Poverty and Its Determinants in Northern Rajasthan of India

भारत के उत्तरी राजस्थान में गरीबी के निर्धारक

Melkamu Mada

Thesis

Doctor of Philosophy in Agriculture

(Agricultural Economics)

उत्तमा वृतिस्तु कृषिकर्मेव

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SWAMI KESHWANAND
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TABLE OF CONTENTS

	Page
Table of content	i
List of tables.....	iv
List of figures.....	viii
List of appendix	ix
Acronyms and abbreviations	x
1. INTRODUCTION.....	1
1.2 The problem statement	10
1.3 Objectives of the study	14
1.4 Significance of the study	14
1.5 Limitations and scope of the study	15
1.6. Organization of study	16
2. REVIEW OF LITERATURE.....	17
2.1 Review of related literature on poverty trend	17
2.2 Review of related literature on poverty extent (condition).....	39
2.3 Review of related literature on Determinants of poverty	52
2.3 Review of related literature on Relative poverty (Inequality)	79
2.5 Review of related literature on coping mechanisms	94
3. METHODOLOGY.....	103
3.1. Selection of the study Area.....	103
3.1.1. Profile of the study area	104
3.1.2. Population of Rajasthan.....	104
3.1.3. Districts of Rajasthan.....	104
3.1.4. Weather and climate in Rajasthan.....	105
3.1.5. Temperature in Rajasthan.....	105
3.1.6. Agriculture in Rajasthan.....	106
3.1.7. Livestock in Rajasthan.....	106
3.1.8. Indira Gandhi Canal and Irrigation.....	107
3.1.9. Irrigation in Rajasthan.....	108
3.1.10. Economy and Income.....	108
3.1.11. Main Challenges in Rajasthan	109
3.1.12. Profile of the study districts.....	109
3.1.12.1 Bikaner district.....	109
3.1.12.2 Sri Ganganagar district.....	110
3.1.12.3. Nagaur district.....	111
3.2. Sampling design.....	112
3.2.1. Selection of the district.....	112
3.2.2. Selection of Tehsils (Taluka)	112
3.2.3. Selection of villages.....	112
3.2.4. Selection of household.....	114
3.3. Data collection.....	115
3.4. Analytical tools.....	115
3.4.1. Poverty trend in country and in the study area (1951-2011)	115
3.4.1.1. Poverty trend using growth model under development plan periods	116
3.4.2. Extent of poverty and socio-economic characteristics	116

3.4.3. Determinants and exit time of poverty..... 119
3.4.3.1. Determinants of poverty..... 119
3.4.3.1. Empirical model..... 121
3.4.3.1.1. Testing multicollinearity..... 123
3.4.3.1.2. Definition of variables and working hypothesis..... 123
3.4.3.1.3. Hypotheses for explanatory variables..... 125
3.4.3.1.4. Marginal effects result in logistic model 130
3.4.3.2. Exit time of poverty..... 130
3.4.4. Relative poverty (income and resource inequality) 132
3.4.4.1. Lorenz curve and Gini coefficients..... 133
3.2.4.1.1. Lorenz curve..... 134
3.2.4.1.2. The Gini-coefficient..... 134
3.4.5. Principal coping strategies used in Northern Rajasthan..... 136
3.4.5.1. Hypothesis of coping strategies..... 137
4. RESULT AND DISCUSSION..... 139
4.1. Poverty trend in seven decades (1951-2011) 139
4.1.2. Poverty trend in India (1951-2011) graphical approach 140
4.1.3. Poverty trend in India (1951-2011) semi-log trend model approach 150
4.2. Poverty extent and socio-economic characteristics..... 156
4.2.1 Poverty extent (condition) 156
4.2.2. Socio-economic characteristics..... 163
4. 2.2.1 Demographic characteristics..... 163
4.2.2.2. Migration..... 176
4.2.2.3. Household Agricultural Resource ownership..... 178
4.2.2.3.1. Agricultural land ownership..... 179
4.2.2.3.2. Irrigated land ownership..... 180
4.2.2.3.3. Livestock ownership..... 181
4.2.2.4. Own production sufficiency..... 183
4.2.2.5. Distribution of respondents by access to institutions..... 186
4.2.2.5.1 Credit..... 186
4.2.2.5.2. Savings..... 189
4.2.2.5.3. Regulated market distance..... 192
4.2.2.5.4. Main road distance..... 193
4.2.2.5.5. Hospital distance..... 194
4.2.2.6. Households accessibility to communication..... 195
4.2.2.7 Household income and expenditure..... 197
4.2.2.7.1. Farm income..... 198
4.2.2.7.2 Non-farm Income..... 202
4.2.2.7.3 Total annual income..... 206
4.2.2.7.4 Expenditure..... 209
4.2.2.8. Income-expenditure gap in Northern Rajasthan 214
4.2.2.9. Household income and expenditure budget share 216
4.2.2.10. Expenditure budget share..... 218
4.2.2.11. Households standard of living indicators..... 221
4.2.2.11.1. Ration card..... 225

4.3. Determinants of poverty and average exit time in Northern Rajasthan… 227
4.3.1. Determinants of poverty in Northern Rajasthan…… 227
4.3.1.1. Discussion on the significant explanatory variables in Nor.Raj…… 232
4.3.2 District wise determinants of household poverty …… 244
4.3.2.1. Discussion on the significant explanatory variables in Bikaner……. 244
4.3.2.2.Discussion on the significant explanatory variables in Sri Ganganagar 247
4.3.2.3. Discussion on the significant explanatory variables in Nagaur district 250
4.3.2. Average poverty exit time…… 253
4.4. Relative poverty (Income and resource inequality) …… 263
4.4.1 Resource inequality…… 264
4.4.1.1. Agricultural land distribution households…… 265
4.4.1.2 Livestock distribution among surveyed households…… 271
4.4.1.3 Irrigated land distribution among households…… 278
4.4.2 Income inequality…… 284
4.4.2.1 Farm income distribution among surveyed households…… 285
4.4.2.2 Non-Farm Income distribution households…… 291
4.4.2.3 Total Income distribution among surveyed households…… 298
4.4.2.4 Inequality Summary…… 305
4.5. Principal coping strategies used in Northern Rajasthan…… 307
5. SUMMERY, CONCLUSION AND RECOMMENDATION…… 315
5.1. Summery…… 315
5.2. Conclusion…… 323
5.3. Recommendation…… 325
Bibliography…… 327
Abstract English…… 357
Abstract Hindi…… 359

LIST OF TABLES

Table No.	Title	Page
Table 3.1:	Number of households selected from each village	114
Table 3.2:	Selected variables and their expected signs	129
Table 4.1:	Growth performance and contribution to poverty	150
Table 4.2:	Each five year plan semi-log trend model output	153
Table 4.3:	Overall development plan Poverty trend	155
Table 4.4:	Decomposition of poverty in Northern Rajasthan	157
Table 4.5:	Decomposition of poverty by districts	159
Table 4.6:	Maximum and minimum expenditure of households	161
Table 4.7:	Monthly per capita expenditure status	162
Table 4.8:	Monthly per capita expenditure gap	163
Table 4.9:	Distribution of households on family size in Northern Rajasthan	164
Table 4.10:	Adult equivalent distributions in Northern Rajasthan	165
Table 4.11:	Distribution of households head age in Northern Rajasthan	166
Table 4.12:	Distributions of household head sex in Northern Rajasthan	166
Table 4.13:	Distributions of sex ratio distributions in Northern Rajasthan	167
Table 4.14:	Sex ratio distributions in Bikaner district	167
Table 4.15:	Sex ratio distributions in Sri Ganganagar district	168
Table 4.16:	Sex ratio distributions in Nagaur district	168
Table 4.17:	Distributions of dependency ratio in Northern Rajasthan	169
Table 4.18:	Distribution of decision maker educational level in Nor. Raj.	170
Table 4.19:	Wife education level in Northern Rajasthan	171
Table 4.20:	Distribution of households farming experience in Nor. Raj	171
Table 4.21:	Distribution of family adult participant in Northern Rajasthan	172
Table 4.22:	Distribution of salary earners in Northern Rajasthan	173
Table 4.23:	Salary earners presence in the family in Bikaner district	173
Table 4.24:	Salary earners presence in the family in Sri Ganganagar	174
Table 4.25:	Salary earners presence in the family in Nagaur district	174
Table 4.26:	Distribution unemployment in Northern Rajasthan	175
Table 4.27:	Distribution unemployment in Bikaner district	175
Table 4.28:	Distribution unemployment in Sri Ganganagar district	176
Table 4.29:	Unemployment distribution in Nagaur district	176
Table 4.30:	Family member migration in Northern Rajasthan	177
Table 4.31:	Family member migration in Bikaner district	177
Table 4.32:	Family member migration in Sri Ganganagar district	178
Table 4.33:	Family member migration in Nagaur district	178
Table 4.34:	Agricultural land ownership in Northern Rajasthan	179
Table 4.35:	Agricultural land distributions in Northern Rajasthan	179
Table 4.36:	Irrigated land ownership in Northern Rajasthan	180
Table 4.37:	Irrigated land distributions in Northern Rajasthan	181
Table 4.38:	Livestock ownership in Northern Rajasthan	182
Table 4.39:	Livestock distributions in Northern Rajasthan	182

Table 4.40: Own production sufficiency in Northern Rajasthan……... 183
Table 4.41: Own production sufficiency in Bikaner district…… 184
Table 4.42: Own production sufficiency in Sri Ganganagar district……. 184
Table 4.43: Own production sufficiency in Nagaur district…….. 185
Table 4.44: Households food deficit months in Northern Rajasthan…….. 185
Table 4.45: Credit institutions availability in Northern Rajasthan…… 186
Table 4.46: Households status on loan in Northern Rajasthan…… 187
Table 4.47: Households classification on loan in Bikaner district……... 187
Table 4.48: Loan status in Sri Ganganagar district…… 188
Table 4.49: Households classification on loan in Nagaur district……. 188
Table 4.50: Loan households taken in Northern Rajasthan……. 189
Table 4.51: Households saving practice in Northern Rajasthan……. 189
Table 4.52: Households saving practice in Bikaner district…….. 190
Table 4.53: Households saving practice in Sri Ganganagar district…… 190
Table 4.54: Households saving practice in Nagaur district …….. 191
Table 4.55: Rupee saved annually in Northern Rajasthan…….. 192
Table 4.56: Market distance in Northern Rajasthan …… 192
Table 4.57: Main road distance in Northern Rajasthan ……... 193
Table 4.58: Hospital distance in Northern Rajasthan…….. 194
Table 4.59: Communication accessibility in Northern Rajasthan …….. 195
Table 4.60: Communication accessibility in Bikaner district……. 196
Table 4.61: Communication accessibility in Sri Ganganagar district…….. 196
Table 4.62: Communication accessibility in Nagaur district……. 197
Table 4.63: Farm income of households in Northern Rajasthan…… 198
Table 4.64: Farm income of households in Bikaner district……. 199
Table 4.65: Farm income of households in Sri Ganganagar district …….. 200
Table 4.66: Farm income of households in Nagaur district ……. 201
Table 4.67: Non-farm income earners in Northern Rajasthan……. 202
Table 4.68: Non-farm income amount in Northern Rajasthan…….. 202
Table 4.69: Non-farm income amount in Bikaner district…….. 203
Table 4.70: Non-farm income in Sri Ganganagar district…….. 204
Table 4.71: Non-farm income in Nagaur district……. 205
Table 4.72: Total income of households in Northern Rajasthan……. 206
Table 4.73: Total income in Bikaner district …… 207
Table 4.74: Total income in Sri Ganganagar district…….. 207
Table 4.75: Total income in Nagaur district …… 208
Table 4.76: Monthly expenditure in Northern Rajasthan……. 209
Table 4.77: Monthly food expenditure in Northern Rajasthan…….. 210
Table 4.78: Monthly Non- food expenditure in Northern Rajasthan…… 211
Table 4.79: Monthly per capita expenditure in Northern Rajasthan…… 212
Table 4.80: Tobacco user households in Northern Rajasthan……. 213
Table 4.81: Monthly tobacco expenditure in Northern Rajasthan…… 214
Table 4.82: Income-expenditure gap in Northern Rajasthan…… 214
Table 4.83: Income-expenditure gap in Bikaner district…… 215
Table 4.84: Income-expenditure gap in Sri Ganganagar district…….. 215
Table 4.85: Income-expenditure gap in Nagaur district……. 216

Table 4.86: Income source of households in Northern Rajasthan……... 216
Table 4.87: Income source of households in Bikaner district……... 217
Table 4.88: Income source of households in Sri Ganganagar district…… 217
Table 4.89: Income source of households in Nagaur district…… 218
Table 4.90: Expenditure budget share in Northern Rajasthan…… 218
Table 4.91: Expenditure budget share in Bikaner district…….. 219
Table 4.92: Expenditure budget share in Sri Ganganagar district…….. 219
Table 4.93: Expenditure budget share in Nagaur district…….. 220
Table 4.94: Total food expenditure share in Northern Rajasthan…… 220
Table 4.95: Material used to build house in Northern Rajasthan…….. 221
Table 4.96: Sources of drinking water in the Northern Rajasthan……... 222
Table 4.97: Sources of drinking water in Bikaner district…….. 222
Table 4.98: Sources of drinking water in Sri Ganganagar district…… 223
Table 4.99: Sources of drinking water in Nagaur district …… 223
Table 4.100: Sources of domestic fuel in the Northern Rajasthan…….. 224
Table 4.101: Sources of domestic fuel in Bikaner district …… 224
Table 4.102: Sources of domestic fuel in Sri Ganganagar district …….. 225
Table 4.103: Sources of domestic fuel in Nagaur district …… 225
Table 4.104: Ration card owned in Northern Rajasthan…….. 226
Table 4.105: Ration card owned in Bikaner district ……... 226
Table 4.106: Ration card owned in Sri Ganganagar district…… 227
Table 4.107: Ration card owned in Nagaur district …….. 227
Table 4.108: VIF of the continuous explanatory variables…… 230
Table 4.109: Logit model estimates of explanatory variables for in Nor.Raj. … 231
Table 4.110: Logit model estimates of explanatory variables in Bikaner …… 244
Table 4.111: Logit model estimates of explanatory variables in Sri Gang. dis. 247
Table 4.112: Logit model estimates of explanatory variables in Nag.district 250
Table 4.113: Aggregate poverty indicators in Northern Rajasthan……. 255
Table 4.114: Aggregate poverty indicators in study districts…… 257
Table 4.115: Summery of average poverty exit time in years…….. 262
Table 4.116: Categorization of farm land in Northern Rajasthan …… 266
Table 4.117: Categorization of farm land in Bikaner district …… 267
Table 4.118: Categorization of farm land in Sri Ganganagar district …… 268
Table 4.119: Categorization of farm land in Nagaur district…… 270
Table 4.120: Categorization of livestock holding in Northern Rajasthan …… 272
Table 4.121: Categorization of livestock holding in Bikaner district …… 274
Table 4.122: Categorization of livestock holding in Sri Ganganagar district … 275
Table 4.123: Categorization of livestock holding in Nagaur district …… 277
Table 4.124: Categorization of irrigated land in Northern Rajasthan …… 278
Table 4.125: Categorization of irrigated land in Bikaner district……... 280
Table 4.126: Categorization of irrigated land in Sri Ganganagar district…….. 281
Table 4.127: Categorization of irrigated land in Nagaur district…… 283
Table 4.128: Categorization of farm income in Northern Rajasthan …… 286
Table 4.129: Categorization of farm income in Bikaner district …… 287
Table 4.130: Categorization of farm Income in Sri Ganganagar district…….. 288
Table 4.131: Categorization of farm income in Nagaur district …… 290

Table 4.132: Categorization of non-farm income in Northern Rajasthan …… 291
Table 4.133: Categorization of non-farm income in Bikaner district…….. 293
Table 4.134: Categorization of non-farm income in Sri Ganganagar district 295
Table 4.135: Categorization of non-farm income in Nagaur district …… …… 297
Table 4.136: Categorization of total income in Northern Rajasthan …… 299
Table 4.137: Categorization of total income in Bikaner district …… 301
Table 4.138: Categorization of total income in Sri Ganganagar district…… 302
Table 4.139: Categorization of total income in Nagaur district…… 303
Table 4.140: Overall Gin-coefficient summary…… 307
Table 4.141: Coping strategies in Northern Rajasthan…….. 308
Table 4.142: Mean ranked coping strategies in Northern Rajasthan…….. 309
Table 4.143: Poor coping strategies in Northern Rajasthan……. 311
Table 4.144: Mean coping strategies of poor in Northern Rajasthan…….. 312
Table 4.145: Non-poor coping strategies in Northern Rajasthan……. 313
Table 4.146: Mean non-poor coping strategies in Northern Rajasthan…….. 314

LIST OF FIGURES

Figure No. **Title** **Page**

Figure 3.1: Location of selected districts in Northern Rajasthan…… 113
Figure 3.2 Lorenz curve of income or resource distribution…….. 135
Figure 4.1: Poverty incidence in India, 1951-2011…… 141
Figure 4.2: Poverty incidence in rural and urban India, 1951-2011…… 144
Figure 4.3: Poverty incidence in national and rural India, 1951-2011…… 145
Figure 4.4: Poverty incidence in national and urban India, 1951-2011…….. 147
Figure 4.5: Poverty incidence in Rajasthan rural and urban, 1957 – 2011…… 149
Figure 4.6: Scatter diagram for relationship between variables…… 153
Figure 4.7: Average poverty exit time Northern Rajasthan…… 256
Figure 4.8: Average poverty exit time for Bikaner district…….. 258
Figure 4.9: Average poverty exit time for Sir Ganganagar district …….. 259
Figure 4.10: Average poverty exit time for Nagaur district ……... 260
Figure 4.11: Average poverty exit time among districts…… 261
Figure 4.12: Average poverty exit time for districts Northern Rajasthan…… 263
Figure 4.13: Lorenz curve for farm land in Northern Rajasthan…….. 266
Figure 4.14: Lorenz curve for farm land in Bikaner district…… 268
Figure 4.15: Lorenz curve for farm land in Sri Ganganagar district…… 269
Figure 4.16: Lorenz curve for farm land in Nagaur district…… 271
Figure 4.17: Lorenz curve for livestock in Northern Rajasthan…… 273
Figure 4.18: Lorenz curve for livestock in Bikaner district…… 274
Figure 4.19: Lorenz curve for livestock in Sri Ganganagar district…….. 276
Figure 4.20: Lorenz curve for livestock in Nagaur district…… 277
Figure 4.21: Lorenz curve for irrigated land in Northern Rajasthan…… 279
Figure 4.22: Lorenz curve for irrigated land in Bikaner district…… 281
Figure 4.23: Lorenz curve for irrigated land in Sri Ganganagar district…….. 283
Figure 4.24: Lorenz curve for irrigated land in Nagaur district…….. 284
Figure 4.25: Lorenz curve for farm income in Northern Rajasthan…… 286
Figure 4.26: Lorenz curve for farm income in Bikaner district…….. 288
Figure 4.27: Lorenz curve for farm income in Sri Ganganagar district…… 289
Figure 4.28: Lorenz curve for farm income in Nagaur district…….. 291
Figure 4.29: Lorenz curve for non-farm income in Northern Rajasthan…… 293
Figure 4.30: Lorenz curve for non-farm income in Bikaner district…….. 294
Figure 4.31: Lorenz curve for non-farm income in Sri Ganganagar district…… 296
Figure 4.32: Lorenz curve for non-farm income in Nagaur district…….. 298
Figure 4.33: Lorenz curve for income in Northern Rajasthan…….. 300
Figure 4.34: Lorenz curve for income in Bikaner district…… 301
Figure 4.35: Lorenz curve for income in Sri Ganganagar district…… 303
Figure 4.36: Lorenz curve for income in Nagaur district…… 304
Figure 4.37: Lorenz curve summary in Bikaner district…… 305
Figure 4.38: Lorenz curve summary in Sri Ganganagar district……... 306
Figure 4.39: Lorenz curve summary in Nagaur district…….. 306
Figure 4.40: Lorenz curve summary in Northern Rajasthan…… 307

LIST OF APPENDIX

Appendix No.	Title	Page
I	Conversion Factors to Estimate Tropical Livestock Unit equivalents	A
II	Conversion Factors Used to Compute Adult-Equivalent	A
III	Questionnaire (schedule) for primary data collection	B

ACRONYMS AND ABBREVIATIONS

BNW - BANWALA

BPL - Below the Poverty Line

CES - Consumer Expenditure Survey

CILSS- Cote d'Ivoire Living Standards Surveys

CSO - Central Statistical Office

DADP - Drought Area Development Programme

et al - et alia (and others)

FAO - Food and Agriculture Organization

FGT - Foster, Greer and Thorbecke

GDP - Gross Domestic Product

GEP - General Education Program

GSDP - Gross State Domestic Product

GoI - Government of India

HCR - Head Count Ratio

HDI - Human Development Index

Ibid - ibidem (in the same place)

ICDS - Integrated Child Development Services

ICRISAT - International Crops Research Institute for the Semi-Arid Tropics

IHDS - India Human Development Survey

IMF - International Monetary Fund

IRDP - Integrated Rural Development Programme

JRY- Jawahar Rojgar Yojna

KBK- Koraput, Balangir and Kalahandi

LDCs - Least Developed Countries

LR - Likelihood ratio

MDG - Millennium Development Goals

MDM - Mid-Day Meal

MGNREGA - Mahatma Gandhi National Rural Employment Guarantee Act

MLE - Maximum Likelihood Estimation

MNP - Minimum needs programme

MoFED - Ministry of Finance and Economic Development

MPCE - Monthly Per Capita Expenditure

MPCE - Mean Per Capita Expenditure

NCAER - National Council for Applied Economic Research

NFHS - National Family Health Survey

NGOs - Non-Governmental Organizations

NSAP - National Social Assistance Programme

NSS - National Service Scheme

NSSO - National Sample Survey Office

NREP - National Rural Employment Programme

NRY - Nehru Rozgar Yojna

OBCs - Other Backward Classes

OLS - Ordinary Least Squares

OXFAM - Oxford Committee for Famine Relief

PCNSDP - Per Capita Net State Domestic Product

PDS - Public Distribution System

PGI - Poverty-Growth-Inequality

PL - Poverty line

PMIUPEP - Prime Minister's Integrated Urban Poverty Eradication Programme

PPP - Purchasing Power Parity

RLEGP - Rural Labour Employment Guarantee Programme

SAT - Semi-Arid Tropics

SCs - Scheduled Castes

SDG - Sustainable Development Goal

SEPUP - Self-Employment Programme for the Urban Poor

SFDP - Small Farmers Development Programme

SPG - Squared Poverty Gap

SPSS - Statistical Package for Social Science

STs - Scheduled Tribes

TLU - Tropical Livestock Unit

TRYSEM - Training Rural Youth for Self Employment

UN - United Nations

UNDP - United Nations Development Programme

UNESCO - United Nations Education, Scientific and Cultural Organizations

US - United States

USD - United States Dollar

VIF - Variance Inflation Factor

WCD - World Commission on Dams

1. INTRODUCTION

No society can surely be flourishing and happy of which the greater part of the members are poor and miserable.-ADAM SMITH

Poverty is easily recognized but difficult to define therefore, better understanding of the concept, pattern and depth of poverty, matters for alleviation. It has political, as well as socio-economic concept. As Alcock states: 'it is the issue of definition that lies at the task of understanding poverty, one must first know what poverty is before one can begin to do anything to measure it and before one can begin to do anything to alleviate it' (Alcock, 1997). This statement depicts the unquestionable problem of finding a definition of poverty because it is multidimensional.

Different ways of understanding poverty lead to different ways of dealing with it. The consequence of the various indigenous methods of data collection in practice is the difficulty of comparing poverty measures across countries and across time. The lack of uniformity also makes it difficult to confidently integrate country-level poverty measures to gain an overall sense of regional and state poverty. The consequence of different ways of understanding and different ways of dealing with poverty is huge amounts of money and millions of man-hours of 'expert' efforts have been put into poverty-alleviation projects throughout the world. Yet the results for hundreds of millions of poor men, women and children have been discouraging in the extreme. Clarification of how poverty is defined is extremely important as different definitions of poverty imply the use of different indicators for measurement; they may lead to the identification of different individuals and groups as poor and require different policy solutions for poverty reduction (Laderchi R. *et al.,* 2003).

In the simplest definition, poverty is the lack of household income (or consumption). More generally, poverty means the inability to meet basic needs, including food, shelter, clothing, water and sanitation, education, and healthcare. In this sense, poverty generally reflects a combination of income

poverty at the household level and poverty at the community level in the provision of basic infrastructure and public services.

Using the World Bank's measure of extreme income poverty, there are around 1.2 billion people in extreme poverty. According to global profile of extreme poverty (2012), around 26 percent of world poor mainly in Sub-Saharan Africa, live in low-income countries which are classified by the World Bank as below $1,025 GDP per person in 2011. Another 58 percent, mainly in Asia, live in lower middle-income countries (between $1,026 and $4,035 GDP per person) such as China, India, and Indonesia. Around 17 percent of the extreme poor live in upper middle-income countries. The high proportion (74 percent) of the extreme poor living in middle income countries is not entirely surprising given that the middle income countries account for approximately 86 percent of the population of the developing world. Nor are the lower-income countries that are home to the greatest proportion of the world's poorest people safely out of the low income country zone where extreme poverty can be endemic. India, Nigeria, and many other low middle income countries face enormous challenges of maintaining high and inclusive economic growth, in view of highly challenging demographic, environmental, and social factors. Sub-Saharan Africa remains the world's poorest region and the one with the highest headcount poverty rate (around 48 percent). South Asia is second (around 36 percent), and Southeast Asia is third. There is scattered extreme poverty in other parts of the world (such as in the Andean highlands, Haiti, indigenous communities in Central America, and small island states). While these pockets of poverty pose serious humanitarian and social challenges for the people and places involved, they are a small proportion of the overall global challenge. Across all poverty indicators, Sub-Saharan Africa and South Asia are the two centers of global poverty and the two regions demanding the most international support. Of these two regions, Sub-Saharan Africa, with lower income than South Asia, faces the greater challenge and need. While the two regions account for approximately 45 percent of the population of the developing countries, they account for a much

higher proportion of poverty in its various manifestations (Global profile of extreme poverty, 2012).

The problem of poverty and how to reduce it remains the most pressing dilemma in the international development debate. From the times immemorial society has been divided as rich and poor or powerful and weak. Some have dominant access to resources while some are deprived of resources. Situation is no different now. The United Nations Food and Agriculture Organization (FAO) estimates that nearly 870 million people of the 7.1 billion people in the world, or one in eight, were suffering from chronic poverty in 2010-2012. Almost all the poor people, 852 million, live in developing countries, representing 15 percent of the population of developing counties (FAO, 2012). The overwhelming majority of people living on less than $1.25 a day belong to two regions: Southern Asia and Sub-Saharan Africa. Entirely, more than 67 percent of people living on less than $1.25 a day belong to two regions, 34 percent in sub-Saharan Africa and 33 percent in Southern Asia (UN, 2014). The distribution of global poverty show that half of the world's poor live in India and China (mainly in India)(Sumner ,2012).

In India, the war on poverty was officially launched in 1947 by late Prime Minister Jawaharlal Nehru, up to current Narendra Modi, all fourteen Prime Ministers of India were challenged by poverty. The high and stubborn levels of poverty in the 1970s led to the slogan "Garibi Hatao (Eliminate Poverty)" attributed to the late Prime Minister, Indira Gandhi. Poverty is neither a new nor it suddenly appeared, but there has been much awareness of the problem within and outside the country (Ahluwalia, 1974). Poor and poverty are historical in nature and their concern appears to be as old as human history in India (Joshi P.D, 1997).

According to the Human Development Index (HDI), India is ranked 134th out of 187 nations with HDI value of 0.586 (UNDP, 2014). Despite high rates of economic growth that exceeded expectations and led to India being placed in third-largest world economy in terms of PPP (Purchasing Power Parity) and

positioned in the category of ‘lower middle income countries’, the grassroots reality makes it clear that the country still have a long way to go in eradicating poverty and ensuring acceptable minimum standards of living for all citizens (Mehta K. *et al*., 2011).

The most recent Rangarajan expert group report (2014) indicates India is home to more than 363 million poor. The proportion of the population below the poverty line in India is 29.5 percent. Similar to other developing countries, majority of the poor (72 percent) in India live in rural areas (*ibid*). Furthermore, the Planning Commission (2014) report indicated that, of these 363 million people in the country who did not have incomes to access a consumption basket that defines the poverty line, 260.5 million lives in rural and 102.5 million in urban areas. According to the world Bank newly revised official poverty line, 37 percent of India’s population (or about 410 million people) falls below the poverty line, making the country home to one-third of the world’s poor. Reduction of poverty in India is, therefore, critical for the attainment of national and international goals. In line with the available statistics, the incidence of poverty in India is a rural phenomenon (World Bank, 1990; Fields, 2000; World Bank, 2001).

Agriculture which is mainstay of the rural economy depends on the capacity of production and productivity. However the former, depends on the amount of resource used in production. Access to productive resources such as land, water, and other inputs for the rural poor, are keys to higher levels of agricultural incomes and poverty alleviation (IHDS, 2003).In addition to increase crop production and consequential family incomes, improved irrigation access can significantly contributes to rural poverty reduction within a region (Chambers,1988). Commenting on the importance of agriculture, the 2008 World Development Report observed that GDP growth originating in agriculture is on average at least twice as effective in reducing poverty as growth outside agriculture (World Bank, 2008). This answers why government of India believes agriculture is so important for economic growth and poverty reduction especially among the rural population. Thus, no country has been

able to sustain a rapid transition out of poverty without raising productivity in its agricultural sector (Timmer C.P, 2005). Agricultural growth reduces poverty directly, by raising farm incomes, and indirectly, through generating employment and reducing food prices. There is a mass of evidence that increasing agricultural productivity has benefited millions through higher incomes, more plentiful and cheaper food, and by generating patterns of development that are employment-intensive and benefit both rural and urban areas. More importantly, it has provided the spur to economic development outside agriculture where growth and job creation are faster and wages higher.

Decades of economic research have confirmed that agricultural productivity growth has positive effects for the poor in three areas: lower food prices for consumers; higher incomes for producers; and growth multiplier effects through the rest of the economy as demand for other goods and services increases (Alston *et al.,* 2000b). Agricultural growth reduces poverty more strongly than growth in other sectors (Thirtle *et al*., 2001; Datt and Ravallion, 1998; Gallup *et al*., 1997; Timmer, 1988). The question of increasing agricultural growth and its 'trickle down' effects on the economic well-being of the rural masses has been addressed by Ahluwalia (1978). In this pioneering study, he finds strong evidence of an inverse relationship between agricultural income per head and the incidence of rural poverty, especially if account is taken of lagged effects. He concluded that, more dynamic and inclusive agricultural sector could dramatically reduce rural poverty, helping countries meet the national and international goals.

Growth alone is not sufficient for poverty reduction – growth associated with progressive distributional changes will have a greater impact on poverty than growth that leaves distribution unchanged (Ames *et al.,* 2001). Absolute poverty can probably be eliminated with sufficient economic growth, which is a key element of the World Bank's strategy for attaining its "dream of a world free of poverty." Outcomes for relative poverty depend more on how income distribution changes; indeed, it is sometimes argued that relative poverty will

always be with us but economic inequality is major risk to poverty alleviation. The experience of countries that have succeeded in reducing poverty significantly point to the important role of high rates of economic growth combined with high rates of employment growth. High rates of economic growth on their own are insufficient to guarantee that poverty reduction will occur unless the benefits of economic growth are more equitably distributed. The creation of productive employment plays a key role in this regard as a critical nexus between growth and poverty reduction (UN, 2013).

Economic inequality is rapidly increasing in the majority of countries. The wealth of the world is divided in two: almost half going to the richest one percent; the other half to the remaining 99 percent. The World Economic Forum has identified this as a major risk to human progress. Extreme economic inequality and political capture are too often interdependent. Left unchecked, political institutions become undermined and governments overwhelmingly serve the interests of economic elites to the detriment of ordinary people. Extreme inequality is not inevitable, and it can and must be reversed quickly (Oxfam, 2014). Some economic inequality is essential to drive growth and progress, rewarding those with talent, hard earned skills, and the ambition to innovate and take entrepreneurial risks. However, the extreme levels of wealth concentration occurring today threaten to exclude hundreds of millions of people from realizing the benefits of their talents and hard work.

Extreme economic inequality is damaging and worrying for many reasons: it is morally questionable; it can have negative impacts on economic growth and poverty reduction; and it can multiply social problems. It compounds other inequalities, such as those between women and men. In many countries, extreme economic inequality is worrying because of the pernicious impact that wealth concentrations can have on equal political representation. When wealth captures government policymaking, the rules bend to favour the rich, often to the detriment of everyone else. The consequences include the erosion of democratic governance, the pulling apart of social cohesion, and the vanishing of equal opportunities for all. Unless bold political solutions are

instituted to curb the influence of wealth on politics, governments will work for the interests of the rich, while economic and political inequalities continue to rise. As US Supreme Court Justice Louis Brandeis famously said, 'We may have democracy, or we may have wealth concentrated in the hands of the few, but we cannot have both.'

In Indian five year development plans and strategies have been prepared to alleviate absolute poverty. Experience show that, absolute poverty can be alleviated if at least two conditions are met, first, economic growth occurs-or the mean income rises-on a sustained basis. Second, economic growth is either neutral to income distribution or reduces income inequality, poverty cannot be reduced if economic growth does not occur; poverty tends to change in the same direction as the mean income (Bruno et al, 1998). There are also good theoretical reasons and empirical evidence to suggest that large income inequality is not good for either poverty reduction or economic growth, high levels of inequality contribute to high levels of poverty in several ways and initial distribution of income (and wealth) can greatly affect the prospects for growth and alleviation of mass poverty. In countries with high initial inequality, the poor tend to have a lower share of the gains from growth. Economic inequality is major risk to poverty alleviation in its trend.

In eleventh and twelfth plan inclusive growth pronounced loudly in India. In his Foreword to the Eleventh Plan the late Prime Minister (Manmohan Singh) explained that the benefits of rapid growth, in terms of income and employment, must be "adequately shared by the poor and weaker sections of our society, especially the Scheduled Castes (SCs) and the Scheduled Tribes (STs), Other Backward Classes (OBCs) and minorities". For this, "growth must occur not just in our major cities but also in our villages and small towns. It must be spread across all states and not just limited to some. It must generate sufficient volumes of high quality employment to provide the means for uplift of large numbers of our population from the low income low quality occupations in which too many of them have been traditionally locked." And that "the higher rate of growth that we have set out for ourselves, coupled with

our thrust on the growth process being inclusive, should ensure that the struggle for the removal of chronic poverty, ignorance, and disease will register major gains in the Eleventh Plan."

According to India Chronic Poverty Report by (Mehta.*et al.,* 2011), the challenge of chronic poverty emanates from the fact that the growth-mediated poverty-reducing strategy has bypassed various historically marginalized groups and deprived regions. Further, persistent spatial backwardness and inequality have led to concentration of poverty in certain parts of the country, meaning there is a geographical dimension to poverty. Analysis of the pattern of incidence of poverty has shown there is a 'geography of poverty,' since it is concentrated in the rural areas of certain states. There is also a 'sociology of poverty,' since the proportion of the poor is higher among certain social groups. Planning Commission set up an Expert Committee in 1997 to identify the 100 most backward and poorest districts in the country, two Rajasthan districts were identified as most backward districts in India. Generally speaking, state-level HDIs follow the pattern of the incidence of poverty; Rajasthan state in which this study was done is also categorized under those states which possess least HDIs. This evidently indicates, like other Indian states poverty is major problem in the state.

Rajasthan state is the largest state in India geographically, but the poverty situation in this largest state is not different than Indian condition. Like other sister Indian states, Rajasthan has been home to more than 17 million poor people (UNDP, 2014). In Rajasthan, totally more than 225.7 *lakh* people who are unable to meet monthly per capita consumption expenditure of ₹1035.97 in rural and ₹1406.15 in urban areas (Rangarajan, 2014). In the state 21.7 percent of people are under poverty line or they are not able to expend minimum amount expenditure to satisfy their monthly consumption needs and deemed as poor in 2011-12 (*ibid*)). Rajasthan is ranked 17th out of 23 states in India, in the Human Development Index (HDI) with value of 0.434 (UNDP, 2014). Human Development Report 2002 which pointed out salient feature of

Rajasthan's poverty profile shows that, there has been a high level of urban poverty (22.5 %), as well as consistently higher rural poverty levels (21.4 %). Rural poverty as found in Rajasthan is nothing more than the concept of poverty of rural areas. In many countries like India, poverty has significant area dimensions i.e. rural poverty, urban poverty, state level poverty, district level poverty and some particular area level poverty (like slums). In generally, it is believed that majority of the population of developing countries live in the rural areas and they have less access to the socio-economic and infrastructural facilities than their urban counterparts. Poverty is more severe in the rural areas and it is empirically stated that rural households are mostly affected by poverty (World Bank, 1990). The importance of rural poverty is not always understood, partly because the urban poor are more visible and more vocal than their rural counterparts. It is also empirically observed that in many countries rural poverty is a critical factor in the overall incidence and depth of poverty. It is admitted that poverty in rural areas is not only of chronic nature, but also structural for it found expression in mediocre socio-demographic characteristics such as; high fertility rates, high infant mortality, lack or absence of infrastructure, deplorable sanitary conditions, poor income from agriculture which is the mainstay of the rural economy and so forth.

To address the problem of rural poverty, the Indian government is committed to a reduction of poverty to the barest minimum and even eradicate if possible hence rural poverty alleviation has remained the declared goal for Central, State and District level governments. In order to reduce or eradicate poverty, since independence successive governments have launched several poverty alleviation programmes to curtail problem of poverty in the country and certain areas of the country such as Northern part of Rajasthan. Poverty alleviation rural programmes by governments can be mainly grouped into: wage employment programmes, self-employment programmes, food security programmes and social security programmes. These programmes are: legal elimination of bonded labourers, preventing the centralization of wealth by modifying the law, *Antyodaya* plan, Small Farmers Development Programme (SFDP), Drought Area Development Programme (DADP), Twenty point

programme, Food for work programme, Minimum needs programme (MNP), Integrated Rural Development Programme (IRDP), National Rural Employment Programme (NREP), Rural Labour Employment Guarantee Programme (RLEGP), TRYSEM scheme, Jawahar Rojgar Yojna (JRY), Swarna Jayanti Gram Swarozgar Yojna, National Social Assistance Programme (NSAP), Rural Housing Programme, Indira A was Yojana, Pradhan Mantri Rojgar Yojna, Nehru Rozgar Yojna (NRY), Self-Employment Programme for the Urban Poor, (SEPUP), Prime Minister's Integrated Urban Poverty Eradication Programme (PMIUPEP) and Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) etc, programs have been implemented in rural area.

These programmes have ensured reduction in poverty; however, the pace of poverty reduction over the past decade has been slow. This phenomenon calls for assessment of not only poverty trend to understand what has really happened to poverty levels in the past, but also getting answers for, who are the poor in Northern Rajasthan? What is the poverty situation (extent) in Northern Rajasthan? Why some people are poor? When will absolute poverty be eliminated? And how equally is income and resource distributed among households, is fundamental. Having this background, this study tries to investigate the poverty and it's determinates in Northern Rajasthan.

1.2 The problem statement

This study addresses the problem of rural poverty and inequality in Northern Rajasthan. Poverty and inequality are the most crucial and persistent problems facing rural people in the area. Report of the Rangarajan expert group statistics shows that, poverty is more prevalent in rural (30.9 per cent) than urban areas (26.4 per cent) (Rangarajan, 2014). Yet, rural poverty situation in India remains a paradox, at least from four perspectives. Firstly, the bulk of agricultural production in India takes place in the rural areas and paradoxically, the level and incidence of poverty is very pronounced in rural areas. Secondly, rural poverty in India is a paradox considering rural area immense natural wealth potentials. Thirdly, economic growth in the country

recorded a significant change, rural poverty paradoxically still remain main development challenge in India. Fourthly, successive governments in India have been devoted huge human and material resources to poverty reduction in rural areas but poverty situations have not declined reasonably.

However, many economic studies and international organizations have emphasized the role of agriculture and higher economic growth to tackle the problem of poverty. World Bank believes that, agricultural growth reduces poverty directly, by raising farm incomes, and indirectly, through generating employment and reducing food prices. There is a mass of evidence that increasing agricultural productivity has benefited millions through higher incomes, more plentiful and cheaper food, and by generating patterns of development that are employment-intensive and benefit both rural and urban areas. More importantly, it has provided the spur to economic development outside agriculture where growth and job creation are faster and wages higher (World Bank, 2008). Higher economic growth contribution to tackle the problem of poverty has been supported empirically by the work of Tendulkar and Jain (1995), Tendulkar (1998), and Ravallion and Datt (1996), Dollar and Kray (2002) presented data from nearly 75 countries, which support the view that higher growth rates of real gross domestic product (GDP) per capita is associated with a more rapid poverty reduction. This result also coincides with the Deaton and Dreze (2001), and Datt and Ravallion (2002). In light with the aforementioned reasons, India has implemented these theories and made notable positive change overtime in the economy, but evaluation of the contribution of agriculture to poverty reduction for everyone in rural areas has received little research especially in Northern Rajasthan.

In rural India, poverty has declined, the reduction has been well below what was anticipated. Official statistics show that poverty measured in terms of headcount ratio (HCR) declined from 54.9% in 1973-74 to 29.5% in 2011-12, (Rangarajan, 2014), but the pace of poverty reduction over the past decade has been slow, even though, poverty eradication has been priority in every

macro and micro planning hence a studies has to be conducted to answer why.

Additionally, India embarked upon its path of development since gaining independence in 1947 by launching the first five year Plan (1951-56). The strategy underlying the first three five year plans was not insignificant because there was unchecked population growth in this period hence trickle down was not efficient and effective to achieve the objective. The 11th five year plan of India (2007-2012) pointed out that percentage of population below the poverty line is declining but only at a modest pace. Malnutrition levels also appear to be declining, but the magnitude of the problem continues to be very high. Far too many people still lack of access to basic services such as health, education, clean drinking water and sanitation facilities without which they cannot claim their share in the benefits of growth is visible. With all these governments' efforts to eradicate poverty from rural areas, population pressure, high malnutrition, lack access to basic services, natural resource exhaustion and other reasons in rural India worsens the standard of living for farming family and hide or dwarf the significance of government efforts. Thus, if poverty eradication was and is the central development agenda of both Central and State Governments of India to alleviate poverty for once and all, clear information on past poverty trend, extent, principal factors which contribute for household poverty and income and resource inequality are fundamental. Especially, what happens to poverty trend in the country is quantitatively important to evaluate overall performance of the country's development plans.

Moreover, macroeconomic performance of any country would be judged by the social and economic objectives it achieved and also the effect of economic growth can be measured by its contribution to poverty reduction. Measurement of state or district wise poverty would help to evaluate how the economy is performing in terms of providing a certain minimum standard of living to all its citizens.

Also, poverty trend analysis is based on the idea that, what has happened to poverty in the past, serves as cornerstone to evaluate policy contribution. The most general goal of trend analysis in poverty analysis is to distinguish whether the level of poverty situation has increased or decreased over time, and if it has, how quickly or slowly the increase or decrease has occurred. Hence, poverty trend in the state especially northern Rajasthan, is quantitatively important to evaluate overall performance of the country's development plans.

Again, poverty measurement is important as it serves as a barometer of the extent to which growth and development are inclusive, and as an indicator of the success or failure of strategies for inclusive growth and poverty reduction. Analysis of determinants of poverty is essential for preparing strategies towards efficient intervention.

Traditionally, governments have addressed the poverty problem by implementing poverty-alleviation programs through social safety nets that are intended to provide some temporary relief for the poor. However, it is now well established that these programs at best provide temporary support, but they do not attack the causes of poverty. Poverty-alleviation programs are focused on the "consequences" of poverty rather than on its causes. This type of schemes provides benefits for rather short periods of time, but leaves the poor in the same (or very similar) position when they are discontinued. Rural poverty is a problem caused mainly by high inequality in resource. The 'excess poverty' present in many developing countries is to be explained by the high level of inequality. This is in turn likely to be linked to high levels of inequality in income generating assets (Attanazio and Székel, 1999). Therefore, to understand what causes income inequality that we observe, we must first determine how the distribution of income generating assets is so unequal.

Furthermore, a better understanding of the current situations with regard to constraints and opportunities will pave the way for strategic lessening of rural

poverty in the study area. The absence of studies on quantitative determinants of poverty in Rajasthan state is a major weak point at the state level poverty reduction policy and strategy formulation. Therefore, even if this study is not expected to alleviate the problem of poverty, which is not a simple task, any short or long term intervention that attempts to reduce or alleviate poverty in the Northern Rajasthan requires an in depth area-focused research. Accordingly, this study was conducted with the main aims of measuring poverty trend in the country, the extent of poverty, severity, determinants of household poverty and identification of poverty exit time in Northern Rajasthan in India. Having this background in mind the study put forward the following research questions. How is poverty patterns and trend over the period in India? Who are the poor in Northern Rajasthan? What is the poverty situation (extent) in Northern Rajasthan? Why some people are poor? When will absolute poverty be eliminated? Which approach is conducive in Northern Rajasthan to eradicate rural poverty?

1.3 Objectives of the study

Based on the observed phenomenon the present study intends to accomplish five broad objectives:

i. To study poverty trend in the country and in the study area.
ii. To measure extent of poverty and socio-economic characteristics in the study area.
iii. To determine the principal factors contributing to household poverty and average exit time in the study area.
iv. To measure income and resource inequality in the study area.
v. To assess common coping strategies to tackle risk in the study area.

1.4 Significance of the study

Rural area in India is, place where the bulk of agricultural production takes place, immense natural wealth potentials exists, successive governments have been devoted huge human and material resources and the country's significant economic growth trickledown effect operation area. Conversely, poverty is prevalent and persistent in rural areas. Why this paradox is the

focus of the study. The study explores significant challenges that make it so difficult for rural people to overcome poverty. Furthermore, a study of poverty trend, extent, determinants and exit time of poverty and income and resource inequality of rural people is vital, because it provides clear information who the rural poor are in Northern Rajasthan, what they do and how equally their income and agricultural resource are distributed.

In addition, promoting rural economic growth and reducing rural poverty requires clear information and understanding of the way in which rural poverty evolve, extent and determinants of household poverty of the area. The research results will enable stakeholders in poverty alleviation in the state to take effective measures so as to improve poverty and inequality status and bring the success to poverty alleviation programs. It will also enable development practitioners and policy makers to have better knowledge as to where and how to intervene in rural areas to alleviate poverty or minimize the severity of poverty. Moreover the empirical analysis carried out in this study is also expected to contribute towards better estimation of resource required to exit poverty. Hence such studies are important in that they could help in designing poverty reduction programs and poverty related policies.

Furthermore, little work has been done about rural livelihood strategies in the study area. Hence, this study besides its narrowing potential of the wide gap of knowledge about livelihood strategies, it was also expected to equip the different organizations and policy makers with the more pertinent information of livelihood strategies adopted by the rural households of the area. Which in turn will help them to design ways so as to build their intervention systems on the strength the rural households have and it is expected that this study would serve as a springboard to undertake detailed and comprehensive studies in another districts and states.

1.5 Limitations and scope of the study

The study specifically has focused on poverty trend, extent, identifying major determinants, exit time of poverty and agricultural resource and income

inequality at household level in Northern Rajasthan. The study covers only 3 districts of the 33 districts of the Rajasthan State. Moreover, the study deals with a limited number of households' and focused on the dimensions and determinants of poverty problems which is a limitation. The study was of the nature of field survey. Though, all attempts were made to collect correct information as far as possible, the memory and reluctance of respondents to provide personal information might have caused limitation to some extent. Findings of this study related to the data collected at one time period (from July 2013 to June 2014). Thus, these may not be valid fully in the successive years mainly due to change in the prices of the various components. The study is also based on secondary data obtained from various records and reports. Hence the results are reliable to the extent of authentically of data.

1.6. Organization of study

The entire study has been divided in to five chapters. In chapter I, the setting of the problem has been presented and the specific objectives of the study have been spelt out. A critical review of relevant literature is presented in chapter II. Chapter III deals the methodology and analytical framework of the problem. Results obtained discussed in details are presented in chapter IV. Summery, Conclusion and policy recommendation of the study is presented in chapter V. Bibliography is given at the end of the text.

2. REVIEW OF LITERATURE

This chapter deals with review of related literature in the world, Asia and India. It allows the researcher to know detailed about studies done on poverty area. For this study, to assure methodically and theory familiarity, a review of previous research literature is done under the following sub-headings: poverty trend, poverty extent (condition), determinants of poverty, relative poverty (Inequality) and coping mechanisms.

2.1 Review of related literature on poverty trend

Bardhan (1971) in his study on “The Incidence of Rural Poverty in the Sixties” estimated the level of consumption expenditure for each state in 1960-61, which is equivalent to consumption expenditure of ₹15 at all-India rural prices, and then he adopted these estimates as his base year estimates of the poverty line in each state. To get the poverty trend, in his analysis, he defined equivalent poverty lines for different years in terms of consumer expenditure in the current prices for each year. These poverty lines had been used in conjunction with the NSS consumption distributions to estimate the study two alternative poverty measures: the percentage of the rural population below the poverty line and the Sen Poverty Index. Finally, he found and conclude that, the time series shows that the incidence of poverty fluctuates in response to variations in real agricultural output per head, but there is no significant time trend. There is a statistically significant inverse relationship between rural poverty and agriculture performance for India as a whole, suggesting that agricultural growth by itself tends to reduce the incidence of poverty.

Dandekar and Rath (1971) had study on “poverty in India: Dimensions and Trends'”. Their study probably was the first to define an income/consumer expenditure norm for poverty with reference to an explicit average daily per capita calorie intake norm of 2250 kcals for both rural and urban areas. They made use of the estimates of household consumer expenditures collected in the annual National Sample Surveys (NSS) to arrive at their numbers. They explained that, commodity prices vary significantly across states; the same

real consumption level requires different levels of consumer expenditure across states. They concluded, this level of expenditure represents an extremely low level of living and one that has been widely accepted as a 'minimum level' in the policy debate" about the poverty line they applied.

Ahluwalia S.M(1977) in his study on "Rural Poverty and Agricultural Performance in India" used time series data for two decades (1956-57 to 1973-74). The twin objectives of his study were to document trends in rural poverty in India and to examine the relationship between rural poverty and agricultural performance. He used secondary data and NSS consumption distributions 1956-57 to 1973-74. He also used Sen Poverty Index and the estimated parameters of the Lorenz curves to estimate his two alternative poverty measures. The study found that, the time series shows that the incidence of poverty fluctuates in response to variations in real agricultural output per head, but there is no significant time trend. There is a statistically significant inverse relationship between rural poverty and agriculture performance for India as a whole, suggesting that agricultural growth by itself tends to reduce the incidence of poverty. The analysis for individual states presents a somewhat different picture. The inverse relationship between output per head and rural poverty is observed in several states but there is also evidence that the incidence of poverty, independently of variations in agricultural output per head.

Adelman *et al* (1985) also used NCAER panel data for 196869 to 1970-71 to provide a dynamic dimension to the discussion of poverty trends by calculating the long run dynamics implicit in household mobility among rural Indian households. However, their analysis was primarily focused on performance of Indian states and found that 7 states were likely to experience a reduction in the poverty ratio while 3 states were likely to experience long run high poverty.

Hanumantha Rao (1994) research has interrelated the five themes viz., agricultural growth, rural poverty, environmental degradation, participatory

rural development, and economic reforms in relation to agriculture. He found that, both growth and poverty interact with environment in complex ways, each affecting the other. The author makes a critical appraisal of the participatory processes and also of some recent reforms – which have implications both for poverty and environment. A similar study carried out by Manikkumaran (1997) in the State of Tamil Nadu. He has examined last 30 years secondary data from 1960-1990 and found that the agricultural growth is inversely related to rural poverty and directly related to environmental quality in the State of Tamil Nadu.

Tendulkar and Jain (1994) discussed about the contribution of growth and distributional change in reduction of social deprivation in terms of prevalence, depth and severity of poverty by considering four key measures of poverty i.e. head count ratio, poverty gap, FGT and Sen Index. The Decomposition scheme has been applied at the all India level separately for rural and urban and for four time periods 1972-73 to 1977-78, 1977-78 to 1983, 1983 to 1987-88 and 1972-73 to 1987-88. According to them, poverty situation in India both in rural and urban areas is usually influenced by agricultural performance. The survey periods 1972-73 and 1987-88 are marked as draught periods due to severe crop loss, whereas that of 1977-78 and 1983 are termed as local peak for the good output of food grains. According to all indicators of poverty, the highest decline in rural India occurred when comparing a local peak of 1983 to a draught period of 1987-88, whereas for urban, it is in between two local peaks of 1977-78 to 1983.

Tendulkar and Jain (1995) had done their research on “Economic Growth, Relative Inequality, and Equity: The Case of India.” The main objective of the study was to examine the links between economic growth, relative inequality, and equity in the Indian context. They analyzed NSS consumption expenditure data of 1993-94 and concluded that the expenditure has reduced in real terms (at constant prices) thereby suggesting that the poverty levels have not changed significantly in the period 1987-89 to 1993-94. But, according to them the states of Andhra, Assam, Bihar, Karnataka, Maharastra

& Rajasthan witnessed a significant decline in per capita consumption expenditure (at constant prices) thus indicating an upward movement in poverty.

Ravallion and Datt (1996) had study on “How Important to India's Poor Is the Sectoral Composition of Economic Growth?” they assessed how much India's poor shared in the country's economic growth, taking into account its urban-rural and output composition. They appreciate India data, among developing countries India has the longest series of national household surveys suitable for tracking living conditions of the poor and they used thirty-three surveys spanning from 1951 to 1991.The study found that, rural consumption growth reduced poverty in both rural and urban areas. Urban growth brought some benefits to the urban poor, but had no impact on rural poverty. And rural-to-urban population shifts had no significant impact on poverty. Decomposing growth by output sectors, they found that output growth in the primary and tertiary sectors reduced poverty in both urban and rural areas but that secondary sector growth did not reduce poverty in either.

Agarwal Bina (1997) analyzed the interrelationships between gender, poverty and the environment in rural India, focusing especially on regional variations and temporal shifts over 1971-91. Briefly identifying the major factors underlying environmental degradation, the study traces why and how this degradation and the appropriation of natural resources by the state (statization) and by some individuals (privatization), tend to have particularly adverse implications for the female members of poor rural households. She further examined Governmental and community initiated attempts at environmental protection and regeneration and computed an aggregate index General Education Program (GEP)(V) to address those issues.

Datt (1997) has done study on” Poverty in India 1951-1994: trends and decompositions.” The main objective of his paper was to construct and present such a time series of poverty measures for rural and urban India over the period 1951 to 1994. To our knowledge, this is the longest available time

series on poverty measures for India, and, perhaps, the longest series of its kind anywhere in the world. The paper is largely descriptive in nature and the individual standard of living is measured by real per capita consumption expenditure of the household methodology was used to measure poverty. The study found that, there was little progress in reducing poverty until the mid-1970s and that there has been a marked downward trend since then. It took nearly 30 years for India's poverty measures to fall appreciably below their levels in the early 1950s. Measures of the depth and severity of poverty show a more marked decline over the period than does the headcount index. More than three-fourths of the decline in national poverty measures is attributable to the decline in rural poverty. Both growth in mean consumption and redistribution contributed to the decline in national poverty.

Datt and Ravallion (1997) did research on “Why have some Indian states performed better than others at reducing rural poverty?” to explain the relative successes and failures at poverty reduction evident in India. They focused on the rural sector because that is where three-quarters of India's poor live. Finally they found that, rural poverty rankings of Indian states in 1990 were very different from 1960. This unevenness in progress allows them to study the causes of poverty in a developing rural economy. They model the evolution of various poverty measures, using pooled state-level data for the period 1957-91. Differences in trend rates of poverty reduction are attributed to differing growth rates of farm yield per acre, and differing initial conditions; states starting with better infrastructure and human resources saw significantly higher long-term rates of poverty reduction. Deviations from the trend are attributed to inflation (which hurt the poor in the short term) and shocks to farm and nonfarm output.

Gaurav D. (1997) on his revised edition on” Poverty in India 1951-1994: Trends and Decompositions” has constructed a new time series of poverty measures for both rural and urban India from 1951 to 1994. The main objective of his study was to construct and present such a time series of poverty measures for rural and urban India over the period 1951 to 1994.

Surprisingly, he acknowledged that it is the longest available time series on poverty measures for India, and, perhaps, the longest series of its kind anywhere in the world. The poverty measures were based on the available National Sample Survey (NSS) data on the size distribution of consumption expenditure and he used altogether of 35 rounds of the NSS data. Finally he concluded that, in terms of the evolution of national poverty, the entire 4-decade period, 1951-1992, can be thought of as consisting of three sub-periods: *first*, the period up to the mid-1970s (rounds 3-28), which is characterized by fluctuations in poverty without a trend, *second*, the period since mid-1970s up to about 1986-87 (rounds 32-42), during which we do observe a significant trend decline; and *third*, the period since the late 1980s (rounds 43-48), when the decline in poverty levels off. Thus it took nearly three decades for the poverty measures to finally fall below - and stay below - their values at the beginning of the 1950s.

Alauddin and Tisdell (1998) did study on “Rural Poverty and Resource Distribution in Bangladesh: Green Revolution and Beyond.” They examined the relationships between agricultural innovations and rural poverty in LDCs, concentrating on either exchange or non-exchange income. They found that, growing concentration of control of land and the effects of components of new agricultural technology on ancillary resources have gradually decreased the access of the rural poor to land and other natural resources. Increasing landlessness and near landlessness have resulted in greater dependence on wage employment for subsistence. However, agricultural wages, being close to the subsistence level, provide little scope for carry-over into periods of slack agricultural activity. Even though, real wages may be trending upwards slightly. Much of their effect on rural poverty is neutralized because of seasonality in employment and real wages. The non-exchange component of income is important in slack periods and may become critical in abnormal years when both real wages and employment fall sharply. With rapid population growth and resource depletion and greater penetration of technological and market forces, access to natural resources with a

cushioning effect on the rural poor in adverse circumstances has become more limited and income security has been undermined.

Datt and Ravallion (1998) in their study on “Farm productivity and rural poverty in India” tried to find to what extent does India’s rural poor share in agricultural growth? Combining data from 24 household sample surveys spanning 35 years with other sources, they estimated a model of the joint determination of consumption-poverty measures, agricultural wages, and food prices. They found that higher farm productivity brought both absolute and relative gains to poor rural households. A large share of the gains was via wages and prices, though these effects took time. They conclude that, the benefits to the poor were not confined to those near the poverty line.

Fan *et al.* (1998) in their discussion paper “Government spending, growth and poverty: an analysis of inter-linkages in rural India” the primary purpose was to investigate the causes of the decline in rural poverty in India, and particularly to disentangle the specific role that government investments have played. The study used state level data for 1970 to 1993 to estimate an econometric model that permits calculation of the number of poor people raised above the poverty line for each additional million rupees spent on different expenditure items. They found that, steady decline in poverty was strongly associated with agricultural growth, particularly the green revolution, which in turn was a response to massive public investments in agriculture and rural infrastructure. They suggested, In order to reduce rural poverty, the Indian government should give priority to increasing its spending on rural roads and agricultural research and extension.

Ahluwalia (2001) in his working paper on **“**State Level Performance under Economic Reforms in India” attempted to document the performance of the major states in the post reform period 1991-92 to 1998-99 and compare it with performance in the previous decade. He used available data on the Gross State Domestic Product for each state to achieve the stated objectives. The study found that, macroeconomic data for the 14 major Indian states reveal

the extent of inter-state differences in the pace of economic growth in the past decade. Rising regional inequality, as measured by an increase in the Gini-coefficient from 1986-87 to 1997-98, has important implications for poverty reduction. The study also found that variations in the private investment ratio are positively and significantly correlated with variations in growth, while public investment and plan expenditure seem to have had little direct impact. It also finds that provision of certain infrastructure, and to some extent also literacy, are associated with variations in growth.

Gordon (2001) had done research on “Macro-level trends and issues in India”. He found that, over a thirty year period the proportion of the rural population that is poor has fallen from two thirds to one third – though it temporarily increased (from roughly 36% to 46%) with the implementation of macro-economic policy reforms in the early 90s. Urban poverty has tended to follow a similar pattern, but with percentages generally 5-10% lower than rural poverty. These trends conceal some important detail, however. Firstly, the fall in the poverty ratio leaves no room for complacency because absolute numbers of poor are increasing. Between 1960 and 1993, the rural population falling below the poverty line increased from 177 million to 278 million. Secondly, performance varies between states. Between 1957 and 1993, the poverty ratio declined in all states except Assam and Jammu and Kashmir. However some states saw more rapid declines (Andhra Pradesh, Kerala, Maharashtra, Punjab, Tamil Nadu and West Bengal) and others made slower progress (Bihar, Haryana and Rajasthan). Only Andhra Pradesh, Tamil Nadu and Kerala were able to reduce absolute numbers of poor2. These different poverty outcomes suggest that an improved understanding of the different policies and circumstances pertaining in different states may yield important insights into poverty reduction.

Ravallion and Datt (2001) had done study on “Why has economic growth been more pro poor in some states of India than others?” They used 20 round household surveys for India’s 15 major states spanning 1960–1994 to study how the sectoral composition of economic growth and initial conditions

interact to influence how much growth reduced consumption poverty. They found that, the elasticities of measured poverty to farm yields and development spending did not differ significantly across states. But the elasticities of poverty to (urban and rural) non-farm output varied appreciably, and the differences were quantitatively important to the overall rate of poverty reduction. States with higher elasticities did not experience higher rates of non-farm growth. The non-farm growth process was more pro-poor in states with initially higher literacy, higher farm productivity, higher rural living standards (relative to urban areas), lower landlessness and lower infant mortality.

Fox J. (2002) in his study on “Poverty in India Since 1974: A Country Case Study” divided the poverty trends in to two 1950 to 1974 and 1974 to 2000. He concluded that, during the first 25 years of Indian independence, India’s efforts to reduce poverty produced retrogression. Between 1952 and 1974, the share of the population in poverty moved up and down cyclically, most importantly in response to good or bad monsoons, but there seems to have been an upward trend. The slow economic growth between 1950 and the mid-1970s (averaging only 1.4 percent per capita) have been blamed for this poor performance. Between 1974 and 1990, the overall poverty rate fell sharply, from 54 percent in 1974 to 26 percent in 1999-2000. The fall in the poverty rate was counterbalanced by a rise in total population. Between 1994 and 2000, however, the number of poor people began to fall sharply—by 60 million people over the six-year period.

Datt and Ravallion (2002) in their study on “Is India’s Economic Growth Leaving the Poor Behind?” the study were designed to answer: what has happened in India in the 1990s? Has poverty continued to fall with growth, or has the nature of the growth process changed, such that the poor have been left behind? Their analysis responded, India has probably maintained its 1980s rate of poverty reduction in the 1990s. They believed their results suggest that the incidence of poverty has been falling at a little less than one percentage point per year over the main post reform period.

Jones (2002) done research on “Poverty Measurement, Poverty Lines and Consumer Price Indexes in India: A Critique.” The study explored how plausible current attempts to do this are focusing on the Official Poverty Line deflators and those proposed by Deaton. He used incorporating data from the 61st round. He suggested that thorough overhauls of the official poverty lines and Consumer Price Indexes and the NSS CES methodologies are required even if this implies limited continuity with earlier measures. He also question why some authors have rushed to apply these dubious PLs to the 61st Round, drawing strong policy conclusions, and why such obviously flawed methods are so widely used despite their obvious deficiencies.

Fan *et al.* (2005) in their discussion paper on “Rural and Urban Dynamics and Poverty: Evidence from China and India” hypothesized correcting urban bias would lead to higher growth in agriculture and therefore larger poverty reduction in both rural and urban areas, as a result of better rural-urban linkages. To test this hypothesis, panel data were used from China and India. They found that, for China, agricultural growth has contributed to poverty reduction in both rural and urban areas. But the effect on rural poverty is larger than the effect on urban poverty. On the other hand, urban growth contributed to only urban poverty reduction and its effect on rural poverty reduction is negative or statistically insignificant. The results for India show that rural growth helps to reduce rural poverty, but its effect on urban poverty reduction is statistically insignificant. On the other hand, urban growth contributes to urban poverty reduction and its contribution to rural poverty reduction is not statistically robust. For both China and India, poverty rates are higher in rural than in urban areas. The study suggested, the government should also reform its policies to nurture the further development of rural industries and small towns that play a key bridge role between rural farming communities and urban centers.

Krishna (2005) had research on “Poverty Knowledge and Poverty Action in India” to examine escape and descent more carefully at the grassroots level. He used 107 villages of three states in India. The study found that, achieving

higher economic growth "is only one element of an effective strategy for poverty reduction in India. Health and healthcare expenses constitute the single most important factor associated with descent into poverty in these three states. Relatively richer as well as relatively poorer households in the Gujarat villages that they studied have fallen into abiding poverty on account of health and healthcare expenses. Providing more regular and more reliable information, not only about jobs and careers, but also about several other factors will be critically important in the fight against poverty. The study suggested, carefully directed public policies and well-targeted non-governmental actions are required if healthcare is to be provided in an accessible and affordable manner to poorer villagers of this region and others.

Nayyar (2005) did study on "Growth and Poverty in Rural India, An Analysis of Inter-State Differences" the object of his study was to analyses differences in poverty levels across states in rural India during the period 1983-2000 and to analyze the effect of policies and institutions on the poverty-reducing impact of growth. In a panel data study for India's 15 major states, he found that economic growth is a crucial determinant of poverty reduction, but it does not provide a complete explanation. Public expenditure on anti-poverty programmes has a significant impact on rural poverty, as does greater gender equality and increased democratic decentralization. Rates of inflation and differences in initial conditions also matter.

Ravallion and Chen (2005) in their study on "China's (uneven) progress against poverty" to document and explain China's record against poverty over the two decades following Deng Xiaoping's initiation of pro-market reforms in 1978. They applied new poverty lines to newly assembled distributional data—much of which has not previously been analyzed. They also addressed some long-standing questions in development economics, applied to the Chinese setting. How much do poor people share in the gains from economic growth? Does the sectoral and geographic pattern of growth matter? What role is played by urbanization? How did initial distribution influence subsequent rates of growth and poverty reduction? How important are

economic policies? Their principal findings were, China has made huge overall progress against poverty, but it has been uneven progress. In the 20 years after 1981, the proportion of the population living in poverty fell from 53% to 8%. Inequality has been rising, though not continuously and more so in some periods and provinces. In marked contrast to most developing countries, relative inequality is higher in China's rural areas than in urban areas. The pattern of growth matters. While migration to urban areas has helped reduce poverty nationally, the bulk of the reduction in poverty came from rural areas. Growth in the primary sector (primarily agriculture) did more to reduce poverty and inequality than either the secondary or tertiary sectors. Starting in 1981, if the same aggregate growth rate had been balanced across sectors, it would have taken 10 years to bring the poverty rate down to 8%, rather than 20 years. Inequality has emerged as a concern for both growth and poverty reduction. With the same growth rate and no rise in inequality in rural areas, the number of poor in China would have fallen to less than one-quarter of its actual value (a poverty rate in 2001 of 1.5% rather than 8%).

Oyeranti and Olayiwola (2005) in their study in Nigeria on "Policies and programmes for poverty reduction in rural Nigeria" had addressed two objectives; an inventory of rural poverty reduction policies and programmes and to evaluate the rural poverty reduction policies and programmes with a view to establishing their impact on poverty phenomenon in the rural economy of Nigeria. In order to achieve the objectives of the study, they adopted the World Bank's approach to appraising poverty reduction programmes. The study found that, an examination of certain indicators of performance indicates that the domestic and international poverty reduction measures have had minimal impact in addressing the problems of poverty and also had insignificant impact on the living conditions of the poor. The study further pointed, strategies were badly implemented and even had no particular focus on the poor in terms of design and implementation. The effort of international agencies cannot be sustained due to lack of domestic supportive measures to guarantee its sustainability. These points to the fact that efficient design of

poverty reduction programmes in Nigeria requires that the poor must be identified and targeted and policies adopted should be consistent and sustainable.

Sen and Himanshu (2005) differed from Deaton as well as Sundaram and Tendulkar (2003a, b and c) in their approach to the problem. Sen and Himanshu relied mainly on recalculation of unit-level NSS data from rounds 43, 50 and 55, and made fewer assumptions than the others. Their estimates showed that Deaton as well as Sundaram and Tendulkar had overestimated the decline in poverty. According to the comparable estimates calculated by Sen and Himanshu, the head-count poverty ratio in India declined by three percentage points at most between the 50th and the 55th rounds, but their result shows the number of poor in the country actually increased during that period.

Chaudhry *et al.* (2006) in their study on" Rural poverty in Pakistan some related concepts, issues and empirical analysis" to investigates some related concepts and issue of rural poverty by looking at agriculture and rural economy, rural poor and features of rural areas, and spatial dimensions and trends of rural poverty. The study used secondary data for the year 1963 to 1999. They found that, rural areas are the major reservoir of poverty in Pakistan and agriculture is the main activity on which most of rural people depend for their livelihood. Rural poverty levels are significantly higher than urban levels in Pakistan. Their study result was able to explain the macro determinants of rural poverty in Pakistan. Accordingly, inflation, unemployment and growth rates have the significant effects to alleviate rural poverty in Pakistan. Finally the study recommended that, elimination of rural poverty is impracticable unless the economy generates opportunities for investment, entrepreneurship, job creation and sustainable livelihood.

Agrawal P.(2008) in his empirical study on "Economic Growth and Poverty Reduction: Evidence from Kazakhstan" examined the relation between economic growth and poverty alleviation in the case of Kazakhstan using

province-level data. To examine the relation between growth and poverty reduction the study used both graphical and econometric regression analysis. He found that, provinces with higher growth rates achieved faster decline in poverty. This happened largely through growth, which led to increased employment and higher real wages and contributed significantly to poverty reduction. Rapidly increasing oil revenues since 1998 have helped significantly raise both gross domestic product growth and government revenue in Kazakhstan. Part of the oil fund was used to fund a pension and social protection program that has helped reduce poverty. However, expenditure on other social sectors like education and health has not increased much and needs more support. Further the study found that increased government expenditure on social sectors did contribute significantly to poverty alleviation. Finally the study suggested that both rapid economic growth and enhanced government support for the social sectors are helpful in reducing poverty.

Oluwatayo (2008) had study focused on analyzing inequality and welfare status of rural households in Ekiti State, Nigeria. The result presented was based on primary data collected from a random sample of 240 households selected from four rural communities in the state. Regression analysis was employed as analytical techniques. The regression analysis revealed that income (8.518E-05**), household size (1.336E-02*) and size of farmland cultivated (1.084E-04*) were positively related to the welfare status of the households while marital status (-2.51E-02) and primary occupation (-2.95E-02) were negatively related to it. The recommendations arising from the study were that there is a need to upgrade technologies for increased agricultural production in order to further improve income levels of households and equity in the distribution of income arising from farming activities since this remains the major source of income of households in the study area.

Patnaik U.(2008) in his study on “Theorizing Poverty and Food Security in the Era of Economic Reforms” which was focused on the correct theorizing of

declining effective demand for food grains, and of the extent of poverty. The study used secondary data from reliable international organizations and government of India. His outcome explained concerns have also been expressed with the determination of the poverty line itself. He found that the fast economic growth contribute for slower rate of poverty reduction in the recent period. He further explained as, what is remarkable is that in the recent period, which is when growth rates picked up, the rate of poverty reduction decelerated, especially in rural India. He supported with data and concluded that rural poverty reduction in particular was much more rapid in the pre-economic liberalization than post and on these trends; India would not meet the MDG of halving poverty by 2015.

Suryanarayana (2008) did study on “How real is the secular decline in poverty in India?” He found that, solution for any problem calls for its proper assessment and estimate. Polices, both macro and micro, for providing safety-nets for the poor in developing countries like India are often formulated with inadequate appreciation of empirical and methodological aspects. As a result factually incorrect assessments of the problem and its magnitude are made, which lead to wrong choice and design of instruments and policies. This issue is examined with reference to India. There is a consensus that incidence of poverty with reference to the calorie intake criterion has declined since the mid-1970s to about 35 per cent of the population. The study examines how far this consensus is valid? How far the database is suitable for such assessments? What are its implications for the observed trends in poverty estimates in the context of dynamic structural changes in the rural economy? The study concludes that the estimates do not show a real reduction in poverty but only a reduction in overestimation of poverty for the initial years followed by its underestimation for the later years. Even today about 75 per cent of the population is calorie deficient largely due to income poverty. This calls into question the choice of policy measures to reduce fiscal deficit by restricting welfare programmes and poverty alleviation measures only to the population currently believed to be poor.

Hashmi and Sial (2009) had done research on “Trends and Determinants of Rural Poverty: A Logistic Regression Analysis of Selected Districts of Punjab”. The main purpose of their study was to explore the questions related to agriculture growth and magnitude of rural poverty and the factors, which determine the poverty status. The study found that, In Pakistan poverty has been increased in rural areas and is higher than urban areas. Of the total rural population 65% are directly or indirectly linked with agriculture sector. In Pakistan more than 44.8% people generate their income from agriculture sector, and the higher rate of increase in poverty in the rural areas has provoked debate on growth and productivity trends in the agriculture sector.

Dhamija and Bhide (2010) had done research on “Dynamics of Poverty in India: A Panel Data Analysis.” Their paper examined the incidence and dynamics of poverty over a period of three decades from 1970 to the end of the 1990s. They used a national rural panel household data set, based on household surveys conducted by the National Council of Applied Economic Research in three rounds in 1970, 1981 and 1998. They found that, the period of 1990s experienced a slower decline in poverty compared to the previous decade, although the incidence of chronic poverty declined even in the latter period. It also examines the pattern of growth in consumption expenditure to understand how it tracks trends in poverty.

Ghosh. Jayati (2010) in his DESA Working Paper on “Poverty reduction in China and India: Policy implications of recent trends” used secondary data from different international organizations. The main objective of the study was to compares the experience of poverty reduction in China and India. The study found that, more than economic growth per se, what has mattered crucially is the nature of the growth: whether it is associated with growing inequalities that do not allow the benefits of growth to reach the poor; whether the structural change involved in the growth process generates sufficient opportunities for productive non-agricultural employment; whether basic needs and essential social services are provided. Finally the study

recommended government mediation of these and of global economic integration is important in determining different outcomes.

Aiyar (2011) in his study on" The Elephant That Became Tiger 20 Years of Economic Reform in India" analyzed secondary government of India data. The study found that, poverty is down from 45.3 percent in fiscal year 1994 to 32 percent in fiscal year 2010, and the literacy rate is up from 52.2 percent to 74 percent in two decades, India's fastest improvement ever. Several of the poorest states have doubled or tripled their growth rates since 2004, and their wage rates have risen by over 50 percent in the last three years. However, India continues to be hampered by poor business conditions and miss-governance. Almost a quarter of Indian districts have recorded some sort of Maoist violence, and corruption is a major issue.

Mehta (2011) did research on" Poverty in India: Key Problems and Programs." The objective of his paper was to try to understand the extent of the problem that needs to be addressed and the reasons why poverty persists despite the plethora of programmes and schemes existing programmes and schemes. The study found that, yet poverty remains the largest development challenge facing India. So why has the trickle-down effect of economic growth, combined with poverty reduction programmes, not eradicated poverty? There are two sets of reasons for this. The first set of reasons concerns flaws in implementing existing programmes and schemes. The second set of reasons is concerned with the magnitude of the problem and the overall strategy for attacking it. For MGNREGS, the number of days of work to which a household is entitled and the wages paid are inadequate. In ICDS, too, overloading of staff, poor monitoring and inadequate provision of funds to enable *anganwadis* to function emerge as a key problem. Misallocation of BPL cards and errors of exclusion because of tying programme benefits to possession of BPL a card. Fiscal difficulties faced by several states lead to their inability to make financial contributions required for implementing schemes. Ad hoc efforts at dealing with different dimensions of poverty, raises cost of delivery and makes them less effective. Finally, the study recommended, to be

effective, poverty alleviation schemes need to address the factors leading to persistence of poverty, entry into it and strengthen factors enabling escape from it. This is not the approach taken to tackle poverty. While most interventions aim to ameliorate the condition of the poor there is no commitment to moving people out of poverty and prevents them from falling back into it.

The World Bank (2011) report with objective to develop the evidence base for policy making in relation to poverty reduction summarized that, India has maintained steady progress in reducing poverty as measured by consumption. Using the Government of India's official poverty lines, in 2004–05, 28 percent of people in rural areas and 26 percent of people in urban areas lived below the poverty line, down from 47 percent and 42 percent, respectively, in 1983. Improvements in the last two decades represent a continuation of a long-term secular decline of both urban and rural poverty under way in India since the 1970s. At this pace, acceleration of progress against poverty since economic reforms began in earnest in the early 1990s is suggested, but it is too early to say that that is a (statistically) robust new trend.

Ghosal (2012) worked on "Growth, Poverty and Inequality Paradox in India—A Panel Data Approach." He attempted to examine the temporal and cross state behaviour of the growth, poverty and inequality and also to examine the relations between them and to see whether the temporal behaviour of the incidence of poverty is compatible with the policy evolution followed since independence. He found that, Indian economy has indeed achieved a high growth trajectory such that it has been conspicuous during the post reform period with a remarkable structural transformation on an unconventional path which has been accompanied by a tremendous increase in service sector driven growth path. Almost all the states have experienced increase in the growth rates of their real per capita. The post reform period marks a phase of achievement of very high growth rates for almost all the states. Interestingly almost all the states have experienced declining trend in the incidence of

poverty in varying degrees during the pre-reform period and also over the period from 1993/94 to 2009/10. Further he found a paradoxical relation between growth performance and regional concentration of poverty. Finally the study suggested, for the further reduction in the magnitude of poverty of the people across the states, more emphasis should be placed not only on the increase in the growth rates but also on the tremendous increase in the social sector expenditures like health ,education etc across the states.

Kiran Sharma (2012) has done research on “Women, Poverty and Food Security in India” and found that, poverty is deeply embedded in social constructs that impact adversely on woman's economic status to society as well as her nutrition and health status, and food security caused from unequal distribution of food at home. Consequently discrimination pattern of food consumption at home is the one cause of malnutrition among women. While much progress has been made on the food production and availability front, adequate nutrition outcomes cannot be assured without unraveling the complexities of the gender food security link. Ensuring equity in women's rights to land, property, capital assets, wages and livelihood opportunities would undoubtedly impact positively on the issue, but underlying the deep inequity in woman's access to nutrition is her own unquestioning acceptance of her status as an unequal member of the family and society. Eventually, gender empowerment alone is likely to be the key to the resolution of the hunger challenge in the country.

Drèze and Khera (2013) in their study on “Rural Poverty and the Public Distribution System” estimated the impact of India’s Public Distribution System on rural poverty, using National Sample Survey data for 2009-10 and official poverty lines. The result shows that, there is both good news and bad news in our findings. The good news lies in clear evidence that India’s public distribution system now has a significant impact on rural poverty. The impact is particularly large in states with a well-functioning PDS, reinforcing recent evidence of the fact that the PDS is now an important source of economic security for poor people in many states The bad news is that the PDS still has

very little impact on rural poverty in a number of large states such as Bihar, Jharkhand, Uttar Pradesh and West Bengal where PDS reforms are long overdue. Hopefully, evidence of continued revival of the PDS around the country will emerge from later rounds of the National Sample Survey.

Patnaik (2013) in his study on “Poverty Trends in India 2004-05 to 2009-10: Updating Poverty Estimates and Comparing Official Figures.” He used secondary data and found that, a comparison of the consumption expenditure and associated nutritional intake data for 2009-10 with that of 2004-05 shows worsening poverty in terms of the percentage of people unable to reach the minimum required calories energy intake through their monthly spending on all goods and services. This result must be seen in the context of neo-liberal policy, the financial crisis and consequent global recession affecting export production, the rapid rise in food prices, declining employment growth, the drought of 2009-10, and in spite of a positive development like the National Rural Employment Guarantee Scheme. It is argued that the decline claimed in the official poverty ratios is spurious.

Anand R.*et al.* (2014a) in their study on “India: Defining and Explaining Inclusive Growth and Poverty Reduction” for IMF, the main objective of their study was to document the evolution of poverty and inequality across Indian states during the period of rapid growth (2004-09) and to examine the role of growth and distribution in reducing poverty. Finally, they found that the rapid economic growth during 2004 to 2009 has contributed to a substantial reduction in poverty. The poverty headcount rate, measured using the national poverty line, declined by 1.5 percentage points per year in 2004/05-2009/10, double the rate of the preceding decade. More recent data suggests that between 2004/05–2011/12, poverty declined by 2.2 percentage points per year, which is about three times the pace of the poverty reduction of the preceding decade. Yet India continues to have the largest number of poor (approximately 300 million) in the world, and nearly half of the poor are concentrated in five states.

Anand *et al.* (2014b) in their study on “India: Defining and Explaining Inclusive Growth and Poverty Reduction” documented the evolution of poverty and inequality across Indian states during the recent period of rapid growth (2004-09), and examine the role of growth and distribution in reducing poverty. The study found that, robust economic growth has been a major driver of poverty reduction and inclusiveness in India. They explore the role of economic policies and macro financial conditions in explaining inclusive growth and its components, using a new measure of inclusive growth. Social expenditures, spending on education and educational attainment rates are important for fostering inclusive growth. Macro-financial stability, with particular attention to inflation risks, is also critical for promoting inclusive growth.

Panagariya and Mukim (2014) in their study on “A Comprehensive Analysis of Poverty in India” they provided estimates using Lakdawala and Tendulkar lines for different social and religious groups in rural and urban areas in all major states and at the national level. The main objectives in writing the paper were to provide answer for whether or not growth has helped the poor (if yes, how much and over which time period) and for explaining how various policy measures impact poverty. The study based on expenditure survey conducted in 2009/2010. They found that, regardless of which of the two official poverty lines they use, they saw a steady decline in poverty in all states and for all social and religious groups. Accelerated growth between fiscal years 2004–2005 and 2009–2010 also led to an accelerated decline in poverty rates.

David Sundar (2015) in his study on “trends in poverty, agriculture and economic development in India” used secondary data and descriptive type of analysis to achieve his objectives. The main objectives of the study were to analyze poverty trend and to see contribution of agriculture in economic development in India. The study found that, economic development has arrested the increasing trend in poverty at the state level and macro level in India and the trend in poverty during 2011-12 as compare to 2004-05 both rural and urban poverty lines had increased nearly 400 rupees in every state indicating an increase in the good/decent standard of living among people.

The study concluded that, one of the major failures of economic development in post-independent India remained its inability to significantly reduce the dependence of workforce on agriculture. This has led to widening of gap between incomes in agricultural and non-agricultural sectors, which is perceived to be one of the major reasons for persistence of poverty in the country. Finally the study suggested that, in order to eradicate poverty completely from the economy, the planners and policy makers should consider the significance of the agricultural sector to the people and economy, and plan and implement strategy accordingly.

Pokharel (2015) attempted to highlight socio-economic, spatial distribution and gender dimension of poverty in Nepal. Nepal is still struggling around upper bound of low human development countries and the official data as of 2010/11 affirms around 25 percent Nepali live under absolute poverty line. There are debates whether the poverty line really defines basic necessities of survival. On contrary, the Human Poverty Index show 44 percent of Nepali are deprived of basic education, health and access to resources. Distribution of poverty across the country varies with high severity in rural mountain and low in urban areas. Despite illustrating development efforts, there is still a sharp divide in development inputs, process and outcomes. The development policies of Nepal have less room to criticize. However, the implementation status and results explain different but gloomy phenomenon. Being poor means having multiple characteristics which denies recognition, share in resources and opportunities, participation in decision making and influencing the processes that affect themselves which as a result challenges their survival freedom. Empowering poor disadvantaged and marginalized and developing their wealth asset including education, health and employment must be the central agenda of the development planning in Nepal in order to achieve sustainable human development.

2.2 Review of related literature on poverty extent (condition)

Gaiha (1989) used a panel survey of 4118 rural households of India, carried out by the National Council of Applied Economic research in 1968-69, 1969-70 and 197071. He identified the chronically poor as households that were below the poverty line in each of the three years under consideration. He found that about 47 per cent of the poor households in 1968 (on an income criterion) were chronically poor. Among the chronically poor, casual agricultural labourers were the largest and cultivators the second largest groups. Most of the chronically poor were either landless or near-landless and were more dependent on wages. Household size was about the same and dependency burden and illiteracy was slightly higher among them than the just poor. Gaiha's results (47% of the poor households in 1968 were chronically poor) contradict the argument made by Baulch and McCulloch that the "poverty problem is one involving a large turnover of vulnerable people rather than a hard-core of the chronically poor." In an earlier paper Gaiha (1988) analyzed income mobility among the rural cultivating poor also on the basis of the NCAER panel survey.

Gaiha and Deolalikar (1993) using the ICRISAT panel survey of 240 households in six villages in the semi-arid region of rural South India covering the period 1975-76 to 1983-84, found that 87.8% of sample households were poor some time during the 9 year panel period. Over 60% of households were poor roughly half the time (i.e. during 5 out of 9 sample years). And more than one-fifth of households were poor during all 9 years. They conclude that "the persistently poor are by no means a small subset of the poor." And further that persistence of poverty is the result of "deep-rooted characteristics" such as schooling of head of household that drastic measures such as income transfers on a continuing basis are needed to compensate subsets of the poor for their innate disadvantages.

Datt (1999) used the NSS data on consumption expenditure after deflating and estimated three sets of poverty measures head count ratio, poverty gap

and squared gaps. The author did not find any change in rural poverty figures for pre and post reform periods. However, the analysis shows a sharp decline of poverty levels in urban areas during pre-reform period and a much slower decline later.

Baulch and McCulloch (2001) used the results of a 5- year longitudinal household survey of 686 households in rural Pakistan to show that while the incidence of income poverty was high at 60% only 35% remained in poverty for two years or more and only 3% of sample households were poor in all 5 years of the panel.

Baulch (2002) contrasted the results of conventional poverty status regressions with an alternative approach, the analysis of poverty transitions, using a five year longitudinal household survey from rural Pakistan. The results show that while the incidence of income poverty in the sample villages was high, turnover among the poor was also rapid. In each year of the survey between 21 per cent and 29 per cent of households had incomes below the poverty line, but 46 per cent to 51 per cent of poor household's exited poverty from one year to the next. Only 3 per cent of households were poor in all five years of the panel. The dependency ratio and geographic variables were important correlates of poverty status, but neither had much impact on entries into or exits from poverty. Other variables, such as education and livestock ownership, had asymmetric impacts on poverty transitions: increasing exit or reducing entry probabilities without influencing transitions in the opposite direction. Targeting anti-poverty policies using the characteristics of the currently poor is highly problematic. If governments care primarily about reducing the poverty headcount, they should focus their efforts on increasing exits from and decreasing entries into poverty. Focusing anti-poverty efforts on the correlates of poverty status means, that it is the symptoms rather than the causes of poverty that are being addressed.

Shah and Sah (2003) used qualitative methods in two tribal villages in southwest Madhya Pradesh and found that about 58% of sample households

were in chronic poverty. Further, all the severely poor were also chronically poor.

Acharya Sanjaya (2004) made an assessment of Nepalese poverty situation during 1977 - 1997 using a comparative static approach. Income and human poverty indices have been estimated using World Bank and UNDP methods, respectively. Moreover, it also makes exploratory analysis to study the causes and nature of Nepalese poverty. It concludes that Nepalese income poverty was drastically reduced during the period 1976/77 – 1984/85, but increased afterwards. However, human poverty has reduced in sustenance during the whole period. Poverty in Nepal is more pervasive, deep and uneven as compared to the rest of the South Asia. Comparing the income and human poverty indices, we conclude that income poverty is volatile as compared to the human poverty. Poverty in Nepal has some economic, demographic, and political origins; and more remote and occupational caste people are poorer as compared to the rest.

Bhide and Mehta (2004) studied on “Tracking Poverty through Panel Data: Rural Poverty in India 1970-1998”. They examined the patterns of movement of rural households across poverty groupings based on a unique panel data set covering a period of three decades. Their analysis was based on three survey conducted by NCAER in 1970-71, 1981-82 and 1998-99. Their findings show that there is significant incidence of chronic poverty in rural India. They considered the two consecutive periods in which the survey was conducted, separately and said, incidence of chronic poverty declined from 28.4 per cent of sample households 1970-71 to 1981-82 to 24.27 per cent of sample households in 1981-82 to 1998-99. Of those who were poor, the percentage of households that were chronically poor declined from 43.28 to 38.61 per cent over these two sets of time. However, if we consider a longer time period of three decades, (1970-71 to 1998-99), the percentage of households experiencing chronic poverty increases. Therefore, while the incidence of chronic poverty declined between 1970-71 to 1981-82 and 1981-82 to 1998-99, the extent of reduction, given the three decade time duration,

is marginal. Similarly, while a clear decline in poverty was observed for all the three social groups, the extent of decline differed and was not as high as would be expected over a three decade time duration. In no case did the decline exceed 10 per cent over the time period from 1970-71 to 1998-99. Why do the households continue to be poor over such long periods of time? This paper finds that social barriers such as caste distinction alone have a smaller impact in explaining the dynamics of poverty. The composition of the household is an important determinant of probability of persistence or exit from poverty although absolute size is not. Importantly, the results point to the significant poverty reducing effects of village level infrastructure and greater opportunities for employment at the local level through links to growing urban population.

Hussain and Hanjra (2004) identified poverty head count ranges from 18 to 53 percent in irrigated and 21–66 percent in rainfed settings. Poverty incidence is 20–30 percent lower in most irrigated settings compared to that in rainfed settings. Studies using a dynamic concept of poverty show that the incidence of chronic poverty is 10 percent (5 percent) lower for irrigated areas in Sri Lanka (Pakistan) than adjoining rainfed areas. The extent of poverty, measured by the poverty gap index, where reported in these studies, is found to be much higher in rainfed than irrigated settings. This shows that the poor in rainfed areas are located relatively further below the poverty line, which implies that rainfed poor's income has to grow relatively faster and in many folds in order for them to catch up with the irrigated poor or escape poverty.

Government of Nepal (2005) trend data from 1995-96 and 2003-04 Nepal Living Standards Surveys (I and II) carried out by the cost-of-basic-needs are used to estimate trends in poverty incidence in Nepal during 8 years between these two surveys. Headcount rates suggest that poverty has dramatically declined in Nepal between 1995-96 and 2003-04. In 2003-04, 31 percent of population was poor in Nepal, compared to 42 percent in 1995-96. Thus, the incidence of poverty in Nepal declined by about 11 percentage points (or 26 percent) over the course of eight years, a decline of 3.7 percent per year. The

incidence of poverty in urban areas more than halved (it declined from 22 to 10 percent, a change of 9.7 percent per year). While poverty in rural areas also declined appreciably, at one percentage point per year, its incidence remained higher than in urban areas.

Bhatta and Sharma (2006) studied for the first time poverty dynamics in Nepal by analyzing the determinants of chronic and transient poverty using data from a nationally representative panel of 962 households surveyed in 1995/96 and 2003/04. Suggesting that one of the consequences of poverty is its negative impact on asset accumulation, it also looks at how human capital accumulation differs between transient and chronically poor individuals. The findings indicate that while the average per-capita consumption of households increased between 1995/96 and 2003/04, over 47% of the households were poor in at least one of those two years. Among them, around 43% were chronically poor and the remaining 57% were transient poor.

Bhide and Mehta (2007) in their study on “Chronic Poverty in Rural India, An Analysis using Panel Data: Issues and Findings ”they used panel data that longitudinally track 3,139 households in rural India to try to identify and understand the factors that influenced or constrained changes in poverty status between 1970/1971 and 1981/ 1982. Data on consumption expenditure and estimates of the poverty line were used to classify households as poor or non-poor and then to divide them into four categories to capture mobility or immobility in the context of poverty. The study found that, those households who were poor initially and remained poor over one decade, those who were non-poor and became poor, those who were poor initially and became non-poor, and those who remained non-poor in both surveys. The data shows that more than half (52.61%) of the panel households who were poor in 1970-71 remained in poverty over a decade later. With more than half the households remaining in poverty eleven years later, it is not possible to argue that very few households remain poor over time. However, the data also supports the view expressed in the literature that there is considerable movement both out of and into poverty. 47.39% of poor households escaped from poverty. One

fourth of households who were non-poor in 1970-71 became poor a decade later.

Radhakrishna *et al.* (2007) in their study conceptualized chronic poverty by using the spaces of income and nutrition and estimate its incidence among states and social groups. Mainly the study attempted to estimate chronic poverty among states and social groups based on income poverty and malnutrition. The analysis used the unit level National Sample Survey and National Family and Health Survey data. They found that, the incidence of chronic poverty varies significantly across the social and occupational groups. Among the social groups, it is highest for schedule castes (21 per cent in rural and 19 per cent in urban areas) and lowest for others (10 per cent in rural and 8 per cent in urban areas). The incidence among schedule caste is double to that of others. State-wise estimates also exhibit a similar pattern. Among the occupational groups, the incidence of chronic poverty in rural areas is highest for agricultural labour (19 per cent) and lowest for cultivators (9 per cent) and in urban areas it is highest for casual labour (24 per cent) and lowest for regular/salary group (7%). These figures clearly demonstrate that households depending on casual labour for livelihood are exposed to a greater risk of chronic poverty.

Alkire and Seth (2008) in their study on) “Measuring Multidimensional Poverty in India: A New Proposal” focused on the methodology by which India’s 2002 Below the Poverty Line (BPL) census data identify the poor and construct a BPL headcount. The paper also develops a sample Index of Deprivation that responds to criticisms regarding BPL data. They found that, to poor families that would be identified using the same variables with the Alike Foster multidimensional poverty methodology. It finds that up to 12 per cent of the poor sample population and 33 per cent of the extreme poor could be misclassified as non-poor by the pseudo-BPL method.

Suryanarayana and Silva (2008) attempted to verify the question, whether the PDS targeted with reference to estimates of poverty based on monetary

measures of consumption distribution has penalized the set of food insecure identified with respect to a physical measure of consumption. This is carried out with reference to disaggregate estimates of poverty and food deprivation for different regions in India by rural and urban sectors. At the same time, our findings call for reconsideration of the emphasis on targeting with reference to aggregate estimates of poverty at the state level. Regions even within developed states like Maharashtra fall in the poorest quartile at the national level in terms of cereal consumption/ calorie intake. Ideally there is a need to formulate policies with respect all the three different measures of deprivation. The study also provides a regional profile of food insecurity in different dimensions which could go a long way in decentralized formulation and implementation of the PDS.

Do and Iyer (2009) had conducted an empirical analysis of the geographic, economic and social factors that contributed to the spread of civil war in Nepal over the period 1996-2006. Conflict-related deaths are significantly higher in poorer districts, and in geographical locations that favor insurgents, such as mountains and forests; a 10 percentage point increase in poverty is associated with 25-27 additional conflict-related deaths. This result is similar to that documented in cross-country studies. In addition, the relationship with poverty and geography is similar for deaths caused by the insurgents and deaths caused by the state. Furthermore, poorer districts are likely to be drawn into the insurgency earlier, consistent with the theory that a lower cost of recruiting rebels is an important factor in starting conflict. On the other hand, geographic factors are not significantly associated with such onset, suggesting that they instead contribute to the intensity of violence once conflict has started. Finally, in contrast with some cross-country analyses, ethnic and caste polarization, land inequality, and political participation are not significantly associated with violence.

Baiyegunhi and Fraser (2010a) had worked on" Determinants of Household Poverty Dynamics in Rural Regions of the Eastern Cape Province, South Africa. "Their study analyzed a panel dataset on a representative sample of

150 rural households interviewed in 2007 and 2008 in the Amathole district Municipality of the Eastern Cape Province to empirical assess the dynamics of poverty. The result of the study indicates that the number of vulnerable households is significantly larger than for the currently poor households; the vulnerability index was found to be 0,62 compared to 0,56 headcount index in 2008. This implies that while 56 percent of the sampled households are poor (ex post) in 2008, 62 percent are vulnerable to becoming poor (ex-ante) in future.

Maru (2010) examined the magnitude and determinants of rural poverty at Zeghe Peninsula. He used consumption expenditure and Foster-Greer-Thorbeck (FGT) measure of intensity to measure poverty. Data were collected through questionnaire survey from 200 sample households. Based on the FGT result, 68.5% are poor, and 18.7% constitutes the poorest of the poor in the Peninsula (i.e., severity).The percentage shortfall of consumption expenditure of the poor from the poverty line (i.e., depth) is 32.8%. The study concludes poverty is severe in the study area and government and NGOs should target poor properly to reduce poverty significantly and benefit poor accurately in the study area.

Akerele and Adewuyi (2011) done their study on “assessment of household poverty and welfare among households in Ekiti State, Nigeria.” Using a multistage sampling approach, a total of 80 households were selected and interviewed with the aid of well-structured questionnaire. Data collected were subjected to analyses such as descriptive statistics, poverty index and multiple regression analysis. The result revealed the 38.30 percent of the households covered by the study were poor and would have to mobilize financial resources up to 41.80% of 1 US Dollar (N130) per day (for each household member) to be able to escape poverty. Female headed households in the study area appear to be more vulnerable to income poverty with poverty incidence, depth and severity of values 0.221 and 0.239, 0.402 and 0.191, respectively. Highest levels of poverty were found among household with 7-9 dependents with values 1.00, 0.715 and 0.511 for the

incidence, depth and severity of poverty respectively. In order to reduce poverty and promote peoples' welfare, policies that would promote employment opportunities; educational status of household head, spouse and household members as well as efforts to enhance women access to more productive resources and investment in infrastructural development are recommended.

Gov Nepal (2011) had Small Area Estimation of Poverty in corporation with World Bank. The main objective of the study was to provide statistically reliable poverty measures for 2344 areas of Nepal. They applied the small area estimation method developed by Elbers, Lanjouw and Lanjouw to achieve the objective. The study used the Nepal Living Standards Survey 2010/11. The study found that, poverty - both as a rate and headcount - is high in the hilly areas of Far West and parts of Mid-West. The percentage of poor varies from negligible in parts of Kathmandu to 75 percent in parts of Gorkha district. A comparison with the poverty map of 2006 shows that though prosperity is spreading in Nepal, it has a hard time moving West and climbing Hills. Poverty concentration in the East and Central has declined while it increased in the rest. Nearly half the small areas have poverty higher than the national average of 25.2 percent and contain two-thirds of the poor in Nepal.

Pathak and Mishra (2011) had done study on" Poverty Estimates in India: Old and New Methods, 2004-05." Their study provided estimates of poverty and inequality across states and for different sub-groups of population for 2004-05 by using the old and new methods of the Planning Commission. The new method replaces the uniform recall of 30 days for all consumption items to a mixed recall where consumption of five low frequency items were collected for the last year (365 days) and appropriately adjusted to get a monthly per capita expenditure. The study found that, relatively higher incidence of poverty among scheduled tribes in rural areas and scheduled castes in urban areas for social groups and that of agricultural labourers and other labourers in rural areas and casual labourers in urban areas for occupation groups have been

discussed. The study recommended every attempt to define and measure poverty is like treading on the dreams of poor. If poverty measure chosen is going to help them, at least some of these dreams would become a reality. Otherwise they dry like leaves fallen from trees.

Himanshu (2013) attempted to analyze the impact of two of India's largest food security interventions—the Public Distribution System (PDS) and the Mid-Day Meal Scheme (MDM)—on poverty outcomes and on nutritional intake. The preliminary analysis shows the significant impact of the Public Distribution System and Mid-Day Meal in terms of poverty reduction and calorie intake. While there are large variations across states, the analysis shows that the schemes have not only improved efficiency in the last 2 decades but have also contributed significantly to poverty reduction. Almost half of the poverty reduction in the distribution-sensitive measures such as the Squared Poverty Gap (SPG) between 2004–2005 and 2009–2010 is explained by the improved efficiency and coverage of these schemes. There is also evidence that the functioning of these schemes, particularly the Public Distribution System, has improved in recent years. This is particularly true in states that have followed a universal or quasi-universal coverage along with low cereal prices.

Lgbalajobi *et al* (2013) empirically analyzed the "determinants of poverty among rural farmers in Ondo State, Nigeria." Primary data were used and a sample of 285 farm households through a multistage sampling technique was drawn from the study. The data collected were analyzed using descriptive statistics, Foster-Greer-Thorbecke (FGT) poverty measure. The findings revealed that 59.3% of the respondents were actually poor while 27.6% of the poverty line (580.42 USD) was needed to get out of poverty. Therefore, government should design holistic policies that will focus on the factors highlighted above in order to alleviate poverty and improve the welfare of the rural farmers in the study area.

Nepal (2013) results from the National Living Standards Survey reveal a 16% reduction in the number of poor in Nepal between 1995/6 and 2010/11 (World

Bank: forthcoming, Figure 1). Additionally, just over 500 households were tracked in National Living Standards Survey II (2003/4) and National Living Standards Survey III (2010/11) through a panel survey to see if they had graduated out of poverty. Just over 70% were classified as not poor in both surveys, while 6.9% remained poor in both. Of the remainder, close to 10% of the panel households slipped from being non-poor to poor, while 13.3% graduated out of poverty.

Osmani and Abdul Latif (2013) examined "Three aspects of rural poverty in Bangladesh, the trend of poverty over the decade of the 2000s, the evolving pattern of poverty among different population groups over the same decade, and identification of the major determinants of poverty in rural Bangladesh." The study found that, rural poverty has declined at an accelerated pace over the decade of the 2000s and poverty reduction has been a broad-based phenomenon. The rate of decline was not equal for everyone; some groups have fared slightly better than others.

Singh *et al* (2013), "Determinates of Rural Poverty: An Empirical Study of Socio-economic factors in Jharkhand, India". The study concludes that, despite years of concerted efforts rural poverty is rampant in Jharkhand. Although in last couple of decades its pace has reduced but yet in 2009-10 about 36 percent farming households and 47 percent agricultural labour households were poor, indicating that their incomes were less than the threshold income level i.e. annual per capita income of ₹7867, which is required to sustain a minimum living. Interestingly, the rate of decline in poverty is more in agricultural labour class households (27 percent) than that of farming households (1.9 percent). Furthermore, analysis of household data of the sample villages also highlights a high incidence of rural poverty ranging from more than 20 percent in Dubaliya to about 76 percent in Durgapur. Incidence of poverty for four groups of households viz. labour, small, medium and large shows mixed pattern of incidence of poverty. Labour class households and large households were comparatively less poor in most of the villages than that of the other classes i.e., small and medium households.

About 27 to 74 percent populations of labour households were poor according to the headcount measure. Incidence of poverty among large households was in the range of 35 percent in Dubaliya to about 60 percent in Durgapur. Surprisingly, none of the small households in Dubaliya was found to be poor whereas in Durgapur all small households were poor. The severity of poverty was least (0.9 percent) in Dubaliya village, whereas it was highest in Durgapur village (15.4 percent) of Jharkhand where incidence and depth of poverty were also comparatively high.

Adetayo (2014) in his study in Nigeria examined the poverty status of farm households in Ogun State, Nigeria using a descriptive statistics, Foster, Greer and Thorbecke poverty (FGT) indices. The data used were generated from a survey involving 117 farm household's randomly selected using multistage sampling technique. The mean per capita consumption expenditure among the farm households was ₦9,103.85 with the FGT poverty incidence, poverty gap and severity of poverty estimated to be 78.1%, 55.8% and 43.0% respectively. Poverty incidence was found to be higher among male headed (60%) and farming (63.9%) households and those having over five members (66.1%). The study suggested that, government should strengthen the adult literacy education programmes and encourage farmers to expand their farm land for increased production.

Ferdousi Samiya and Dehai Wang (2014) attempted to sketch poverty and inequality trends in Bangladesh. The study found currently one-third (31.5 percent) of its population are living below the poverty line. Moreover, inequality afflicts the persistence of poverty. The average annual rate of poverty reduction in Bangladesh during 2000-2005 was the second highest among south Asian countries. The pace of poverty reduction in Bangladesh is, however, much lower than in faster-growing east Asian countries like China, Thailand, and Vietnam, which underscores the importance of higher growth for achieving even faster reduction in poverty. Since 1991-92, the incidence of poverty has decreased to 31.5 percent in 2010 from 56.7 percent in 1992. From the study, it is evident that, the incidence of poverty is higher in rural

areas than that of the urban areas and the rate of decrease of poverty is also higher in rural areas (1.24 percent) than that of the urban areas (1.13 percent). Both general inflation and food inflation are responsible for raising the income inequality in Bangladesh. Despite steady growth of GDP in last one decade, the general people are suffering more due to higher growth in household expenditure and food inflation in compare with growth in income. The analysis shows a clear picture of the current trend of poverty and inequality in Bangladesh.

Thapa *et al.* (2014) their study intended to analyze the major determinants of rural poverty. A two stage sampling method was applied to generate cross sectional data by randomly selecting 279 households from one Village Development Committees of six districts of Western Development Region of Nepal. In this study 33% percent of households were lying below poverty line as per the poverty scoring method.

Melkamu and Bannor (2015) worked for a better understanding of the poverty situation in terms of incidence, gap and severity in Chencha district. 250 farming households were drawn using systematic random sampling proportionate to household head techniques. They found that, the proportion of poor people in the study area is estimated to be 56.4% representing almost half of people living in the study area which are unable to meet a monthly per capita consumption expenditure of 315 Birr. National results shows that, the poor households require only 7.8% expenditure per capita to reach the poverty line at national level but our research shows a requirement of 47.4 % that is 39.6% more to escape from poverty group. Poverty severity index is 0.404 at the study area but it is 0.031 at national level indicating government policy intervention should target this 40.4% of the poorest among the poor; these are the group of people or as it were the percentage of the population in Chencha district that needs policy intervention by the government and other stakeholders.

2.3 Review of related literature on Determinants of poverty

Ben and Welch (1976) found that poorer families may be slower to respond to a fall in child death rates, as they base their expectations of infant mortality rates on the experiences of their parents and others in their parent's generation i.e. there could be imperfect information. Poor families may also tend to have more children because they are more likely to be located in poorer regions where the probability is greater that a single child will not earn enough in adulthood to support his parents.

NCAER (1986a and 1986b) provides an analysis of the mobility of the rural households in India based on the panel data of 3139 households collected for 1970-71 and 1981-82. The study notes both upward and downward movement of the households across income classes. The factors associated with the upward movement of households in the lower income categories were identified as more 'intensive use' of labour resources and acquisition of land. The factors associated with the downward mobility were loss of land and rigidities in inter-occupational mobility. The study notes that education, caste and demographic factors were important in explaining changes in per capita income over the period.

Gupta.S (1987) in his study found that, inability to control family size is a component of poverty and large families rise dependency, increase labour supply, it affects asset accumulation, chance of mortality is high, family asset is divided among family members which means less per capita income. So, large family size increases the chance to fall in to poverty. Further, he also recognized that, the majority of the poor belong to the joint family (64.2 percent) and the size of their families is large consisting of 5 to 7 and more members. The rural poor's families are larger than that of the urban poor's families and the poor want many children and do not care how many they have (Stycos, 1963). The wrong certainty on large family size for security and to future income of the poor is affecting present life of the poor.

Gaiha (1988) notes that the factors that enabled the cultivating poor to overcome poverty included greater access to cultivable land combined with modern agricultural inputs and “escape from poverty was not a result of growth trickling down to the rural poor.

Lanjouw and Stern (1991) examined definition, identification, and determinants of poverty in the village of Palanpur in North India. The meaning and identification of poverty are examined using three indicators of standard of living in the North Indian village of Palanpur. A comparison of these three indicator shows that income measured in any one year may give a misleading impression of the incidence of poverty. The risk of poverty for households is calculated. Vulnerability is high among low-caste households and those which are involved in agricultural labor. Categories however are not homogeneous; for example, whereas the landless and widows are more likely to be poor, some of such households are quite well off. It is argued that poverty in a good agricultural year is a better indicator of sustained poverty than poverty in a bad year. Occupational mobility out of agricultural labor is low, and changes in the distribution of land are largely accounted for by demographic processes such as household splits.

Noponen Helzi (1991) used a panel of 300 poor women informal sector workers and their households in Madras city over a five-year period (1980-85) to focus on the key role women play in sustaining poor households despite constrained labour market choices. On average, 4 economic stress events affected the sampled households over the 5 year study period. The event with the greatest influence on the sampled households combining aspects of occurrence and magnitude was illness. The stress of fire or flood related house damage was also prominent. The overwhelming response to economic stress events was ‘indebtedness’. As economic stress events hit the family over time, women helped by increasing earnings, adding on secondary jobs, utilizing their earning status to obtain loans from a variety of sources, sacrificing their subsidized business loan for family debt repayment, and foregoing personal expenditures and leisure.

Singh and Binswanger (1993) used longitudinal data collected by ICRISAT from 218 rural households from six villages in India's Semi-Arid Tropics (SAT) for a period of nine cropping years from 1975-76 to 1983-84. They found that: Poverty was closely associated with the resource base of the people in addition to their personal characteristics. Compared to the non-poor households, the poor cultivating households had poorer quality land, poorer resource base, lower risk bearing capacity, stronger subsistence orientation and a stronger preference for coarse gains in their cropping pattern. The initially poor, who escaped poverty experienced a decline in their family size by more than one member. At the same time, the initially non-poor households, who became poor, experienced an increase in their family size by more than one member. Poor households who remained poor neither accumulated wealth nor reduced liabilities. Households who remained poor or became poor lost considerable operational area, while those who escaped poverty were able to maintain their operational holding sizes in the face of increased demographic pressure. The same group was also able to increase its irrigation level. The percentage gains in income over the period did not differ much across these caste groupings. Out of 218 rural households studied over time, 131 were initially poor. After nine years, 48 of these households had income above the poverty line threshold. Nine of the initially 87 non-poor households became poor despite considerable growth in the average income of the sample. However, they point out that generalizations of these results should be made with caution because the sample selected for the study could not remain truly representative after a period of nine years.

Grootaert and Kanbur (1995) used the CILSS multipurpose panel data set for Cote d'Ivoire for around 700 households in 1985-86, 1986-87 and 1987-88 and found that over the 1985-88 period despite recession, there were numerous people who luckily bucked the trend and escaped poverty and that they were widespread regionally, although in some socioeconomic groupings the poor had higher chances of escaping poverty amidst general decline.

Dennis A. et al (1996) explained the impact of family size on poverty differently. They explained, family size is believed to perpetuate poverty in the next generation because children from large families are less likely to be educated and less likely to receive nutrition adequate for normal development.

Wlodzimier Okrasa (1999) used four-year panel data from Poland's Household Budget Survey to explore the distinction between transitory and long-term poverty and examine poverty mobility. The section of population that could minimize or avoid chronic poverty in Poland included those living in urban areas, headed by older and better educated, with few children and unemployed members and possessing financial or physical assets. Households with a larger kinship network faced significantly less danger of falling into chronic poverty or vulnerability.

Grootaert, Kanbur and Oh (1997) explored the role of household characteristics especially human and physical assets in addition to region of residence and socioeconomic status in differentiating those who escape from poverty from those who remain poor. He found that, both initial conditions and pattern of changes in endowment affected changes in welfare. In urban areas households that were more successful in raising their welfare levels and escaping poverty despite the economic decline, were those who were well educated, (skills more than diplomas) with young heads of household, few children and holding a wage job, preferably in the public sector. In rural areas, those households that had fewer members, heads younger than 45 years of age, with larger and better equipped farms and with a non-farm source of income (diversified sources of income) were most likely to achieve welfare gains. Education played a smaller role in rural areas. Female headed households did better than male headed households and export crop farmers did better than food crop farmers. In both urban and rural areas, household size and composition were important. Region and socioeconomic status are strong predictors of welfare change. Finally he suggested for policy makers include the relevance of education in coping with economic declines, targeting social safety nets to larger households, providing support targeted at children

through school lunches or subsidized uniforms, and support to small holders who are more vulnerable to welfare losses in periods of overall economic decline. They suggest using age of (older) head of household and number of durables owned by the household as useful in identifying target households.

World Bank (1997) document on “India: Achievements and Challenges in Reducing Poverty” also indicated that, the incidence of poverty was highest of all among the landless wage-earners who provide largely unskilled labor in markets where the prevalence of long-term contracts has been declining and wages remain too low to lift casual laborers from the bottom rungs of the ladder.

Jean and Mamta (1999) found that women’s education is the most important factor explaining fertility differences across the country and over time. Female education can be expected to reduce desired family size for a number of reasons. First, education raises the opportunity cost of women's time and, generally, opens up greater opportunities for women that often conflict with repeated child-bearing. This may lead educated women to want fewer children. Second, in a country such as India where there is marked son preference, the education of women may reduce their dependence on sons for social recognition or support in old age. This too may lead to some reduction in desired family size, to the extent that large families are the consequence of a desire for an adequate number of surviving sons. Third, educated women may have higher aspirations for their children, combined with lower expectations of them in terms of labour services. This may also reduce desired family size, especially if there is a trade-off between the number of children and the time available for each child. Fourth, educated women may be more receptive to modern social norms and family planning campaigns. For example, according to the National Family Health Survey (1992-3), less than 60 percent of illiterate women in India consider family planning messages in the media to be ‘acceptable’, compared with over 90 percent of women who have completed high school education (International Institute for Population Sciences, 1995, Table 6.28). The overall negative

relation between female education and desired family size is borne out in a wide range of studies.

Kurosaki (1999) used a household panel data set collected by ICRISAT covering three villages from 1975-1984 to investigate the dynamics of individual consumption and its fluctuation due to shocks across households. The complete panel data set comprised 35 households in Aurepalle, in Andhra Pradesh, 33 in Shirapur, Maharashtra and 36 in Kanzara, Maharashtra. The econometric results indicated that risk was shared among villagers in that more wealthy households served as implicit insurance providers. This also implied that more landed households were likely to extract more on average from less wealthy villagers in exchange for the insurance service. In the long run, this could lead to increased inequality in asset accumulation and isolation of the poor from economic growth.

Sen A. (1999), based on his thinking that development is “a process of expanding the real freedoms that people enjoy” and he suggested that education contributes to development directly, because of its relevance to the well-being and freedom of people, indirectly through influencing social change, and economic production. He concluded, education is potentially good for income generation, but it also has a strong potential to improve a person’s self-esteem.

Baulch and Hoddinott (2000) emphasized on the importance of data sets that permit analysis of poverty dynamics to help reduce errors of inclusion and exclusion, and design safety net and other policies intended to protect the vulnerable. Some of the poverty observed in one time surveys is due to consistently low welfare levels while some of it is due to short term shocks. They provide information on households that are always poor, sometimes poor and never poor for 13 different panels located in 10 different countries. The range of estimates of those in chronic poverty varies from an unbelievably low 3% for Pakistan to a high 33% for India and 54% for Chile.

Jalan and Ravallion (2000) used panel data from 5854 households in China to identify factors that determine transient and chronic poverty. They include as explanatory variables household specific human and physical assets, and community effects. They find that while 6.21% of the population was persistently poor or poor at all dates, 14.38% had mean consumption below the poverty line, but was not poor at all dates. Further these estimates rose to 39.56% and 30.46% respectively if the poverty line was raised by 50%. Both chronic and transient poverty are reduced by greater access to physical capital and life-cycle effects are also similar between the two types of poverty. Demographic characteristics and human capital indicators such as literacy, having a household member with a job outside the village or town, living in a revolutionary base area or a minority area as also higher grain yields seem to be more important for chronic poverty than for transient poverty.

McCulloch and Baulch (2000) used a 5 year panel of 686 households to show that different types of anti-poverty interventions may be needed to address chronic and transitory poverty. They examine the impact on chronic and transitory poverty of two types of policy simulations – those designed to smooth incomes over time (such as safety nets, micro credit and insurance schemes) and those designed to promote income growth. Interventions that enable households to smooth their incomes might achieve large reductions in transitory poverty but make little difference to chronic poverty, which is reduced by large and sustained growth in real incomes. They also find that provision of child benefits of as little as Rs.100 to each child could dramatically reduce poverty as also improving education via educational subsidies, especially education of the household head. They conclude that while interventions to improve human and physical capital of the poor are likely to be successful in the long run in reducing chronic poverty, in the short term large reductions in income poverty could be achieved through smoothing incomes for instance through provision of micro-credit, seasonal public works, crop insurance and food price stabilization schemes.

Shenggen *et al.* (2000) has done study using state-level data for 1970–93, a simultaneous equation model was developed to estimate the direct and indirect effects of different types of government expenditure on rural poverty and productivity growth in India. The results show that in order to reduce rural poverty, the Indian government should give highest priority to additional investments in rural roads and agricultural research. These types of investment not only have much larger poverty impacts per rupee spent than any other government investment, but also generate higher productivity growth. Apart from government spending on education, which has the third largest marginal impact on rural poverty and productivity growth, other investments (including irrigation, soil and water conservation, health, and rural and community development) have only modest impacts on growth and poverty per additional rupee spent.

Ray B. (2000) documented land is the basic item of the rural folk. Its ownership, size and use determine the economy of a household. Therefore, unemployment and poverty tend to vary with the size of the land holding in rural India.

Melin (2001) addressed poverty education relationship as; education can reduce poverty, through its influence on productivity and earnings – while poverty leads to education deprivation. It has been argued that the mutually reinforcing cyclic relationship between education and income poverty can be broken effectively by concentrating on education development of the poor. He concluded that, education is not a way to escape poverty - It is a way of fighting it.

Silva and Hettihewage (2001) focus on poverty, social exclusion and the impact of selected legal measures against caste discrimination in South Asia. They analyze how the lowest caste is looked at in terms of how they are affected by their position in society and discuss the issues involved with the reservation system in trying to help the untouchables get out of poverty. Based on their analysis, they conclude that, even though the caste system

primarily encompasses a value system applicable to ritual domain and social relations, it also determines the relative worth and level of dignity of human beings, affecting their overall position including their livelihood security, freedom, and adaptation to a modern market economy.

UNESCO (2001) in “International Workshop on Education and Poverty Eradication Kampala” addressed that, poor children have numerous disadvantages in relation to their better-off counterparts. They are usually less healthy, their language skills less developed (a factor that has negative influence on school achievement), and they are generally less well equipped - socially, emotionally and physically - to undertake a school programme. If their disadvantaged position and different day-to-day experiences are not taken into account by school education, it is no wonder that they are unable to benefit fully from the school system.

Gaiha and Imai (2002) used panel data for 183 households belonging to 5 sample villages in Andhra Pradesh and Maharashtra (i.e., two states of India - ICRISAT data) for 1975-84 to assess the impact of crop shock. They note that large segments of rural households experience long spells of poverty (over 3 years) even without negative crop shocks. Occurrence of crop shocks leads to an increased proportion of households experiencing short spells of poverty (1to 2 years). There is greater vulnerability of low caste households and small farmers to long spells of poverty when large or severe crop shock occurs. They note with concern that much larger transfers of land and non-land assets are needed if vulnerable sections such as landless households in the lowest caste category are to protect themselves better against crop shocks. Anti-poverty strategy needs to be reoriented in view of this.

World Bank (2002a) outcome on assessing the welfare impacts of rural roads poses a number of problems, with implications for data collection and evaluation methods. The paper reports on a study being conducted to assess the impacts on living standards of World Bank rural road rehabilitation project in Viet Nam. The evaluation approach combines double differencing with

propensity score matching. Subject to a number of caveats, preliminary findings suggest impact on road quality in the project communes along with a shift in rehabilitation efforts from earth to sealed roads. We find that the project was to some extent targeted to poor communes and that time savings were most pronounced for the poorest households.

World Bank (2002b) identified that, a rationale for public investment in rural roads is that households can better exploit agricultural and nonagricultural opportunities to employ labor and capital more efficiently. This study examines the impacts of two rural road-paving projects in Bangladesh using a new quasi-experimental household panel data set surveying project and control villages before and after program implementation. Rural road investments are found to reduce poverty significantly through higher agricultural production, lower input and transportation costs, and higher agricultural output prices at local village markets. Rural road development has also led to higher secondary schooling enrollment for boys and girls, as compared to primary school enrollment. It found that road investments have also benefited the poor, meaning the gains are significant for the poor and in some cases disproportionately higher than for the non-poor.

Binayak Sen (2003) in his study on" Drivers of Escape and Descent: Changing Household Fortunes in Rural Bangladesh" analyzed a panel data set of 379 rural households from 21 villages in Bangladesh for 1987-88 and 2000 to find that the drivers of escape from poverty and descent into poverty are not mirror images of each other. Escape from poverty is based on overcoming structural obstacles by pursuing multiple strategies such as crop intensification, agricultural diversification, off-farm activity and irrigation that permit rapid accumulation of a mix of assets. Descent into poverty is associated with lifecycle changes and crises like floods and ill-health. The likelihood of escape from poverty and entry into it is sensitive to initial asset position. The pattern of livelihood change has been of a lower quality and potential and increased at a slower pace in the case of the chronic poor than were changes observed for ascending households. Ascending households

were found to be faster accumulators of human, physical and financial assets, better diversifiers, with regard to adopting modern varieties of rice and occupational diversification to higher productivity non-agricultural activities. They showed increased supply of labour with declining dependency. The pace of improvement in human capital (years of schooling) was highest for ascending households. The key causes of downward mobility were crisis or discrete shocks, unfavorable lifecycle factors and structural factors such as loss of natural or human or financial assets or adverse market conditions.

Gupta and Dubey (2003) also justified age dependency as, larger families, especially those with larger numbers of children, are likely to have a lower per capita income simply because of the high dependency ratio. Child labour may mitigate this effect somewhat, but children are not paid much. More significantly, poverty may actually feed on itself by creating the incentive to have a large number of children. Poor households in developing countries may be more likely to invest in children as a source of support in old age, to compensate for missing markets in life insurance and social security. Infant mortality is another factor, in that families that expect higher mortality rates (such as the poor) may choose to have more children to compensate for this possibility.

Ira *et al.* (2003), in their study on "Caste, Ethnicity and Poverty in Rural India", they analyzed determinants of rural poverty in India, contrasting the situation of scheduled caste (SC) and scheduled tribe (ST) households with the non-scheduled population. The study used household survey data from the 50th round of the National Sample Survey conducted in 1993-1994. They applied a probit decomposition analysis method. The analysis revealed that the incidence of poverty among SC and ST households is significantly higher than among non-scheduled households (the poverty rate gap) and for SC households, differences in characteristics explain the gap in poverty rates more than differences in coefficients; while for ST households, it is the reverse. The study further showed differences in educational attainment explain approximately one quarter of the poverty rate gap for both social

groups and occupational structure is very influential in determining the poverty rate gap for both SC and ST, as do differences in returns to individual occupations. Analysis results indicate that poverty rates are not very different between SC and ST households. The study further concluded that the underlying factors accounting for the higher incidence of poverty in these social groups are not the same.

Javier and Carmen (2003) worked on "The Benefits of Rural Roads: Enhancing Income Opportunities for the Rural Poor." The study evaluated the benefits of rural roads on their impact on key welfare indicators such as income or consumption. Looking at rural households living in some of the poorest districts of Peru, this study compares (using propensity score matching techniques) households located near rehabilitated roads to suitable controls. Results show that rehabilitated road accessibility can be related to changes in income sources, as the rehabilitated road enhances non-agricultural income opportunities, especially from wage- employment sources. The study also finds that income expansion is not been matched by an equivalent consumption increase; apparently because the additional income is allocated to savings, through increments in livestock, most likely because road quality improvement is being perceived as transitory.

Finan *et al.* (2004) studied on "Measuring the Poverty Reduction Potential of Land in Rural Mexico." The sole purpose of the paper was to analyze the heterogeneity in marginal returns to land for poor households endowed with little land. Their research helped to inform the past debate on the role of land as an instrument for poverty reduction. They analyzed the conditions under which access to land reduces poverty in Mexican rural communities. Semi-parametric regression results show that access to even a small plot of land can raise household welfare significantly. For smallholders, an additional hectare of land increases welfare on average by 1.3 times the earnings of an agricultural worker. In addition, the marginal welfare value of land depends importantly on a household's control over complementary assets such as education and on the context where assets are used such as road access.

Hussain and Hanjra (2004) identified the linkages between irrigation and poverty using research. Cropping intensity difference, one of the intermediate indicators of poverty, is higher in the irrigated setting than the rainfed setting. The availability of irrigation facilities has therefore enabled farmers to raise nearly an extra crop a year, with consequent implications for household food security. Similarly, there is a body of empirical studies that show that household income is higher in the irrigated than the rainfed setting, and poverty is lower. Although these studies do not use common income categories and yardsticks to allow meaningful comparisons, whatever the units used, income in irrigated settings is higher than in the rainfed, and a 50 percent point gap is not uncommon. Also income inequality is lower in irrigated than rainfed settings, at least for these studies.

Mehta and Bhide (2004) using data collected for a study by NCAER in the late 1960s to measure changes in income levels and income distribution and their impact during three consecutive years, 1968-69, 1969-70 and 1970-713. The results of their regressions show that caste, tribe and demographic composition of households were very important determinants of poverty. Ownership or access to income from cropland, house and livestock as also larger size of village had poverty reducing effects. Larger households with more children have greater probability of being poor than the smaller households. Larger proportion of females in the household increased the probability of a household being poor in 1970-71 but was not significant in 1981-82. Literacy and age of head of household were not significant in 1970-71 but older and literate head of household had poverty reducing effects in 1981-82. Factors that explain persistence of poverty are belonging to a scheduled tribe, larger household size, increase in household size, larger number of dependent children and increase in number of dependent children. Factors determining persistence of severe poverty were the same as those for poverty. Belonging to a scheduled tribe did not cause persistence of moderate poverty. Factors that drive escape from poverty are literacy, ownership of or access to income from physical assets such as cropland, livestock, house and increases in incomes from these physical assets. Infrastructure and having a

large urban population in the neighborhood were other factors that helped exit from poverty.

Radhakrishna *et al.* (2005) studied on" Estimation and Determinants of Chronic Poverty in India: An Alternative Approach" to improve their understanding of the determinant of chronic poverty by considering economic, demographic and social factors. It attempts to answer the following questions: How important a determinant of chronic poverty is household income? What factors inhibit escape from chronic poverty? How different are the other poor from chronic poor? They used the unit level National Sample Survey and National Family and Health Survey data. They have examined the determinants of chronic poverty in India. Their main conclusions are as follows. Demographic pressure, low wage rate for households offering labour in rural and urban areas, low household income, and social factors have significant impact on chronic poverty. The probability of a household falling into chronic poverty increases with household size, number of children per household, dependency ratio; and decreases with household expenditure and number of days of work put in by a household. Agricultural labour in rural areas and casual labour and self-employed households in urban areas among the occupational groups and scheduled caste households both in rural and urban areas among the social groups are the core chronic poor groups.

Rao (2005) on his study on "poverty in India: Global and Regional Dimensions" found that the coefficient of the dependency ratio variable is found significant at 1 percent level in the equation of all tribes medium and large farms.

Birthal and Taneja (2006) found that livestock, draft animals and poultry are also considered as disposable assets, and have positive impact on the household livelihood. Livestock follows an expected pattern of diminishing marginal returns with significant and negative coefficients on the squared terms. It is also noticed that draft and poultry also follows diminishing marginal returns with significant and negative coefficients on the squared

terms. One of the reasons for the diminishing returns for both livestock as well as draft animals could be the high maintenance cost associated with larger numbers of the same. At the household level, its contribution is much more in the case of small landholders who comprise a sizeable proportion of rural households, and control bulk of the livestock resources.

Bhatt (2006) significantly addressed the asset as, across land size category nearly one-third and two-third of landless households are very poor and below the poverty line respectively. Across class and land size group, the percentage of households from very poor to poor and further to rich show a continuous progressive pattern in terms of social hierarchy and land size ownership. Half and two-third of households belonging to agricultural labour class and landless size groups are very poor or poor.

Bhatta and Sharma(2006) studied poverty dynamics in Nepal by analyzing the determinants of chronic and transient poverty using data from a nationally representative panel of 962 households surveyed in 1995/96 and 2003/04. In studying the determinants of poverty, they focus on three factors, namely ethnicity, human capital and wealth. Their multinomial logit regression results indicate that while household wealth and human capital have a significant association with both chronic and transient poverty, they are more strongly related to chronic poverty. Another important factor related to poverty is the intensity of violent conflict in the household's district. Ethnicity, on the other hand, does not have a significant relationship with either type of poverty. Their investigation of the effects of transient and chronic poverty on human capital accumulation reveals that, on average, the chronically poor have a lower level of human capital. This gap can be largely explained by the differences in the characteristics of the chronic and transient poverty groups. Their findings suggest that since both the transient and chronic poor occur in large numbers, the government should have concrete policies to address both types of poverty. In particular, emphasis on human capital development and rural asset enhancement could have a beneficial impact on both transient and chronic poverty.

Baulch and McCulloch (2007) investigated the factors that are associated with movements into and out of poverty and show that the correlates of entries and exits differ from correlates of poverty status. Important correlates of poverty status are dependency ratio and geographic variables. Important correlates of increasing exit and decreasing entry include education and livestock ownership. They argue that there is considerable movement in and out of poverty and this occurs as shocks and changing circumstances force households below or above the poverty line before opportunities or shocks help them surface above or push them under it and that this has important implications for policy interventions. Therefore, reducing the poverty headcount would require that attention is focused on increasing exits from and decreasing entries into poverty rather than on the correlates of poverty status. However, they also note that the relatively few longitudinal household studies for South and East Asia "seem to confirm this characterization of poverty as a temporary phenomenon.

Ali J. (2007) studied on" Livestock sector development and implications for rural poverty alleviation in India." his research also found that, the regression analysis of relationship between poverty and livestock income has shown that, growth in livestock sector contributes more towards poverty reduction. These results indicate that livestock can be used as an effective tool for reducing rural poverty. Accordingly, livestock ownership determines household poverty in India.

FAO (2007) conducted survey in India and found that, land is the most important asset among rural households. As such, the landless and marginal farmers happen to be among the poorest families in different states. More specifically, households with less than one hectare have more than the average poverty level.

Huang *et al.* (2007) examined the major driving forces of poverty reduction in China. Based on time series and cross-sectional provincial data, the determinants of rural poverty incidence are estimated. The results show that

economic growth is an essential and necessary condition for nationwide poverty reduction. It is not, however, a sufficient condition. While economic growth played a dominant role in reducing poverty through the mid-1990s, its impacts has diminished since that time. Beyond general economic growth, growth in specific sectors of the economy is also found to reduce poverty. For example, the growth the agricultural sector and other pro-rural (vs urban-biased) development efforts can also have significant impacts on rural poverty. Notwithstanding the record of the past, their paper was consistent with the idea that poverty reduction in the future will need to rely on more than broad-based growth and instead be dependent on pro-poor policy interventions (such as national poverty alleviation programs) that can be targeted at the poor, trying to directly help the poor to increase their human capital and incomes.

Okwi *et al.* (2007) studied on "Spatial determinants of poverty in rural Kenya*",* to investigates the link between poverty incidence and geographical conditions within rural locations. Evidence from poverty maps for Kenya and other developing countries suggests that poverty and income distribution are not homogenous. They used spatial regression techniques to explore the effects of geographic factors on poverty. Slope, soil type, distance/travel time to public resources, elevation, type of land use, and demographic variables prove to be significant in explaining spatial patterns of poverty. However, differential influence of these and other factors at the location level shows that provinces in Kenya are highly heterogeneous; hence different spatial factors are important in explaining welfare levels in different areas within provinces, suggesting that targeted pro-poor policies are needed. Policy simulations are conducted to explore the impact of various interventions on location-level poverty levels. Investments in roads and improvements in soil fertility are shown to potentially reduce poverty rates, with differential impacts in different regions.

Radhakrishna *et al.* (2007) in their study on "Estimation and Determinants of Chronic Poverty in India: An Alternative Approach". The study was done

mainly to identify determinants of chronic poverty by considering economic, demographic and social factors. They used unit level NSS (National Sample Survey) and NFHS (National Family and Health Survey) data. The study found that, demographic pressure, low wage rate for households offering labour in rural and urban areas, low household income, and social factors have significant impact on chronic poverty. The probability of a household falling into chronic poverty increases with household size, number of children per household, dependency ratio; and decreases with household expenditure and number of days of work put in by a household. Agricultural labour in rural areas and casual labour and self-employed households in urban areas among the occupational groups and scheduled caste households both in rural and urban areas among the social groups are the core chronic poor groups. The study recommended higher wage rate is of crucial importance for lifting labour households from poverty. Roughly they estimated 60 percent increase in per capita expenditure is required to lift all of the chronic poor households from poverty.

John M. *et al.* (2009) on their book entitled "Chronic Poverty in Asia, Causes, Consequences and Policies" clearly identified that, family size also matters. They conclude that, the larger the family, the greater the probability of suffering from chronic poverty. Large families are 2.5 times as likely to be poor as smaller families.

Rajaram (2009) in his study on "Female-Headed Households and Poverty: Evidence from the National Family Health Survey" has found that, households with higher child-adult ratio have a higher probability of being poor under all measures of poverty and the coefficient estimates are statistically significant at less than the 1% level in all the columns.

Sabina and Suman (2009) in their study on "Measuring Multidimensional Poverty in India: A New Proposal". They focused on the methodology by which India's 2002 Below the Poverty Line (BPL) census data identify the poor and construct a BPL headcount. The analysis revealed existence of

significant differences appeared, with under-coverage and over-coverage rates of up to 33 per cent, which, despite the differences in dimensions, bears consideration. The study also found that up to 12 percent of the poor sample population and 33 percent of the extreme poor could be misclassified as non-poor by the pseudo-BPL method. Multidimensional poverty in Jharkhand is driven by asset deprivation, low air quality, and poor quality of work, with nutritional deficits and disempowerment also contributing significantly. In Gujarat, nutrition ranks as the leading contributor to poverty, followed by deprivations in women's empowerment and air quality. The study recommends nine dimensions, which were living standard (housing, electricity), health, water and sanitation, air quality the household members breathe in, assets, education, livelihood, child status, and empowerment.

Baiyegunhi and Fraser (2010b) studied on" Determinants of Household Poverty Dynamics in Rural Regions of the Eastern Cape Province, South Africa." Their study analyzed a panel dataset on a representative sample of 150 rural households interviewed in 2007 and 2008 in the Amathole district Municipality of the Eastern Cape Province to empirical estimate the determinants of households' vulnerability to poverty. The result of the Probit model shows that the age, level of education and occupation of the household head, dependency ratio, exposure to idiosyncratic risks and access to credit are statistically significant in explaining a households' vulnerability to poverty.

Bhide and Mehta (2010) in India found factors that explain persistence of poverty are belonging to a larger household size, increase in household size, larger number of dependent children and increase in number of dependent children. All this literature indicates, family size determines household's poverty.

Krishna (2010), amazingly concluded education level of the household head did not make a significant difference to the probability of escape from poverty. Compared to households headed by illiterate individuals, the odds of escaping poverty were not significantly different for other rural households. On the other

hand, the risk of descent was significantly lower among households whose heads had secondary or higher levels of education, although having only primary education did not convey the same advantage. Information matters separately from education.

Krishna and Shariff (2010) identified escaping poverty in rural areas requires developing a connection with the city. Households residing in villages located fewer than five kilometers from the nearest city and connected by better bus services and denser telephone links had significantly higher odds of breaking out of poverty. Households who derived a higher share of income from non-farm sources in 2004-05 compared to 1993-94 had a significantly higher chance of escaping poverty.

Krishna and Shariff (2010 a) concluded that possession of rural-origin material assets–such as agricultural land as well as other material assets (indicated by households' scores on the asset index) significantly reduced the odds of falling into poverty, but it did not improve the prospects for escaping poverty. Thus, in agrarian economy, land size matters on household's poverty.

Krishna and Shariff (2010 b) found women's media exposure, is strongly related to both escape and descent to poverty. Having better informed women in one's household resulted in raising the odds of escaping poverty and lowering the risk of falling into poverty. They finally conclude that, women's education matters in family livelihood improvement, different literatures supported this idea with research.

Maru (2010) identified determinants of rural poverty at Zeghe Peninsula. He used the logit model were used. The study found that, variables like large land holding size, better suitability of land for coffee production, participation of households in contractual farming activities, engagement of households in petty trading, beekeeping and fishing activities decreased the probability of households to be poor. High dependency ratio and participation of households in firewood-selling activities increased the chance of households to fall into

poverty. This implies that any development endeavor that aims at improving the welfare of people of the Peninsula should focus on these correlates of poverty.

Gupta and Dubey (2011) in their working paper using household micro data from the 1993-94 Indian Quinquennial Survey (5th wave), found fertility significantly and positively affects poverty and poor household have larger family sizes.

FAO (2011) household level study concludes that, livestock contribute to household livelihoods through a variety of direct and indirect pathways. Firstly, livestock provide cash income or income in kind through the sale of animals and / or the sale and consumption of milk, meat, eggs and other animal products. Second, livestock are a form of savings (capital growth through herd growth) and insurance, as the sale of animals provides immediate cash to deal with significant or unexpected expenditures (for example, school or medical fees). Third, livestock provide manure, draft power and transport services, which can be used on the household farm or exchanged on the market (for example, rental of bull for ploughing). Fourth, being a source of wealth, livestock not only contribute to social status but may possibly facilitate access to financial services, both in formal and informal markets. Finally, because some livestock can be kept close to the homestead and require few labour inputs, such as a small flock of poultry birds, these can be tended by women while managing other time-consuming activities (for example, cooking or child care), thereby falling under their control and providing some degree of empowerment. Given these diverse outputs, which comprise both monetized and non-monetized goods and services, it is difficult to quantify the overall contribution of livestock to household livelihoods, and only few have tried (Alary et al., 2011; Moll, 2005; Moll et al., 2007).

Hashmi and Sial (2011) studied on “Trends and Determinants of Rural Poverty: A Logistic Regression Analysis of Selected Districts of Punjab.” The main purpose of their study was to identified the factors responsible for path

ways out and in among rural households or associated with the poverty status. For this purpose the variable associated with the poverty status and poverty line used in this study were compared. A logistic regression model was estimated with a wide range of household's characteristics (explanatory variables) to explore the determinants of poverty status. The results showed that the chance of a household being poor increased due to its household size, dependency ratio and residential district. The chance of being poor is higher for a household living in Attock. The probability of being poor decreased with a greater number of adults male and female members of households. The level of the household heads basic education had also negative relationship with poverty. Where the household assets such as land owner ship, value of livestock also reduced the chance of being poor, while the household operating 0.5 acres and more also less poor. This emphasized on the redistribution of the land (irrigated and rain-fed both) because land distribution pattern is much skewed in rural Pakistan.

Kumar *et al*.(2011) in their study on "Rural Poverty and Agricultural Growth in India: Implications for the Twelfth Five Year Plan" used log-linear regression model to identify determinants or causes of poverty in India. They used secondary data from NSSO and CSO, Government of India. The study found that, with one per cent growth in per capita agricultural output, the poverty would be reduced by 0.97 per cent. Wages are the major source of rural households and improvement in wages would significantly reduce the poverty of rural households. A significant negative association between poverty and literacy suggests that the education plays an instrumental role in rural poverty reduction, asserting for greater investment on human resource development in the rural areas for inclusive growth. Finally, the study suggested that, there is an urgent need for substantial increase in public investments in irrigation, rural infrastructure (roads and power), research and development, etc.

Rani and Schmid (2011) in their study found, dependent household members significantly increase the probability of being poor. In the absence of any social security benefits or pensions, the elder depend on their families once

they stop working. The marginal effect shows that the presence of persons above 64 years significantly raises the risk of poverty for the household with not much change in the nineties (5.4 percent). The effects have declined quite substantially from 1983 (7.9 percent).

Malik *et al.* (2012) in their study on “Analysis of Rural Poverty in Pakistan; Bi-Model Estimation of Some Selected Villages” focused on poverty, particularly poverty prevalence in rural areas where majority of people are bearing the burden of this nemesis. The study used primary data collected from three villages of Punjab province of Pakistan and used multiple regression methodology. They found that, 36.69 percent people are living below extreme poverty line, 14.93 percent households are ultra-poor and 11.04 percent are poor. It also shows that 7.47 households are ultra-poor and 12.66 are quasi non-poor while only 17.20 percent households are non-poor. The Study suggests that these determinants play an important role in poverty alleviation and betterment in these determinants can remarkably decrease poverty level in rural areas of Pakistan.

Rajarshi (2012) in his study on “Removing poverty and inequality in India: the role of infrastructure”. The main objective of his study was to see the association between infrastructure, well-being and poverty in a static framework. The study used secondary data from NSS. The study found the association between infrastructure, poverty and well-being using correlation, cross-tabulation and multivariate regression methods. Finally the study revealed that infrastructural availability at the regional/district level has impacts on both average living standards as well as the income distribution in terms of lowering the proportion of people living below the poverty line. At the same time, some components of infrastructure – the physical sectors – tend to increase inter-personal inequality at the regional level. Dynamic relationship reveals positive association between expansion rates of infrastructural facilities and growth of consumption and reduction in incidence of poverty. The study recommended that expansion of regional infrastructural facilities

enhances average consumption level of the people and reduces the proportion of people living below poverty line. At the same time, these impacts are not uniform across the populace, and are accompanied by increased inequality within the region/district. Availability of education and health facilities however leads to both lowering of poverty and convergence through reduced interpersonal inequality. The study emphasizes the importance of focused and regionally segregated infrastructural development for raising living standards and alleviation of poverty in India, along with adequate attention to social infrastructure to prevent increased inequality.

Dutta S. (2013a) in his study on "Poverty to Vulnerability in Indian Rural States: An Asset Based Approach" with designed objective to bring new area of poverty measurement. He used "The India Human Development Survey data (IHDS) 2005". Finally he found and conclude that, among the various assets, land size and its square value has a positive significant impact on the household livelihood with a coefficient of 0.04 and 0.02 respectively. The result indicated that, as household's land size increases, it has a significant positive impact on the household income relative to poverty line income. This outcome suggests an increase in land size has a direct positive increase in the household income and reduce poverty.

Dutta S.(2013b) in his study on "Poverty to Vulnerability in Indian Rural States: An Asset Based Approach" also addressed determinants of household poverty and found that there is no association between sex of the household head with poverty status. It is observed that with increasing age of the household head, the probability of being structural chronic poor and structural transient poor increases. Further his result shows that the number of children (below 15years) in a household increases the probability of being structural chronic poor and structural transient poor. He pointed out; there are two possible reasons for the same. It will reduce the per-capita availability of income of the household and more children will divert the labour from productive economic activity to unproductive ones and therefore lower income and lower asset generation.

Lgbalajobi *et al*.(2013) empirically analyzed the determinants of poverty among rural farmers in Ondo State, Nigeria. Primary data were used and a sample of 285 farm households through a multistage sampling technique was drawn from the study. The data collected were analyzed using logit model regression. The result of logit regression model indicated that age, gender, marital status, household size, access to credit, farm income and educational level of the respondents were the major determinants of poverty among rural farm households. Therefore, government should design holistic policies that will focus on the factors highlighted above in order to alleviate poverty and improve the welfare of the rural farmers in the study area.

Ogwumike and Akinnibosun (2013) investigated the determinants of poverty among farming households in Nigeria. The study adopted the National Bureau of Statistics measure of poverty and employed the logit regression model to estimate the effect of the socio-economic variables on poverty among farming households. The results show high incidence of poverty among farming households. Age, size of household, income, and number of farms are major determinants of poverty among farming households. Further, living in the North-east, North-central, South-east, and South-south geo-political zones relative to North-west are major determinants of poverty. The results of marginal effects analysis reinforce the conclusion that the above factors are major determinants of poverty among farming households. Investing in the agricultural sector to reduce poverty should be a matter of priority. Measures aimed at improving both the quality of land and access to inputs could enhance the productivity of farmers. Though poverty is predominant in all the zones, a flexible approach to address the specific challenges of each zone rather than generalized measures could accelerate the pace of sustainable poverty reduction in the rural areas in particular and the country in general.

Panagariya and More (2013) in their study on poverty by social, religious and economic groups in India and its largest states 1993-94 to 2011-12, also conclude that, poverty declines steadily for each household size and it declines faster in the second than the first period. According them, poverty

levels are higher in the larger households and households with two or less members are subject to low poverty levels in both rural and urban areas. Finally, they pointed that; percentage point decline in poverty is generally higher in the larger households, which are also subject to higher poverty ratios.

Singh *et al.* (2013), “Determinates of Rural Poverty: An Empirical Study of Socio-economic factors in Jharkhand, India”. The study examined various factors that inflict poverty by using an ordered probit regression model. Among various determinants of poverty, length of education and number of earning members in family had significant poverty reducing effect. It also emanates that big family size and increased dependency on agriculture would induce poverty and it is therefore imperative that family planning policies and alternative non-farm employment programme should receive due priority in any poverty alleviation programme in the state.

Adetayo (2014) in his study in Nigeria examined the poverty status of farm households in Ogun State, Nigeria using a descriptive statistics and Logit regression model. The data used were generated from a survey involving 117 farm household’s randomly selected using multistage sampling technique. The logit regression indicates that the likelihood of being poor were more with large households, non-educated farm households head and households without access to credit and other non-farm income. The study suggested that, government should strengthen the various government credit agencies in order for them to make enough credit available to farmers, strengthen the adult literacy education programmes and encourage farmers to expand their farm land for increased production.

Libois and Somville (2014) using the last three rounds of the Nepal Living Standards Surveys, they investigate the links between household’s fertility decisions and their consequent achievements in incomes and consumption. In contradiction with the popular presumptions they found that, having more children does not have a negative effect on incomes (per capita) and

consumption. In fact, because households are parts of extended family networks, those who have fewer children will host other relatives. They show that the size of the household does not change with additional births; only the household composition is affected. An additional birth reduces the number of adult members and increases the number of child members. As a result, it has an ambiguous impact on the consumption per-capita that depends on the importance of the gain in lower consumption versus the cost of a lower income. To identify the causal relationship, we use the gender of the first born child to instrument the total number of consecutive children. The results question the relevance of the policies and information campaigns aiming at reducing the fertility of the poorest people.

Majeed and Malik (2014) had done study in Pakistan on determinants of household poverty: empirical evidence from Pakistan" and they found that, a household is more likely to be poor if it has a large number of members. If the family size increases by one person then it increases the probability of the household being poor by up to 22 percent.

Panagariya and More (2014) in their study concluded that, no matter which year or region we consider, the higher the level of education of the head of the household, the lower the poverty ratio. Even in rural areas, rising level of education of the head of the household is associated with sharply declining poverty rates. For households headed by individuals with secondary or higher secondary education in rural areas, the poverty rate drops below the average poverty rate in urban areas.

Thapa *et al.*(2014) their study intended to analyze the major determinants of rural poverty. A two stage sampling method was applied to generate cross sectional data by randomly selecting 279 households from one Village Development Committees of six districts of Western Development Region of Nepal. By applying binary logistic regression, the study identified age of household head; size of land holding, female's involvement in service, family occupation and caste as major determinants of rural poverty. Contrary to

general view, remittances do not show any significant effect on rural poverty as per this study. So we can infer that poverty in rural parts of Nepal is entangled in structural and cultural web, and the remittance sent by migrant family members to rural households might have been siphoned off to urban pocket areas. With large chunk of young rural population engulfed by international labor market and existing socio-economic structures, the policy makers need to address the rural poverty via social and cultural aspects.

Gibson and Olivia (2015) used a new measure of poverty that has been developed by Morduch (1998) from an existing measure (the Watts index) that has appealing ordinal properties. The goal of the World Bank is 'a world free of poverty' but the most widely used poverty measures do not show when poverty might be eliminated. The 'head-count index' simply counts the poor, while the 'poverty gap index' shows their average shortfall from the poverty line. Neither measure reflects changes in the distribution of incomes amongst the poor, but squaring the poverty gap brings sensitivity to inequality, albeit at the cost of intuitive interpretation. This paper illustrates a new measure of poverty. They found new poverty measure (poverty exit time) that is distributionally-sensitive and has a ready interpretation as the average time taken to exit poverty with a constant and uniform growth rate.

Melkamu and Bannor (2015) on their poverty study in Chencha (Ethiopia) found that family size is positively related to poverty of the households and further their model result reviled that an addition of one member to the family size will result 9.7 percent probability of the household becoming poor.

2.4 Review of related literature on Relative poverty (Inequality)

Gov. India National Human Development (2001) published the state-wide Gini coefficients for the years 1983, 1993-1994 and 1999-2000. These coefficients were estimated using the 38th, 50th & 55th rounds of Household Consumer Expenditure survey conducted by the National Sample Survey (NSS) of India. Comparing the level of inequality between 1993-1994 and 1999-2000, among

the 32 states and union territories report showed that seven states experienced an increase in rural inequality and fifteen states experienced an increase in urban inequality. There were five states where both urban and rural inequalities increased. It is interesting to note that all these five states were located in the North-Eastern part of India. It is also notable that during the reform period, urban inequality in India was much higher than rural inequality for most of the states. In fact, in 31 of the 32 states and union territories, urban inequality was higher than rural inequality. Moreover, it could also be seen that from 1983 to 1999-2000, the rural Gini declined consistently, but there was a gradual rise in urban inequality during the same period.

Ahluwalia (2002) highlighted the trend of increasing inequality among states by using per capita gross state domestic product data for the period 1980-1981 to 1998-1999. The trend of the Gini coefficient indicates inter-state inequality. It also confirms that inter-state inequality grew steadily in India with liberalization. More evidence on increasing inter-state inequality came from Singh and others (2003), who used regressions to check convergence in per capita consumption expenditures across states. The study found absolute divergence of inter-state per capita consumption expenditures for the periods 1983 to 1999-2000 and 1993-1994 to 1999-20004. A convergence exercise by Jha (2004) indicated that the ranking of states with respect to inequality had not changed in the reform period. According to his findings, inter-state convergence of the level of inequality was weak.

Deaton (2002) in his study on “Health, inequality, and economic development” discovered the connection between health and inequality in both poor and rich countries. His primary focus was on the relationship between *income* inequality and *mortality*, but he also discussed the effects of inequalities in other, often more important, dimensions. He discussed a range of mechanisms, including nonlinear income effects, credit restrictions, nutritional traps, public goods provision, and relative deprivation. He reviewed the evidence on the effects of income inequality on the rate of decline of mortality

over time, on geographical patterns of mortality, and on individual-level mortality. From the results, he conclude that there is no direct link from income inequality to mortality; individuals are no more likely to die or to report that they are in poor health if they live in places with a more unequal distribution of income. The raw correlations that are sometimes found are likely the result of factors other than income inequality, some of which are intimately linked to broader notions of inequality and unfairness. That income inequality itself is not a health risk does not deny the importance for health of other inequalities, nor of the social environment. Whether income redistribution can improve population health does not depend on the existence of a direct link between income inequality and health and remains an open question.

Deaton and Dreze (2002) presented a new set of integrated poverty and inequality estimates for India and Indian states for 1987-88, 1993-94 and 1999-2000. The poverty estimates are broadly consistent with independent evidence on per capita expenditure, state domestic product and real agricultural wages. They show that poverty decline in the 1990s preceded more or less in line with earlier trends. Regional disparities increased in the 1990s, with the southern and western regions doing much better than the northern and eastern regions. Economic inequality also increased within states, especially within urban areas, and between urban and rural areas.

Fox W. (2002) in his study on “Poverty in India Since 1974: A country case study” found that the Gini coefficient fell from 0.34 in 1957 to 0.29 in 1974 for consumption, as measured by the NSS. Because average consumption did rise over the period, this increased equality appears inconsistent with the increase in the poverty rate. It suggests that the redistribution did not favor those near the poverty line. The trend in India’s Gini coefficient from 1957 to 1997 shows Inequality fell during the late 1950s, but remained quite stable until a rise in the mid-1990s.

Bhalla S. (2003) stated that both urban and rural Gini coefficients declined between 1993-1994 and 1999-2000. According to his calculations, rural inequality decreased in 15 out of 16 major states of India, and urban inequality declined in 8 of the 17 states over this period. He therefore concluded that inequality had not worsened in India during the period of reform.

Singh *et al* (2003) could not find strong evidence of increases in household inequality for the period 1993-1994 to 1999-2000. According to them, “there are some indications of increases in regional inequality, but they are neither uniform nor overly dramatic”. They also studied convergence of economic performance at a sub-state level. Using set of five variables petrol sales, diesel sales, bank credit, bank deposits and cereal production they done their analysis. Finally they found that, during the post reform period, some states experienced increasing within-state inequality.

Bourguignon (2004) in his paper on “The Poverty-Growth-Inequality Triangle” tried to clarify the debate about growth vs. distribution development strategies by providing a rigorous analysis of the relationships that exist among the three vertices of the PGI (Poverty-Growth-Inequality) triangle. Finally, the study found that, if one interprets literally the potentially negative relationship between inequality and growth, then this redistribution policy would enhance growth. It would then be sufficient to have at one’s disposal policy instruments to guarantee that growth is pro-poor – i.e. that it reduces inequality – for a virtuous circle to start and lead progressively to faster growth, declining inequality and accelerated poverty reduction. “Reduce inequality through redistribution or through promoting ‘pro-poor’ growth and sustainable growth would settle”. The arguments summarized above tend to suggest that redistribution of ‘wealth’ from rich to less-rich people may have a positive impact on growth.

Hussain and Hanjra (2004) identified the lower bound was almost the same, the upper bound Gini values are 0.53 and 0.61 for irrigated and rainfed

settings, respectively. The studies unfailingly document evidence of lower poverty rates in irrigated than rainfed environments.

Jha.R. (2004) calculated rural and urban inequality for the period 1993-1994 to 1999-2000 in India using data from different rounds of the National Sample Surveys. The result shows that, both rural and urban Gini coefficients increased in the period between 1993-1994 and 1997, and declined between 1997 and 1999-2000. However, as Jha pointed out, changes in the methodology used in the 55th round National Sample Survey meant that the results for 1999-2000 were not comparable to earlier rounds. Therefore, care should be taken not to interpret the lower Gini coefficients of 1999-2000 as a sign of declining inequality in India. He concluded that in both rural and urban sectors, all-India level inequality was higher during the post reform period than it was during the crisis period of the early 1990s.

Black *et al.*(2005) Research was designed to draw lessons from particular case studies that are relevant to policy debate. It demonstrates how the mutual causality between migration and inequality varies across space both between and within these regions The paper focuses on case studies across Central America, Eastern Europe, West Africa and South Asia. The study found and conclude that, macro-economic stabilization in countries of origin may also be critical in enabling investment of remittances in anything other than personal consumption. Whilst personal consumption may itself involve investment in social terms, and may contribute to reducing inequality, substantial and sustainable investment in economic and social activities at a community level is clearly a higher goal for most governments interested in reducing inequality. Migrants cannot, and should not, be expected to make such a contribution on their own, but the creation of economic conditions in which they perceive it as in their interests to do so is clearly a worthwhile objective.

Cornia G. (2005) worked on “Policy Reform and Income Distribution” to analyses the relationship between within-country income inequality and

policies of domestic liberalization and external globalization. The models used to provide the rationale for such reforms—such as the Hecksher-Ohlin model—usually predict a decline in inequality. However, the evidence shows that inequality often rose with the introduction of such reforms. The paper tries to explain this discrepancy by identifying the conditions under which the models' conclusions do not hold. Indeed, such models are based on a simplified view of reality and restrictive assumptions, and their predictions do not necessarily hold in conditions of institutional weakness, structural rigidities, inefficient markets, asymmetric information and persistent protectionism.

Sen and Himanshu (2005) provided striking evidence about increased inequality in India in the post-reform period. Based on indices of real Mean Per Capita Expenditure (MPCE) by fractile groups, they showed that whereas the consumption level of the upper tail of the population, including the top 20 per cent of the rural population, went up remarkably during the 1990s, the bottom 80 per cent of the rural population suffered during this period. Their finding clearly shows that the consumption disparities between the rich and the poor and between urban and rural India increased during the 1990s. These findings are based on the NSS 'thin sample' surveys, conducted annually since 1986. These surveys are not as comprehensive as the NSS comprehensive rounds or the 'thick sample' surveys, but provide sufficiently good estimates at the national level. Also, these thin sample results are comparable because they use a common type of questionnaire. They also provided state wide rural and urban Gini coefficients for the 50th round and the 55th round NSS surveys. These Gini coefficients were comparable because they were based on adjusted data for the 50th and 55th rounds. It can be seen that for the rural sector, eight of the fifteen states experienced a decline in inequality, while in seven others, inequality increased. On the other hand, it was noteworthy that for all the 15 major states, urban inequality increased by 1999-2000 as compared to 1993-1994.

Gustafsson *et al.* (2006) studied the composition, inequality and determinants of wealth among households in urban China in 1995. In addition, they compared the wealth distribution in urban China with the wealth distribution in rural China and present the first estimates of inequality in the distribution of household wealth in China as a whole. The results show that housing wealth makes up a large part of net worth in urban China. Most urban Chinese households keep a bank account; debts are unusual. A household's net worth is strongly related to its income and location. Net worth is more unequally distributed among urban households than among rural households. However, compared to the situation in most industrialized countries, net worth in urban China and in China as a whole appear to be rather equally distributed.

Purfield (2006) examined how growth has varied across India's states. The study found that (i) the income gap between rich and poor states has widened; (ii) rich and faster-growing states have been more effective in reducing poverty; (iii) poor and slower-growing states have had little success in generating private sector jobs; (iv) labor and capital flows do little to close income gaps; and (v) the volatility in economic growth is greatest in poor states. Differences in states' policies affect the cross-state pattern of growth. Greater private sector investment, smaller governments, and better institutions are found to have a positive impact on growth.

Hajispyrou and Nicolaidou (2007) analyzed inequality, and its sources, in Cyprus over the period 1991-2003. Two different measurement methods were employed in order to assess the trend over the 12-year period. For the overall income inequality the results on inequality evolution are inconclusive in the sense that simple differences show an increase whereas percentage differences show that inequality remained unchanged over this period. Regardless of how one chooses to measure inequality, the position of these household groups relative to the average was worse off in 2003 compared to what it was in 1991. Such groups are single parents, large families and

families whose head is unemployed or, in general, not participating in the labour market.

Jayadev *et al.* (2007) examined patterns of wealth disparities in India using the all-India debt and investment surveys (1991 and 2002). They found that there have been increases in wealth levels in the country across virtually all groupings, accompanied by a small but perceptible rise in the level of interpersonal wealth inequality, whether examined by summary measures such as the Gini coefficient or by centile shares of wealth. We examine differences in wealth holdings by state and income in the two surveys as well as disparities according to socio- economic categories in 2002. There have been sharp differences in the growth rates of wealth holdings in the middle and upper income states on the one hand and poor states on the other, suggesting divergence in wealth outcomes. Faster growing states have seen larger increases in wealth inequality. Finally, there are large differences in the levels of wealth holdings according to socio-economic categories.

Pal and Ghosh (2007) analyzed the nature and causes of the patterns of inequality and poverty in India. Since the economic liberalization in the early 1990s, the evidence suggests increasing inequality (in both spatial and vertical terms) as well as persistent poverty. The macroeconomic policies possibly responsible for these trends include—fiscal tightening, regressive tax policies and expenditure cuts; financial sector reform that reduced institutional credit flow to small producers and agriculturalists; liberalization of rules for foreign and domestic investment, leading to more regional imbalance and skewed investment patterns, and trade liberalization, which has affected livelihoods and employment generation.

Oluwatayo (2008) focused on analyzing inequality and welfare status of rural households in Ekiti State, Nigeria.The result presented was based on primary data collected from a random sample of 240 households selected from four rural communities in the state. Descriptive statistics, Lorenz curve, Gini coefficient. The Lorenz curve analysis showed that there’s an unequal

distribution in the income and other indicators of welfare with a Gini coefficient of 0.3570. The recommendations arising from the study were that there is a need to upgrade technologies for increased agricultural production in order to further improve income levels of households and equity in the distribution of income arising from farming activities since this remains the major source of income of households in the study area.

Subrahmanian and Prasad (2008) had done study on “Rising inequality with high growth isn't this trend worrisome? Analysis of kerala experience” the relation between growth, inequality and poverty was the central theme of the paper. They achieved their objective by tracing trends in per capita income growth and Gini coefficients, estimated from the data on household consumer expenditure (taken as a proxy for income) of NSS surveys, in Kerala as compared to the pattern at all- India and major states during pre and post reform periods. They found and conclude that, the results of growth and distributional elasticity of poverty, inequality growth trade off index, and other statistical tests showed that economic growth of Kerala is not “pro-poor” in nature. In short, findings emerging from the analysis of rising inequality with high growth signal some worrisome trends and send out a note of caution on the celebration of high growth rate with a blind eye on inequality, and also on meeting the goal of achieving the newly jostled “inclusive.

World Bank (2008) observed that India has a relatively equal distribution of income across states, as measured by standard deviation of GDP per capita, as well as a low level of income inequality, if it is compared with other developing countries such as China or Brazil, though these measures show an increase between the 1980s and the 1990s.

Esquive (2009) reviewed the pattern of income inequality in Mexico since 1994. It shows that in the past few years there has been an important reduction of income inequality in Mexico, which has almost reverted the sharp increase in inequality observed between 1984 and 1994. Using a Gini decomposition exercise he conclude that labor income, transfers and

remittances have all played an important role in this process. He also argue that the equalizing effect of labor income and the reduction of wage inequality in Mexico can be explained as the combination of a late outcome of trade liberalization (as predicted by standard theories of trade) and a structural change in Mexico's workforce composition in terms of education and experience. In general, he concluded that, the recent reduction of inequality in Mexico is due to the interaction of both, the market and the State.

Chalasani (2010) used data from the three Indian National Family Health Surveys (1992-93, 1998-99, 2005-06) to examine how the relationship between household wealth and child mortality evolved during a time of significant economic change in India. Results indicate that the overall relationship between household wealth and mortality weakened over time, as evidenced by the coefficients for under-five mortality at the national level. However, this result is dominated by the relationship between household wealth and neonatal mortality (deaths at ages 0-30 days). Examining mortality exclusively at older ages (deaths between the ages of 1-4 years) for urban and rural areas separately reveals a different pattern. The relationship between household wealth and child mortality actually became stronger in rural areas suggesting that in these areas, the burden of ensuring child survival is increasingly being borne by households, possibly due to a weakening of complementary public inputs into child health.

Vakulabharanam *et al.* (2010) investigated the question of whether class structure matters in understanding the increasing inequality in China and India. They argue that almost the entire increase in the overall Indian inequality between 1993-94 and 2004-05 is explained by the rising inequality between classes rather than within them, whereas in the case of China, the entire increase in inequality between 1995 and 2002 appears to be explained by the rising inequality within classes. In the Chinese case too, while the between-class inequality explains an even higher part (than in the Indian case) of the overall inequality, we argue that the rise in overall inequality that is seemingly explained by the rise in intra-class inequality is actually explained

by the phenomenon of “administrative urbanization.” We analyze the class structures in India and China and decompose (using the methodology of Yitzhaki 1994) the overall inequality into inter-class and intra-class terms while investigating the trends towards stratification.

Groll and Lambert (2011) in their study on “The pro-poorness, growth and inequality nexus: some findings from a simulation study” to investigate the effects of parameter changes on mean income, the Gini coefficient of inequality and the Watts index of poverty, for the displaced lognormal, Singh-Maddala and Dagum distributions. They identify, among parameter changes which increase mean income, those which reduce inequality, and those which reduce poverty by more than would benchmark income growth. By this we are able to expose the extent of difference between those income growth patterns which are pro-poor and those which are inequality-reducing.

Khilji (2012) in his study focused for capturing the pattern of inequality both across and within countries. The study used data on Asia over the past three decades supports three broad trends. The study found that, income inequality within countries has also increased. All countries excepting Thailand record increases in income inequality. The Gini index has increased in several countries, in India (from 32.2 in 1986 to 36.8 in 2004), in Indonesia (from 32.4 in 1984 to 36.3 in 2005), and in Vietnam (from 32.8 in 1993 to 37 in 2004). In the case of Pakistan it declined slightly (from 32.44 in 1985 to 30.6 in 2002). By and large, for most countries Asia, inequality has increased within countries, with relatively shaper increase in this divergence over the past decade and a half. The study concludes that, persistent inequality, in addition to being ethically wrong, is politically risky and is likely to arrest development gains. If the transition from developing to developed is to be achieved by the least developed countries in Asia while keeping inequality in check, then the transition from rural to urban needs to be managed carefully.

Majumder (2012) studied on “Removing poverty and inequality in India: the role of infrastructure.” His paper tried to explore multidimensional association

between different types of infrastructural facilities and poverty across India in a regional framework. He explored the poverty-infrastructure-development inter-linkage at the levels of NSS regions for 1993-94 and 2004-05, and at the district level for 2004-05. The study found that, infrastructural availability at the regional/district level has impacts on both average living standards as well as the income distribution in terms of lowering the proportion of people living below the poverty line. At the same time, some components of infrastructure – the physical sectors – tend to increase interpersonal inequality at the regional level. Dynamic relationship reveals positive association between expansion rates of infrastructural facilities and growth of consumption and reduction in incidence of poverty. It can therefore be inferred from the study that expansion of regional infrastructural facilities enhances average consumption level of the people and reduces the proportion of people living below poverty line.

Bernstein (2013) examined the impact of inequality on growth. The study found that, among the most important economic challenges facing the United States and some other advanced economies today is the increase in the inequality of economic outcomes. In the case of the United States, the distributions of income, wages, and wealth are more dispersed than ever. Though measurement issues abound, it is widely agreed that U.S. economic inequality is at historically high levels.

Igbalajobi *et al*.(2013) empirically analyzed the determinants of poverty among rural farmers in Ondo State, Nigeria. Primary data were used and a sample of 285 farm households through a multistage sampling technique was drawn from the study. The data collected were analyzed using Gini coefficient measure. The result of Gini coefficient (0.492) implies average level of income inequality among the respondents. Therefore, government should design holistic policies that will focus on the factors highlighted above in order to alleviate poverty and improve the welfare of the rural farmers in the study area.

Knight (2013) provided an overview of research on income inequality in China over the period of economic reform. It presents the results of two main sources of evidence on income inequality and, assisted by various decompositions, explains the reasons income inequality has increased rapidly and the Gini coefficient is now almost 0.5. This paper evaluates the degree of income inequality from the perspectives of people's subjective well-being and government concerns. It poses the following question: has income inequality peaked? It also discusses the policy implications of the analysis. The concluding comments of this paper propose a research agenda and suggest possible lessons from China's experience that may be useful for other developing countries.

Singh S. (2013) studied with the main objectives were to understand the basic obstacle in the rural development, to understand the gap in level of living between high income and low Income and to analyze the impact of government programmes on poverty reduction. His paper was based on the secondary data collected from Ministry of finance, The Planning Commission, Ministry of Rural Development, and the UNDP and the World Bank. He found that there was a sharp increase in regional inequality in India during the 1990s. In 2002-03 the per capita Net State Domestic Product of the richest state, Punjab was about 4.7 times that of Bihar the poorest state. This ratio has increased from 4.2 in 1993 – 1994.5 A time series graph of this ratio shows that the disparity between the richest and poorest state shot up. This has been highlighted by Ghosh and Chandrashekhar, who showed that inter-state inequality increased sharply in India during the reform period.6 It seems Marxian concept of capitalist society is true in the context of our society also. Rich are becoming richer and poor are becoming poorer that leads to a revolution. Government organized several schemes for removing poverty after that it remains, so much more has to be done to bring prosperity in the lives of people of rural areas.

Anand R.*et al.* (2014) in their study on "India: Defining and Explaining Inclusive Growth and Poverty Reduction" for IMF, also found the period of

rapid growth and poverty reduction (2004–09) also witnessed a rise in inequality, with the Gini index rising from about 0.27 in rural and 0.35 in urban India in 2004/05 to about 0.28 and 0.37, respectively, in 2009/10. Moreover, rural-urban as well as regional inequality also increased during this period—the ratio of urban to rural per capita consumption and the ratio of real per capita income of the richest state to that of the poorest state both rose.

Hari and Neelambar (2014) recently observed, during 2004-05 to 2009-10, for the country as a whole, rural inequality decreased slightly, urban inequality increased and all India inequality increased. The increase was less pronounced as compared to the same during the period 1993-94 to 2004-05. However, it is worth noting that in the comparison between the latest two rounds, they examine changes over only five years, whereas in comparison between 1993-94 and 2004-05, they examine a much longer period. Taking roughly the two decade period between 1993-94 and 2009-10, inter-personal inequality increased at all the levels- rural, urban and all India. If one looks at the consumption for the poor and the wealthy as a percentage of median consumption, they can see that, the expenditure of an individual at the 90th percentile as a percentage of the median has increased since the 1990s - 212.63 percent (1993-94), 235.20 percent (2004-05) and 234.41 percent (2009-10). On the other hand, expenditure of an individual at the 10th percentile, as a percentage of the median has decreased steadily since the 1990s- 56.67 per cent (1993-94), 56.32 percent 92004-05) and 55.99 percent (2009-10). Further they pointed, rural- urban inequality increased since the 1990s. For inequality among states, the share contributed by the between component increased between 1993-94 and 2004-05 and trend continued into the period 2004-05 to 2009-10. In other words, inequality among states has been increasing steadily since the 1990s.

Oxfam (2014) identified that, economic inequality is rapidly increasing in the majority of countries. The wealth of the world is divided in two: almost half going to the richest one percent; the other half to the remaining 99 percent. The World Economic Forum has identified this as a major risk to human

progress. Extreme economic inequality and political capture are too often interdependent. Left unchecked, political institutions become undermined and governments overwhelmingly serve the interests of economic elites to the detriment of ordinary people. Extreme inequality is not inevitable, and it can and must be reversed quickly.

Bajar and Rajeev (2015) did research to analyses the links between physical infrastructure and inequality and determines the nature of this relation and focuses on 17 major Indian states. Gini coefficient (for rural and urban sectors combined) was used as the dependent variable and it was computed data on Monthly Per Capita Consumption Expenditure (MPCE), which was estimated from Unit level records of the periodical Household Consumer Expenditure surveys of National Sample Survey Organisation for the years 1983, 1987-88, 1993-94, 2004-05, and 2009-10 (Rounds 38th, 43rd, 50th, 61st and 66th round respectively). The results have shown that some components of infrastructure, mainly power and roads, tend to increase interpersonal inequality at the regional level and the paper provides some explanations for this result. The initially rich states were also the ones with a better endowment for infrastructure facilities and these states continued to remain in the rich income category with an average PCNSDP much above India's, and they managed to grow in terms of their infrastructure endowments. They, however, also showed higher levels of inequality. The results of this study do not prescribe abandoning transportation projects or infrastructure development but instead recommend that the government should emphasize also on investments in complementary policies. Infrastructure can help open up opportunities but it should not be that these benefits are reaped by those who are in a position to be able to take advantage of these.

Basole and Basu (2015) analyzed consumption inequality through the hitherto neglected lens of non-food expenditure in India during the post reform period. Using household level consumption expenditure data from the quinquennial "thick" rounds of the NSS, we show that inequality within food and non-food

groups has declined, even as overall expenditure inequality has increased over time. We suggest that the rise in overall expenditure inequality is due to the increased weight in the household budget of non-food spending, which tends to be more unequal than food spending. We also show that inequality is very different across broad non-food items. Durables, education, healthcare, and consumer services show the most rapid increases in real expenditure, and also display the highest levels of inequality. Finally, we offer some possible mechanisms for this phenomenon and suggest policy measures to deal with this form of inequality.

Melkamu and Bannor (2015) analyzed the inequality of agricultural resources among states in India using the Lorenz curve and Gini coefficient. The study found that, the shape of the Lorenz Curve shows inequality in operational holding, livestock population, irrigation and per capital income at current prices (2012-2013) among states in the country. Irrigation inequality was highest with Gini-coefficient value of 0.66 followed by 0.6 for agricultural landholding size. Livestock inequality had a value of 0.54 whereas per capita income at current prices (2012-2013) reported the least inequality among states with a Gin coefficient value of 0.2.

2.5 Review of related literature on coping mechanisms

Watts (1983) suggests that, “households do not respond arbitrarily to a food crisis for which they are in some sense conceptually prepared; rather they do so serially, with respect to the intensity of what one might call famine signals.” His survey led him to group the 10 most commonly observed responses into the following sequence: collect famine foods, borrow grain from kin, sale of labor power (migration),engage in dry season farming (migration),sale of small livestock, borrow grain or money from merchants/ moneylenders, sale of domestic assets, pledge farmland , sale of farmland and migrate permanently.

Rahmato (1987) suggests that the elements of famine survival may be grouped into four sequential series of activities. In the first stage of this sequence households would cope with a risk to their livelihood by austerity

and reduced food consumption. At the same time there would be increased reliance on loans and transfers of food and assets within and between families. Temporary migration in search of wage employment formed the second stage. Once these options had been exhausted farmers would rely on divestment, but this is selective and gradual and the exact sequence in which assets were sold or mortgaged depended very much on current market conditions. The fourth and terminal stage of these strategies was crisis migration and the decision to resort to this was often taken at a community as well as a household level.

Corbett (1988) classified the strategies into precautionary strategies – the strategies that households use in response to repeated exposure to the same type of non-acute risk, and crisis strategies—strategies to cope with an unusually severe threat to food security. A key argument in coping strategy literature is the sequence in which households take certain strategies according to levels of distress.

Frankenberger (1992) pointed out in their study that, when households suffer a shock such as the floods, they do not remain passive but employ several coping strategies. These coping strategies are fallback mechanisms for when habitual means of meeting needs are disrupted. The first thing households do when they suffer a shock is to attempt to minimize risks and manage losses to ensure some minimal level of sustenance. The second strategy employed by households in distress is divestment, or the gradual disposal of assets.

Frankenberger (1992) classified asset disposal as a coping strategy into several phases, with liquid assets, such as jewelry, being disposed of first and productive assets later. When productive assets are disposed of, it becomes more difficult for the person or household to return to a pre-crisis state. Finally, the household or individual may embark upon distress migration, which is a sign of failure to cope with the crisis.

Dunn and Valdivia (1996) make an important distinction between ex-ante strategies of income diversification, which help to reduce households' exposure to shocks, and ex-post coping strategies to offset the effects of shocks after they occur. They argue that in Andean semi-arid regions, households with more opportunities for ex-post adjustment (greater assets in the form of livestock), have fewer incentives for ex-ante risk-reducing strategies.

Dercon (2000) focused on the opportunities available to households to use risk management and risk-coping strategies, and on the constraints on their effectiveness. He found that, fluctuations in consumption usually imply relatively high levels of transient poverty. High income risk may also be a cause of persistent poverty. The failure to cope with income risk is not only reflected in household consumption fluctuations but affect nutrition, health and education and contribute to inefficient and unequal intra-household allocations. Evaluating the effects of alternative coping mechanisms such as savings, or of policy interventions such as providing better savings instruments or public safety nets, needs to take into account their effect on incentives to sustain the agreement rather than to go it alone. It is possible that opportunities for precautionary savings or a public safety net would actually be welfare reducing and displace the informal insurance arrangement by more than one to one. Policies that influence asset market risks could be beneficial to households attempting to deal with shocks.

Gordon (2001) in his study found common coping strategies in semi-arid India. According him, poor households in risky environments adopt coping strategies to protect their livelihoods. Coping strategies he found were: (1) intensification of existing income activities (2) diversification into new activities, including migration (3) drawing on common property resources (4) drawing upon social relationships and informal credit networks (5) drawing on formal safety nets (e.g., through the state) (6) drawing upon assets (stores or,

in extremis, productive assets) (7) adjusting consumption patterns (changing or reducing consumption).

Lokshin and Yenitsov (2001) analyzed household coping strategies in Russian. What strategies have Russian households used to cope with economic hardship in the wake of the recent financial crisis? Which coping strategies have been most effective in reducing poverty for different groups of households? The results of their analysis show that a household's choice of survival strategy strongly depends on its human capital: the higher its level of human capital, the more likely it is to choose an active strategy (such as finding a supplementary job or increasing home production). Households with low levels of human capital, those headed by pensioners, and those whose members have low levels of education are more likely to suffer social exclusion.

Rani and Dodia (2001) their study shows that one of the most favored mechanisms of coping is that of diversifying into non-farm activities and seasonally migrating to other areas. The study showed, in the semi-arid areas diversification into non-farm activities is of a temporary and permanent nature depending upon the severity of the situation. They found that, the households that are badly hit in the semi-arid areas are those of small, marginal farmers and landless households and those belonging to lower castes, who also diversify first. Apart from diversifying into other income generating activities and seasonally migrating out, the households in the semi-arid areas also view common property resources as integral to their livelihoods. These resources act as a very important source of subsistence for poor households whose depend on for fodder, fuel and grazing of livestock. In diversifying into non-farm activities, households simultaneously draw upon social relationships and informal credit networks. The social relationships and the traditional support system along caste lines continue to serve as a means of support in various ways, though these networks are weakening. Interest rates rise during droughts, making it very difficult for the poor households to borrow, though these networks continue to be effective during normal years. In drought years,

households also reduce their food intake and expenditure on social and religious commitments. The reduction in food intake is more prominent among the women, and smaller farmers.

Mohapatra Gadadhara (2006) in his study identified common coping mechanisms in Eastern India and Dongaria and Kutia Kondh largely rely on hunting, gathering and shifting cultivation in the Niyamgiri hills for survival. The landless Dalits (Domb) who live in these villages are mainly dependent upon the forest produce for their livelihood. Due to depletion of forest resources and aggressive mining activities, the livelihood base is shrinking and compels them to depend upon purchased foods to meet the food deficit. They face acute shortage of food in the post-sowing monsoon period (July-September) and again around March when the *kharif* harvest has been exhausted. People of all income groups especially the most vulnerable were reported long-term trends towards eating foods that are less preferred as a means of adopting to lower income levels. The sources of food in these villages are own production, purchase, nature (forest), credit from the ration-shops and local money lenders. When other coping strategies fail, distress migration to neighboring districts of the state and outside is a final option for the villagers as a result of factors recurrent drought, land alienation, debts and high levels of food insecurity. The health status of these tribal villagers is poor due to high level of poverty, poor environmental sanitation and hygiene, and increased morbidity from water-borne and vector-borne infections. Therefore, a multi-pronged approach for sustainable livelihood coupled with improvement in their literacy levels would certainly lead to economic and social empowerment.

Rashid *et al.* (2006) examined strategies used by rural households for coping with the shocks and investigates whether there is any distinctive pattern in adopting these strategies. Using a cross section data set covering 1600 households from the northwestern Bangladesh, they estimated a trivariate probit model for explaining the adoption of coping strategies. Results indicate that choice of coping strategies depend on diversity and stability of household

income sources. Households with higher education have greater access to stable incomes sources and have more income sources, and so are less likely to adopt ex-post coping strategies. Households with more assets are more likely to divest assets or obtain secured loans rather than rely on unsecured loans. Wealthier households are not less likely to adopt current adjustment strategies, suggesting that there is a general sequence of coping strategies that all households follow, irrespective of the assets they own.

IFAD (2009) synthesized the major findings of a recent, cross-country comparative research study of the economic costs of drought in Asia and farmers' coping mechanisms. Farm survey data were used to estimate the household-level impact of drought and to analyze farmers' coping mechanisms. Various statistical and econometric methods were used to analyze the collected data. The study found that, the various coping mechanisms that farmers deployed were inadequate to prevent a shortfall in income. Farmers employ different combinations of ex ante and ex post drought coping strategies to minimize the impact of drought. Ex ante coping strategies include careful choice of rice varieties, planting date, crop establishment methods, and weeding and fertilization practices to minimize the effects of drought. Farm households also employ a wide range of ex post drought coping strategies, which include dependence on wage income; increased borrowing; liquidation of productive assets; higher rate of seasonal out-migration; increased use of social networks; increased dependence on forests for food, livestock pasturing and income; forced reduction of expenditures on items such as clothing, social functions, food, medical treatment and children's education; adjustments in food balance; and reliance on public relief.

Mjonono *et al.* (2009) their study set out to investigate the food insecurity coping strategies employed by sample households from the Embo community in the Umbumbulu district of KwaZulu-Natal. The study used the Coping Strategy Index to establish the food security status of the households by calculating and comparing the Coping Strategy Index Scores of households.

The main findings related to the application of coping strategies were that households applied short-term food consumption coping strategies to cope with food shortages. The study showed that households employed coping strategies to mitigate food shortages which resulted from insufficient crop production. These strategies were the following: relying on less preferred/inexpensive food; borrowing food, or relying on help from friends or relatives; gathering wild food, hunting or harvesting immature crops; consuming seed stock held for the next season; sending household members to eat elsewhere; limiting portion size at meal times; restricting adult consumption in favour of small children; reducing the number of meals eaten in a day; skipping entire days without eating and begging from neighbors or friends.

Tongruksawattana *et al.* (2010) analyzed the relationship between shock type and coping decisions of rural households in Thailand. The data used for this analysis are from the large-scale panel household survey of some 2200 households in three provinces in Northeast Thailand and the data cover the period of May 2006 to April 2008 which captures two full crop years. Results show that a large share of rural households has experienced different types of shocks mainly related to ecological but also from other economic, demographic and social factors. The majority of households undertake coping actions in response to shocks. Households that refrain from coping actions are mostly those that experienced ecological shocks. Results from the univarate probit model show that the main factors that cause a household to actively respond to shocks are wealth status and the severity of the shock in terms of income and asset losses. Regarding the type of coping action asking for more remittances from migrant household members and relatives, taking up opportunities for public transfers, reallocate household resources especially labour, to borrow from formal and informal sources of finance, to draw on available savings and selling assets are dominant.

Melkamu (2011) studied on"Food security and its determinants in the rural Ethiopia: the case of Kamba district in Gamo Gofa zone." The study used

primary data collected from 200 randomly selected households. He identified coping mechanism of the sampled farmers in the study area. In the district coping mechanisms have different patterns and commonly practiced were: reduced amount of food consumed, sale of livestock, wage work and migration, sale of productive asset and jewelers, food aid and eating wild food (in pastoral *kebele*).

Jha *et al.(2012)* for systemically analyze household welfare under uncertainty, one needs to investigate not only household vulnerability, but also the household's risk coping strategy and the effect of the strategy on household consumption. Their paper demonstrates in rural India household vulnerability is most explained by poverty and idiosyncratic components. So far as risk coping strategies go households rely heavily on informal instruments such as their own saving, transfers or capital depletion. However, they also try to cope with covariate risks by participating in government programmes. Further, household consumption is highly covariate with income. This implies that existing informal insurance instruments are not sufficient to protect household consumption against income shocks. Government sponsored coping strategies reduce the idiosyncratic and risk component of vulnerability. Hence, an important policy implication of our analysis is that the government should provide readily accessible and well-targeted public safety nets. The existing informal strategy is not very effective as a consumption insurance mechanism. Although the government coping programme is found to reduce vulnerability access to such programmes is constrained. Expansion of government sponsored coping programmes is likely to protect households effectively from negative shocks.

Pattnaik (2012) his study makes an attempts to understand the different coping mechanism adopted by households when they face a drought like conditions. The units of the analysis are households in a village. The work is based on intensive field work based on two villages in a region in Odisha which is identified as drought prone i.e., KBK districts. The two villages are situated in Balangir district. The impact of drought leads to the reduction in

food security of the households. The strategies used by households were sale of livestock, asset and shift in employment pattern and migration of people. The study shows that the economic loss of drought leads to disinvestment and adversely affects the asset creation of the farm households. The inability of poorer households to adopt proper coping strategies may increase vulnerability and widen gap between the rich and the poor. The poor and marginalized community of the backward region, without proper coping strategies, lack of provision of institutional arrangements and lack of assets pushed the people behind the poverty trap due to the occurrence of repeated distress situation like drought.

Demi and Kuwornu (2013) identified the common coping strategies that are adopted by households to mitigate the impact of food insecurity. A multistage sampling technique was used to select the respondents and 240 households were interviewed for the study. They found that, the months of April and May are the periods in which households experience severe food shortage. The immediate food insecurity coping strategies households adopt when faced with food insecurity were eating less preferred food, food rationing and skipping meal within a day. Most of the food insecurity coping strategies used by farming households are moderate, and only employed to temporarily minimize the impact of food insecurity. These results have implications for agricultural food policy in developing countries.

In summary, poverty trend literature in India suggests that agriculture and economic growth are the two powerful contributors for the declining poverty trend. Significant principal determinants of poverty vary locational, socially and economically among countries and within country. Economic inequality literature suggests, it is serious and needs action like poverty. Similarly, coping strategy literature suggests that there is a general sequence of different types of strategies that households adopt sequentially as stress becomes more prolonged, initially adopting strategies that will not jeopardize future earnings, and only resorting to strategies that will reduce future earnings if necessary.

3. METHODOLOGY

The present chapter is arranged as follows. Section (3.1) presents selection of the study area and detailed profile of the study area. Section (3.2) describes sampling design and data collection methods are presented in section (3.3). Section (3.4) describes analytical tools. In this section, how secondary data can be analyzed using graphical and semi-log growth trend models to understand poverty trend in seven decades (1951-2011) in the country. Following this, extent of poverty measurement, determinants and average exit time of poverty, empirical logit model specification, definition of variables and working hypothesis, testing multicollinearity and marginal effects result in logistic model are discussed in-depth. Relative poverty (income and resource inequality) is also discussed on Lorenz curve and Gini coefficients and finally principal coping strategies used by sampled households in Northern Rajasthan are discussed in-depth.

3.1. Selection of the study area

Northern part of Rajasthan state was selected purposively for this study. Rajasthan is one of the states where state-level HDIs (Human Development Indexes) is very low and the state is ranked 18th in poverty status among all the states of India exposing a need for poverty research in the state (Chronic Poverty Report, 2011). The existence of significant variability in agricultural resource structure among districts in northern part of the state is a contributor of actual livelihood gap among districts which also needs further study. To address these problems properly, primary data is more appropriate than secondary data. To collect primary data, considering time constraint that the researcher has, northern part of Rajasthan where Rajasthan Agricultural University situated is considered as most appropriate area to undertake the study. The above reasons contributed to selection of northern Rajasthan state purposively for this study.

3.1.1. Profile of the study area

The study area, Rajasthan literally, "Land of Kings") is the largest state of India, constituting 10.4 percent of total geographical area (342,239 square kilometers) and 5.67 percent of total population of India (GoI,2011). It is located on the northern side of the country and the state was formed on 30 March 1949. Rajasthan is bordered by the other Indian states: Punjab to the north; Haryana and Uttar Pradesh to the northeast; Madhya Pradesh to the southeast; and Gujarat to the southwest (Wikipedia, 2015). The capital of Rajasthan is Jaipur, the largest city of the state.

3.1.2. Population and literacy rate of Rajasthan

Population of Rajasthan, according to the 2011 census, stands at about 68,548,437 of which male and female are 35,550,997 and 32,997,440 respectively. Of the total population of Rajasthan state, around 75.13 percent live in rural areas and 24.87 percent people live in urban areas. In actual numbers, males and females were 26,641,747 and 24,858,605 respectively. Rajasthan state is the 8th most populated state in India. State makes up about 5.6 percent of the country's population a figure which was about 5.4 percent during the last census in 2001. The density of population per sq. Km. is about 200 and a lot below the national average of 382. The total population growth in this decade was 21.31 percent greater than Indian rate of 17.64 percent, while in previous decade it was 28.33 percent. The literacy rate in the state is about 67 percent of that, male literacy stands at 79.19 percent while female literacy is at 47.76 percent. Sex Ratio in Rajasthan is 928 i.e. for each 1000 male, which is below national average of 940 as per census 2011(Rajasthan Government, 2015).

3.1.3. Districts of Rajasthan

Rajasthan state comprised with 33 districts namely: Ajmer, Alwar, Banswara, Baran, Barmer, Bharatpur, Bhilwara, Bikaner, Chittorgarh, Bundi, Churu, Dausa, Dholpur, Dungarpur,Sri Ganganagar, Hanumangarh, Jaipur,

Jaisalmer, Jalore, Jhalawar, Jhunjhunu, Jodhpur, Karauli, Kota, Nagaur, Pali, Pratapgarh, Rajsamand, Sawai Madhopur, Sikar, Sirohi, Tonk and Udaipur.

3.1.4. Weather and climate in Rajasthan

Rajasthan state has a tropical desert climate. The arid and semi-arid areas constitute about two-third of total geographical area of the state. The average rainfall in the state is 57.4cm against country average rainfall 110 cm. The period of monsoon is very short ranging around 60 to 75 days. On an average, its onset is late and withdrawal is early as compared to other states and one or two dry spells is a common phenomenon. Rainfall in large parts of Rajasthan is not only inadequate but also varies sharply from year to year. Consequently, droughts are perceived as a normal and cyclical occurrence. Districts in Rajasthan state such as Bikaner, Jaisalmer, Churu, Hanumangarh and Sri Ganganagar districts in arid western plain and north-western plain receive annual rainfall varying from 10 cm to 30 cm. On the other hand, the districts in humid south-eastern plain such as Dungarpur, Udaipur, Banswara and Chittorgarh receive the annual rainfall in the range of 65 cm to 100 cm (Swain, *et al*, 2012).

3.1.5. Temperature in Rajasthan

Temperature in the state varies widely from as low as 3°C to as high as 48°C across the agro-climatic zones. The temperature keeps rising progressively from March through April, May and June. West of Rajasthan and the eastern side of Aravalli Range, in the region of Bikaner, Phalodi, Jaisalmer and Barmer, the maximum daily temperature hovers around 40°C to 45°C. Sometimes, it even reaches as high a 49°C during the summer months. Night temperature during summer fall considerably around 20°C to 29°C. As noted by Pant and Hingane (1988), a gradual decreasing trend in the mean annual temperature for the region of northwest India including Rajasthan has been observed. After Jammu and Kashmir, Rajasthan is the second state where maximum number of cold waves has occurred (Swain, *et al*, 2012).

3.1.6. Agriculture in Rajasthan

Indeed Rajasthan, a predominantly agricultural state, with over seventy five per cent of the total population residing in rural areas. As per the 2011 Census, 75 percent of Rajasthan's population lived in rural areas. Cultivators and agricultural workers accounted for about 62 percent of total population of Rajasthan. While such a large proportion of the population was dependent on agriculture, agriculture and allied activities contributed about 30 per cent of gross state domestic product of Rajasthan in 2010-11. Agriculture in Rajasthan is primarily rain-fed. The period of monsoon is short. Due to unstable weather conditions farmers have to depend on both rainfed and ground water agriculture. As per the land use statistics for 2012-13 is 342.67 lakh, out of this, 51.01 percent net area sown,8 percent under forest,12.48 percent under non-griculture,17.13 percent other uncultivated land. The production under kharif and rabi crops for the 2011-12 in the state in lakh tonnes is 220.50 food grains (cereals 196.98 and pulses 23.54), 57.12 oil-seeds, 4.51 sugarcane and 17.31 cotton. In Rajasthan productivity of rice has been estimated at 1812 kg/ha, wheat 3048 kg/ha, jowar 577 kg/ha, bajra 828 kg/ha, maize 1736 kg/ha, tur 789 kg/ha, gram 696 kg/ha, pulses 613 kg/ha and oilseeds 1220 kg/ha as per 3rd Advance Estimates of 2008-09. The state is India's largest producer of mustard, pearl millet (bajra), and three spices (coriander, cumin, and fenugreek), cluster beans, isabgol and it is the second largest producer of maize. The state has a substantial area under vegetable crops (Gov. of Rajasthan, 2012-13).

3.1.7. Livestock in Rajasthan

"The greatness of a nation can be judged by the way its animals are treated- Mahatma Gandhi". In Rajasthan, animal husbandry is a major economic activity of the rural peoples, especially in the arid and semi-arid regions. Development of livestock sector has a significant beneficial impact in generating employment and reducing poverty in rural areas. The potential of crop production depends upon huge investment and weather and meteorological conditions. Comparatively animal husbandry and livestock is more stable and requires lesser investments. Livestock and poultry have

proved to be lifesaver in many distress conditions, especially in case of drought. Rajasthan has about only 7 percent of the country's cattle population and contributes about 11 percent of the total milk production, 30 percent of the mutton and 31 percent wool produced in the country. Rajasthan is first in Wool production while second in milk production. Animal Husbandry contributes about 8 percent in the GDP of the state. This sector has a great potential for rural self-employment at lowest possible investment per unit. Therefore, livestock development is a critical pathway to rural prosperity. The livestock population of the state as per 2012 livestock census is 57,732,204,which is composed of 13,324,462 Cattle, 12,976,095 Buffalo, 9,079,702 Sheep, 21,665,939, Goat, 37,776 Horses & Ponies, 3,375 Mules, 81,468 Donkeys, 325,713 Camels and 237,674 Pigs. The state has also over 80.24 lacs Poultry. The estimate of milk, egg and wool production was 14573 thousand tones, 1190.30 million nos. and 150 lac Kgs respectively in 2013-14 (Government of Rajasthan, 2012).

3.1.8. Indira Gandhi Canal and Irrigation

The Indira Gandhi canal is the longest canal in India and the largest irrigation project in the world. It is 649 km long and consists of Rajasthan feeder canal and Rajasthan main canal and runs through 167 km in Punjab and Haryana and remaining 492 km in Rajasthan. The canal is one of the projects of green revolution in India and also runs through the great Thar Desert. Indira Gandhi canal project was designed to utilize 9,367 Mm^3/yr of the total 10,608 Mm^3/yr allocated to Rajasthan from the surplus waters of the Ravi and Beas river. The Punjab rivers in the north, the Narmada river in the south and the Agra canals from Haryana and Uttar Pradesh provide water to the dry land of Rajasthan. The canal traverses seven districts of Rajasthan: Barmer, Bikaner, Churu, Hanumangarh, Jaisalmer, Jodhpur, and Sri Ganganagar. Indira Gandhi canal, when completed, would provide irrigation to about 12.58 lakh hectares of land in Ganganagar, Bikaner, and Jaisalmer districts of Rajasthan.

Some of the benefits of this canal ever the water was used in the cultivation of crops starting 1961 are:

- The canal water is available for drinking and other domestic uses.
- The crops can be grown every year with the help of canal water.
- Change in socio-economic conditions of the people and spurt in all economic activities.
- Improvement in household income and expenditure structure.
- Change in attitude and life style of people resulting into greater urge for education and rise in mobility and communication.
- Increase in 'heterogeneity' of population, enhanced inters and intra community interaction and quicker diffusion and adoption of technology of irrigated farming.
- Control over drought conditions.
- Change in the fauna of the area and introduction of fisheries.

3.1.9. Irrigation in Rajasthan

Irrigation infrastructure sounds more in Rajasthan than other states of India. North-western Rajasthan is irrigated by the Indira Gandhi Canal. Though, Rajasthan state has only 1 percent of country's water resources, 83 percent of available water used for irrigation. In the state 67 percent of the area is rain fed and about 33.6 percent area was irrigated out of which 27 percent is irrigated through canals and 65 percent through ground water and 8 percent irrigated through others. The net irrigated area was about 58.5 lakh hectares constituting about 34.5 per cent of net sown area in 2013-14. In the state average annual rainfall is 557 mm and ground water level is available at a depth of 30m to 61m.

3.1.10. Economy and Income

The Gross State Domestic Product (GSDP) is the total monetary value of all the final goods and services produced by an economy during a given period of time (generally a year) accounted without duplication. The Gross & Net State Domestic Product of state was ₹239,913 crore in 2012/2013. The per capita income at constant (2004-05) prices during 2012-13, was ₹29,917 as compared to ₹28,851 in the year 2011-12, registering an increase of 3.69 per cent over the previous year (Government of Rajasthan, 2012-13).

3.1.11. Main Challenges in Rajasthan

Some of the major challenges for agriculture sector in Rajasthan include rainfall is highly inadequate, 61% of area is in arid and semi-arid tracts where soil has poor fertility, low water holding capacity, high infiltration rate, 12 lakh ha area is either saline or alkaline, crop suffer from high temperature and wind effect, limited availability of ground water, limited spread of retail outlets for agriculture input, limited power-supply. Excessive irrigation and intensification of agriculture over the years has caused water-logging, seepage from canals and poor drainage. These factors produced a rise in the water table, increased salinity and finally submergence of the land. In light of the abovementioned information, this study is therefore designed in three districts of Northern Rajasthan.

3.1.12. Profile of the study districts

To understand the study area more clearly and comprehensive, it would be useful to look at some overall important statistics on each selected districts. The three districts that were selected randomly were Bikaner, Sri Ganganagar, and Nagaur districts (see section 3.2.1. for district selection)

3.1.12.1. Bikaner district

The district is bounded by Ganganagar district to the north, Hanumangarh district to the northeast, Churu district to the east, Nagaur district to the southeast, Jodhpur district to the south, Jaisalmer district to the southwest, and Punjab province of Pakistan to the northwest. According to the 2011 census Bikaner district has a population of 2,363,937 of which male and female are 1,240,801 and 1,123,136 respectively. This gives it a ranking of 190th in India (out of a total of 640). Out of total population in Bikaner 66.35 percent (1564691) lives in rural and 33.65 percent (803,736) lives in urban. The district has a population density of 78 inhabitants per square kilometer (200/sq mi).Its population growth rate over the decade 2001-2011 was 41.42 percent. Bikaner has a sex ratio of 903 females for every 1000 males, and a literacy rate of 65.92 percent. Area of district is 30247.90sq.km of this

1,772,000 ha cultivable area, 93,000 ha forest area, 299,000 ha land under non-agricultural use 52,000 ha permanent pastures. Bikaner district constitutes 7.96 per cent of total geographical area of Rajasthan state. It has 343,156 ha irrigated land size. Bikaner economy strongly depends on agricultural, in the district cereals, pulses and oilseeds are produced. Bikaner District lies in the Thar Desert. The Indira Gandhi Canal, also known as the Rajasthan Canal, runs through the district from northeast to southwest, providing irrigation water for the district. Bikaner is well connected to other parts of the state by air, rail and road (Wikipedia the free encyclopedia, 2015).

3.1.12.2. Sri Ganganagar district

Sri Ganganagar district is a northernmost district of Rajasthan state in western India. It is bordered on the east by Hanumangarh district, on the south by Bikaner district, and on the west by Bahawalnagar district of the Pakistani Punjab and on the north by the Punjab. According to the 2011 census Sri Ganganagar district has a population of 1,969,520, males constitute 52.99 percent of the population and females 47.01 percent. In Sri Ganganagar district 75 percent population lives in rural and 25 percent in the urban. This gives it a ranking of 235th in India (out of a total of 640). The district has a population density of 179 inhabitants per square kilometre (460/sq mi). Its population growth rate over the decade 2001-2011 was 10.06 percent. Sri Ganganagar has a sex ratio of 887 females for every 1000 males. It has an average literacy rate of 70.25 percent, higher than the national average of 59.8 percent: male literacy is 79.33 percent, and female literacy is 60.07 percent. The total area of Sri Ganganagar district is 1,115,466 hectares of which 911,000 ha cultivable area, 61,000 ha forest area, 68,000 ha land under non-agricultural use 51.7 ha permanent pastures. Sri Ganganagar district constitutes 3.2 percent of total geographical area of Rajasthan state. The economy of Sri Ganganagar district is dependent on agriculture. Major crops of the region are wheat, cotton, mustard, guar, grams, and sugarcane.

Horticulture is also becoming popular among farmers Kinnow (a citrus family fruit) is a popular horticultural product; other fruits of the citrus family are also

grown. Sri Ganganagar district has around 788,016 ha land is irrigated from Gang Canal, because of this irrigation the district is the 'breadbasket of Rajasthan'(Wikipedia the free encyclopedia, 2015).

3.1.12.3. Nagaur district

Nagaur district is one of the 33 districts of the state of Rajasthan in western India. The district is bounded by Bikaner District to the northwest, Churu district to the north, Sikar district to the northeast, Jaipur district to the east, Ajmer district to the southeast, Pali district to the south, and Jodhpur district to the southwest and west. Area of the district is 17,718 km^2. According to the 2011 census, Nagaur district has a population of 3,340,234 of which male and female were 1,679,570 and 1,660,474 respectively. Out of total population in Nagaur 82.80 percent lives in rural and 17.2 percent lives in urban. The district has a population density of 187 inhabitants per square kilometer (200/sq mi). Its population growth rate over the decade 2001-2011 was 19.25 percent. Nagaur district has a sex ratio of 948 females for every 1000 males, and a literacy rate of 64.08 percent out of which male literacy rate is 78.9 percent and female literacy rate is 48.63 percent. Area of Nagaur district is 17,718 km of this 1,764,000 ha cultivable area, 18,000 ha forest area, 87,000 ha land under non-agricultural use 73,000 ha permanent pastures. In the district 319,318 ha land is irrigated. Nagaur district constitutes 5.18 per cent of total geographical area of Rajasthan state. Economy of Nagaur district is primarily dependent on agriculture. Agriculture is the main occupation of a majority of the population of the Nagaur District. Bajra, wheat, jowar, til, barley and pulses are the major crops of the Nagaur District. Nagaur has a dry climate with a hot summer. Sand storms are common in summer. The district's climate is marked by extreme dryness, large variations of temperature & highly irregular rainfall patterns. The rainy season is relatively short, extending from July through mid-September (Wikipedia the free encyclopedia, 2015).

3.2. Sampling design

Multistage stratified random sampling procedure was adopted for the selection of 300 sampled respondents from three districts. In the first stage, Northern part of Rajasthan was selected purposively for stated reasons in section 3.1.

3.2.1. Selection of the district

In the second stage, out of seven districts, giving equal chance for each district, three districts namely Bikaner, Sri Ganganagar and Nagaur were selected randomly for further Tehsil sampling(see selected districts on figure 3.1). Tehsils were selected in each district according to the following tehsil selection procedure.

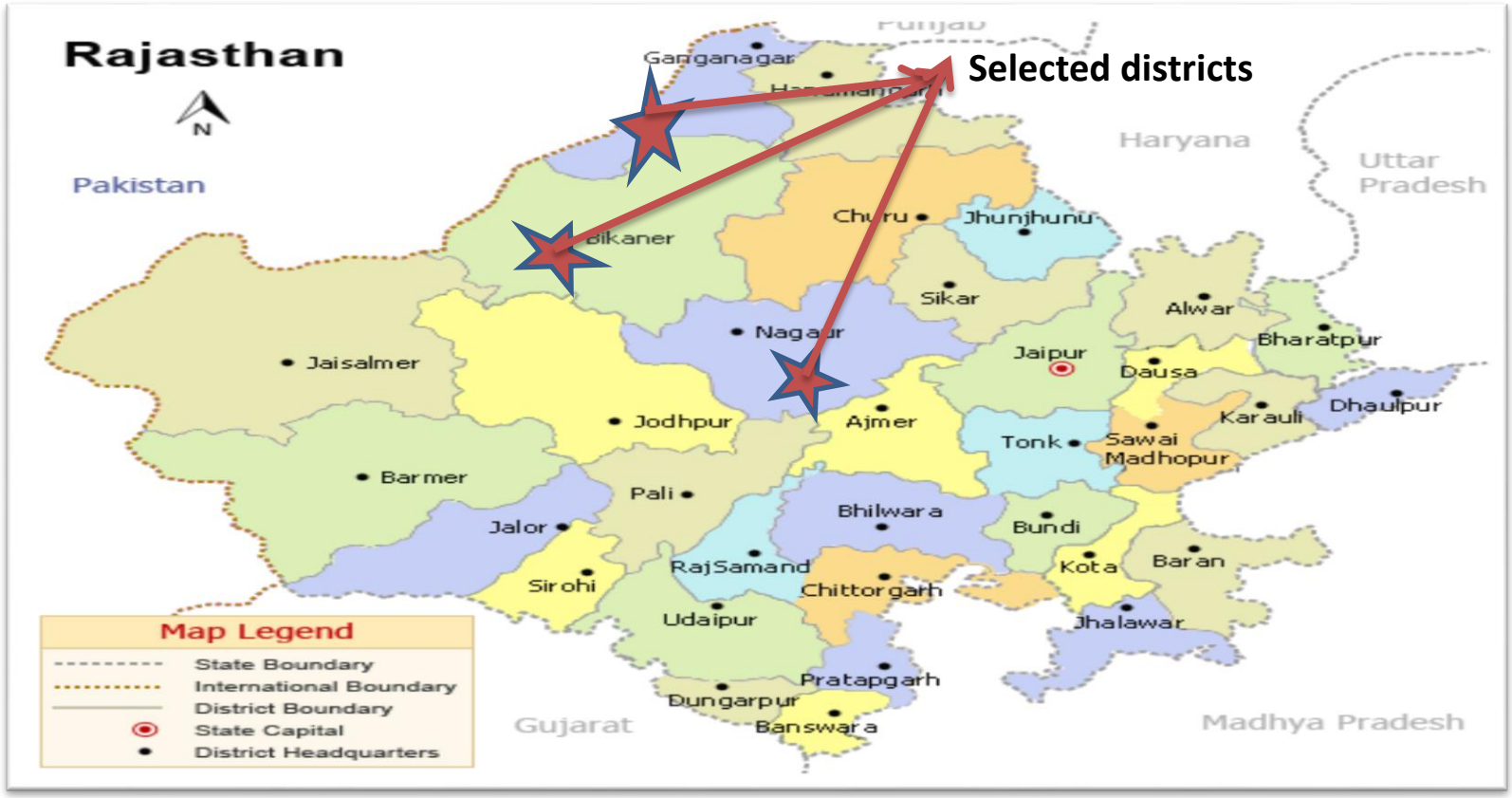
3.2.2 Selection of Tehsils (Taluka)

In the third stage, two *tehsils* from each selected district were selected randomly. Namely: in Bikaner district, Bikaner and Lunkaransar whereas in Sri Ganganagar district, Sadulshahar and Sri Ganganagar further in Nagaur district, Merta and Khinwsar *tehsils* were selected randomly. Thus, totally six *tehsils* were selected from three selected districts for selection of villages.

3.2.3. Selection of villages

In the fourth stage, three villages from each selected *tehsil* were selected randomly. From Bikaner *tehsil* (Khara, Palana, Gusaisar), from Lunkaransar *tehsil* (Udana, Bhaderan, Chandsar) villages were selected. Also from Sadulshahar *tehsil* (9, 10, BNW, Lal Garth Jattar, Maniwali) and from Sri Ganganagar *tehsil* (4'C, Mirza Wali, Madera) villages were selected. Furthermore, from Merta *tehsi* (Jarora, Dantani, Kheduli) and Khinwsar *tehsil (*Bhed*,* Chawandia*,* Panchla sidha*)* villages were selected randomly*.* Thus, totally eighteen villages from six selected *tehsils* were selected for further selection of households. Respondent households were selected in each *tehsil* according the following household selection procedure.

Figure 3.1: Location of selected districts in Northern Rajasthan



***Source:** Author's computation and mapsofIndia*

3.2.4. Selection of household

In the fifth stage, list of all households residing in each selected village from village *Patwari* and voters list available in the village *Sarpanch* were applied to pick out targeted households' using systematic sampling technique. To apply systematic random sampling, the researcher first identify the needed sample size (100 from each district and different for each villages). Then, he divides the total number of the population in each village with the sample size to obtain the sampling fraction. He randomly picks his starting number that is less than sampling fraction. Then, the researcher will select each n'th subject from the list by adding sampling fraction. Hundred households were selected based on size proportional to household size from six randomly selected villages of a tehsil by using systematic sampling technique from each district. Thus, total three hundred household's data were however found useful for this study. Table 3.1 depicts district, Tehsils, village and number of household selected from each village.

Table 3.1: Number of households selected from each village

Selected districts	Selected *tehsils*	Selected Village	Number of respondents
Bikaner	Bikaner	Khara	16
		Palana	17
		Gusaisar	17
	Lunkaransar	Udana	18
		Bhaderan	16
		Chandsar	16
			Bikaner total 100
Sri Ganganagar	Sadulshahar	9,10,BNW	16
		Lal Garth Jattar	17
		Maniwali	18
	Sri Ganganagar	4'C	19
		Mirza Wali	16
		Madera	14
			Sri Ganganagar total 100
Nagaur	Merta	Jarora	14
		Dantani	16
		Kheduli	17
	Khinwsar	Bhed	19
		Chawandia	18
		Panchla sidha	16
			Nagaur total 100
			North Rajasthan total 300

Source:- Author's compilation

3.3. Data collection

To achieve the stated objectives, detailed primary and secondary data were collected on poverty trend, poverty situation, determinants and exit time of poverty, income and resource inequality and common coping strategies in the study area. Rajasthan state is the largest *state* of India and it has 33 districts, it would not be easy to collect data from all Rajasthan for the study because of time and resource constraint, dedicated to the Northern part of Rajasthan. In Northern Rajasthan there are seven districts. The data collection was done efficiently through a structured questionnaire to collect the required data from selected sampled households. Primary data was collected for one year from July 2013 to June 2014. The questionnaire was first pre-tested and modified before the execution of the survey (See the questionnaire in Appendix III). The concept of a resident investigator was central to the rural studies. Secondary data on poverty trend and other necessary data were collected from government of India, Government of Rajasthan, and World Bank and other websites. Further available records and periodicals, reports from the state and district level government offices were also used to collect secondary data.

3.4. Analytical tools

3.4.1. Poverty trend in country and in the study area (1951-2011)

Poverty trend analysis is based on the idea that, what has happened on poverty in the past, serves as cornerstone to evaluate policy contribution. The most general goal of trend analysis in poverty is to distinguish whether the level of poverty situation has increased or decreased over time, and if it has, how quickly or slowly the increase or decrease has occurred. What happens to poverty trend in the country is quantitatively important to evaluate overall performance of the country's development plans. Thus, to achieve the first objective, this study aims to investigate the trend in poverty for the last seven decades (1951-2011) using graphs. Secondary data from reliable sources were collected and graphed from 1951 to 2011 for seven decades. Time interval was divided in decades to understand the trend simply.

3.4.1.1 Poverty trend using growth model under development plan periods

To strengthen the analysis, it would be better to support economic data econometrically. Sometimes economic theory and/or observation of data will not easily show functional relationship between economic variables. A much more common and simple way to see the functional relationship between variables is drawing scatter diagram. For this particular analysis following literatures, log-linear or semi-log or growth rate model was used. Some researchers log a variable because it has a long *tail* (it is skewed to the right) whereas its logged value looks like it is normally distributed. A log-linear (or "semi-log") model takes the form:

$$\text{Ln}\,(Y_i) = \beta_0 + \beta_1 X_i + \varepsilon \qquad ---------- (1)$$

$$\beta_1 = \frac{\partial \ln Y_i}{\partial X_i} = \frac{Relative\ Change\ in Y_i}{Change\ in\ X_i} \qquad ------ \quad (2)$$

For this functional form, the slope parameter β_1 has a useful interpretation. When X (year in our case) changes by one unit, Y will change by approximately β_1*100 percent. The smaller the absolute value of β_1 the closer the approximation.

3.4.2. Extent of poverty and socio-economic characteristics

To achieve second objective in this study, minimum consumption expenditure per person or preferably per household was used as standard of measurement to measure poverty. To measure extent of poverty, the choice of income or consumption expenditure as best indicator for living standard measurement of households is another point of debate. Government of India and most analysts prefer to use current consumption as an indicator of living standard measurement because; income of the poor often varies over time. Particularly, this is true for rural based economies that depend on traditional production systems. On the other hand, consumption expenditure may reflect the purchasing power of households better than measured current income because recorded income during a survey may be distorted by transitory poverty situation. However, consumption shows relative stability due to a

consumption smoothening effort from own saving, borrowing from others, or social risk sharing schemes. Rural households in developing countries also have the difficulty of excluding farm input costs from their revenue in estimating their income, and inaccuracy is tenable. Sometimes it is also common to have underestimated income figures as people are reluctant to give accurate information about their incomes (Atkinson, 1991; Chaudhuri & Ravallion, 1994; Deaton & Grosh, 2000; Deaton & Zaidi, 2002; Fields, 2000; Kyereme & Thorbecke, 1991). Expert group to review the methodology for measurement of poverty for India accepted consumption expenditure per person or preferably per household based poverty measurement is best approach than deprivations or other base approach (Rangarajan, 2014).

This minimum level of consumption expenditure can be derived, in turn, in terms of minimum expenditure on food and non-food items. Minimum food consumption is related to fulfilling certain nutritional standards. However, for consumption to be an indicator of the household's welfare, it has to be adjusted for differences in the calorie requirement of different household members (age). This adjustment can be made by deflating household consumption by an adult equivalent scale that depends on the nutritional requirement of each family member.

In this study based on individual household minimum consumption expenditure per person data, firstly, households were classified as poor and non-poor as compared with Rajasthan state rural poverty line standard. Poverty line is a monthly per capita consumption expenditure per person or a cut of living standard level below which an individual is considered to be poor (Rangarajan, 2014, MoFED ,2013; Doyle, 2003; Ravallion, 1992). According to expert group of India (Rangarajan, 2014) monthly per capita consumption expenditure of ₹1035.97 in rural areas and ₹1406.15 in urban areas is treated as the poverty line at the Rajasthan state level. This implies a monthly consumption expenditure of ₹5179.85 in rural areas for a family of five at 2011-12 prices. Any household failing to meet this level of consumption expenditure can be treated as a poor household. Hence, for this study,

following (Rangarajan, 2014), ₹1035.97 per adult equivalent per month in rural areas was employed as a cut-off value between poor and non-poor households. People are counted as poor when their measured standard of living (generally in any consumption expenditure) is below poverty line, otherwise non-poor (Rangarajan, 2014).

Based on the above poverty line and data from households, this study used three poverty dimension instruments that were identified by (Foster, Greer, and Thorbecke, 1984) to attain the second objective which is related to the extent of poverty in northern part of Rajasthan. These include headcount index; the poverty gap index; and severity index or Foster-Greer- Thorbecke (FGT) index of poverty. These three poverty dimension instruments also helped us to see the poverty situations in northern Rajasthan easily. Using these three poverty dimension instruments we identified the percentage of the poor (headcount index), the aggregate poverty gap (poverty gap index), and the distribution of income among the poor (poverty severity index) in northern Rajasthan to achieve our second objective.

The mathematical expression of the model in Foster, Greer, and Thorbecke (1984) for poverty measure is explained by considering, *P*α as class of poverty measures. By levelling real per-adult (per capita) household consumption expenditure per person, Y_i as

$$Y_1 \leq Y_2 \leq \ldots\ldots Y_q \leq Z < Y_q + 1 \ldots . \leq Y_n - -(3)$$

Where

Z = is poverty line

n = is the total population

q = the number of poor

Then, P_α is given by

$$P_\alpha = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{Z - Y_i}{Z}\right)^\alpha - - - - - - - - - - - (4)$$

Where:

P_α = Poverty measure

Z = Poverty line

N = Population number

q = Number of persons/households below the poverty line

Y_i = real per capita consumption expenditure, in the equation,

$Z - Y_i = 0$ if $Y_i > Z$.

α = is the weight attached to the severity of the poor which takes the value 0, 1, 2 depending on the degree of concern about poverty.

Headcount index (P_0): This is the share of the population whose monthly per capita consumption expenditure is below the poverty line, that is, the share of the population that cannot afford to buy a basic basket of goods. However, this index does not capture differences among the poor.

$$P_0 = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{Z - Y_i}{Z}\right)^0 ---------(5)$$

Poverty gap index (P_1): indicates the depth of poverty or this provides information regarding how far households are from the poverty line. This measure captures the mean aggregate monthly per capita consumption expenditure shortfall relative to the poverty line across the whole population. In other words, it estimates the total resources needed to bring all the poor to the level of the poverty line (divided by the number of individuals in the population).

$$P_1 = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{Z - Y_i}{Z}\right)^1 ------ ------(6)$$

Poverty severity index *(squared poverty gap)*(P_2):- This takes into account not only the distance separating the poor from the poverty line (the poverty gap), but also the inequality among the poor, that is, a higher weight is placed on those households further away from the poverty line.

$$P_2 = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{Z - Y_i}{Z}\right)^2 -------(7)$$

3.4.3. Determinants and exit time of poverty

3.4.3.1. Determinants of poverty

Once we identified who and where the poor (relative position of the poor) are we need to examine the causes for that poverty and the time required escaping the poverty trap. To make analysis of poverty complete and to

address the third objective of this study, we focused more, to get key answer for, why people are poor and how long are they going to stay in poverty? Identifying principal determinants and the time required escaping the poverty was the focus of this section. The study used binary logistic regression model and Watts's poverty index, to identify the determinant factors that are correlated with rural household poverty and to estimate the average time to exit poverty in Northern Rajasthan respectively.

To mention few points as to why the logistic regression model is used, when the dependent variable is binary (poor, non-poor), OLS (Ordinary Least Squares) regression technique produces parameter estimates that are inefficient and heteroscedastic error structure. As a result, testing hypothesis and construction of confidence interval becomes inaccurate and misleading (Aldrich and Nelson, 1984). Similarly, a linear probability model may generate predicted value outside 0 - 1 interval which violates the basic tenets of probability (Gujarati, 1988). It also creates a problem of non-normality, hetroscedasticity of the disturbance term; thereafter leading to lower coefficients of determination (*ibid*). To alleviate these problems and produce relevant outcomes, the most widely used qualitative response models are the logit and probit models (Amemaya, 1981). Conventionally, linear regression analysis is widely used in most economic and social investigation because of availability of simple computer packages, as well as ease of interpreting the results. However, results derived from linear regression analysis may lead to fairly unreasonable estimates when the dependent variable is dichotomous (Ayalneh and Shimelis, 2009). Therefore, the use of the logit or probit models is recommended as a panacea of the drawback of the linear regression model (Gujarati, 2003). Which model to choose between logit and probit is, however, difficult for they are similar in most applications, the only difference being that the logistic distribution has slightly fatter tails. This means that there is no binding reason to choose one over the other but for its comparative, mathematical and logit output (Odds ratios) are easier to interpret than probit output many researchers tend to choose the logit model (Hosmer and

Lemeshew, 1989). Therefore, in this study logit model was applied using STATA-12 packages to achieve the proposed objectives.

3.4.3.1 Empirical model

The main purpose of a qualitative choice model like logit is to determine the probability that an individual with a given set of attributes will fall in one category rather than the other, i.e. poor / non poor. Household can be categorized as poor (Y = 1) with the probability of P_i , if monthly per capita consumption expenditure is less ₹1035.97 in rural areas and ₹1406.15 in urban areas per month in Northern Rajasthan. Or Household can be categorized as non- poor (Y = 0) with the probability of 1 - P_i, if the per capita consumption expenditure is greater than ₹1035.97 in rural areas and ₹1406.15 in urban areas per month in Northern Rajasthan. To characterize the poor in Northern Rajasthan, a probability falling below the poverty line are linked to household and may at the same time be poverty generating factor. These models estimate the probabilities of being poor using Maximum Likelihood Estimation (MLE) while accounting for the discrete nature of the dependent variable (Greene, 2002). The dichotomous dependent variable (poor / non poor) is regressed on a series of household characteristics, which potentially affect the level of household poverty that are as explanatory variables can be best explained by applying logit model.

An explanation of logistic regression begins with an explanation of the logistic function, which always takes on values between zero and one.

$$\mathrm{f}(x) = \frac{1}{1+\mathrm{e}^{-\mathrm{x}}} ---------- (8)$$

$$\mathrm{P(t)} = \frac{\mathrm{e}^{\mathrm{t}}}{1+\mathrm{e}^{\mathrm{t}}} = \frac{1}{1+e^{-t}} ---------- (9)$$

Viewing t as a linear function of an explanatory variable x (or of a linear combination of explanatory variables), the logistic function can be written as:

$$\mathrm{t}_i = \beta_i \mathrm{X}_i + \varepsilon_i ---------- (10)$$

Where: t_i - is the conditional probability. It takes value

1 if the household is poor

0 Otherwise.

β_i - vector of the respective parameter estimated using maximum likelihood method.

ε_i – error term

$$P(x) = \frac{1}{1+e^{-(\beta_0+\sum \beta_i X_i)}} ----------(11)$$

$P(x)$ is the probability that the dependent variable equals a case, β_0 is the intercept from the linear regression equation (the value of the criterion when the predictor is equal to zero), $\beta_1 X$ is the regression coefficient multiplied by some value of the predictor, and base e denotes the exponential function.

The formula for $P(x)$ illustrates that the probability of the dependent variable equalling a case is equal to the value of the logistic function of the linear regression expression. This is important in that it shows that the value of the linear regression expression can vary from negative to positive infinity and yet, after transformation, the resulting expression for the probability $P(x)$ ranges between 0 and 1.This was interpreted as the probability of the dependent variable equalling a "non-poor" or "case" rather than a poor or “non-case”. We also define the inverse of the logistic function, the logit:

$$g(x) = \ln\left(\frac{P(x)}{1-P(x)}\right) = \beta_0 + \sum \beta_j X_i + \varepsilon_i \quad -------(12)$$

$g(x)$ – Refers to the logit function of some given linear combination x of the predictors

ln - denotes the natural logarithm

If there are multiple explanatory variables, then the above expression $\beta_0 + \beta_1 X_1$ can be revised to $\beta_0 + \beta_1 X_1 + \beta_2 X_2 + -- + \beta_m X_m$.Then when this is used in the equation relating the logged odds of a success to the values of the predictors, the linear regression will be a multiple regression with *m explanators* ; the parameters β_j for all *j* = 0, 1, 2, ..., *m* are all estimated.

$$g(x) = \ln\left(\frac{P(x)}{1-P(x)}\right) \beta_0 + \beta_1 X_1 + \beta_2 X_2 + -- + \beta_{16} X_{16} -- (13)$$

Here $P(x)$ is the conditional probability of household poverty; β_j's are parameters to be estimated; (X_1) Family size, (X_2) Farm size, (X_3) Irrigated land size, (X_4) Income, (X_5) Saving,(X_6) Credit,(X_7) livestock owned (TLU), (X_8) Decision maker education,(X_9) Wife education,(X_{10}) Dependency ratio,

(X_{11}) Number of farm participant,(X_{12}) Farming experience,(X_{13}) Road distance, (X_{14}) Months of food deficit, (X_{15}) Age of decision maker and (X_{16}) Adult number are identified variables.

3.4.3.1.1 Testing multicollinearity

Before estimating the logit model, it is necessary to check if multicollinearity exists among the continuous variables. Multicollinearity in logistic regression is a result of strong correlations between independent variable. Maddala (1989) described that high inter-correlation among the predictor variables by themselves need not necessarily cause any problems in conclusion. Whether or not this is a problem depend on the magnitude of the error variance and the variance of the predictor variables. Multicollinearity may be induced due to poor sampling method, miss measurement and over fitting of a model as well as improper use of dummy variables. There are a lot of statistically accepted thumb rules that have been proposed for detecting multicollinearity among categorical predictor variables. Accordingly, Variance Inflation Factor (VIF) technique was employed to detect the problem of multicollinearity for continuous explanatory variables (Gujarati, 2003). Each selected continuous variable is regressed on all the other continuous explanatory variables, the coefficient of determination (R_j^2) being constructed in each case. If an approximate linear relationship exists among the explanatory variables then this will result, in a 'large' value for R_j^2 in at least one of the test regressions. A popular measure of multicollinearity associated with the VIF is defined as:

$$VIF(X_j) = (1 - R_j{}^2)^{-1} ---------- (14)$$

A rise in the value of R_j^2 that is an increase in the degree of multicollinearity, does indeed lead to an increase in the variances and standard errors of the OLS estimates. A VIF value greater than 10 (this will happen if R_j^2 exceeds 0.90), is used as a signal for existence of severe multicollinearity (Gujarati, 2003).

3.4.3.1.2. Definition of variables and working hypothesis

In this study, the selection of the variable for the final logistic model was made by looking the association between each predictor variables with the response

variable. A minimum of 10 events per independent variable has been recommended for sample size and dependent variable efficiency (Hosemer-Lemeshow, 1989). This study had 21 events per independent variable. The separate effect of each predictor variable in explaining the outcome variable was made by postulating the null hypothesis that $H_0 : \beta_i = 0$ against the alternative $H_1: \beta_i \neq 0$ for at least on i = 1, 2, 3,……..n. The significance test for each coefficient in the model was done using the Wald-chi-square ($[\beta / s.e(\beta)]^2$) which is distributed as a chi-square with degree of freedom and likelihood ratio test. A likelihood ratio (LR) chi-square test was also employed to examine the importance of each predictor variables to the outcome variable.

Therefore, sixteen explanatory independent variables were selected to analyze the hypothesis whether they explain a household's poverty status or not. These variables were selected on the basis of theoretical explanations and the results of various empirical studies. The broad determinant variables of poverty used in this study includes three components. *Community level characteristics***:** these include the availability of infrastructure (roads, water, and electricity) and services (health, education), proximity to markets, and social relationships. *Household and individual characteristics***:** Among the most important are: *Demographic:* household side, age structure, dependency ratio, gender of head. *Economic:* employment status, hours worked, property owned. *Social:* health and nutritional status, education, shelter (World Bank Institute, 2005). Therefore, the following sixteen variables were used to identify the major determinants of household poverty in the study area.

The dependent variable of the model (HPSTAT**):** The household's poverty status is a discrete variable representing the status of households' poverty. It was represented in the models by two possible alternative ways: 1 for poor and 0 otherwise. The information, which identifies the poor from the non-poor, is obtained by comparing the monthly per capita consumption expenditure of ₹1035.97 in rural Rajasthan areas. Households beyond this threshold is said to be non-poor, otherwise not.

Independent variables: The independent variables that are expected (hypothesized) to have association with poverty status, selected on the basis of theoretical explanations and the results of various empirical studies. Any exogenous variable having negative coefficient is expected to reduce poverty whereas explanatory variable found to be positively related to the poverty status will deteriorate the well-being of the households. Efforts were made to incorporate demographic, biophysical and socioeconomic factors, which are expected to be relevant in the rural livelihood systems of Northern Rajasthan. Accordingly, the empirical model was built using the data collected on the following hypothesized variables. The associated hypotheses of the study with respect to each one of the explanatory independent variables are also presented below.

3.4.3.1.3 Hypotheses for explanatory variables

Based on critical review of the literature from chapter 2 and theoretical explanations and the results of various empirical studies, the following explanatory variables were hypothesized to have an influence (positive or negative) on household poverty.

Family size (FAMS): this is the total number of family members in the household, who live together. The expectation is that as the family size increases the probability of the household to have disguised unemployment and dependency ratio would increase which in turn would affect the well-being of the household. Therefore, it is hypothesized that family size is expected to have positive association with poverty.

Farm size (FARS): Farm size is a continuous variable measured in hectare. It is a salient resource expected to be associated with a household's poverty status. As the cultivated farm size increases, provided other associated production factors remain the same, the possibility that the household gets more output is high as it remains the basic capital input in production. Therefore, it is hypothesized that households with large farm size are less likely to be poor and vice versa.

Dependency Ratio (DR): this is the ratio of children under age 15 and old age of above 64 to total family size. This ratio allows us to measure the burden on members of the labour force within the household. For a given household size, a larger number of children and elderly members would imply a smaller number of earners in the household. One might expect that a high dependency ratio would be correlated positively with the level of rural household poverty.

Age of decision maker (AGEH): Age is a continuous explanatory variable. As age of a household increases, it is assumed that he/she could acquire more knowledge and experience. They are more risk averter and their chance to become non-poor increases with age. Thus, it is hypothesized that age of the household heads and poverty are negatively correlated.

Adult number (ADULN): The poverty-reducing effort of household depends on the participation of adult members in the production process. It reveals that more participation of adult in the production process, more income earned to reduce poverty. In accordance with the argument given above, adult number is expected to be negatively correlated to poverty.

Irrigated land size (IRRLS): The ownership of irrigated land is considered the main factor that can extricate a household from poverty. Large irrigated land contributes to increase household per capita income. We hypothesize negatively correlated to poverty.

Income (INCM): is an important variable explaining the characteristics of poor and non-poor households, in that those who have earned relatively larger income could be non-poor. In this study income is total family income both from farm and non-farm sources. Larger income has positive impact on the probability of being non poor or negative impact on poverty.

Saving (SAVG): Saving is difference between household's income and expenditure. It is important in the poverty reduction. Saving protects selling of

their assets as a coping strategy. Therefore, it is hypothesized that households with more saving are less likely to be poor and vice versa.

Credit (CRDT): Households which have the opportunity to receive credit would build their capacity to produce more through the use of improved seeds and the adoption of improved technologies. Thus, it is hypothesized that a household which has access to credit is more likely to be non-poor.

Livestock (TLU): The livestock sector is an important sector of the rural economy in Rajasthan. The contribution of the livestock sector toward family income is quite substantial. In the present study, this form of property or asset is normally included and measured by Tropical Livestock Unit (TLU). It helps to use a common unit to describe livestock numbers of various species as a single figure that expresses the total amount of livestock present – irrespective of the specific composition. Therefore, possession of large size of livestock increases the likelihood of the household to be non-poor.

Decision maker education (DEMED): Decision maker education is an important variable determining household poverty. High educational attainment may imply a greater set of employment opportunities and specifically in the rural context, a better awareness of the full potential of new agricultural technologies and associated agricultural practices. Thus, it is hypothesized that negatively correlated to poverty.

Wife education (WIFE): Women education is important indicators of the quality of life of household members. Educated women's have better knowledge for managing their family health by adopting better nutrition in addition of increasing family income. Therefore, it is hypothesized that women education is negatively correlated to poverty.

Number of farm participant (NFAP): The poverty-reducing effort of household depends on the number of farm participant of adult members in the family. It reveals that more participation of household members in agriculture

will increase agricultural resource and family labour use efficiency and finally improve output and income of household. Therefore, it is hypothesized that number of farm participant is negatively correlated to poverty.

Farming experience (FAMEX): represented the years of experience. Years of practicing an act makes the practice more effective and efficient. Efficiency leads to cost minimization, increased profit and thus, improved standard of living. Therefore, it is hypothesized that farming experience is negatively correlated to poverty.

Road distance (ROAD): represents the household access to main road. It is an important factor that determined the level of being poor in Northern Rajasthan. This might be because access to road improves farmers' marketing and production choice by minimizing cost of production. Distant the household access to main road, the higher the probability of being poor. We hypothesize positively correlated to poverty.

Months of food deficit (MOFD): As months of food deficit increase household food consumption depends on purchasing, using past saving or current income. As months of food deficit increase the higher the probability of decrease in well-being. Therefore, it is hypothesized that months of food deficit is positively correlated to poverty.

Table 3.2: Selected variables and their expected signs

Code	Variable	Description	Measurement	Expected sign
HPSTAT	Household's poverty status	Household's poverty status	Dummy (1 if poor and 0 otherwise)	Response variable
FAMS	Family Size	Number of people in household	Number	+/-
AGEH	Age of decision maker	Age of household head	Years	-
ADULN	Adult Number	Number of adults in the household	Number	-
FARS	Farm Size	Land size	Hectares	-
IRRLS	Irrigated land size	Amount of farm under irrigation	Hectares	-
INCM	Income	Total amount of annual Income	Rupee	-
SAVG	Saving	Total amount of annual savings	Rupee	-
CRDT	Credit	Total amount of credit taken	Rupee	-
TLU	Livestock	Total number of livestock in TLU	Number	-
DEMED	Decision Maker Education	Household head highest level of education successfully completed	Number of years of schooling	-
WIFE	Wife Education	highest level of education attendance of head's wife	Number of years of schooling	-
DR	Dependency Ratio	The number of dependents	percentage	+
NFAP	Number of Farm participant	Total Number participant in agricultural production	Number	-
FAMEX	Farming Experience	Number of years working in Agriculture	Number	-
ROAD	Road Distance	Distance from main regulated road	kilo meters	+
MOFD	Months of Food Deficit	Number of months in food deficit	Number	+

Source: Own computation, 2015

3.4.3.1.4 Marginal effects result in logistic model

In this study marginal effects results were preferred than odds ratio to make interpretation clear and understandable. Marginal effects for continuous variables measure the instantaneous rate of change and they are popular in some disciplines (e.g. Economics) because they often provide a good approximation to the amount of change in Y that will be produced by a one unit change in X_k. The marginal effect, in binary regression model, is the slop of probability curve relating X_i to P_r (Y_i=1/X_i), holding all other variables constant. It measures the change in probability of occurrence for a unit change in X_i's at their mean value. The positive sign of marginal effect indicates that the probability of households to be poor will be increased at the mean value of continuous predictors while the negative sign indicates that the probability of households to be poor will decline at their respective mean.

3.4.3.2. Exit time of poverty

Recently proposed Sustainable Development Goal (SDG) for 2030 has a theme of end poverty**.** Sustainable Development Goals has set numerical targets of end poverty and hunger by 2030. In their backdrop, there is alarming need to have meaningful poverty analysis, identifying the time required to escape the poverty trap under sustainable growth scenarios. This can be achieved if FGT (Foster-Greer-Thorbeecke) measures of poverty are supplemented with a cardinally meaningful measure - Average Exit Time Measure of Poverty.

The goal of the Indian government is ‘a country free of poverty’. But, the most widely used poverty measures do not show when poverty might be eliminated. The ‘head-count index’ simply counts the poor, while the ‘poverty gap index and squaring it, shows their average shortfall from the poverty line. But, in this section we searched answer for the question how long are they going to stay in poverty? Economic growth and average exit time in Northern Rajasthan following Morduch, (1998), approach was this section outline. For that, we employed Watts poverty index to compare the performance of the average

exit time measure of poverty with that of the more familiar FGT class of poverty measures. Morduch shows that a simple linear transformation of the Watts index gives it cardinal properties that can be useful as well. To derive the average exit time measure of poverty, Morduch (1998) starts with an existing distributionally sensitive Watts measure. The original Watts measure is defined as ,where there are *i* individuals in the population indexed from 1 to *N* in ascending(positive) order of income (per capita monthly expenditure) and *q* is the number of people with expenditure *y* below the poverty line z, then the Watts poverty index, W, can be written as follows:

$$\mathrm{W} = \frac{1}{\mathrm{N}} \sum_{\mathrm{i}=1}^{\mathrm{q}} [(ln\,(Z) - \ln(y_i)] ---------(15)$$

Despite the Watts poverty index has been proposed in the literature quite a long time ago, the index however has never been widely used since this index cannot be cardinally interpreted. Morduch (1998), transformed Watts poverty index to make it more useful and could be applied widely in poverty studies.

Specifically, Morduch (1998) shows that simply dividing the Watts poverty measure by some hypothetical growth rate *g*, where *g* > 0, gives it an interesting cardinal interpretation. This transformed index reflects the average number of years that it would take the population to exit poverty if it were possible to ensure that all incomes grow at rate *g*. In other words, this average exit time maps the income distribution to the space of time. It thus provides a simple metric of the potential for economic growth to reduce poverty and in this way it may help to illuminate a contested policy debate (see, for example, Dollar and Kraay, 2000).

Morduch (1998) shows that a household's expected exit time is defined as the time it will take it to reach a given poverty line via income growth. If the income of household *i* grow at a constant positive rate g per year, the relationship of the poverty line to current income can be written

$$\mathrm{Z} = y_i(1+\mathrm{g})^{t_{\mathrm{g}}^{i}} ----------(16)$$

Taking the logarithm and solving for t_{γ}^{i} yields the number of years it will take them to reach the poverty line is:

$$t_{\mathrm{g}}^{i} \cong \frac{\ln(Z) - \ln(y_i)}{\mathrm{g}} ----------(17)$$

Where $\mathrm{g} > 0$

What is more interesting is that, Morduch's transformation of Watts poverty index has enable us not only to estimate the average time to exit poverty for individual i, but we also could estimate the average time to exit poverty for the total individual, N (including those who are not poor; i.e. for households above the poverty line, t_{g}^{i} = 0. Therefore, the average exit time for total individual is simply t_{g}^{i} averaged over the whole population, including the non-poor for whom t_{g}^{i} = 0:

$$\mathrm{T_g} = \frac{1}{\mathrm{n}} \sum_{\mathrm{i=1}}^{\mathrm{m}} \mathrm{t}_i\ \mathrm{g} = \frac{1}{\mathrm{n}} \sum_{\mathrm{i=1}}^{\mathrm{m}} \frac{ln\ Z - \ln y_i}{\mathrm{g}} = \frac{w}{\mathrm{g}} ------(18)$$

In addition to the average exit time across the whole population, $\mathrm{T_g}$, the average exit time just for the poor can be obtained, the average time to exit poverty among the poor, $(\mathrm{T_g})^P$, could be obtained by dividing $\mathrm{T_g}$ with the poverty *headcount ratio*, P_0, as follows:

$$(\mathrm{T_g})^P = \frac{\mathrm{T_g}}{p_0} ----------(19)$$

***Note*,** for this analysis the head-count ratio output (P_0) can be used from second objective.

3.4.4 Relative poverty (income and resource inequality)

Inequality measurement is an important factor in economy, which indicates whether benefits of the growth have been concentrated or "trickled down" sufficiently to the society. There may be wide difference of opinion as to the significance of a very unequal distribution of wealth, but there can be no doubt as to the importance of knowing whether the present distribution is becoming more or less unequal (Lorenz,1905). Inequality is a broader concept than poverty in that it is defined over the entire population, not just for the portion of the population below a certain poverty line. In the course of inequality measurement, we are able to say at what point a community is to be placed between the two extremes, equality, on the one hand, and the ownership of all wealth by one individual on the other (Lorenz, 1905). Inequality is concerned

with distribution. Note that inequality measures can be calculated for any distribution, not just for income, or other monetary variables but also for land, livestock and other continuous and cardinal variables. Among the most important economic challenges facing Rajasthan, the increases in the inequality of economic outcomes needs attention like poverty. This study was designed only to address the status of income and agricultural resource inequality among sampled households in Northern Rajasthan generally and in Bikaner, Sri Ganganagar and Nagaur districts specifically. Income and agricultural resource inequality analysis focused on: income (farm and non-farm income), agricultural land holding, irrigated land holding and livestock holding inequality using Lorenz curve and Gini coefficients among sampled households both in Northern Rajasthan and its districts using household survey data.

3.4.4.1 Lorenz curve and Gini coefficients

3.4.4.1.1. Lorenz curve

In this analysis Lorenz curve and Gini coefficient are used as inequality gadget to assess how income and agricultural resource distributed among sampled households. The Lorenz Curve is a tool used to represent income or resource distributions as proposed by Lorenz (1905); it tells us which proportion of total income or resource is in the hands of a given percentage of population. This method is conceptually very similar to the method by quantiles that we applied in-depth in this analysis in addition to Lorenz curve and Gini coefficient. However, instead of ending up with income shares, the Lorenz Curve relates the cumulative proportion of income to the cumulative proportion of individuals.

The Lorenz Curve is obtained as follows: The *X*-axis records the cumulative proportion of population ranked by income level. Its range is therefore (0, 1). The *Y*-axis records the cumulative proportion of income or resource for a given proportion of population, i.e. the income or resource share calculated by taking the cumulated income or resource of a given share of the population, divided by the total income or resource Y, as follows:

$$L\left(\frac{k}{p}\right) = \frac{\sum_i^k y_i}{Y} ---------- (20)$$

Where

k =1……..n is the position of each individual in the income or resource distribution

i =1……...k is the position of each individual in the income or resource distribution

P……. is the total number of individuals in the distribution

y_i…….. is the income (resource) of the ith individual in the distribution

$\sum_i^k \mathbf{y_i}$ ……is the cumulated income or resource up to the kth individual

Y……. is total income

It is obvious that $\sum_i^k y_i$ ranges between 0, for *k* = 0, and *Y*, for *k* = *n*, therefore the equation value Ranges between 0 and 1.

The shape of the Lorenz curve is therefore a good visual indicator of how much inequality there is in an income distribution. It provides an easy way to represent income or resource equality in terms of graphs; however, it does not work easily in comparative analysis. Comparative analyses, among sampled households, require a discrete value for computation. The common value for representing income inequality is the Gini coefficient.

3.4.4.1.2. The Gini-coefficient

Attributed to Gini (1912), is by far the most widely used measure of inequality; the reason for this may be the fact that it is a straight forward, easy to understand and not at all complicated to calculate. Its value ranges from 0 to 1, (Although it is commonly multiplied by 100 in empirical studies) being 0 the value of perfect equality and 1 of maximum inequality (i.e. one individual holds all the income or wealth and the rest hold no income or wealth). Another advantage of the Gini- coefficient is that it can be easily represented in the Lorenz (1905) graph for a graphical, more intuitive, description, as it represents the ratio of the difference between the line of absolute equality and the Lorenz curve which represents the income (wealth) distribution among population quintiles.

There are several ways to calculate the Gini coefficient; by referring the most customary method for calculating the Gini coefficient based on the Lorenz curve. Graphically, the Gini coefficient can be easily represented by the area between the Lorenz curve and the line of equality. The Gini coefficient is calculated as the area A divided by the sum of areas A and B (see figure 3.1). If income is distributed completely equally, then the Lorenz curve and the line of total equality are merged and the Gini coefficient is zero. If one individual receives all the income, the Lorenz curve would pass through the points (0,0), (100,0) and (100,100), and the surfaces A and B would be similar, leading to a value of one for the Gini-coefficient (see the pictorial representation on figure 3.1).

$$\text{Gini(G)} = \frac{\text{Concentration Area(A)}}{\text{Maximum Concentration area(A + B)}} --- (21)$$

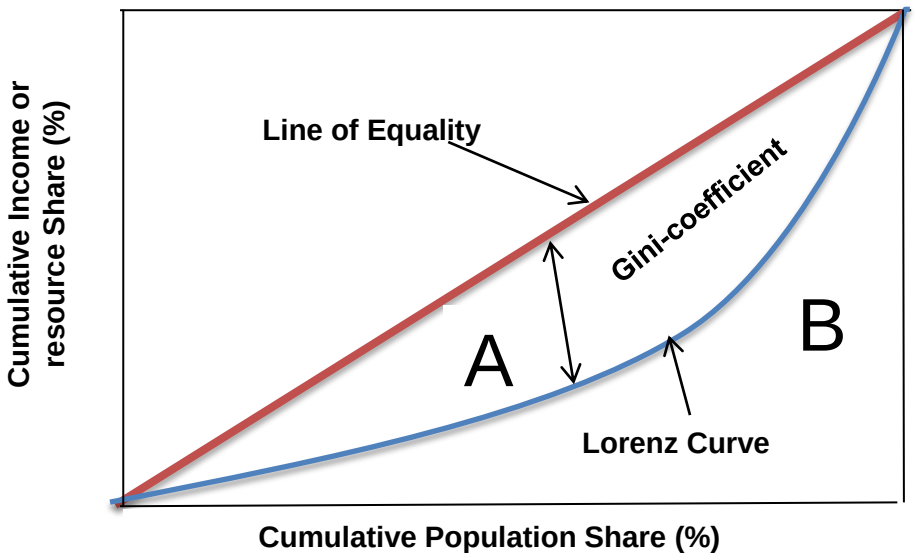
$$\text{G} = \frac{n+1}{\text{n}} - \frac{2\sum_1^n (n+1-i)X_i}{\text{n}\sum_1^n X_i} ---------- (22)$$

$$Gini = \frac{A}{(A+B)} ---------- (23)$$

Since, A+B equals 0.5 (Area of equality triangle), the Gini - coefficient will be:

$$Gini = \frac{A}{0.5} \quad or \quad Gini = 1 - 2B ---------- (24)$$

Figure 3.2 Lorenz curve of income or resource distribution



3.4.5. Principal coping strategies to tackle risk in Northern Rajasthan

Household coping strategies refer to all the strategically selected acts that households use to survive at the same level and not fall too far below their society's level of welfare. They are household adjustment strategies made by households in response to internal and external factors, to survive at the same level or attain upward mobility. Different household traditional coping strategies that have been adopted at the household and community level in Northern Rajasthan are important for poverty alleviation policy.

Numerous methods for testing ranking of coping strategies have been identified from literature and notable among them are Garrett's ranking score techniques, Friedman's two-way analysis of variance and Kendall's coefficient of concordance. There is close relation between Friedman's test and Kendall's coefficient of concordance (Legendre, 2005). They address hypotheses concerning the same data and use Chi squarer test for testing. However, they differ in the formulation of their respective hypothesis. Whereas Friedman's test focuses on the items being ranked, the hypothesis of Kendall's test focuses on the rankers themselves. Garrett's ranking score techniques on the other hand uses average score of the rankers and arrange them in either ascending or descending order. However, the limitation of this method is that it involves a number of steps and it does not test the level of agreements between rankers. Kendall's coefficient of concordance was employed by this study because the Kendall's (W) provides the test of agreement of the rankers (respondents), among their rankings which the Friedman's and Garrett's test lack.

For execution of Kendall's coefficient of concordance, data was collected by using the following procedure. For each sampled household, hypothesized seven coping strategies were explained by the enumerator and the household have been asked to rank a list of seven coping strategies, from the most recent option to the last option coping strategies. Following similar procedure, 300 sampled households ranked hypothesized seven coping strategies. This section concerned to create methodology that provides answer for, what are

the most widely used poverty coping strategies by the households in Northern Rajasthan? Is coping strategies the same among poor and non-poor households? Is there coping strategies ranking agreement among poor and non-poor sampled households? Majority were answered by calculating Kendall's coefficient of concordance (*W*). The formula for the coefficient of concordance W is then given by:

$$w = \frac{\sum\left[T^2 - \left(\sum T\right)^2/n\right)/n\right]}{m^2(n^2-1)/12} ---------- (25)$$

The formula is further simplified as follows:

$$w = \frac{12\sum\left[T^2 - \left(\sum T\right)^2/n\right)\right]}{nm^2(n^2-1)} ---------- (26)$$

Where; T = sum of ranks for each coping strategies being ranked.

m = number of rankers (sampled households) and

n = number of coping strategies being ranked

3.4.5.1. Hypothesis of coping strategies

The following three hypotheses were tested for the coping strategies ranking agreement among sampled households in the study area.

Hypothesis-1

H_0: There is no agreement among the coping strategies by sampled households.

H_1: There is agreement among the coping strategies by sampled households.

Hypothesis-2

H_0: There is no agreement among rankings of coping strategies of poor households.

H_1: There is agreement among rankings of coping strategies of poor households.

Hypothesis-3

H_0: There is no agreement among rankings of coping strategies of non-poor households.

H_1: There is agreement among rankings of coping strategies of non-poor households.

To test the hypotheses Kendall's coefficient of concordance was calculated from our data using Statistical Package for Social Science (SPSS 16.0) and it ranges from 0 (no agreement) to 1 (complete agreement). If the test statistic *W* is 1, then all the survey respondents have been agreed, and each sampled households has assigned the same rank order to the list of coping strategies. If *W* is 0, then there is no overall trend of agreement among the sampled households, and their responses may be regarded as essentially random. The Coefficient of concordance *W* is tested for significance using the F distribution.

4. RESULT AND DISCUSSION

Poverty is a multidimensional problem, therefore, studies on poverty needs more recent and more comprehensive sets of data. It can be recognized that, poverty is fundamentally a phenomenon arising at the level of households; its measurement, determinants and characterization ideally require the use of household surveys by making multi-topic questionnaire which was used in the data collection. In the present study both primary and secondary poverty data statistics were used. Therefore, the arrangement of the chapter is as follows. In section (4.1) we shall present poverty trend in seven decades (1951-2011) using graphical and semi-log trend model approach.Poverty extent and socio-economic characteristics among the surveyed households was discussed in section (4.2). Section (4.3) is devoted to get a satisfactory explanation for why some people are poor and when poverty might be eliminated. Section (4.4) describes the status of distribution of agricultural resource and income inequality among sampled households in Northern Rajasthan. Finally, in section (4.5) offers answer for what are the most widely used poverty coping strategies by the households in Northern Rajasthan.

4.1. Poverty trend in seven decades (1951-2011)

Poverty trend analysis is based on the idea that, what has happened on poverty in the past, serves as cornerstone to evaluate policy contribution. The most general goal of trend analysis in poverty is to distinguish whether the level of poverty situation has increased or decreased over time, and if it has, how quickly or slowly the increase or decrease has occurred. What happens to poverty trend in the country is quantitatively important to evaluate overall performance of the country’s development plans. Growth is not the sole objective of economic policy. It is necessary to ensure that the benefits of growth accrue to all sections of the society. Eradication of poverty is thus an important objective (Rangarajan, 2014). This important objective has been articulated in all twelve five year plans. It shows that principal objective of India's development strategy has always been the eradication of poverty. The macroeconomic performance of any country would be judged by the social

and economic objectives it achieved and also the effect of economic growth can be measured by its contribution to poverty reduction. Measurement of country or state poverty would help to evaluate how the economy is performing in terms of providing a certain minimum standard of living to all its citizens.

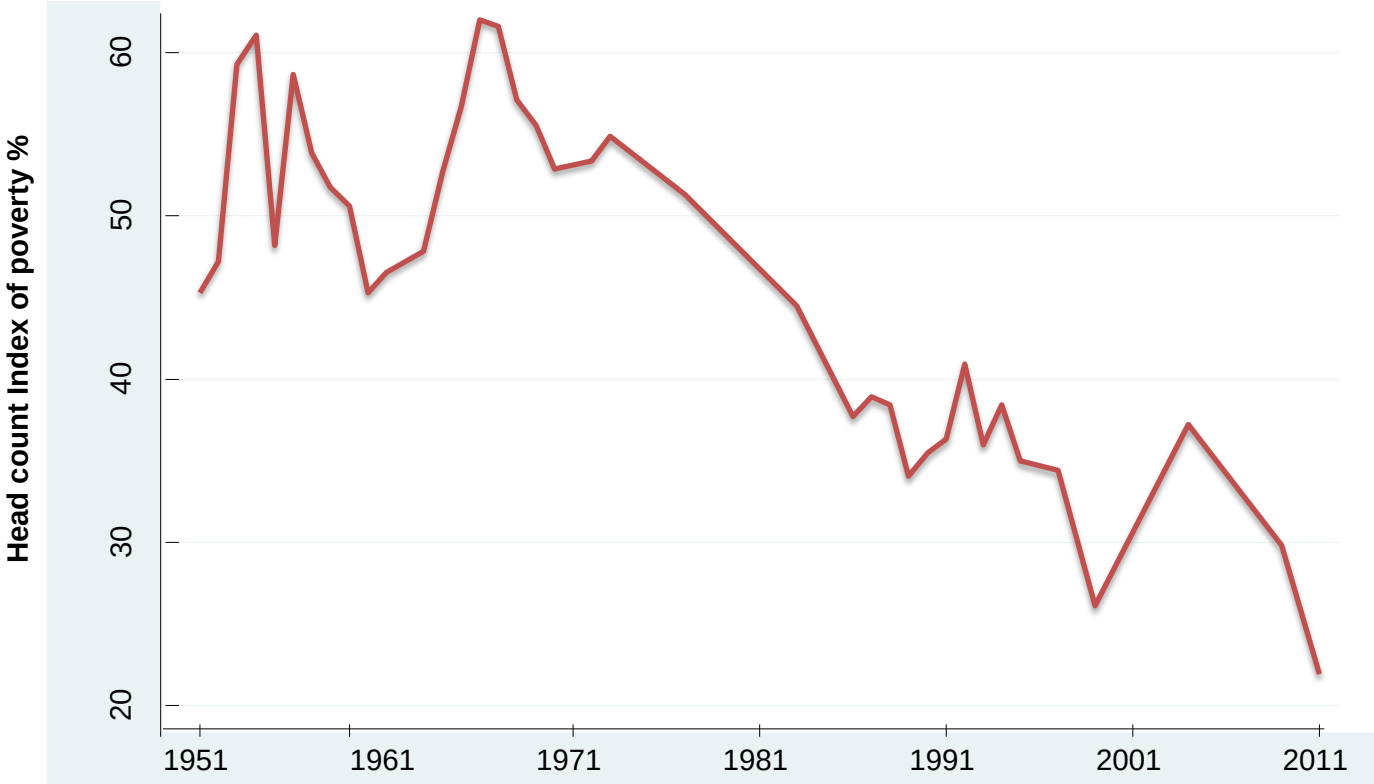
Thus, to achieve first objective, this section aims to investigate the trend in poverty for the last seven decades (1951-2011) graphically and fitting growth model. On its method to achieve the mentioned objective, the study tries to answer the following key questions;- in which five year development plans period does poverty declined significantly? In this section to achieve the objective and to provide answer for the above raised key questions, first, Indian poverty trend as a whole and then rural and urban poverty trends since 1951 to 2011 was graphically analyzed. Next, growth model (semi-log trend model) was fitted to assess the amount of growth (decline) of poverty in each year under development plan period.

4.1.2. Poverty trend in India (1951-2011) graphical approach

The availability of the longest series of data in India created opportunity to see the impact of development policy on poverty. Such a time series also presents a unique opportunity to study the relationship between poverty and policy, a relationship that is fundamentally time-based in nature. In the course of the discussion, due attention was given to assess the period of significant changes in India's poverty rate. Ahluwalia (1978) provided what has been probably the best-known time series on poverty measures for India to date. Datt G. (1998) organized government of India planning commission data in appropriate manner and this study used this data as source.

Figure 4.1 shows evolution of poverty in India in seven decades (1951-2011). The trend shows overall incidence of poverty in the country has been declining. It indicates that the incidence of poverty, as measured by head count index, declined from 45.3 percent in 1951/52 to 21.9 percent in 2011/12. The figure point 1954/55 and 1966/67 were the two historical years

Figure 4.1: Poverty incidence in India, 1951-2011



Source: Own computation based on data source from Datt G. (1998) and Government of India Planning Commission (2014)

that Indian poverty rate has reached maximum, 61.1 percent and 62 percent, respectively. 1966/67 was not only year in which poverty reached maximum but, year of reference for continuous decline in poverty.

Between 1952 and 1967, the share of the population in poverty moved up and down cyclically, most importantly in response to good or bad monsoons. The period up to the mid-1960s, is characterized by fluctuations in poverty without a trend. Fox W, (2002) in his study concluded that, the slow economic growth between 1950 and the mid-1970s (averaging only 1.4 percent per capita) have been blamed for this poor performance.

The 1970s was decade in which poverty trend contentiously declined without rise. The reduction in poverty since the early 1970s has been sizable; between 1969–70 and 1993–94, the national head-count index declined from about 56 to 35 percent. The graph also shows that there was little progress in reducing poverty until the 1968, and that there has been a marked downward trend since then. Green revolution in 1960s contributed for this significant decline. Koichi Fujita (2010) in his paper addressed that, Green Revolution in India started in the late 1960s and with its success India attained food self-sufficiency and rural poverty started to decline for the first time significantly.

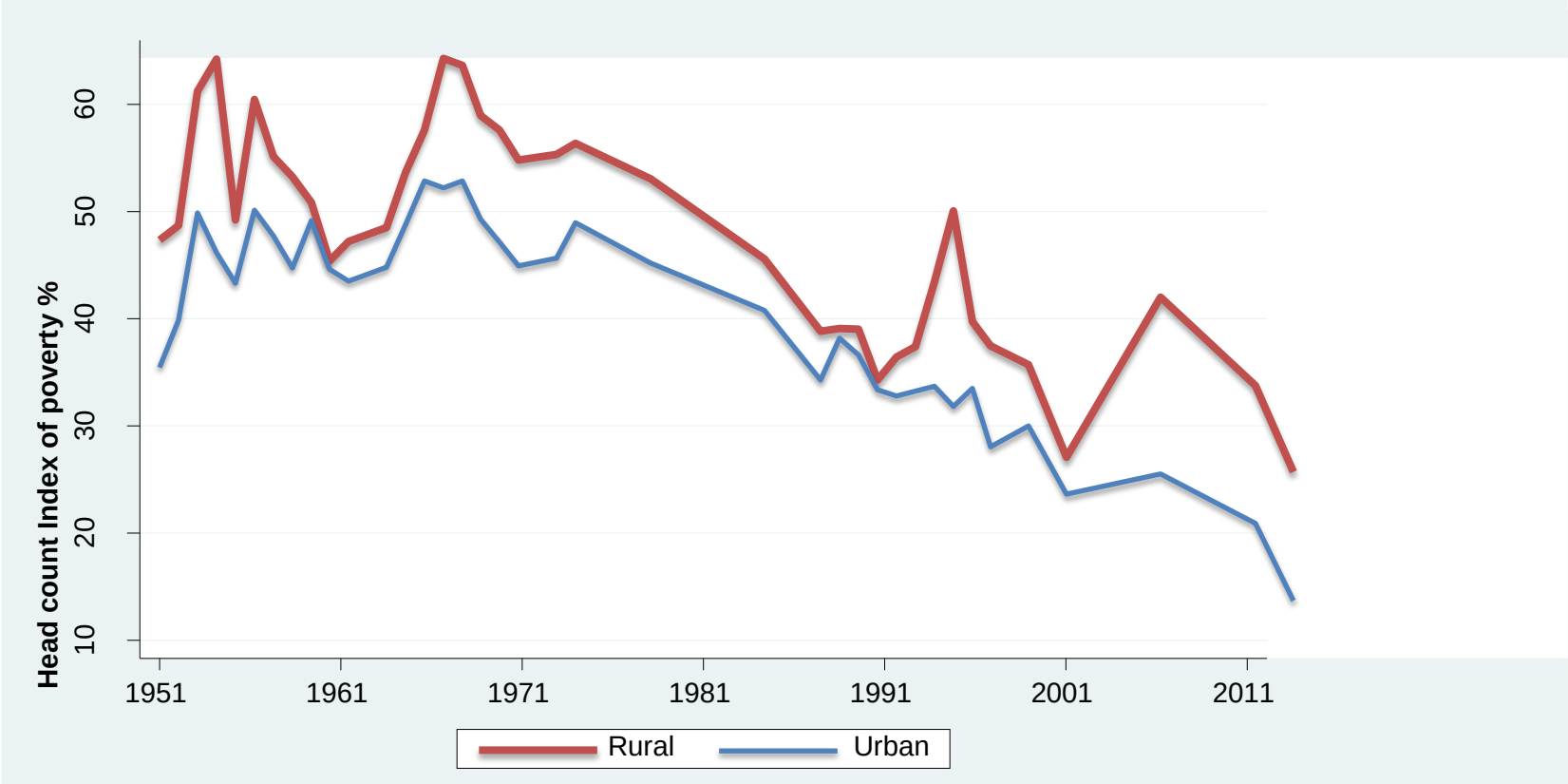
The trend in 1980s indicates poverty has declined continuously. In 1982–83, 44.5 percent of people lived below the poverty line, but in 1990 the rate declined to 35.5 percent. Improvements in 1980s support a continuation of a long-term secular decline of poverty under way in India since the 1970s. The expansion of anti-poverty programmes by government contributed for this outcome. But, it took nearly 30 years for India's poverty measures to fall appreciably below their levels in the early 1950s.

Poverty has fallen far more rapidly and significantly after 1990s than previously. Its decline after 1991 contributed much more for overall decline than previously. Apparently reliable survey data indicate that there was a sharp increase in measured poverty rate in 1992/93 and 2004/05 because of

bad weather or drought. Tendulkar and Jain (1995) in their study indicated that, fact of sharp increase in poverty rate in 1992 in the country; it was relatively bad agricultural year.

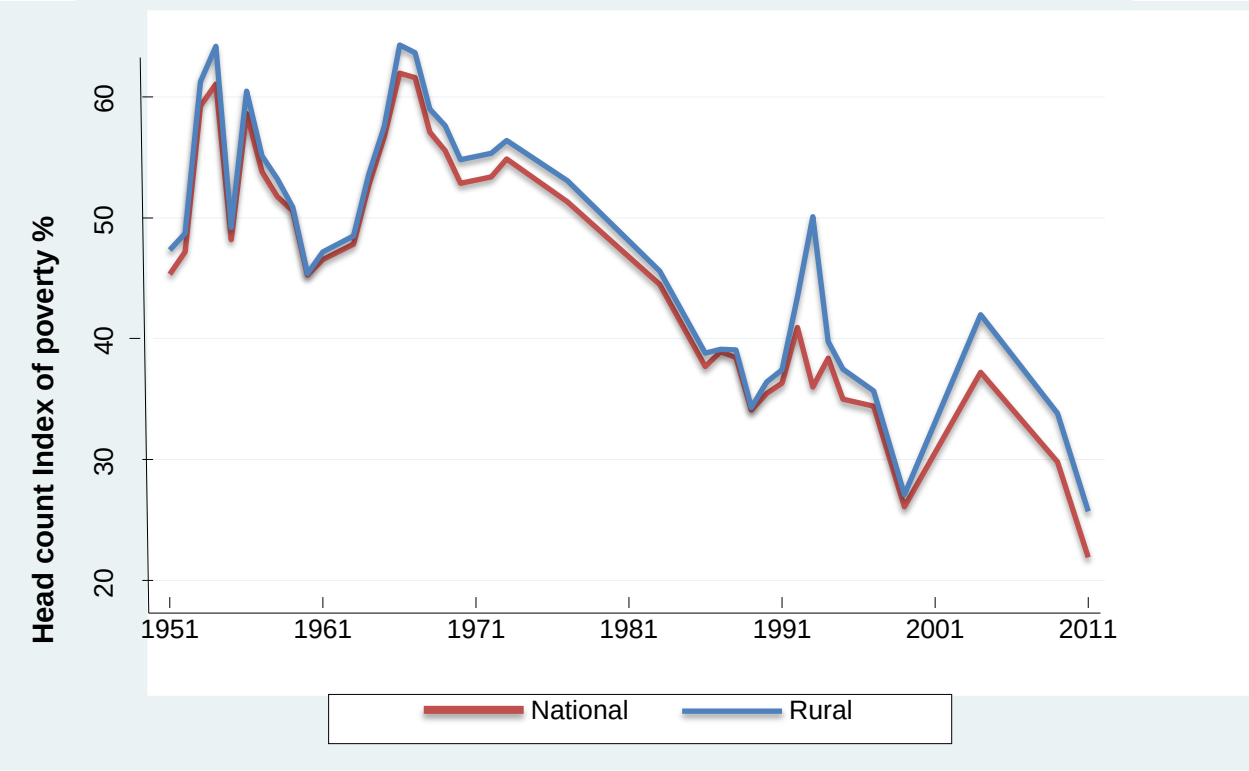
Figure 4.2 shows trends in poverty rates in urban and rural India during seven decades (1951-2011). The trend similarly shows long-term secular decline of both urban and rural poverty in the country since the 1950s. Both urban and rural poverty declined, the incidence of rural poverty was higher than that of urban poverty throughout the period. The graphical expression clearly indicates that rural poverty is a critical factor in the overall incidence and depth of poverty. The incidence of rural poverty was 47.4 percent in 1951/52 and it declined to 25.7 in 2011. On the other hand, the incidence of urban poverty was 35.5 percent in 1951/52 and declined to 13.7 percent in 2011.This difference in poverty incidence is as majority live in rural area. Out of total poor in India, 72 percent lives in rural area and only 28 percent lives in urban area (Rangarajan, 2014). This shows that poor are heavily concentrated in rural areas. The data also show that poverty in India is rural phenomena. Historically both rural and urban poverty were close to each other in 1960/61; still rural poverty is above urban poverty. There was a sharp increase in rural poverty during 1992/93, but that appears to have been a single-year phenomenon. Agriculture has lag behaviour and impact of bad weather in 1992/93 also contributed increase in poverty in 1993/94, the poverty rates returned to their pre-1992 levels by 1994/95. There was relatively faster decline of urban poverty in the period. The long-term secular poverty decline trend was seen both at national, rural and urban areas in the country. The similarities in poverty trend movement in rural and urban areas show existence of comprehensive action by government.

Figure 4.2: Poverty incidence in rural and urban India, 1951-2011



Source: Own computation based on data source from Datt G. (1998) and Government of India Planning Commission (2014)

Figure 4.3: Poverty incidence; All India vs rural India, 1951-2011



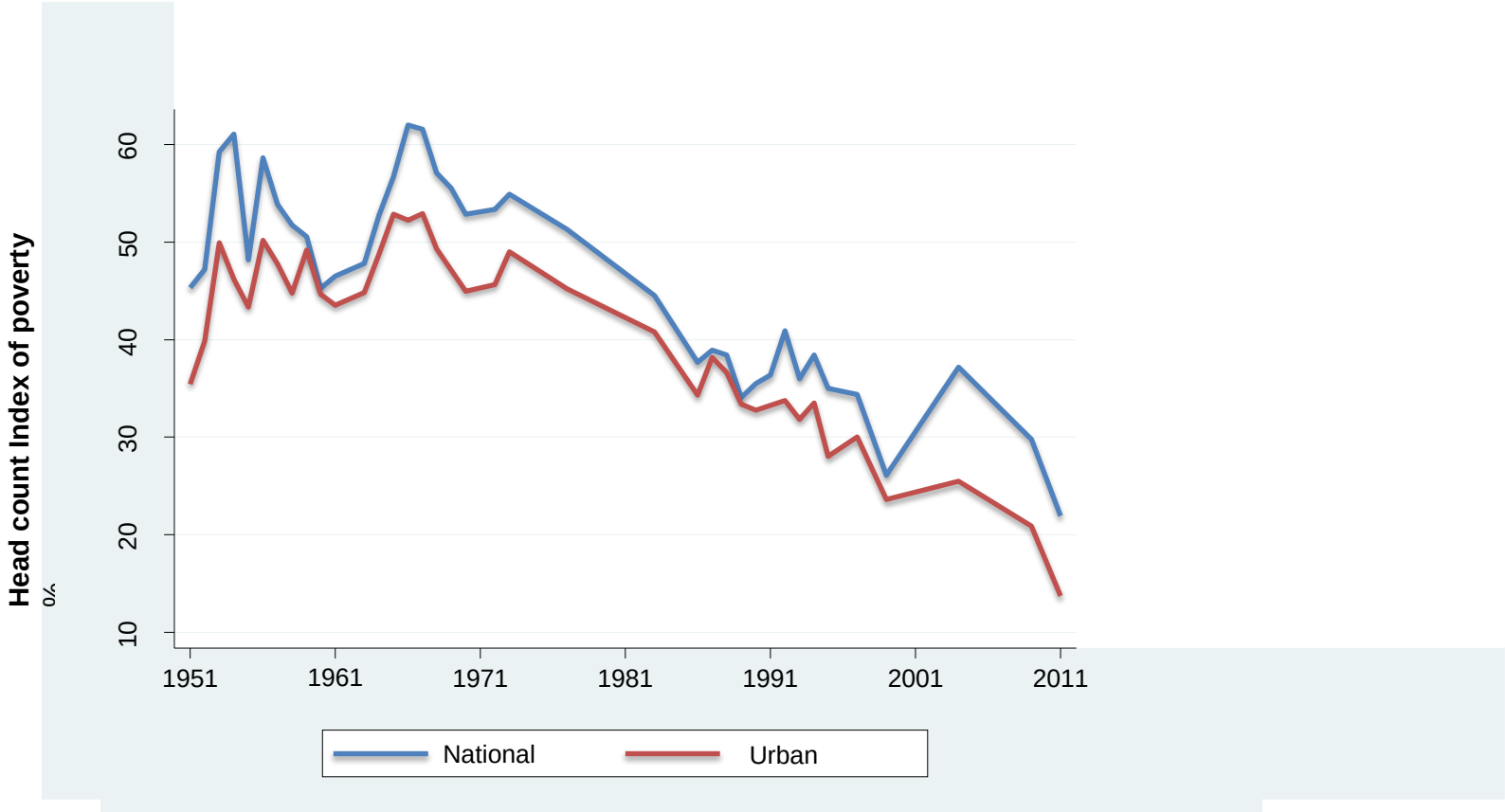
Source: Own computation based on data source from Datt G. (1998) and Government of India Planning Commission (2014)

Figure 4.3 shows trends in national and rural poverty rates in India in seven decades (1951-2011). The trend clearly shows the country poverty history was directly connected with rural poverty. The change in rural poverty measures was strongly reflected in the change in national poverty measures, which is not surprising given that a large proportion of India's population lives in rural areas. In all seven decade, the incidence of rural poverty is higher than national average. The rise in rural poverty in 1992/93 and 1993/94 was sharp and it has reached 50%, but national poverty level in that time was 36%. The poverty incidence trend both at national and rural India specify, what was happened in rural poverty, eatheir increase or decrease at that specific time had similar consequence at national poverty trend. Agriculture production seasons determine the rural poverty rate. Similarly the long time series trend indicates, it determines national poverty trend. When agriculture grows, overall economic growth reduces rural poverty faster.

Figure 4.4 shows trends in poverty rates at national and urban in 1951-2011. The trend shows urban poverty has been declining consistently since the 1970s. In all periods, the incidence of urban poverty is lower than national average. The trend clearly shows national poverty trend was less connected with urban poverty. The gap between the national and urban poverty shows the urban poverty had less influence on national poverty trend as compared to rural poverty.

The performance of individual states in poverty reduction has not received comparable attention like national poverty study. State level performances on poverty reduction have important implications for poverty reduction at national level. The survey conducted at national level in 1950/51 on poverty, which put India as model in conducting regular basis long time survey, was not decomposed in to rural, urban and states. State level data was compiled latterly, that creates problem to find out how national level change and vice versa in poverty have affected the national and state poverty situation. Rajasthan state poverty trend series is somewhat shorter due to data limitations and only cover the period 1957/58 to 2011.

Figure 4.4: Poverty incidence in national and urban India, 1951-2011



Source: Own computation based on data source from Datt G. (1998) and Government of India Planning Commission (2014)

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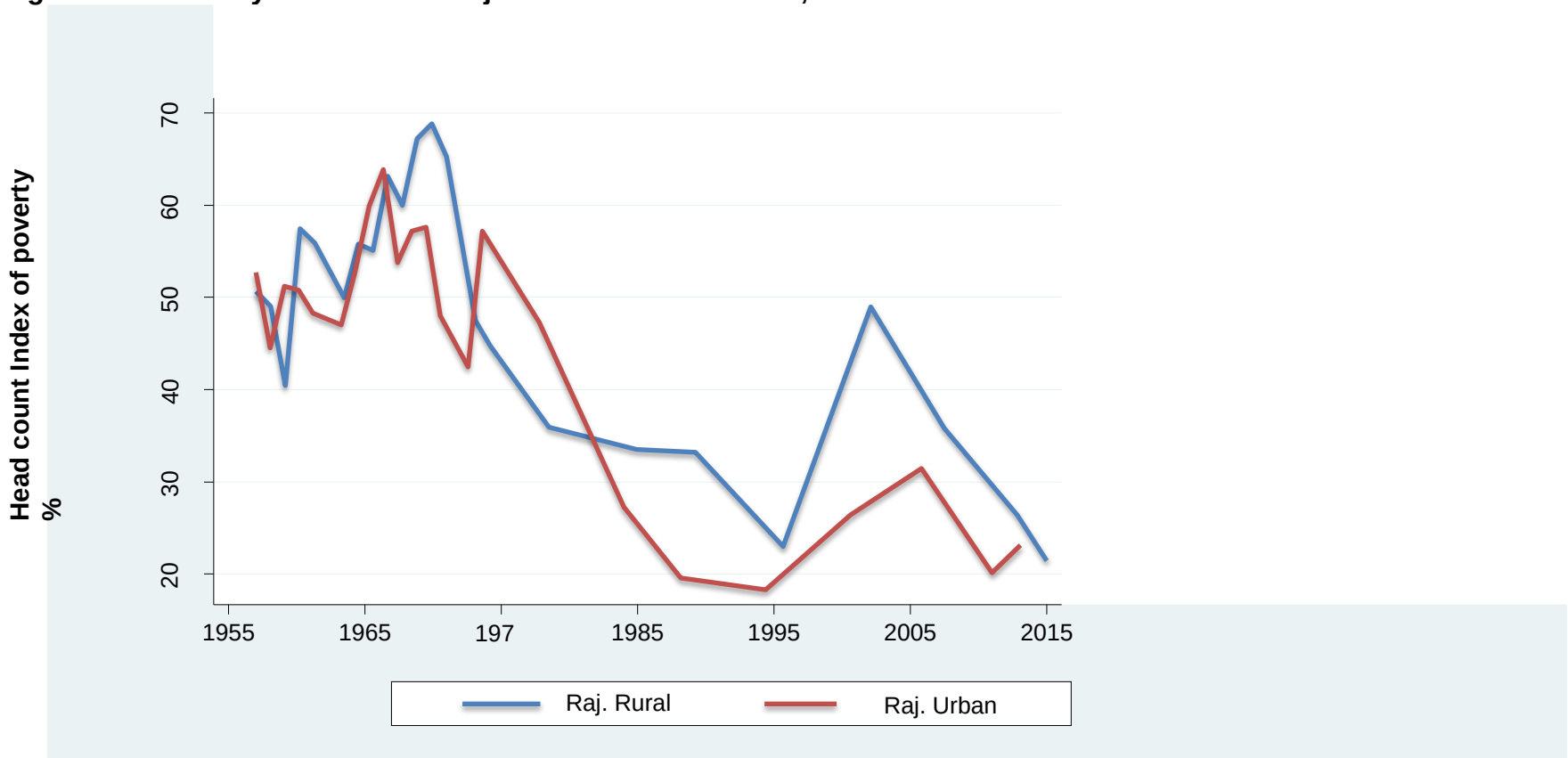
Figure 4.5 shows trends in poverty rates in Rajasthan state rural and urban in 1957 - 2011. The data indicates steady decline in poverty in Rajasthan from 50.6 percent in 1957 to 21.2 percent in 2011. The percentage of the population below the poverty line in rural Rajasthan fluctuated, falling in good agricultural years and rising in bad, but with trend significant decline. The number of poor people below the poverty line in rural Rajasthan was reached 69 percent in 1969 and 49 percent in 1999. There was a sharp increase in rural poverty during 1960s in the state. In 1968 rural poverty was reached to its most horrible level, 69 percent. After 1970 reduction in poverty in rural Rajasthan was sizable. Between 1968 and 2011, rural poverty in the state has been declined from about 69 to 21.2 percent. Agricultural infrastructure expansion contributes significantly for this sizable decline in poverty. Current state poverty ratio is lower than country average, which is 29.5 percent in 2011/12.

Figure 4.5: Poverty incidence in Rajasthan rural and urban, 1957 - 2011



Source: Own computation based on data source from Datt G. (1998) and Government of India Planning Commission (2014)

4.1.3. Poverty trend in India (1951-2011) semi-log trend model approach

In India eradication of poverty is a central objective and was articulated in all twelve development plans. Less attention has been devoted to assessment of the poverty growth trend under each five year development plan period. The main interest of this section is to assess poverty decline rate in each five year development plans time period and overall development plan period. First we can assess poverty trend of each five year development plans separately then overall development plan poverty trend to achieve countries principal objective by fitting growth trend model (semi-log trend model). The poverty trend under each targeted development plan and its actual achievement is given on table 4.1.

Table 4.1: Growth performance and contribution to poverty

Plan	Economic growth rate		Poverty trend in the plan period (in %)
	Target	Actual	
1st Plan (1951-1956)	2.1	3.6	Increased 2.7%
2nd Plan (1956-1961)	4.5	4.21	Decreased 2.5%
3rd Plan (1961-1966)	5.6	2.8	Increased 3.1%
4th Plan (1969-1974)	5.7	3.2	Decreased 1.4%
5th Plan (1974-1979)	4.4	4.7	Decreased 2.8%
6th Plan (1980-1985)	5.2	5.5	Decreased 1.1%
7th Plan (1985-1990)	5.0	5.6	Decreased 0.7%
8th Plan (1992-1997)	5.6	6.5	Decreased 0.4%
9th Plan (1997-2002)	6.5	5.5	Decreased 1.0%
10th Plan (2002–2007)	7.9	7.7	Decreased 1.5%
11th Plan (2007–2012)	9	8	Decreased 1.7%
12th Plan (2012–2017)	8	-	

Source: Own calculation and eleventh and twelfth plan (volume I)

Table 4.1 shows Indian development plan target, actual achievement and each plan contribution to poverty alleviation. The rate of growth remained at 3 to 4 percent until fifth development planning. The third development plan achieved the lowest (2.8 percent) on the other hand eleventh plan achieved the highest (8 percent) per year. Three decade development planning 1950 to 1980 has been implemented to jump in to high growth rate. The economy shifted towards a high growth path during the early eighties and crossed the barrier of 5 percent growth for the first time during sixth development plan

years. In eleventh and tenth development plan actual growth has reached to 8 and 7.7 percent respectively. From fifth development plan up to eighth development plan the actual economic growth was higher than targeted. During first and third development plan years, the incidence of poverty increased, but in remaining nine development plans, poverty has been declined.

In first development plan period, averagely poverty increased by 2.7 percent point each year and in the third development plan period also averagely poverty increased by 3.1 percent point each year. On the other hand, in the fifth development plan period (1974-1979),a higher rate of poverty reduction was recorded, poverty declined averagely at a rate of 2.8 percent point per year. This also coincides with Fox W. (2002) result; he concluded that, in the agricultural sector, pricing reforms and new technologies (the “green revolution”) led to faster growth in production and less vulnerability to fluctuations in monsoon rains. Between 1974 and 1990, GDP per capita grew at an annual rate of 2.4 percent, and agricultural output also grew faster, at 3.0 percent. Similarly, in sixth development plan period, poverty declined averagely at a rate of 1.1 percent point per year. This result also coincides with Tendulkar and Jain (1994), according to them, the survey periods 1987-88 are marked as draught periods due to severe crop loss, whereas that of 1977-78 and 1983 are termed as local peak for the good output of food grains. Finally they conclude that in all indicators of poverty, the highest decline in rural India occurred when comparing a local peak of 1983 to a draught period of 1987-88.

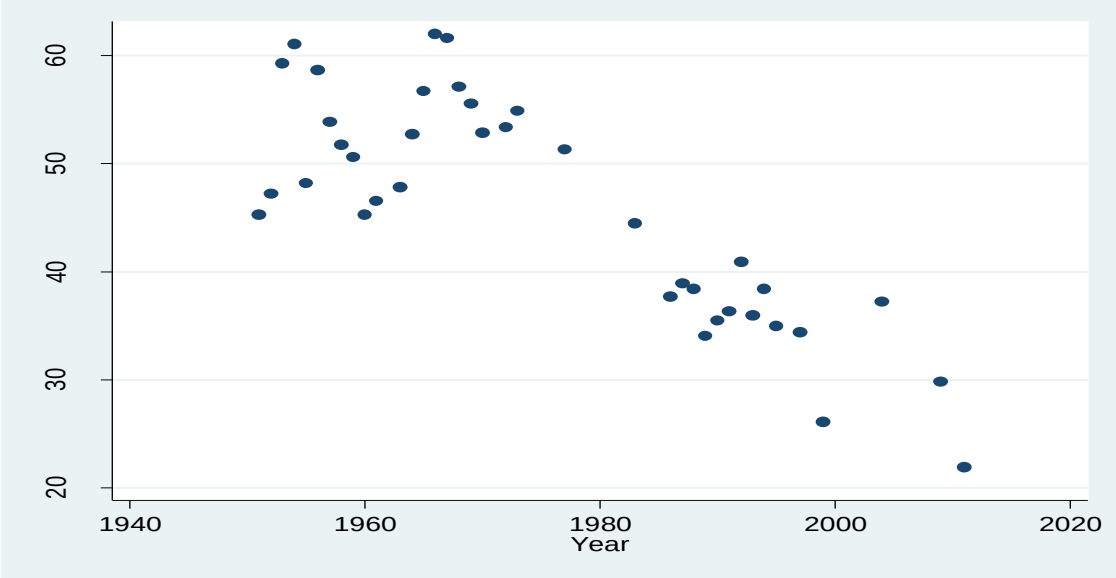
During seventh and eighth development plan period, poverty declined by 0.7 and 0.4 percent point per year, respectively. This result also agrees with Datt and Ravallion (2002) result, they conclude that, India has probably maintained its 1980s rate of poverty reduction in the 1990s and incidence of poverty has been falling at a little less than one percentage point per year over the main post reform period.

Ninth, tenth and eleventh development plan periods were periods in which poverty continuously declined in the country. During ninth development plan period, poverty declined averagely at a rate of 1.0 percent point per year followed by tenth development plan by 1.5 percent point per year and in eleventh development plan poverty declined averagely at a rate of 1.7 percent point per year. This result also coincides with Anand R.etal (2014a), he conclude that, the poverty headcount rate, measured using the national poverty line, declined by 1.5 percentage points per year in 2004/05-2009/10, double the rate of the preceding decade.

Table 4.1 also shows the fact that the responsiveness of poverty reduction to economic growth has been effective over time. The evidence suggests that declining poverty, in general, is associated with relatively high economic growth. Sustainable and higher growth years offer encouraging news for poverty reduction in the country. Thus the overall impact of development plans by increasing economic growth on poor has been positive leading to a reduction in the incidence of poverty in the country, albeit at a slow rate. This helps us to conclude, well planned economic growth matters for reducing both urban and rural poverty in India.

To strength our analysis, it would be better to support economic data econometrically. Sometimes economic theory and/or observation of data will not easily show functional relationship between economic variables. A much more common and simple way to see the functional relationship between variables is drawing scatter diagram. We checked our data relationship, as depicted in figure 4.6; the scatter diagram shows absence of linear relationship and existence of non-linear relationship among data. So, following our methodology in chapter three (see section 3.2.1.2), we fitted semi-log trend model using STATA-12 software.

Figure 4.6: Scatter diagram for relationship between variables



Source: Own computation based on data source from Datt G. (1998) and Government of India Planning Commission (2014)

Table 4.2: Each five year plan semi-log trend model output

Plan	Coeff.	Std. Err.	t	P>|t|	Cons.	R^2
First plan	.039	.029	1.32	0.257	-73.25	0.304
Second plan	-.018	.008	-2.44	0.003*	99.07	0.910
Third plan	.044	.003	13.86	0.001*	-162.89	0.997
Fourth plan	-.021	.006	-3.36	0.010*	61.65	0.843
Fifth plan	-.026	.002	-14.22	0.055 **	45.87	0.992
Sixth plan	-.011	.005	-2.001	0.028**	64.15	0.945
Seventh plan	-.022	.016	-1.36	0.267	46.56	0.381
Eighth plan	-.012	.021	-0.65	0.560	31.31	0.124
Ninth plan	.009	.029	0.032	0.848	-8.877	0.023
Tenth plan	.013	.033	0.40	0.759	-23.14	0.137
Eleventh plan	-.023	.003	-7.86	0.006 *	143.25	0.891

Source: Own computation based on data source from Datt G. (1998) and Government of India Planning Commission (2014). NB: Significance; 1% = *, 5% = *

Table 4.2 shows each five year development plan output after fitting semi-log growth trend model. In the table coefficient of trend measures the constant proportional or relative change in population below poverty line for a given absolute change in the value of time in years. The coefficient shows the direction of influence under each five year development plan. Constant in the table helps to show that at the beginning of each planning year when (t = 0) the estimated poverty extent is equal to antilog of that constant value. Our R^2 result indicates how well our data fit a statistical model; If R^2 is near to 1,

means that the regression line gives a good fit to the observed data. It also shows the percentage of total change in poverty that can be explained by the changes in time. Accordingly, second, fourth, fifth, sixth, seventh, eighth and eleventh development plan periods have negative coefficient, which means under these periods poverty trend influenced to decline. But, only second, third, fourth, fifth, sixth and eleventh development plans periods poverty decline were statistically significant.

During second development plan period poverty declined and showed statistically significant downward trend. During this period, poverty declined at the rate of -0.018 per year, or at 1.8 percent point per year. One year increase in time resulted in 1.8 percent point decrease in poverty. Our (R^2= 0.91) result indicates, the model explains 91 percent of the total variation of the poverty that can be explained by the changes in the years. This result also agrees with result of table 4.1 of overall poverty decline trend during second development plan period. Similarly, in fourth development plan period poverty declined and showed statistically significant downward trend. It declined between 1969 - 1974 at the rate of -0.021 per year, or at 2.1 percent point per year. One year increase in time resulted in 2.1 percent point decrease in poverty during fourth development plan period. This result also coincides with World Bank (1997) report, it concluded that in India, 1971 to 1986-87: steady decline in poverty was seen; during this period HCR (Head Count Ratio) declined by an average 2 percentage points per year.

Furthermore, it agrees with result on table 4.1 of overall poverty decline under fourth development plan period. During fifth and sixth development plan periods poverty declined and showed statistically significant downward trend. It declined during fifth development plan period at the rate of -.026 per year, or at 2.6 percentage points per year and declined during sixth development plan period at the rate of -0.011 per year, or at 1.1 percentage points per year. This means, one year increase in time resulted in 2.6 percentage points decrease in each year in poverty during fifth development plan period and 1.1 percentage points per year decrease in poverty during sixth development plan

period. This result is not too much far from Datt and Ravallion (2002), they conclude that India has probably maintained its 1980s rate of poverty reduction in the 1990s, which means incidence of poverty has been falling at a little less than one percentage point per year over the main post reform period.

Equally, in eleventh development plan period poverty declined and showed statistically significant downward trend. It declined during eleventh development plan period at the rate of -0.023 per year, or at 2.3 percentage point per year. One year increase in time resulted in 2.3 percentage point per year decrease in poverty during eleventh development plan period. This result also agrees with result of table 4.1 of overall contribution of eleventh development plan to poverty decline. But, during third development plan period poverty raised and showed statistically significant upward trend. Poverty rose during third development plan period at the rate of .044 per year, or at 4.4 percentage point per year. One year increase in time resulted in 4.4 percentage point per year increase in poverty during third development plan period. This result also agrees with result on table 4.1 of overall contribution of third development plan to poverty increase. Our (R^2= 0.99) result indicates the proportionate amount of variation in the poverty situation explained by the changes in the years. 0.99 means that the regression line gives a good fit to the observed data. The model explains 99 percent of the total increase of the poverty that can be explained by the changes in the years.

To see poverty trend under overall development plan periods semi-log trend model was fitted and the result is presented on table 4.3.

Table 4.3: Overall development plan Poverty trend

plan	Coef.	Std. Err.	t	P>|t|	cons	R^2
All plan	-.012	.0013	-9.28	0.000 *	27.18	0.7054

Source: Own computation based on based on Gaurav Datt (1998) and Government of India Planning Commission (2014). NB: Significance; 1% = *

Table 4.3 shows poverty trend under overall development plan periods after fitting semi-log trend model. The model is statistically significant. It shows

aggregately, poverty declined in five year development plan periods. Poverty declined between 1951-2011 development plan period at the rate of -0.012 per year, or at 1.2 percentage points per year. One year increase in time resulted in 1.2 percentage points per year decrease in poverty until eleventh development plan period (1951-2011). This result also coincides with Millennium Development Goals India country report 2011; it found that, poverty declined at roughly 0.8 percentage points per year during the 11 year period before the Eleventh Plan. Furthermore, the result also agrees with Datt and Ravallion (2002), they found that the incidence of poverty has been falling at a little less than one percentage point per year over the period. The overall poverty incidence in the country has been declining at a slow rate of almost 1.2 percentage points per year under development plan periods.

4.2. Poverty extent and socio-economic characteristics

4.2.1 Poverty extent (condition)

Poverty measures are used first and foremost to monitor social and economic conditions and to provide benchmarks of progress or failure. Here in this study poverty measures are indicators by which policy results are judged and by which the impact of events (the introduction of a government transfer program) can be weighed. The measures will function well as long as everyone agrees that when poverty numbers rise, conditions have indeed worsened (and conversely, when poverty measures fall, that progress has been made). In this section aggregate survey data used to describe the condition of poverty in Northern Rajasthan to achieve our second objective. The data collected from sampled household on per capita expenditure can be used as base for a welfare measure. Our focus here is on situations of absolute poverty as measured by a fixed poverty line, following government of India, rural Rajasthan poverty line.

At this level emphasis was given on ways in which survey data aggregated to answer key questions such as: How many poor people are there in a Northern Rajasthan, Bikaner, Sri Ganganagar and Nagaur districts? How much would have to be spent to eliminate poverty through costless (and perfectly) targeted

transfers and how deep is their severity? The data result for three poverty dimension instruments: headcount index, poverty gap index and the poverty severity index for Northern Rajasthan is presented on table 4.4.

Table 4.4: Decomposition of poverty in Northern Rajasthan

Area	Headcount Index (poverty incidence)	Poverty gap index (poverty depth)	Poverty severity index
Northern Rajasthan	0.173	0.04	0.0121

Source:- Survey data, 2015

Table 4.4 shows different poverty indexes as measured by different poverty measuring approaches in Northern Rajasthan. Following planning commission expert group to review the methodology for measurement of poverty in India defined poverty line for rural Rajasthan (₹1036 per month per person), the data result in table 4.4 shows the poverty headcount (incidence of poverty) was 0.173 in Northern Rajasthan. It shows share of the population that is poor, that is, the proportion of the population for which consumption expenditure is less than ₹1036. Out of three hundred sampled households in the study area, fifty two households were categorized as poor. This means 17.3 percent of sampled households are under poverty line in Northern Rajasthan. For fifty two households consumption expenditure is less than ₹1036 per person per month. According to 2011/12 report of the expert group, Rajasthan state total percentage of the population below the poverty line was 21.7 percent.

Within four years interval between 2011/12 to 2014/15 the average poverty status of sampled household reduced from 21.7 percent to 17.3 percent in Northern Rajasthan. Poverty declined by 4.4 percentage points over the four years. In each year poverty declined 1.1 percentage points. This result also coincides with our result on overall period poverty decline rate, poverty declined between 1951-2011 development plan periods at the rate of 1.2 percentage points per year. Based on the result it is possible to say the benefits of growth, in terms of income and employment has been adequately shared by the poor in the country.

Poverty gap index depicted in table 4.4 indicates the extent to which the per-capita expenditure of the poor falls below the poverty line in Northern Rajasthan. The poverty gap index was 0.04 for the study area. Poverty gap index result shows poverty is deeper among sampled households in Northern Rajasthan. Using poverty gap information to assess how many resources would be needed to eradicate poverty through cash transfers perfectly targeted to the poor is important. In Northern Rajasthan on average 4 percent of the poverty line cash transfer needed to lift each poor person out of poverty.

The squared poverty gap index is not easy to interpret as compared to headcount index and Poverty gap index; however, it has the advantage of reflecting the degree of inequality among the poor, in the sense that the greater the inequality of distribution among the poor and thus the severity of poverty, the higher is the squared poverty gap index. The squared poverty gap index result in the study area also shows poverty is less sever among sampled poor's and the value of squared poverty gap index (0.0121) is not closer to one; rather it is closer to zero, which indicates poverty is not highly serious in Northern Rajasthan.

To make poverty comparisons easier and understandable we expand our data analysis range to district level. In poverty measurement the desirable characteristic is the ability to decompose poverty measures by sub-population like residents of different districts. The critical feature for decomposition is that the sub-groups are distinct from each other (so that there is no overlap in membership) and that together they encompass the entire population. All additive indexes are decomposable, and all of the measures discussed below share the feature. These include the headcount index, poverty gap, and squared poverty gap.

Table 4.5: Decomposition of poverty by districts

District	Headcount Index (poverty incidence)	Poverty gap index (poverty depth)	Poverty severity index
Sri Ganganagar	0.15	0.03	0.005
Bikaner	0.17	0.2	0.011
Nagaur	0.2	0.06	0.021

Source:- Survey data, 2015

Table 4.5 shows situations of absolute poverty as measured by different poverty scales. With a poverty line of ₹1036 per person per month for rural Rajasthan, the poverty headcount (incidence of poverty) was 0.15 in Sri Ganganagar district. It shows the proportion of the population for which consumption expenditure is less than ₹1036 per person per month. This means 15 percent of sampled households are under poverty line in Sri Ganganagar district. The proportion of poor people who have not yet attained a minimum level of expenditure to meet basic needs in Bikaner district was 0.17. This means 17 percent of sampled households are under poverty line in Sri Ganganagar district. Similarly, the proportion of poor people who have not yet attained a minimum level of expenditure to meet basic needs in Nagaur district was 0.2. In Nagaur district 20 percent of sampled households are under poverty line. From the data we can easily see that Nagaur district has more number of poor under poverty (20 percent) followed by Bikaner (17 percent) and Sri Ganganagar district (15 percent).

Poverty gap index in table 4.5 indicates the extent to which the per-capita expenditure of the poor falls below the poverty line. It is often considered as representing the depth of poverty. It is the mean distance separating the population from the poverty line. The greater the gap the deeper poverty they are in. The poverty gap index was 0.2 for Bikaner district followed by Sri Ganganagar (0.03) and Nagaur (0.06). Poverty gap index result shows poverty is deeper among sampled households in Bikaner district than other two districts. Bikaner district has the highest poverty gap and needs more resource to lift each poor person out of poverty. In Bikaner district on average 20 percent of the poverty line cash transfer needed to lift each poor person out of poverty. In Nagaur district on average 6 percent of the poverty line cash

transfer needed to lift each poor person out of poverty and in Sri Ganganagar district only 2.5 percent of the poverty line cash transfer needed to lift each poor person out of poverty. The result points that the poverty gap is a useful statistic to assess how many resources would be needed to eradicate poverty through cash transfers perfectly targeted to the poor. Therefore, Bikaner district poverty gap is large and poor household in Bikaner district need more resource to lift out of poverty followed by Nagaur district. But the poverty gap in Sri Ganganagar is not serious, if perfectly targeted to the poor, less resource allocation to lift out of poverty needed. The amount of cash transfer needed to lift a poor at the Northern Rajasthan (4 percent) is much lesser than transfer needed in Bikaner and Nagaur districts.

Similarly, squared poverty gap index at district is not easy to interpret as compared to headcount index and poverty gap index. Hence, by squaring the poverty gap index, the measure implicitly puts more weight on observations that fall well below the poverty line, in other words the poorest among the poor. The result on table 4.5 shows, the squared poverty gap index was 0.021 for Nagaur district followed by Bikaner (0.011) and Sri Ganganagar (0.005). This shows the degree of inequality among the poor in Nagaur district is greater as compared to Bikaner and Sri Ganganagar districts. The squared poverty gap index result also shows in Nagaur district the poverty is more sever among sampled poor's as compared to Bikaner and Sri Ganganagar districts. The squared poverty gap index was 0.0121 for Northern Rajasthan. This shows the degree of inequality among the poor in Northern Rajasthan is lesser as compared to district inequality.

In Northern Rajasthan as well as in all three study districts absolute poverty level is below the state average in 2011-12, which is 21.7 percent. It indicates poverty has declined further in Rajasthan. The possible reason for decline in poverty might be in the state 2011/12 to 2013/14 growth in GDP per capita was increased by 19 percent. In Rajasthan annual GDP per capita was Rs. 52735 in 2011/12 and increased to 65,098 in 2013/14 according to data released by Planning Commission of India in local currency (2015).

Furthermore, currently, the growth performance of the agriculture sector increased in India. The growth performance of the agriculture sector has been fluctuating across the plan periods. However, the Eleventh Plan had sought to reverse the deceleration of agricultural growth and good harvests in the past years seasons lifted farm sector growth to 4.7 percent for the year 2013-14 as compared to its long-run average of 2.4 percent during Tenth plan period (2002–07)(Indian Economic survey,2013-14). Agricultural growth reduces poverty more strongly than growth in other sectors (Thirtle et al., 2001; Datt and Ravallion, 1998; Gallup, Radelet and Warner, 1997; Timmer, 1988). And also 2011/12 government data is not the most recent, almost five years are enough time to see decline in poverty in growing states like Rajasthan. To understand poor and non-poor households in more detail, sampled household maximum and minimum expenditure, monthly per capita expenditure and monthly per capita expenditure gap is depicted as follows.

Table 4.6: Maximum and minimum expenditure of households

District/area	Maximum and minimum expenditure by poor and non-poor			
	Poor		Non-poor	
	Maximum in (₹)	Minimum in (₹)	Maximum in (₹)	Minimum in (₹)
Bikaner	1011	755	9128	1667
Sri Ganganagar	1010	714	8009	2094
Nagaur	1034	760	5395	1088
Northern Rajasthan	1034	714	9128	1088

Source:- Own calculation data, 2015

Poor person's monthly expenditure was almost similar and there was no significant difference among districts. Which means it is income but not location that contributes for household's expenditure. Poor person in both district expend small amount of money per person per month. Poor person in Nagaur has maximum expenditure of ₹1034 per person per month followed by ₹1011 Bikaner and ₹1010 Sri Ganganagar districts. But, non-poor person's maximum and minimum expenditure has significant difference among districts. Non- poor person in Bikaner district expend maximum ₹9128 per person per month followed by non-poor in Sri Ganganagar district expend maximum ₹8009 and ₹5395 non-poor person in Nagaur district. These non-

poor person maximum expenditures are much more than minimum quantity of ₹1036 (poverty line) per person per month. Non-poor's expenditure in Bikaner is eight times, in Sri Ganganagar seven times and in Nagaur four times more than the recommended minimum expenditure. Education expenditure might contribute for this rise in expenditure in all districts. The average expenditure trend in Northern Rajasthan is not different from district expenditure trend.

Table 4.7: Monthly per capita expenditure status

District/Area	Average expenditure in (₹)			
	Poor	% share	Non-poor	% share
Bikaner	794	33	2888	31.2
Sri Ganganagar	867	36	3923	42.4
Nagaur	747	31	2445	26.4
Total	2408	100	9256	100
Northern Rajasthan	797		2445	

Source:- Own calculation data, 2015

Table 4.7 shows sampled household's monthly per capita expenditure status in three districts of Northern Rajasthan. Poor person average expenditure in all three districts is far from the poverty line of ₹1036 per person per month. Poor person in Nagaur district averagely expend ₹747 per person per month followed by ₹794 in Bikaner and ₹867 in Sri Ganganagar districts. This average expenditure gap from expected expenditure (poverty line) specifies the situation of poverty among poor's in the study area. The average expenditure clearly shows how poor the poor are, poor's in Nagaur are seriously poorer than poor's in Bikaner and Sri Ganganagar districts. Similarly, poor person in Northern Rajasthan averagely expend ₹797 per person per month which is not far from district average. This result agrees with squared poverty gap index at district level in table 5.

But, non-poor in all three districts averagely expend far more than the expected poverty line. Non-poor person in Sri Ganganagar district averagely expends almost four times higher than the minimum quantity (poverty line) per person per month followed by three times higher in Bikaner and more than two times higher than poverty line per person per month in Nagaur districts. Surprisingly, non-poor average expenditure per person per month in Sri

Ganganagar district is more than five times higher than poor person average per person per month expenditure in Nagaur districts. Equally non-poor in Northern Rajasthan averagely expend ₹2445 per person per month which is more than two times higher than minimum quantity (poverty line) per person per month. This unequal and skewed type of expenditure shows the existence of income source inequality among the districts in Northern Rajasthan.

Table 4.8: Monthly per capita expenditure gap

District/Area	Average expenditure gap in (₹)	Gap in % (from poverty line)
Nagaur	272	26.3
Bikaner	242	23.4
Sri Ganganagar	169	16.3
Northern Rajasthan	239	23.1

Source: Own calculation data, 2015

Table 4.8 result illustrates sampled poor household monthly per capita expenditure gap both in three districts and Northern Rajasthan. In Nagaur district a poor person needs averagely ₹272 per person per month cash transfer to reach the poverty line. Poor person in Bikaner district needs ₹242 per person per month cash transfer to reach the poverty line and Sri Ganganagar district poor person needs only ₹169 per person per month cash transfer to reach the poverty line. Equally, in Northern Rajasthan a poor person needs ₹239 per person per month cash transfer to reach the poverty line. This means for five member poor families in Nagaur ₹1360, in Bikaner ₹1210 and in Sri Ganganagar ₹845 per month cash transfer is needed to reach the poverty line. Five member poor families in Northern Rajasthan needed ₹1195 per month cash transfer to reach the poverty line. These results would work if we perfectly targeted to the poor in each district appropriately. Proper targeting is one of the tools that assists resource wastage and increases efficiency of poverty reduction programmes.

4.2.2. Socio-economic characteristics

Descriptive statistics are numbers that describe our data.

4. 2.2.1 Demographic characteristics

Demographic characteristics are helpful in understanding a sampled household's status and to express statistically how much they are connected with household's poverty. To analyze demographic characteristics of sampled households in the study are, we focused on variables: family size, adult equivalent, household head (age and sex) distributions, sex ratio, dependency ratio, educational attainment of household head and wife, adult participation in the family in agriculture, family regular salary earners distribution, and unemployment distribution among sampled households. We used basic summarized descriptive statistics such as, easy to understand table statistics mainly mean, standard deviation, maximum, minimum and percentage distributions. Accordingly, a family size distribution among sampled households in Northern Rajasthan is presented on table 4.9.

Table 4.9: Distribution of households on family size in Northern Rajasthan

Family size	Non-poor		Poor		Total	
	N=248	Percent	N=52	Percent	N=300	Percent
≤ 6	183	74	12	23	196	65
≥ 7	65	26	40	77	106	35
Total	248	100%	52	100%	300	100%
Mean	5.7		8.1		6.14	
SD	2.1		2.4		2.3	
Maximum	15		15		15	
Minimum	2		3		2	

Source: Author's computations, based on household survey data, 2015.

Family size was considered and hypothesized as one of the potential variables that would have due contribution to poverty. A single person obviously needs less money than a family of four and a family of eight needs more money. The larger the family, the lower will be its level of living. Largest family has 15 and the smallest has 2 family sizes in the area. The average family size was found to be 8.1 for poor, 5.7 for non-poor and 6.14 for overall sampled households. This average family size is above the national rural average family size of 5.47 persons per family in rural India (Government of India, 2011). About 77 percent of the poor and 26 percent of the non-poor sampled households were found to have family size greater than or equal to seven. Whereas, 74 percent of non-poor, 23 percent of poor and 65 percent of overall sampled households have family size less than 6.

If we use family size without adjustment, it will overestimate the number of poor people in large families relative to those in small families, for the fact that children are different from adults. To overcome such problems adult equivalent better describes number of poor people, expenditure and income in a given family than family size. This study analyzed data based on family adult equivalent rather than family size, calculated by the adopted ratios (see Appendix II). Accordingly, adult equivalent distributions among sampled households in Northern Rajasthan is calculated and presented on table 4.10.

Table 4.10: Adult equivalent distributions in Northern Rajasthan

Adult equivalent	Non-poor		Poor		Total	
	N=248	Percent	N=52	Percent	N=300	Percent
≤ 6	205	83	37	71	241	80
≥ 7	43	17	15	29	59	20
Total	248	100	52	100	300	100
Mean	4.9		5.8		5.1	
SD	1.7		2.1		1.8	
Maximum	12.93		13.76		13.76	
Minimum	1.58		2.42		1.58	

Source: *Author's* computations, based on household survey data, 2015.

Table 4.10 illustrates adult equivalent distributions among households in Northern Rajasthan. Like family size, majority 83 percent of non-poor, 71 percent of poor and 80 percent of overall sampled households have less than 6 adult equivalents in each family. While the remaining 17 percent of non-poor, 29 percent of poor and 20 percent of overall sampled households have more than 7 adult equivalents. The average adult equivalent size was 5.8 for poor, 4.9 for non-poor and 5.1 for overall in Northern Rajasthan. The adult equivalent ranges between 13.76 and 1.56 among sampled households. In the same manner, sampled household head age distribution was calculated and presented on table 4.11.

Table 4.11: Distribution of households head age in Northern Rajasthan

Household head age in years	Non-poor		Poor		Total	
	N = 248	Percent	N=52	Percent	N=300	Percent
≤ 30	10	4	0	0	10	3.3
31- 65	213	86	49	94	262	87
≥ 65	25	10	3	6	28	9.7
Total	248	100	52	100	300	100
Mean	49.9		50		49.9	
SD	12.1		10.8		11.8	
Maximum	90		72		90	
Minimum	28		32		28	

Source: Author's computations, based on household survey data, 2015.

The mean age among sampled households was 50 years. Majority household head were grouped in the age range of 31- 65, which is economically active age category. All sampled poor households age was more than 30 years and only 6 percent household's age were more than 65 years. The household heads age varies between 90 and 28 among sampled households. Similarly, a household head sex distribution among sampled households is presented on table 4.12. Sex of household head was hypothesized to be one of the variables that make a difference among sampled households poverty level.

Table 4.12: Distributions of household head sex in Northern Rajasthan

Household head sex	Non-poor		Poor		Total		$\chi 2$
	N = 248	Percent	N = 52	Percent	N=300	percent	
Male	242	97	48	92	290	97	0.42
Female	6	3	4	8	10	3	
Total	248	100%	52	100%	300	100%	

Source: Author's computations, based on household survey data, 2015.

The survey results on table 4.12 show that 8 percent of poor, 3 percent of non-poor and 3 percent of overall sampled households were female headed. Ninety-seven percent of overall, 92 percent of poor and 97 percent of non-poor sampled households were male headed in the study area. The chi-square result showed no significant difference ($p > 0.10$) on poverty status of households in terms of households head sex. The possible reasons may be the female headed households could not face any labour and income

shortage problem due to capability of their son for farming activities. We can also see the sex distribution among sampled households and the sex ratio is calculated and presented on table 4.13.

Table 4.13: Distributions of sex ratio distributions in Northern Rajasthan

Sex ratio	Non-poor (N=248)		Poor (N = 52)		Total (N=300)		χ^2
	No	Percent	No	Percent	No	percent	
Male	738	52	186	51.5	924	51.8	0.12
Female	683	48	175	48.5	858	48.2	
Ratio(F:M)	0.93:1	100%	0.94:1	100%	0.93:1	100%	

Source: *Author's* computations, based on household survey data, 2015

Sex ratio helps to find the equality of males and females in a society at a given period of time. Table 4.13 shows also existence of inequality among male and female numbers in Northern Rajasthan. There are 858 females and 924 males in the sample households. This is 1: 0.93 male to female ratio and the result also coincides with the Rajasthan state sex ratio report of 1:93 (Gov.Raj, 2012). The statistical analysis ($\chi 2 = 0.107$), revealed that there was no significant difference in males and females number among households between poor and non-poor households at less than 10 percent probability level of significance.

Gender equality is a core development objective in its own right, which needs detail analysis. To understand sex ratio distributions the study carries out district level analysis. Accordingly, sex ratio distributions among sampled households in Bikaner district is presented on table 4.14.

Table 4.14: Sex ratio distributions in Bikaner district

Sex ratio	Non-poor (N = 83)		Poor (N = 17)		Total (N=100)	
	N = 518	Percent	No =108	Percent	N = 626	percent
Male	271	52	59	55	330	53
Female	247	48	49	45	296	47
Ratio(F:M)	0.91 : 1	100%	0.83:1	100%	0.89 : 1	100%

Source: Author's computations, based on household survey data, 2015

Table 4.14 result shows existence of inequality among male and female numbers in Bikaner district. There are 296 females and 330 males in the

sampled household. This is 1: 0.89 male to female ratio and the result is less than Rajasthan state sex ratio report of 1: 93 (Gov.Raj, 2012). Similarly, Sex ratio distributions among sampled households in Sri Ganganagar district calculated and presented on table 4.15.

Table 4.15: Sex ratio distributions in Sri Ganganagar district

Sex ratio	Non-poor (N = 83)		Poor (N = 17)		Total (N=100)	
	N = 489	Percent	No =123	Percent	N = 612	percent
Male	257	53	61	49	318	52
Female	232	47	62	51	294	48
Ratio(F:M)	0.9 :1	100%	1:1	100%	0.92:1	100%

Source: Author's computations, based on household survey data, 2015.

Table 4.15 shows also existence of inequality among male and female numbers in Sri Ganganagar district. There are 294 females and 318 males in the sampled household's family. This is 1: 0.92 male to female ratio and the result is near to the Rajasthan state sex ratio report of 1: 93 (Gov.Raj, 2012). Equally, sex ratio distributions among sampled households in Nagaur district is calculated and presented on table 4.16.

Table 4.16: Sex ratio distributions in Nagaur district

Sex ratio	Non-poor (N = 80)		Poor (N = 20)		Total (N=100)	
	N = 414	Percent	No =130	Percent	N = 544	percent
Male	210	51	66	51	276	51
Female	204	49	64	49	268	49
Ratio(F:M)	0.97 : 1	100%	0.97:1	100%	0.97: 1	100%

Source: Author's computations, based on household survey data, 2015

Table 4.16 indicates male and female sex ratio distribution among households in Nagaur district. The result shows almost the district has equal number of male and female. There are 268 female and 276 male as family member among sampled households. This ratio (1:97) is better than Rajasthan state sex ratio report of 1: 93 (Gov.Raj, 2012). Both poor and non-poor have equal number of sex ratio, which indicates gender is not cause for household poverty. The number of dependents affects household economy than male to female ratio.

Dependency ratio is a measure of the portion of a population which is composed of dependents (people who are too young or too old to work). It is found by the number of individuals aged below 15 or above 64 divided by the number of individuals aged 15 to 64, expressed as a percentage. It is hypothesized as one of the potential variables that would have due contribution on household poverty. Dependency ratio distributions result among sampled households in Northern Rajasthan is calculated and presented on table 4.17.

Table 4.17: Distributions of dependency ratio in Northern Rajasthan

Dependency ratio	Non-poor		Poor		Total	
	N = 248	Percent	N=52	Percent	N=300	Percent
< 1	165	67	17	33	182	60
1	48	19	11	21	59	20
≥ 1	35	14	24	46	59	20
Total	248	100	52	100	300	100
Mean	0.69		0.98		0.72	
SD	0.59		0.69		0.61	
Maximum	3		4		4	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015

The survey results on table 4.17 illustrates 46 percent of poor, 14 percent of non-poor and 20 percent of overall sampled households have more than one dependency ratio. That means in those households, the number of aged below 15 or above 64 is more than economically active family member aged 15 to 64. Majority 67 percent of non-poor, 33 percent of poor and 60 percent of overall have less than one dependency ratio. The mean dependency ratio was found to be 0.98 and 0.69 for poor and non-poor households respectively. While the overall mean dependency ratio of the sample households was 0.72, which is more than national average dependency ratio of 0.52. Decision maker education level also matters to direct dependents; decision maker educational level of sampled households is depicted on table 4.18.

Table 4.18: Distribution of decision maker educational level in Northern Rajasthan

Education level	Non-poor		Poor		Total	
	N = 248	Percent	N=52	Percent	N=300	Percent
Illiterate	80	32	28	54	108	37
School to 4th	3	1.2	8	15.5	11	4
School 5 - 12 th	139	56	16	30.5	155	52
Graduate	26	10.8	0	0	26	7
Total	248	100	52	100	300	100
Mean	6		2		6	
SD	5.4		3.0		5.3	
Maximum	Graduate		12		Graduate	
Minimum	Illiterate		Illiterate		Illiterate	

Source: Author's computations, based on household survey data, 2015

Majority sampled household heads (52 percent) in the survey attended 5-12 standard education followed by no formal education (illiterate 37 percent) and graduate standard education (7 percent). The households who never attended school or illiterate were significant for both poor and non-poor households, 54 and 32 percent respectively. The mean education attendance standard was found to be 2 th and 6 th standards for poor and non-poor households, respectively. While the overall mean education attendance standard for the sampled households was 6th. Maximum education attendance standard for non-poor was graduate but it was 12 standard for poor household. The possible implication is that in addition to other factors, while some level of education is important to household's welfare. Equally to the decision maker educational level, wife education also influences family poverty and wife education level presented on table 4.19.

Overall, an education level of sampled household wife across Northern Rajasthan is low and 63 present respondent wives were illiterate. Sampled household wife from poor family who did not have formal education were 81 present. While the overall mean wife education attendance for the sampled households was 2.5. Maximum education attendance for non-poor sampled household wife was graduate but it was 10 standard for poor sampled household wife. Predictably, illiterate was high for all categories. The data result revealed that women education significantly influences household

poverty in Northern Rajasthan, even if the social norms restricting them to home based works. If wife education is supported by high farming experience in the agriculture, it will bring significant change in the family economy, decision maker farming experience among sampled household is presented on table 4.20.

Table 4.19: Wife education level in Northern Rajasthan

Education level	Non-poor		Poor		Total	
	N = 242	**Percent**	**N = 48**	**Percent**	**N = 290**	**Percent**
Illiterate	143	59	39	81	182	63
School to 4th	6	2.5	2	4	8	3
School 5 - 12 th	91	37.5	7	15	98	33.5
Graduate	2	1	0	0	2	0.5
Total	242	100	48	100	290	100
Mean	3		1		2.5	
SD	3.8		2.5		3.8	
Maximum	Graduate		10		Graduate	
Minimum	Illiterate		Illiterate		Illiterate	

Source: Author's computations, based on household survey data, 2015

Table 4.20: Distribution of households farming experience in Northern Rajasthan.

Farming experience in years	Non-poor		Poor		Total	
	N=248	**Percent**	**N=52**	**Percent**	**N=300**	**Percent**
≤ 10	43	17	27	52	70	23
11 - 30	165	67	22	42	187	63
≥ 30	40	16	3	6	43	14
Total	248	100	52	100	300	100
Mean	20		9.8		18	
SD	11.9		8.2		11.9	
Maximum	50		45		50	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015

The overall sampled respondent's average experience in farming was 18 years with standard deviation of 11.9. Furthermore; the average farming experience of poor was 9.8 years with standard deviation of 8.2, while for the non-poor it was 20 years with standard deviation of 11.9. Majority sampled households have farming experience between 11 to 30 years, 67 percent from non-poor, 42 percent from poor and 63 percent from overall were under this class. Experience in agricultural varied among the sampled households from

minimum value of no experience, who have no land and depend on off-farm, to a maximum of 50 years. Farming experience has role in household poverty and number of adult participation in the family contributes for efficient implementation of farming experience in rural economy. Number of adult participation in the family among sampled households in the study is calculated and presented on table 4.21.

Table 4.21: Distribution of family adult participant in Northern Rajasthan

Adult participant rate in number	Non-poor		Poor		Total	
	N=248	Percent	N=52	Percent	N=300	Percent
≤ 2	195	79	34	65	229	76
3 - 5	46	18	13	25	59	20
≥ 5	7	3	4	10	12	4
Total	248	100	52	100	300	100
Mean	1.8		2.3		1.9	
SD	1.37		1.75		1.45	
Maximum	6		7		7	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015

The decision of households to supply labour to own farm work and to hire farm labour depends on the seasonal nature of agriculture and availability of household agricultural land along with many other socio-economic features. Shortage of farm labour supply may lead to low farm productivity. The premise for this analysis is that, family members have stronger work incentives compared to hired labour. Two or less than that number of adult participation was dominated type of adult participation in the study area as well as in the poor and non-poor households. The mean adult participation rate was 1.8 for non-poor followed by 2.3 for poor sampled households and 1.9 for overall sampled households. In poor family there were maximum 7 adult participants and it was 6 in non-poor family. For the poor, labour is often the only asset they can use to improve their well-being. Sampled households were also assessed on presence and absence of permanent salary earners among sampled households and the result presented on table 4.22.

Table 4.22: Distribution of salary earners in Northern Rajasthan

Presence of regular salary earner in the family	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	98	39.5	14	27	111	37
No	150	60.5	38	73	189	63
Total	248	100	52	100	300	100
$\chi^2 = 0.007$***						

Source:-Survey result (2015) *** Significant at less than 1% probability level

Regular salary earners refer to member of household who through work get monthly salary or wage. Majority households did not have any family member who earns regular salary. In the poor household 73 percent and in non-poor households 60.5 percent households responded that they do not have any salary earner. As expected non- poor sampled households have more regular salary earner than poor sampled households. The statistical analysis ($\chi 2$ = 0.007), revealed that there was significant difference between families having regular salary earner and without regular salary earner among sampled households at less than 1 percent probability level of significance. It shows that regular salary has impact on household poverty in Northern Rajasthan.

Regular salary earners availability in the family varies among districts. Therefore, the study analyzed salary earners presence in the family among sampled households at district level. Accordingly, Bikaner district result is presented on table 4.23.

Table 4.23: Salary earners presence in the family in Bikaner district

Presence of regular salary earner in the family	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N =100	Percent
Yes	20	24	3	18	23	23
No	63	76	14	82	77	77
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

Majority, 82 percent of poor, 76 percent of non-poor and 77 percent of overall sampled households responded, they do not have any salary earner family member. In the same manner, sampled households were assessed on

presence and absence of permanent salary in Sri Ganganagar district and the result presented on table 4.24.

Table 4.24: Salary earners presence in the family in Sri Ganganagar

Presence of regular salary earner in the family	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
Yes	34	40	4	27	38	38
No	51	60	11	73	62	62
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

Like Bikaner district majority, 60 percent of non-poor, 73 percent of poor and 62 percent of overall sampled households in Sri Ganganagar district responded, they do not have any family member who earns regular salary. Equally, in Nagaur district sampled households were assessed on presence and absence of permanent salary earners and result presented on table 4.25.

Table 4.25: Salary earners presence in the family in Nagaur district

Presence of regular salary earner in the family	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Yes	44	55	7	35	51	51
No	36	45	13	65	49	49
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

Above half sampled households in Nagaur district responded that they have salary earner in their family. Similarly, 55 percent non-poor and 35 percent poor also had salary earner family member. But, majority 65 percent poor, 45 percent non-poor and 49 percent overall had no salary earner family member among sampled households. District level analysis indicates that among districts, Nagaur district respondents have more number of family members who earns regular salary.

It is also hypostasized that family member unemployment negatively affects the family well-being and unemployment distribution among sampled households in the study area is presented on table 4.26.

Table 4.26: Distribution unemployment in Northern Rajasthan

Presence of unemployed in the family	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	150	60	18	35	168	56
No	98	40	34	65	132	44
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

In this study unemployed, refers to people who have attained standard 12 and above education only. Sixty percent non-poor sampled households were responded they have unemployed family members and 35 percent poor also similarly showed existence of unemployed in the family. But, 40 percent non-poor and 65 percent poor reported absence of unemployed in their family. More than 56 percent overall sampled households reported that, in their family they have unemployed family member who had attained standard 12 and above but 44 percent did not have any member who had attained standard 12 and above. It shows unemployment rate act as a factor which would force family to move in to poor family. So, to understand unemployment distribution among sampled households, the study carries out district level analysis. Accordingly, sampled households were assessed about unemployment distribution in Bikaner district and the result is presented on table 4.27.

Table 4.27: Distribution unemployment in Bikaner district

Presence of unemployed in the family	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
Yes	34	41	7	41	41	41
No	49	59	10	59	59	59
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

In Bikaner district, 41 percent of non-poor, 41 percent of poor and 41 percent of overall sampled households were responded they have unemployed family members who had attained standard 12 and above. In the same manner, unemployment distribution among sampled households in Sri Ganganagar is presented in table 4.28.

Table 4.28: Distribution unemployment in Sri Ganganagar district

Presence of unemployed in the family	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
Yes	52	61	6	40	58	58
No	33	39	9	60	42	42
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

In Sri Ganganagar district, majority 58 percent of overall and 61 percent of non-poor sampled households were responded they have unemployed family members who had attained standard 12 and above. Equally, unemployment distribution among sampled households in Nagaur district is calculated and presented on table 4.29.

Table 4.29: Unemployment distribution in Nagaur district

Presence of unemployed in the family	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Yes	46	56	7	35	53	53
No	34	44	13	65	47	47
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.29 result illustrates that, majority 53 percent of overall, 56 percent of non-poor and 35 percent of poor sampled households responded they have unemployed family member. Therefore, district level analysis indicates that in all districts unemployment is serious problem at family level.

4.2.2.2. Migration

Migration of family member in search of job to increase family income was hypostatized to influence family livelihood. Accordingly, sampled households were asked whether any family member migrated to other palace for job or not. Table 4.30 presents respondents response about family member migration in the study area.

Table 4.30: Family member migration in Northern Rajasthan

Is anyone migrated from your family in search of job?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
No	238	96	50	96	288	96
Yes	10	4	2	4	12	4
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

Majority, 96 percent of non-poor, poor and total sampled households respond no one has migrated from their family. Households who had migrants for job were 4 percent from non-poor, 2 percent from poor and 4 percent from overall sampled households. This might be the outcome of implementation of several poverty-alleviation and employment-generation programmes. They reduced distress migration and improved the bargaining power of agriculture labour leading to higher wages. The job and wage difference factors appear to be a major determinant of rural-to-urban migration. To understand situation of migration, district level analysis was done. Therefore, Bikaner district sampled households were asked whether any family member migrated to other palace for job or not.

Table 4.31: Family member migration in Bikaner district

Is anyone migrated from your family in search of job?	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
No	79	95	17	100	96	96
Yes	4	5	0	0	4	4
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

Majority, 95 percent of non-poor, 100 percent of poor and 96 percent of overall sampled households respond no one has migrated from their family. Similarly, Sri Ganganagar district sampled households were asked whether any family member migrated to other palace for job or not.

Table 4.32: Family member migration in Sri Ganganagar district

Is anyone migrated from your family in search of job?	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
No	83	98	15	100	98	98
Yes	2	2	0	0	2	2
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

In Sri Ganganagar district also majority, 98 percent of overall and non-poor, 100 percent of poor sampled households respond no one has migrated from their family. Equally, Nagaur district sampled households were asked whether any family member migrated to other palace for job or not.

Table 4.33: Family member migration in Nagaur district

Is anyone migrated from your family in search of job?	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Yes	4	5	2	10	6	6
Yes	76	95	18	90	94	94
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

In Nagaur district similarly majority, 94 percent of overall 90 percent of poor and 95 percent of non-poor sampled households respond no one has migrated from their family. Therefore, district level analysis result indicates, at present migration is not problem in all three districts of Northern Rajasthan.

4.2.2.3. Household Agricultural Resource ownership

An agricultural resource in this study includes those resources which contribute to the production, preparation and marketing of crops, livestock and livestock products that have direct connection with rural household poverty. In this section we focused on household's agricultural land, irrigated land and livestock ownership, among sampled households. But, in section four of this chapter, agriculture resource inequality discussed in detail.

4.2.2.3.1. Agricultural land ownership

From any other productive resources land is by far the most important resource in agriculture. The fertility status, location and other attributes of land in association with its size made it a binding resource in agriculture. Accordingly, data was collected from sampled households to assess whether they owned agricultural land or not and the result is presented in table 4.34.

Table 4.34: Agricultural land ownership in Northern Rajasthan

Do you have agricultural land?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	214	86	36	69	243	81
No	34	14	16	31	57	19
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

The household survey data indicates that in Northern Rajasthan 81 percent of sampled households have agricultural lands. Majority (86 percent) non-poor sampled households owned agricultural land and 69 percent of sampled poor households also have agricultural land. This result agrees with, labour bureau, government of India,2000 report, among the major states, the highest percentage of households with cultivated land was observed in Rajasthan (62.56 percent).To realize how agricultural land is distributed among sampled households table 4.35 is prepared.

Table 4.35: Agricultural land distributions in Northern Rajasthan

Agricultural land Holding	Non-poor		Poor		Total	
	N = 248	%	N = 52	%	N = 300	%
Marginal holding (0 to1 ha)	41	16	15	29	56	19
Small holding (1-2 ha)	26	11	11	21	37	12
Small-medium holding (2-4 ha)	48	19	8	15	56	19
Medium holding (4-10 ha)	88	36	14	27	102	34
Large holding (>10 ha)	45	18	4	8	49	16
Total	248	100	52	100	300	100
Mean	6		3.3		5.7	
SD	5.2		2.6		4.8	
Maximum	25		13		25	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015

The land holding of sample households vary from marginal holding to large holding with an overall average holding of 5.7 hectares with standard deviation of 4.8. It also vary from 25 ha maximum to nil ha minimum. The average size of land for poor was 3.3 ha with standard deviation of 2.6, while that of non-poor was 6 ha with standard deviation of 5.2. The medium holding is dominant category, 36 percent of non-poor, 27 percent of poor and 34 percent of overall have medium holding. About 29 percent of poor, 16 percent of non-poor and 19 percent of overall have marginal holding. Similarly, 8 percent of poor, 18 percent of non-poor and 16 percent of overall have more than 10 ha holding. The high standard deviation value for land holdings among poor and non-poor sampled households indicate that there is great variability within the groups in agricultural land holding in the area. Nagaur district non-irrigated land holding may push the average up.

4.2.2.3.2. Irrigated land ownership

Irrigated agriculture has been an extremely important source of production over recent decades. It is an important factor that can boost agricultural productivity of a country. To analyze irrigated land ownership among sampled households table 4.36 is prepared.

Table 4.36: Irrigated land ownership in Northern Rajasthan

Irrigated land ownership	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	149	60	16	31	165	55
No	99	40	36	69	135	45
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

The Northern Rajasthan is rich in irrigation infrastructure as compared to other Indian areas. In the area, more than half of sampled households had irrigated land. Similarly about 60 percent of non-poor and 31 percent of poor have also irrigated land. The survey result revealed that 69 percent of poor and 40 percent non-poor sampled households do not have any irrigated land. To realize how irrigated land is distributed among sampled households table 4.37 is prepared.

Table 4.37: Irrigated land distributions in Northern Rajasthan

Irrigated land Holding	Non-poor		Poor		Total	
	N = 248	%	N = 52	%	N = 300	%
Marginal holding(0 to1 ha)	97	39	42	80	139	46
Small holding(>1 - 2 ha)	25	10	4	8	29	10
Small-medium holding(>2 - 4 ha)	63	25.5	6	12	69	23
Medium holding(>4 - 10 ha)	57	23	0	0	57	19
Large holding(>10 ha)	6	2.5	0	0	6	2
Total	248	100	52	100	300	100
Mean	3.2		0.21		2.3	
SD	2.6		0.24		2.1	
Maximum	15		1.5		15	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015

Of the total sampled households 46 percent owned marginal irrigable land followed by 23 percent small-medium, 19 percent medium, 10 percent small holding and only 2 percent large holding. Majority 80 percent poor sampled households had marginal irrigable land and 12 percent small-medium irrigable land holding. Non- poor sampled households share in irrigated land holding was 39 percent marginal holding, 25.5 percent in small-medium holding and 23 percent in medium holding. The mean size of irrigated land for poor was 0.21 with standard deviation of 0.24, while that of non-poor was 3.2 with standard deviation of 2.6. Irrigated land holding vary from maximum 15 ha to minimum nil ha irrigated land holding among sampled households in the study area.

4.2.2.3.3. Livestock ownership

There is ample evidence that rural households keep livestock across various levels of income. In India, the landless, marginal and poor poultry farmers keep an average flock of 7-8 non-descript hardy but low-yielding poultry birds, mainly as a source of eggs for home consumption and to meet one-off expenditures, whereas wealthier farmers can keep flocks with over 20,000 broilers for profit motives (GoI, 2006; Mehta and Nambiar, 2007). To analyze in detail about livestock ownership and distribution among sampled households in Northern Rajasthan sampled households were asked whether they have livestock or not.

Table 4.38: Livestock ownership in Northern Rajasthan

Do you have Livestock?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	207	83	30	58	237	79
No	41	17	22	42	63	21
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

Table 4.38 depicts livestock ownership among sampled households in Northern Rajasthan. A vast majority of the households surveyed rear various kinds of animals in order to produce animal products as well as to generate income both contributing to reduce the household's poverty. In the area, 58 percent of poor, 83 percent of non-poor and 79 percent of overall sampled households were keeping livestock. On the other hand, 42 percent of poor, 17 percent of non-poor and 21 percent of overall surveyed households were not keeping livestock. Livestock ownership analyzed through distribution number gives detail information about the status of household. Table 4.39 illustrates livestock distribution among sampled households in Northern Rajasthan.

Table 4.39: Livestock distributions in Northern Rajasthan

Livestock Holding in (TLU)[1]	Non-poor		Poor		Total	
	N = 207	Percent	N = 30	Percent	N=237	Percent
< 1	38	18	19	63	57	24
1 - 3	77	37	8	27	85	36
>3 - 6	69	34	3	10	72	30
> 6	23	11	0	0	23	10
Total	207	100	30	100	237	100
Mean	3.12		0.9		2.7	
SD	2.64		0.89		2.57	
Maximum	14.85		5.35		14.85	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015

Out of total 237 livestock owner respondents (see table 4.38), 24 percent owned less than 1 TLU, 36 percent between 1 to 3 TLU, 30 percent owned 3

[1] ***Tropical Livestock Unit (TLU) helps to use a common unit to describe livestock numbers of various species as a single figure that expresses the total amount of livestock present – irrespective of the specific composition. This unit is 1 Tropical Livestock Unit (TLU). The standard used for one Tropical Livestock Unit is one cattle with a body weight of 250 kg(In our case 1 Buffalo)(see Appendix I for conversion details***)

to 6 TLU and 10 percent owned more than 6 TLU in Northern Rajasthan. As expected non-poor have better share in livestock holding, 18 percent owned less than 1 TLU, 37 percent owned 1 to 3 TLU, 34 percent owned 3 to 6 TLU and 11 percent owned more than 6 TLU. Sixty-three percent of poor households owned less than 1 TLU, 27 percent owned 1 to 3 TLU and only 10 percent owned 3 to 6 TLU. No poor owned more than 6 TLU. The survey result shows that the average livestock holding for the poor households was 0.9 TLU, whereas that of non-poor was 3.12 TLU. Livestock holding vary from maximum 14.85 TLU to minimum nil livestock holding among sampled households in the study area.

4.2.2.4. Own production sufficiency

If family grows all the food they need to feed their families and themselves, the chance to escape poverty is high. Household food self-sufficiency is important element at the time of food bill is increasing. Sampled households were asked whether their normal year own production is enough years round or not.

Table 4.40: Own production sufficiency in Northern Rajasthan

Is your own production enough years round?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	138	56	18	34	156	52
No	110	44	34	66	144	48
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

The results on table 4.40 shows sampled households response on whether their normal year own production is enough years round or not. Accordingly, 66 percent poor, 44 percent non-poor and 48 percent overall sampled households responded their own production is not enough year round. However, 34 percent poor households, 56 percent non-poor and 52 percent overall sampled households responded their own production would last them through the year. This self-sufficiency is particularly important, because in Northern Rajasthan, where food expenditure reaches to 64 percent (see table 4.90), a family that can feed itself has high survival value and low probability

to be poor regardless of other difficulties confronting it. It is believed that to bring national food self-sufficiency family food self-sufficiency is vital.

Districts are areas where agricultural production operates. To understand own production sufficiency among sampled households, the study undertake district level analysis. Therefore, Bikaner district sampled households were asked whether their normal year own production is enough years round or not.

Table 4.41: Own production sufficiency in Bikaner district

Is your own production enough years round?	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
Yes	45	54	3	18	48	48
No	38	46	14	82	52	52
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

The results on table 4.41 shows 82 percent of poor, 46 percent of non-poor and 52 percent of overall sampled households responded their own production is not enough year round. In the same manner, Sri Ganganagar district sampled households were asked whether their normal year own production is enough years round or not.

Table 4.42: Own production sufficiency in Sri Ganganagar district

Is your own production enough years round?	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
Yes	46	54	3	20	49	49
No	39	46	12	80	51	51
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

The results on table 4.42 shows 80 percent of poor, 46 percent of non-poor and 51 percent of overall sampled households responded their own production is not enough year round. Equally, Nagaur district sampled households were asked whether their normal year own production is enough years round or not.

Table 4.43: Own production sufficiency in Nagaur district

Is your own production enough years round?	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Yes	47	59	8	40	55	55
No	33	41	12	60	45	45
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

The results on table 4.43 shows 60 percent of poor, 41 percent of non-poor and 41 percent of overall sampled households responded their own production is not enough year round. Therefore, district level result indicates almost in all three districts for majority poor their own production is not enough years round. To understand the status of sampled household's food self-sufficiency their food deficit month is calculated and presented on table 4.44.

Table 4.44: Households food deficit months in Northern Rajasthan

No of food deficit months	Non-poor		Poor		Total	
	N=248	Percent	N=52	Percent	N=300	Percent
≤ 3	196	79	36	69	232	77
4 - 6	52	21	16	31	68	23
Total	248	100	52	100	300	100
Mean	1.16		1.6		1.24	
SD	2.02		2.18		2.05	
Maximum	7		10		10	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015.

Table 4.44 depicts sampled households results on food deficit months in Northern Rajasthan. Seventy-seven percent overall, 79 percent non-poor and 69 percent poor sampled households responded, they could face less than three months food deficit. Furthermore, 23 percent overall, 31 percent poor and 21 percent non-poor sampled households responded, they would face four to six months. The mean food deficit month for poor was 1.6 with standard deviation of 2.18, while that of non-poor was 1.16 with standard deviation of 2.02.

4.2.2.5. Distribution of respondents by access to institutions

Institution in this study refers to particular formal organizations of the government and public services. Poverty is the outcome of not only of economic phenomena but also of institutional. Institutions affect poverty both directly and indirectly. Institutions like credit service influence capacity of production and productivity, which in turn influence family income, which then affect the pace of poverty reduction. In addition, institutional services like market and road accessibility directly influence the pace and quality of household economy. In this particular study institution viability and accessibility data was collected from sampled households on credit, road and market.

4.2.2.5.1 Credit

Credit is powerful instruments to fight poverty, if there is uniform access to formal credit to all households. Availability of credit institutions that provide financial and business services closest to household also determines its efficiency. Surveyed households were assessed whether they have formal credit institutions nearby their village or not. Table 4.45 depicted sampled respondents response.

Table 4.45: Credit institutions availability in Northern Rajasthan

Is credit institutions availability in your village	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	214	86	37	71	251	84
No	34	14	15	29	49	16
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

The survey results show that in Northern Rajasthan, credit institutions were established in all the study areas. Majority respondents, 86 percent of non-poor, 71 percent of poor and 84 percent of overall sampled respondents replied that they have credit institutions in their village. Credit institutions availability alone does not contribute for household poverty unless households make microfinance work by borrowing. Based on this, households were

assessed whether they have taken loan or not. Table 4.46 illustrates sampled respondents response on loan.

Table 4.46: Households status on loan in Northern Rajasthan

Have you taken loan?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	113	46	44	85	157	52
No	135	54	8	15	220	48
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

Overall, 52 percent of sampled households in Northern Rajasthan had loans. Furthermore, 46 percent of non-poor and 85 percent of poor also had loans from credit institutes. On the other side, majority households from non-poor 54 percent had no loan. But, only few poor households had no loans (15 percent) and 48 percent from overall also do not borrowed money.

Sampled households were assessed in detail at district level, whether they have taken loan in the last three years or not. Bikaner district results are presented in table 4.47.

Table 4.47: Households classification on loan in Bikaner district

Have you taken loan?	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
Yes	37	45	4	23	41	41
No	46	55	13	77	59	59
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

In Bikaner district, 45 percent of non-poor, 23 percent of poor and 41 percent of overall sampled households had loans. But, dominant 55 percent of non-poor, 77 percent of poor and 59 percent of overall sampled households had no loans from credit institutes. Similarly, sampled households were assessed in in Sri Ganganagar district.

Table 4.48: Loan status in Sri Ganganagar district

Have you taken loan?	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
Yes	13	15	5	33	18	18
No	72	85	10	67	82	82
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015.

In Sri Ganganagar district, 15 percent of non-poor, 33 percent of poor and 18 percent of overall sampled households had loans. But, Majority 85 percent of non-poor, 67 percent of poor and 82 percent of overall sampled households had no loans from credit institutes. Equally, sampled households were assessed in Nagaur district.

Table 4.49: Households classification on loan in Nagaur district

Have you taken loan?	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Yes	12	15	4	20	16	16
No	68	85	17	80	85	85
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

Also in Nagaur district, 15 percent of non-poor, 20 percent of poor and 16 percent of overall sampled households had loans. But, majority 85 percent of non-poor, 80 percent of poor and 85 percent of overall sampled households had no loans from credit institutes. Therefore, district level result indicates in all three districts, majority households did not take loan from credit institutes.

To understand credit status in the area total loan amount of potential borrowers was assessed and depicted on table 4.50. On average, credit participant households had ₹40,300 loan with standard deviation of 1,170. Poor and non-poor sampled households borrowed averagely ₹15,000 and ₹52,295, respectively. Surprisingly, the loan that poor households had taken and majority 62 percent of overall sampled households taken were less than ₹50,000 loan, which is very small loan to bring change. More than one lakh rupee loans had taken by 27 percent non-poor and 20 percent overall sampled households. Twenty-six percent non-poor and 18 percent of overall

sampled households had taken ₹50,000 to 100,000 loans. The minimum amount of loan accessed by sampled households was ₹10,000 whereas the maximum was ₹700,000.

Table 4.50: Loan households taken in Northern Rajasthan

Amount of loan households taken in(₹)	Non-poor		Poor		Total	
	N = 113	Percent	N = 44	Percent	N=157	Percent
< 50,000	53	47	44	100	97	62
50,000 - 100,000	29	26	0	0	29	18
> 100,000	31	27	0	0	31	20
Total	113	100	44	100	157	100
Mean	52,295		15,000		40,300	
SD	1,167		3,169		1,170	
Maximum	700,000		32,000		700,000	
Minimum	10,000		5,000		10,000	

Source: Author's computations, based on household survey data, 2015

4.2.2.5.2. Savings

Savings is the portion of income not spent on current expenditures. It helps an individual or family become financially secure. Rural people practice saving because they do not know what will happen in the future. Money should be saved to pay for unexpected events or emergencies. To investigate saving culture in Northern Rajasthan sampled households were asked whether they have saving habit or not.

Table 4.51: Households saving practice in Northern Rajasthan

Do you have saving habit?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	112	45	19	37	131	44
No	136	55	33	63	169	56
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

Table 4.51 illustrates households saving habit in Northern Rajasthan and the results show that 44 percent of overall, 45 percent of non-poor and 37 percent of poor sampled households have responded that, they have good tradition of putting cash or kind aside for future use. In contrast, majority of sampled

households 55 percent of non-poor, 63 percent of poor and 56 percent of overall sampled households replied that they had no saving habit.

To understand rural people saving practice in detail, the study carry out district level analysis. To investigate saving culture in Bikaner district sampled households were asked whether they have saving habit or not.

Table 4.52: Households saving practice in Bikaner district

Do you have saving habit?	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
Yes	32	38	4	23	36	36
No	51	62	13	77	64	64
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.52 illustrates households saving habit and the results show that, 36 percent of overall, 38 percent of non-poor and 23 percent of poor sampled households were responded they have good tradition of putting cash or kind aside for future use. In contrast, majority of sampled households 66 percent of non-poor, 77 percent of poor and 64 percent of overall sampled households replied that they had no saving habit. In similar manner, Sri Ganganagar district result is presented on table 4.53.

Table 4.53: Households saving practice in Sri Ganganagar district

Do you have saving habit?	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
Yes	47	55	4	27	51	51
No	38	45	11	73	49	49
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.53 illustrates households saving habit in Sri Ganganagar district and the results show that 51 percent of overall, 55 percent of non-poor and 27 percent of poor sampled households were responded they have good tradition of putting cash or kind aside for future use. In contrast, 73 percent of poor, 45 percent of non-poor and 49 percent of overall sampled households replied that they had no saving habit. To investigate saving culture in Nagaur district

sampled households were asked whether they have saving habit or not and the result is presented on table 4.54.

Table 4.54: Households saving practice in Nagaur district

Do you have saving habit?	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Yes	25	31	3	15	28	28
No	55	69	17	85	72	72
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.54 illustrates households saving habit in Nagaur district and the results show that 28 percent of overall, 31 percent of non-poor and 15 percent of poor sampled households were responded they have good tradition of putting cash or kind aside for future use. In contrast majority, 85 percent of poor, 69 percent of non-poor and 72 percent of overall sampled households replied that they had no saving habit. Therefore, district level result indicates saving is not common practice among sampled households because people are reluctant to give accurate information about their savings.

In the process of saving, amount of saving matters rather than habit of saving to see its impact on household poverty. Amount of Rupee households saved annually is assessed and result presented on table 4.55.

Among the total number of respondents, 51 percent of overall, 79 percent of poor and 46 percent of non-poor saved less than ₹50,000 annually. No poor has saved more than ₹100,000 annually, but 24 percent of overall and 28 percent of non-poor had saved more than ₹100,000. Of the total number of respondents, 25 percent of overall, 21 percent of poor and 26 percent of non-poor saved ₹50,000 to 100,000 annually. The mean saving for the total number of respondents was ₹43,561, for non-poor it was ₹52,295 and for poor it was ₹7,160. Saving vary from maximum ₹700,000 to minimum ₹10,000 annually among sampled households in Northern Rajasthan.

Table 4.55: Rupee saved annually in Northern Rajasthan

Amount saved in (₹)	Non-poor		Poor		Total	
	N = 112	Percent	N = 19	Percent	N=131	Percent
< 50,000	52	46	15	79	67	51
50,000 - 100,000	29	26	4	21	33	25
≥ 100,000	31	28	0	0	31	24
Total	112	100	19	100	131	100
Mean	52,295		7,160		43,561	
SD	11,673		12,910		10,781	
Maximum	700,000		40,000		700,000	
Minimum	10,000		10,000		10,000	

Source: Author's computations, based on household survey data, 2015

4.2.2.5.3. Regulated market distance

The distance in kilometers that the households traveled to get main market for accessing different services was assessed among sampled households in Northern Rajasthan and results are presented on table 4.56.

Table 4.56: Market distance in Northern Rajasthan

Market distance in (km)	Non-poor		Poor		Total	
	N=248	Percent	N=52	Percent	N=300	Percent
< 5	52	21	0	0	52	17
5 - 10	39	16	4	8	43	14
>10	157	63	48	92	205	69
Total	248	100	52	100	300	100
Mean	11.8		23.6		13.8	
SD	7.2		10.9		9.2	
Maximum	35		55		55	
Minimum	0.1		5		0.1	

Source: Author's computations, based on household survey data, 2015

In line with this, the average distance traveled by the overall sampled respondents to the main road was about 13.8 km. Furthermore, on average poor sampled household traveled about 23.6 km while the non-poor traveled 11.8 km to reach regulated market. Majority, 69 percent of overall, 92 percent of poor and 63 percent of non-poor sampled households traveled more than 10 km to reach regulated market. But, 37 percent of non-poor, 4 percent of poor and 31 percent of overall sampled households traveled less than 10 km

to reach regulated market. Of the total number of respondents, 16 percent of non-poor, 8 percent of poor and 14 percent of overall sampled households traveled 5 to 10 km to reach regulated market. The maximum and minimum distance traveled by respondent was 55 and 0.1 Km, respectively.

4.2.2.5.4. Main road distance

Closeness to main road creates opportunity to additional income by providing easy access to inputs, transportation and off-farm employment opportunities. It was, therefore, expected that households nearer to main road have better chance to improve household's poverty status than who do not have proximity to main road.

Table 4.57: Main road distance in Northern Rajasthan

Main Road distance in km	Non-poor		Poor		Total	
	N=248	Percent	N=52	Percent	N=300	Percent
< 1	30	12	0	0	30	10
2 - 5	178	72	20	38	198	66
> 5	40	16	32	62	72	24
Total	248	100	52	100	300	100
Mean	3.24		7.84		4.04	
SD	4.3		5.3		4.8	
Maximum	20		21		21	
Minimum	0		1		0	

Source: Author's computations, based on household survey data, 2015

Table 4.57 depicts the statistical results of main road distance sampled households travel in Northern Rajasthan. The maximum and minimum main road distance varies between 21 and nil km. About 62 percent of the poor, 24 percent of overall and 16 percent of non-poor sampled households were travel more than 5 km to reach main road, while 72 percent of the non-poor, 38 percent of the poor and 66 percent of overall sampled households travel 2 to 5 km to reach main road. But, only 12 percent of non-poor and 10 percent over all sampled households were travel less than 1 km to reach main road. In that, the mean main road distance was found to be 7.84 km for poor followed by 4.04 km for overall and 3.24 km for non-poor sampled households.

4.2.2.5.5. Hospital distance

Geographic distance of healthcare center has both direct and indirect effect on family welfare. The study focused on public hospital distance from respondent's residence. Sampled households were asked about the distance of the nearest public hospital from their home. The result is depicted on table 4.58.

Table 4.58: Hospital distance in Northern Rajasthan

Hospital distance in (km)	Non-poor		Poor		Total	
	N=248	Percent	N=52	Percent	N=300	Percent
≤ 5	108	43.5	17	33	125	42
5.1 - 10	32	13	12	23	44	15
≥10	108	43.5	23	44	131	43
Total	248	100	52	100	300	100
Mean	8.1		9.2		8.3	
SD	6.7		6.5		6.7	
Maximum	21		21		21	
Minimum	0.5		1		0.5	

Source: Author's computations, based on household survey data, 2015

The results on table 4.58 shows sampled household's response on distance of the nearest hospital from their house in kilometer. Accordingly, 43.5 percent of non-poor, 33 percent of poor and 42 percent of overall sampled households responded they travel less than 5 km to reach nearest public hospital. However, 43.5 percent of non-poor, 44 percent of poor and 43 percent overall sampled households responded they travel more than 10 km to reach nearest public hospital. Of the total number of respondents, 13 percent of non-poor, 23 percent of poor and 15 percent overall sampled households responded they travel 5 to 10 km to reach nearest public hospital. The average distance traveled by the overall sampled respondents to the nearest public hospital was about 8.3 km. Furthermore, on average poor sampled household traveled about 9.2 km while the non-poor traveled 8.1km to the nearest public hospital. The maximum and minimum distance traveled by respondent to the nearest public hospital was 21 and 0.5 km, respectively.

4.2.2.6. Households accessibility to communication

Accessibility to communication plays a significant role in getting information about technology, market information, weather, government policy and others in shortest time possible over large area of coverage. Sampled households were asked about accessibility of communication ways in their village. Table 4.59 illustrates results of respondents on their accessibility to communication.

Table 4.59: Communication accessibility in Northern Rajasthan

Accessibility to communication	Non-poor		Poor		Total	
	N = 248	Percent	N=52	Percent	N=300	Percent
Mobile	248	100	52	100	300	100
TV	193	78	26	50	219	73
Radio	106	43	11	21	117	39
Post Office	198	80	40	77	238	79

Source: Author's computations, based on household survey data, 2015

Mobile communication is popular in both poor and non-poor sampled households, everyone has mobile. It is encouraging to note that 100 percent of sampled households have mobile communication. Out of sampled households 50 percent of poor, 78 percent of non-poor and 73 percent of overall sampled households have television communication accessibility in their home. Similarly, 21 percent of poor, 43 percent of non-poor and 39 percent of overall sampled households have radio communication accessibility. Like mobile, post office was used widely in Northern Rajasthan, 77 percent of poor, 80 percent of non-poor and 79 percent of overall sampled households have post office service around their village.

To get clear information about accessibility to communication the study carryout district wise analysis. Result of accessibility to communication ways in Bikaner district is given in table 4.60.

Table 4.60: Communication accessibility in Bikaner district

Accessibility to communication	Non-poor		Poor		Total	
	N = 83	Percent	N=17	Percent	N=100	Percent
Mobile	83	100	17	100	100	100
TV	50	60	5	29	55	55
Radio	24	29	6	35	30	30
Post Office	45	54	10	59	55	55

Source: Author's computations, based on household survey data, 2015.

Mobile communication is popular in both poor and non-poor sampled households, everyone had mobile. Out of sampled households 29 percent of poor, 60 percent of non-poor and 55 percent of overall sampled households have television communication accessibility in their home. Similarly, 35 percent of poor, 29 percent of non-poor and 30 percent of overall sampled households had radio communication accessibility. Like mobile, post office is used widely in Bikaner district, 59 percent of poor, 54 percent of non-poor and 55 percent of overall sampled households had post office service around their village. Similarly, result of accessibility to communication ways in Sri Ganganagar district is given in table 4.61.

Table 4.61: Communication accessibility in Sri Ganganagar district

Accessibility to communication ways	Non-poor		Poor		Total	
	N = 85	Percent	N=15	Percent	N=100	Percent
Mobile	85	100	15	100	100	100
TV	77	90	5	35	82	82
Radio	43	51	6	40	49	49
Post Office	73	86	11	73	84	84

Source: Author's computations, based on household survey data, 2015

It is encouraging to note that 100 percent of sampled households had mobile communication also in Sri Ganganagar district. Out of sampled households 35 percent of poor, 90 percent of non-poor and 82 percent of overall sampled households have television communication accessibility in their home. Similarly, 40 percent of poor, 51 percent of non-poor and 49 percent of overall sampled households had radio communication accessibility. Like mobile, post office is used widely in Sri Ganganagar district, 73 percent of poor, 86 percent of non-poor and 84 percent of overall sampled households had post office

service around their village. Equally, result of accessibility to communication ways in Nagaur district is given in table 4.62.

In Nagaur district also**,** mobile communication is popular in both poor and non-poor sampled households, everyone had mobile. Out of sampled households 35 percent of poor, 82 percent of non-poor and 73 percent of overall sampled households have television communication accessibility in their home. Similarly, 40 percent of poor, 49 percent of non-poor and 47 percent of overall sampled households had Radio communication accessibility. Like mobile, post office is used widely in Nagaur district, 75 percent of poor, 90 percent of non-poor and 87 percent of overall sampled households had post office service around their village.

Table 4.62: Communication accessibility in Nagaur district

Accessibility to communication	Non-poor		Poor		Total	
	N = 80	Percent	N=20	Percent	N=100	Percent
Mobile	80	100	20	100	100	100
TV	66	82	7	35	73	73
Radio	39	49	8	40	47	47
Post Office	72	90	15	75	87	87

Source: Author's computations, based on household survey data, 2015

4.2.2.7 Household income and expenditure

Family income is an indicator of household's economic capacity. Total family income was calculated as the aggregate of farming income, wage income, rent income, non-farm income and other sources of income. For our study we sub-divide family income into two components, namely farm income and non-farm income. Farm income includes net-revenue from sale of crops, vegetables, livestock, livestock products, by-products and others. Non-farm income included wage, business and trade, forest produce, remittances, rent of land, rent of other property, social and insurance, profit and dividend, interest received and others. Family income helps as gauge to measure living standard and poverty relative to the given society in which household lives in. According to the concept of relative poverty, a person is considered poor

when his income is not sufficient to ensure a standard of living compatible with the habits and standards of the given society he lives in.

4.2.2.7.1. Farm income

Based on the collected data from sampled household, we now proceed to investigate how total household farm income earning varies among sampled households in Northern Rajasthan and its districts. Total farm income for Northern Rajasthan is presented on table 4.63.

Table 4.63: Farm income of households in Northern Rajasthan

Farm income in (₹)[2]	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
No farm income	52	21	10	19	62	20.3
< 67,384	53	21.4	39	75	92	31
67,383 – 390,516	114	46	3	6	117	39
> 390,516	29	11.6	0	0	29	9.7
Total	248	100	52	100	300	100
Mean	291,402		35,032		161,566	
SD	24,022		23,083		228950	
Maximum	925,000		96,000		925,000	
Minimum	0		0		0	

Source: Author's computations, based on household survey data, 2015

The survey result revealed that 21 percent of non-poor, 19 percent of poor and 20.3 percent of overall sampled households have no farm income. Majority 75 percent of poor, 21.4 percent of non-poor and 31 percent of overall sampled household's farm income was less than ₹67,384 per annual. But, for 9.7 percent of overall and 11.6 percent of non-poor sampled household's annual farm income was more than ₹390,516. Majority 46 percent of non-poor and 6 percent poor earned ₹67,383 to 390,516 from farm income annually. The average farm income for poor sampled households was ₹35,032 and for non-poor it was ₹291,402. The non-poor sampled household's average annual farm income is more than eight times higher than poor sampled household's annual farm income. The maximum and minimum

[2] Income was classified based on less than Mean- SD, between Mean- SD and Mean+ SD and greater than Mean+ SD intervals.

farm income ranges for sampled households in Northern Rajasthan between ₹925,000 and nil farm income annually, respectively.

Indeed Rajasthan, predominantly agricultural state, with over seventy five per cent of the total population residing in rural areas and farm income has been found to be the dominant source of income for sampled households (see table 4.86). To understand the farm income difference among households, the study analyzed district level farm income. Accordingly, Bikaner district farm income among sampled households is determined and results are shown in table 4.64.

Table 4.64: Farm income of households in Bikaner district

Farm income in (₹)	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
No farm income	6	7	3	18	9	9
< 13,613	2	2.4	1	6	3	3
13,613 – 436,727	64	77	13	76	77	77
> 436,727	11	13.6	0	0	11	11
Total	83	100	17	100	100	100
Mean	233,435		71,429		225,170	
SD	200,874		24,773		211,557	
Maximum	925,000		96,000		925,000	
Minimum	11,000		10,000		10,000	

Source: Author's computations, based on household survey data, 2015

Table 4.64 depicts farm income among sampled households in Bikaner district. In the district, of overall sampled household's majority 77 percent earns ₹13,613 to 436,727 and 11 percent earns more than ₹436,727 farm income annually. In the district, 9 percent overall sampled household's had no farm income annually and 3 percent earns less than ₹13,613 farm income annually. Similarly majority, 77 percent of non-poor earns ₹13,613 to 436,727, 13.6 percent earn more than ₹436,727 and the remaining 2.4 percent earns ₹13,613 farm incomes annually. The mean agricultural income for non-poor and poor was ₹233,435 and ₹71,429, respectively in Bikaner district. The agricultural income among sampled households varies in Bikaner district ₹925,000 to 10000.

Similarly, agricultural income distribution among surveyed households in Sri Ganganagar district is determined and results are depicted on table 4.65.

Table 4.65: Farm income of households in Sri Ganganagar district

Farm income in (₹)	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
No farm income	30	35.5	5	33	35	35
< 11,821	1	1	0	0	1	1
11,821 - 638,671	52	61	10	67	62	62
> 638,671	2	2.5	0	0	2	2
Total	85	100	15	100	100	100
Mean	272,900		43,127		325,246	
SD	190,175		10,427		313,425	
Maximum	730,000		60,000		730,000	
Minimum	10,000		30,000		10,000	

Source: Author's computations, based on household survey data, 2015

The results on table 4.65 indicate that, farm income among sampled households in Sri Ganganagar district. In the district farm income varies among sampled households ₹730,000 to 10,000 with mean farm income for overall sampled households was ₹325,246 annually. The mean farm income of non-poor and poor was ₹272,900 and 43,127. Significant number households in the district had no agricultural income, 35.5 percent of non-poor, 33 percent of poor and 35 percent of overall sampled household have no annual farm income. Majority 38 percent of non-poor and 32 percent of overall sampled households earns more than ₹200,000 annually from agriculture in Sri Ganganagar district. Similarly, 14 percent non-poor and 12 percent overall sampled households earns ₹100,000 to 200,000 annually from farm income. Majority 61 percent of non-poor, 67 percent of poor and 62 percent of overall sampled households earns ₹11,821 to 638,671 incomes from farm annually. Farm income distribution among surveyed households in Nagaur district is calculated and results are shown in table 4.66.

Table 4.66: Farm income of households in Nagaur district

Farm income in (₹)	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
No farm income	16	20	2	10	18	18
< 22,652	12	15	3	15	15	15
22,652– 240,514	42	52.5	15	75	57	57
> 240,514	10	12.5	0	0	10	10
Total	80	100	20	100	100	100
Mean	110,695		40,000		108,931	
SD	96,492		15,415		131,583	
Maximum	380,000		63,500		380,000	
Minimum	10,000		5,000		5,000	

Source: Author's computations, based on household survey data, 2015

Table 4.66 illustrates agricultural income among sampled households in Nagaur district. Of overall 18 percent, 20 percent of non-poor and 10 percent of poor sampled households have no farm income. Majority 52.5 percent of non-poor, 75 percent of poor and 57 percent of overall sampled households earns ₹22,652 to 240,514 incomes from farm annually. But, 12.5 percent of non-poor and 10 percent of overall sampled households earns more than ₹240,514 from farm annually. The average farm income was ₹108,931 for overall, ₹40,000 for poor and ₹110,695 for non-poor sampled households. The farm income also varies from maximum ₹380000 to minimum ₹5000 among sampled households.

Generally, among the districts poor household in Bikaner district averagely gets better annual farm income than poor household in Sri Ganganagar and Nagaur districts. Poor household in Sri Ganganagar and Nagaur districts almost have equal average annual income. But, conversely non-poor in Sri Ganganagar earns more than two times higher farm income annually than non-poor in Nagaur district. This significant household farm income difference within the same state might be outcome of agricultural infrastructure like irrigation accessibility variation.

4.2.2.7.2 Non-farm Income

Rainfed agriculture and small-scale agriculture on its own is unable to provide sufficient means of survival and means to escape out of poverty for the majority of poor rural households (World Bank, 2008b). Non-agricultural or off-farm development and diversification as sources of alternative income may be of vital importance for rural livelihoods. Therefore, sampled households were assessed whether they have non-farm income source or not. Table 4.67 presented results of non-farm income earners among sampled households in Northern Rajasthan.

The survey results indicate that nearly 84 percent of overall, 87 percent of poor and 83 percent of non-poor sampled respondents have non-farm income from one or multiple source. On the other hand, 13 percent of poor, 17 percent of non-poor and 16 percent of overall sampled households have no non-farm income. For northern Rajasthan non-farm earner the income they acquired from non-farm is presented on table 4.68.

Table 4.67: Non-farm income earners in Northern Rajasthan

Do you have non-farm income?	Non-Poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	207	83	46	87	253	84
No	41	17	6	13	47	16
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

Table 4.68: Non-farm income amount in Northern Rajasthan

Non-farm income in (₹)	Non-poor		Poor		Total	
	N = 207	Percent	N = 46	Percent	N=253	Percent
No non-farm income	41	16.5	6	11.5	47	16
< 18,433	26	10.5	5	9.5	31	10
18,433 – 265,737	159	64	41	79	200	67
> 265,737	22	9	0	0	22	7
Total	248	100	52	100	300	100
Mean	126,970		47,692		123,652	
SD	145,638		26,164		142,085	
Maximum	1,461,818		115,000		1,461,818	
Minimum	2,727		6,000		2,727	

Source: Author's computations, based on household survey data, 2015

Table 4.68 shows 10 percent of overall, 10.5 percent of non-poor and 9.5 percent of poor sampled households have less than ₹18,433 non-farm income annually. Whereas, majority 64 percent of non-poor, 79 percent of poor and 67 percent of overall sampled households got ₹18,433 to 265,737 non-farm incomes annually. But, 9 percent of non-poor and 7 percent of overall respondents got more than ₹265,737 non-farm incomes annually. The average non-farm income of poor and non-poor was ₹47,692 and ₹126,970, respectively. Maximum non-farm income for non-poor was ₹1,461,818 while that of poor was ₹115,000. The non-farm income varies from ₹1,461,818 to 2,727 annually among sampled households. The significant difference in non-farm is because; non-poor households invest more from agriculture to non-agriculture to diversify their non-farm income to supplement rain dependent agriculture in some districts like Nagaur.

Rajasthan agriculture is more of rainfed and small-scale agriculture, this type agriculture on its own is unable to provide sufficient means of survival and means to escape out of poverty for the majority of poor rural households (World Bank, 2008b). Non-agricultural or off-farm development and diversification as sources of alternative income may be of vital importance for rural livelihoods. Therefore, to understand the status of non-farm income among households, the study done district level analysis. Accordingly, non-farm income distribution among surveyed households in Bikaner district is calculated and results are shown in table 4.69.

Table 4.69: Non-farm income amount in Bikaner district

Non-farm income in (₹)	Non-poor		Poor		Total	
	N = 83	Percent	N = 20	Percent	N=100	Percent
No non-farm income	32	38.5	6	35	38	38
< 18,655	7	8.5	5	29.5	12	12
18,655 – 259,285	37	44.5	6	35.5	43	43
> 259,285	7	8.5	0	0	7	7
Total	83	100	17	100	100	100
Mean	135,017		33,818		120,315	
SD	150,301		31,435		138,970	
Maximum	600000		70000		600000	
Minimum	6,900		6000		6000	

Source: Author's computations, based on household survey data, 2015.

Table 4.69 illustrates non-farm income among sampled households in Bikaner district. In the district 38.5 percent of non-poor, 35 percent of poor and 38 percent of overall sampled households had no non-farm income. Majority 35.5 percent of poor, 44.5 percent of non-poor and 43 percent of overall sampled households have annual non-farm income ₹18,655 to 259,285. But, 8.5 percent of non-poor and 7 percent of overall sampled households in the district have more than ₹259,285 income from non-farm. Similarly, 8.5 percent of non-poor, 29.5 percent of poor and 12 percent of overall sampled households in the district have also less than ₹18,655 non-farm income annually. The mean non-farm income was ₹33,818 for poor, ₹135,017 for non-poor and ₹120,315 for overall sampled households in the district. In Bikaner, non-farm income varies from ₹600000 to ₹6000 among sampled households.

Table 4.70: Non-farm income in Sri Ganganagar district

Non-farm income in (₹)	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
No non-farm income	6	7	0	0	6	6
< 43,115	21	25	5	33.3	26	26
43,115 – 324,627	54	63.5	10	66.7	64	64
> 324,627	4	4.5	0	0	4	4
Total	85	100	15	100	100	100
Mean	132,082		56,824		140,756	
SD	183,521		24,168		183,871	
Maximum	1,461,818		96,000		1,461,818	
Minimum	5000		20900		5,000	

Source: Author's computations, based on household survey data, 2015

In Sri Ganganagar district non-farm income varies from ₹1,461,818 to ₹5,000 as depicted on table 4.70. The mean non-farm income for poor was ₹56,824 with standard deviation 24,168, for non-poor it was ₹132,082 with standard deviation 183,521 and it was ₹140,756 with standard deviation 183,871 for overall sampled households. In the district only 7 percent of non-poor and 6 percent of overall have no non-farm income. Majority 63.5 percent of non-poor, 66.7 percent of poor and 64 percent of overall sampled households have ₹43,115 to 324,627 annual non-farm incomes. But, 25 percent of non-poor and 33.3 percent of poor and 26 percent of overall had less than ₹43,115

non-farm income annually. Only 4.5 percent of non-poor and 4 percent of overall sampled households had more than ₹324,627 annual non-farm incomes. Similarly, non-farm income distribution among surveyed households in Nagaur district is calculated and results are shown in table 4.71.

Table 4.71 shows non-farm income among sampled households in Nagaur district. In the district 4 percent of non-poor and 3 percent of overall sampled households have no non-farm income. Majority 66 percent of non-poor, 85 percent of poor and 73 percent of overall sampled households have annual non-farm income ₹22,782 to 195,706 annually. However, 16 percent of non-poor and 13 percent of overall have more than ₹195,706 non-farm income annually in the district. But, 11 percent of non-poor, 15 percent of poor and 12 percent of overall have less than ₹22,782 non-farm income annually. The non-farm income in Nagaur varies from ₹437,500 to ₹4000 among sampled households. The mean non-farm income was ₹48,475 for poor, ₹116396 for non-poor and 109,244 overall sampled households in the district.

Table 4.71: Non-farm income in Nagaur district

Non-farm income in (₹)	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
No non-farm income	3	4	0	0	3	3
< 22,782	9	11	3	15	12	12
22,782 – 195,706	55	69	17	85	73	73
> 195,706	13	16	0	0	13	13
Total	80	100	20	100	100	100
Mean	116,396		48,475		109,244	
SD	88,763		22,202		86,462	
Maximum	437,500		80,000		437,500	
Minimum	21400		4000		4000	

Source: Author's computations, based on household survey data, 2015

Generally, the non-farm income is similar among districts. Non-poor household have ₹135,017 in Bikaner, ₹132,082 in Sri Ganganagar, ₹116,396 in Nagaur district annual income from non-farm source. Poor household in Bikaner gets averagely ₹33,818, in Sri Ganganagar, ₹56,824 and in Nagaur ₹48,475 annually from non-farm.

4.2.2.7.3 Total annual income

In this study, total income refers to the sum of farm income and non-farm income. Total income distribution among surveyed households in Northern Rajasthan is calculated and results are shown in table 4.72.

Table 4.72: Total income of households in Northern Rajasthan

Total income in (₹)	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
< 60,445	8	3	13	25	21	7
60,445– 484,581	196	79	39	75	235	78
> 484,581	44	18	0	0	44	15
Total	248	100	52	100	300	100
Mean	327,404		76,548		272,513	
SD	208,051		23,801		212,068	
Maximum	955,000		115,000		955,000	
Minimum	35,000		16,000		16,000	

Source: Author's computations, based on household survey data, 2015

The family annual total income among overall sampled households in Northern Rajasthan varies from ₹955,000 to 16,000 with overall average total annual income of ₹272,513 with standard deviation of 212,068. The mean annual income for poor sampled was ₹76,548, for the non-poor it was ₹327,404. The non-poor total annual income is more than four times higher than the poor household total annual income. For majority 79 percent of non-poor, 75 percent of poor and 78 percent of overall sampled household's annual total family income was ₹60,445 to 484,581. However, 3 percent of non-poor, 25 percent of poor and 7 percent of overall have less than ₹60,445 annual total income annually. But, 18 percent of non-poor and 15 percent of overall have more than ₹484,581annual total income annually.

To understand total income situation among sampled households, the study analyzed district level total income among sampled households. Accordingly, total income among sampled households in Bikaner district is calculated and presented on table 4.73.

Table 4.73: Total income in Bikaner district

Total income in (₹)	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
< 31,300	0	0	1	6	1	1
31,300 – 530,108	72	87	16	94	88	88
> 530,108	11	13	0	0	11	11
Total	83	100	17	100	100	100
Mean	286,510		59,258		280,704	
SD	228,976		26,420		249,404	
Maximum	1,200,000		87,000		1,200,000	
Minimum	6,000		16,000		6,000	

Source: Author's computations, based on household survey data, 2015

Table 4.73 illustrates total income among sampled households in Bikaner district. In the district majority 87 percent of non-poor, 94 percent of poor and 88 percent overall sampled households earns annually ₹31,300 to 530,108 incomes. For 13 percent of non-poor and 11 percent of overall household's annual total income was more than ₹530,108. But, for 6 percent of poor and 1 percent of overall household's annual total income was less than ₹31,300.The mean total income was ₹228,976 for non-poor, ₹59,258 for poor and ₹280,704 for overall sampled households in the district. Total income ranges maximum ₹1,200,000 to minimum ₹6,000 among sampled households. Similarly, total income among sampled households for Sri Ganganagar district is presented in table 4.74.

Table 4.74: Total income in Sri Ganganagar district

Total income in (₹)	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
< 44,217	0	0	0	0	0	0
44,217 – 643,225	74	87	15	100	89	89
> 643,225	11	13	0	0	11	11
Total	85	100	15	100	100	100
Mean	371,564		85,575		343,721	
SD	209,016		16,570		299,504	
Maximum	900,000		96,000		900,000	
Minimum	52,000		54,000		52,000	

Source: Author's computations, based on household survey data, 2015

The results on table 4.74 depict total income among sampled households in Sri Ganganagar district. In Sri Ganganagar district, for all sampled household's annual total income was more than ₹44,217. In the district majority 87 percent of non-poor, 100 percent of poor and 89 percent overall sampled households earns annually ₹44,217 to 643,225 incomes. For 13 percent of non-poor and 11 percent of overall household's annual total income was more than ₹643,225. Average total income for poor in Sri Ganganagar district was ₹85,575; it was ₹371,564 for non-poor and ₹343,721 for overall sampled households. Equally, total income among sampled households for Nagaur district is presented in table 4.75.

Table 4.75 depicts total income among sampled households in Nagaur district. In the district, the annual total income among sampled households varies from ₹935,000 to ₹27,000. The mean total income was ₹322,912 for non-poor, ₹84,475 for poor and ₹193,112 for overall sampled households in the district. In the district majority 51.25 percent of non-poor, 90 percent of poor and 59 percent overall sampled households earns annually ₹64,381 to 321,843 incomes. For 47.5 percent of non-poor and 38 percent of overall household's annual total income was more than ₹321,843. But, 1.25 percent of non-poor, 10 percent of poor and 3 percent of overall household's annual total income was less than ₹64,381 in Nagaur district.

Table 4.75: Total income in Nagaur district

Total income in (₹)	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
< 64,381	1	1.25	2	10	3	3
64,381 – 321,843	41	51.25	18	90	59	59
> 321,843	38	47.5	0	0	38	38
Total	80	100	20	100	100	100
Mean	322,912		84,475		193,112	
SD	174,885		18,235		128,731	
Maximum	935,000		99,000		935,000	
Minimum	27,000		42,500		27,000	

Source: Author's computations, based on household survey data, 2015

Generally, non-poor total annual income in Sri Ganganagar district is better than other two districts. Total income in all districts seems almost equal. This shows income inequality among districts is not serious problem. This outcome agrees with Melkamu and Bannor (2015), who found and concluded existence of per capital income inequality in India but, inequality in per capital income in the country is not serious like other resources inequality.

4.2.2.7.4 Expenditure

In the measurement of poverty, use of consumption expenditure assumed best indicator for living standard measurement of households than income expenditure. This is because income of the poor often varies over time and consumption expenditure may reflect the purchasing power of households better than measured current income. Sometimes it is also common to have underestimated income figures as people are reluctant to give accurate information about their incomes (Deaton & Zaidi, 2002). In this particular study we classified monthly consumption expenditure in to monthly food expenditure and monthly non-food expenditure to see the weight given by sampled households. Accordingly, surveyed households total monthly expenditure is calculated and presented on table 4.76.

Table 4.76: Monthly expenditure in Northern Rajasthan

Monthly total expenditure in (₹)	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
< 5,000	7	3	30	58	37	12
5,000 – 10,000	52	21	22	42	74	25
> 10,000	189	76	0	0	189	63
Total	248	100	52	100	300	100
Mean	14,703		4,968		13,015	
SD	11,789		1,952		11,361	
Maximum	16,900		12,133		16,900	
Minimum	3,693		2,020		2,020	

Source: Author's computations, based on household survey data, 2015

As it is shown in the Table 4.76, of overall sampled households, 63 percent sampled households expended more than ₹10,000 per month, 25 percent expended ₹5,000 to 10,000 and 12 percent expended less than ₹5000 per

month for food and non-food items. Majority non-poor (76 percent) expended more than ₹10,000, 21 percent expended ₹5,000 to 10,000 and only 3 percent expended less than ₹5000 per month on food and non-food items. As far as poor sampled households concerned, majority (58 percent) expended less than ₹5000 per month and the remaining 42 percent expended ₹5,000 to 10,000 per month on food and non-food items. Overall, sampled households in the study area on average spent ₹13,015 per month for food and non-food items. Similarly, the average expenditure for poor and non-poor on food and non-food items was ₹4,968 and ₹14,703, respectively. The maximum and minimum monthly expenditure for poor and non- poor households vary from ₹16,900 to 2,020, respectively. To understand household's monthly expenditure in more detail, we decomposed total expenditure in to food expenditure and non-food expenditure. The monthly food expenditure of sampled households is analyzed and presented on table 4.77.

Table 4.77: Monthly food expenditure in Northern Rajasthan

Monthly food expenditure in (₹)	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
< 3,000	8	3	27	52	35	11.5
3000 - 6000	93	37.5	23	44	116	38.5
> 6000	147	59.5	2	4	149	50
Total	248	100	52	100	300	100
Mean	6,889		3,116		6,235	
SD	2,726.8		1,297.6		2,911.3	
Maximum	10,280		8,260		10,280	
Minimum	1,935		1,375		1,375	

Source: Author's computations, based on household survey data, 2015

Table 4.77 depicts that more than half of the sampled poor household's monthly expenditure on food was less than ₹3,000 and 44 percent poor expended ₹3000 to 6000 on food. Only 4 percent poor household expended more than ₹6000 per month on food but almost 60 percent non-poor expended more than ₹6000 per month on food. In non-poor households, only 3 percent expended less than ₹3,000 and more than 37 percent expended ₹3000 to 6000 on food each month. Out of totally sampled households, 50 percent expended more than ₹6000 per month, 38.5 percent expended ₹3000

to 6000 and 11.5 percent expended less than ₹3000 per month on food. Descriptive statistics results shows that the mean monthly food expenditure of poor household was ₹3,116 and that of non-poor ones was ₹6,889. The maximum and minimum monthly food expenditure varies within ₹10,280 to 1,375 per month for non- poor and poor households, respectively. Monthly expenditure results of non-food of sampled household presented on table 4.78.

Table 4.78 depicts that almost all of the poor sampled households expend less than ₹3,000 per month on non-food while, 22 percent of non-poor expend more than ₹6,000 per month, which is two times higher than poor household's expenditure on non-food. Other majority non-poor, 40 percent expended ₹3000 to 6000 and 38 percent expended less than ₹3000 per month on non-food. Out of totally sampled households, 49 percent expended less than ₹3,000, 33 percent expended ₹3000 to 6000 and 18 percent expended more than ₹6000 per month on non-food. The result of the survey shows that the overall monthly non- food mean expenditure for the sampled households was ₹3,567 per month. Additionally, for poor and non-poor sampled household, it was ₹1,200 and 4,548, respectively. The maximum and minimum monthly non-food expenditure for poor and non-poor vary between ₹20,166 to 459 monthly in in Northern Rajasthan. Monthly per capita expenditure results of sampled household presented on table 4.79.

Table 4.78: Monthly Non- food expenditure in Northern Rajasthan

Monthly non- food expenditure in (₹)	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
< 3,000	95	38	52	100	147	49
3000 - 6000	100	40	0	0	100	33
> 6000	53	22	0	0	53	18
Total	248	100	52	100	300	100
Mean	4,548		1,200		3,567	
SD	3,113		626		2,731	
Maximum	20,166		2,833		20,166	
Minimum	791		459		459	

Source: Author's computations, based on household survey data, 2015

Table 4.79: Monthly per capita expenditure in Northern Rajasthan

Monthly per capita expenditure in (₹)	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
< 1036	0	0	52	100	52	17
1036 – 3108	154	62	0	0	154	51
> 3108	94	38	0	0	94	32
Total	248	100	52	100	300	100
Mean	4,463		860		2,712	
SD	2,395		139		3,570	
Maximum	37,144		1,034		37,144	
Minimum	3,125		436		436	

Source: Author's computations, based on household survey data, 2015

Table 4.79 result shows as expected all sampled poor households monthly per capita expenditure was less than ₹1,036, which is Rajasthan state rural poverty line. Monthly per capita expenditure for majority 62 percent of non-poor was ₹1,036 to 3,108 and for the remaining 38 percent it was more than ₹3,108. Overall, more than half of sampled household's per capita expenditure was ₹1,036 to 3,108 followed by 32 percent who's per capita expenditure more than ₹3,108 and for 17 percent households per capita expenditure was less than ₹1,036 per month. Average monthly per capita expenditure for overall sampled households was ₹2,712 with standard deviation of 3,570. Furthermore, the average monthly per capita expenditure of sampled poor was ₹860 with standard deviation of 139, while for the non-poor it was ₹4,463 with standard deviation of 2,395.

Tobacco and poverty create a vicious cycle: low income people smoke more, suffer more, spend more, and die more from tobacco use. We hypothesize that tobacco shares household's expenditure on necessities such as food, education and health care. Thus, sampled households were assessed whether any family members is using tobacco or not and results are represented on table 4.80.

Table 4.80: Tobacco user households in Northern Rajasthan

Is anyone using tobacco in the family?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Yes	153	62	35	67	188	63
No	95	38	17	33	112	37
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

The results on table 4.80 show that about 63 percent of the overall sample households are using tobacco. Surprisingly 67 percent of poor sampled household are using tobacco and 62 percent of non-poor are also using tobacco. On the other hand, 38 percent of non-poor, 33 percent of poor and 37 percent of overall sampled households were not using tobacco. To see effect of tobacco on total household expenditure, it is better to assess monthly tobacco expenditure among sampled households in the study area and the result is presented on table 4.81.

Table 4.81 depicts monthly tobacco expenditure among sampled households in Northern Rajasthan. The result shows that more than 34 percent poor sampled households expended more than ₹1000 per month on tobacco. Majority 54.5 percent expended less than ₹500 and 11 percent expended ₹500 to 1000 per month on tobacco. Similarly, out of non-poor sampled households, 42.5 percent expended ₹500 to1000, 42 present expended less than ₹500 and 15.5 percent expended more than ₹1000 per month on tobacco. Out of totally sampled households, 44 percent expended less than ₹500, 37 percent expended ₹500 to 1000 and 19 percent expended more than ₹1000 per month on tobacco. The maximum and minimum monthly tobacco expenditure varies among sampled households in the area between ₹1500 to 50. Descriptive statistics results shows that the mean monthly tobacco expenditure of poor household was ₹388 and that of non-poor ones was ₹760.

Table 4.81: Monthly tobacco expenditure in Northern Rajasthan

Monthly tobacco expenditure in (₹)	Non-poor		Poor		Total	
	N = 153	Percent	N = 35	Percent	N=188	Percent
< 500	64	42	19	54.5	83	44
500 - 1000	65	42.5	4	11	69	37
> 1000	24	15.5	12	34.5	36	19
Total	153	100	35	100	188	100
Mean	760		388		690	
SD	1270.9		444.6		1170.5	
Maximum	1500		1500		1500	
Minimum	100		50		50	

Source: Author's computations, based on household survey data, 2015

4.2.2.8. Income-expenditure gap in Northern Rajasthan

This study assumes that expenditures and income were accurately reported by households during data collection. Both household income and spending size matter to personal well-being. If an income-expenditure gap is positive, therefore that household has probability of saving and if it is negative, that household has probability of de-saving from past saving. Accordingly, income expenditure gap is calculated for sampled households and the result presented on table 4.82.

Table 4.82 result shows 71 percent of poor, 84 percent of non-poor and 82 percent of overall sampled household expenditure was less than their income and their annual balance is positive whereas, for 16 percent of non-poor, 29 percent of poor and 18 percent of overall sampled household expenditure was more than their income and their annual balance is negative. They filled their gap using their past saving or other source.

Table 4.82: Income-expenditure gap in Northern Rajasthan

Income-expenditure gap	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Positive	208	84	37	71	245	82
Negative	40	16	15	29	55	18
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

Income-expenditure gap among is good indicator of household welfare, therefore to understand the situation in more detail district level analysis was carried out. Bikaner district income-expenditure gap result among sampled households is presented on table 4.83.

Table 4.83: Income-expenditure gap in Bikaner district

Income-expenditure gap	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
Positive	57	69	14	82	71	71
Negative	26	31	3	18	29	29
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.83 result shows 82 percent of poor, 69 percent of non-poor and 71 percent of overall sampled household expenditure was less than their income and their annual balance is positive whereas, for 31 percent of non-poor, 18 percent of poor and 29 percent of overall sampled household expenditure was more than their income and their annual balance is negative. They filled their gap using their past saving or other source. Similarly, Sri Ganganagar district income-expenditure gap result among sampled households is presented on table 4.84.

Table 4.84: Income-expenditure gap in Sri Ganganagar district

Income-expenditure gap	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
Positive	67	79	12	80	79	79
Negative	18	21	3	20	21	21
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.84 result shows 80 percent of poor, 79 percent of non-poor and 79 percent of overall sampled household expenditure was less than their income and their annual balance is positive whereas, for 21 percent of non-poor, 20 percent of poor and 21 percent of overall sampled household expenditure was more than their income and their annual balance is negative. They filled their gap using their past saving or other source. Also, Nagaur district income-

expenditure gap result among sampled households is presented on table 4.85.

Table 4.85: Income-expenditure gap in Nagaur district

Income-expenditure gap	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Positive	74	92	16	80	90	90
Negative	6	8	4	20	10	10
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.85 result shows 80 percent of poor, 92 percent of non-poor and 90 percent of overall sampled household expenditure was less than their income and their annual balance is positive whereas, for 8 percent of non-poor, 20 percent of poor and 10 percent of overall sampled household expenditure was more than their income and their annual balance is negative. They filled their gap using their past saving or other source.

4.2.2.9. Household income and expenditure budget share

In this study, total income refers to the sum of farm income and non-farm income. To understand sources of income and their share, data collected from sampled household is presented on table 4.86.

Table 4.86: Income source of households in Northern Rajasthan

Sources of income	Share from total income in (%)
Farm income(Annual)	61
Non-farm income(Annual)	39

Source: Author's computations, based on household survey data, 2015

Table 4.86 depicts sources of household income in the study area. Sources of income of rural households are diverse but agriculture is still the main source of income. In Northern Rajasthan farm income has been found to be the biggest source of income for sampled households, 79 percent of sampled households have reported having income from agriculture, and agriculture generates nearly 61 percent of the total income in the study area. The non-farm incomes, with a share of 39 percent in the total income, comprise the second largest income source after agriculture. This result coincides with

output, analysed by Birthal et al.(2014), using NSSO, 2005 data, they found that agriculture makes up 41.4 per cent of the total income on an average in India and the non-farm business activities, with a share of 24.4 per cent in the total income, comprise the second largest income source after agriculture in the country.

To understand sources of income and their share at district level, analysis was done at district level. Therefore, Bikaner district income sources and its share results presented on table 4.87.

Table 4.87: Income source of households in Bikaner district

Sources of income	Share from total income in (%)
Farm income(Annual)	63
Non-farm income(Annual)	37

Source: Author's computations, based on household survey data, 2015

In Bikaner farm income has been found to be the biggest source of income and agriculture generates nearly 63 percent of the total income. The non-farm incomes, with a share of 37 percent in the total income, comprise the second largest income source after agriculture. In the same manner, Sri Ganganagar district income sources and its share results presented on table 4.88.

Table 4.88: Income source of households in Sri Ganganagar district

Sources of income	Share from total income in (%)
Farm income(Annual)	64
Non-farm income(Annual)	36

Source: Author's computations, based on household survey data, 2015

Sri Ganganagar district, agriculture is the main source of income and it generates nearly 64 percent of the total income and the non-farm incomes, with a share of 36 percent in the total income, comprise the second largest income source after agriculture. Similarly, Nagaur district income sources and its share results presented on table 4.89.

Table 4.89: Income source of households in Nagaur district

Sources of income	Share from total income in (%)
Farm income(Annual)	55
Non-farm income(Annual)	45

Source: Author's computations, based on household survey data, 2015

In Nagaur district, farm income and non-farm income are the two dominant sources of household income. The share of non-farm income differently from other sister districts is almost near to agriculture income. Agriculture generates nearly 55 percent of the total income in the study area. The non-farm incomes, with a share of 45 percent in the total income, comprise the second largest income source after agriculture. Therefore, district level analysis result shows agriculture income is dominant source of income in the districts and non-farm income share is also significant.

4.2.2.10. Expenditure budget share

How the budget of a household is allocated to buy different commodities is one of the most traditional topics in economics. Household budget shares, defined as the share of total household resources spent for purchasing a specific class of goods. Household expenditure shares for sampled household in Northern Rajasthan is calculated and presented on table 4.90.

Table 4.90: Expenditure budget share in Northern Rajasthan

Expenditure budget share	Share from total expenditure in (%)
Food expenditure (monthly)	64
Non-food expenditure (monthly)	17
Education expenditure (monthly)	15
Medical expenditure (monthly)	4

Source: Author's computations, based on household survey data, 2015

Table 4.90 depicts share of some important household monthly expenditure variables. Food expenditure takes the lion share. Out of monthly total expenditure for sampled households in Northern Rajasthan, 64 percent goes to food purchase, 17 percent to non-food expenditure, 15 percent to education expenditure and the remaining 4 percent to medical expenditure monthly. By

taking our study average family size (6) in the study area, per capita education expenditure is Rs 239 every month.

To get clear information about household budget shares in each district, analysis was further done at district level. Bikaner district expenditure budget share among sampled households is calculated and presented on table 4.91.

Table 4.91: Expenditure budget share in Bikaner district

Expenditure budget share	Share from total expenditure in (%)
Food expenditure (monthly)	63
Non-food expenditure (monthly)	18
Education expenditure (monthly)	16
Medical expenditure (monthly)	3

Source: Author's computations, based on household survey data, 2015

Out of monthly total expenditure for sampled households in Bikaner district, 63 percent goes to food purchase, 18 percent to non-food expenditure, 16 percent to education expenditure and the remaining 3 percept to medical expenditure monthly. Also, Sri Ganganagar district expenditure budget share among sampled households is calculated and presented on table 4.92.

Out of monthly total expenditure for sampled households in Sri Ganganagar district, 62 percent goes to food purchase, 19 percent to non-food expenditure, 15 percent to education expenditure and the remaining 4 percept to medical expenditure monthly. Equally, Sri Ganganagar district expenditure budget share among sampled households is calculated and presented on table 4.93.

Table 4.92: Expenditure budget share in Sri Ganganagar district

Expenditure budget share	Share from total expenditure in (%)
Food expenditure (monthly)	62
Non-food expenditure (monthly)	19
Education expenditure (monthly)	15
Medical expenditure (monthly)	4

Source: Author's computations, based on household survey data, 2015

Table 4.93: Expenditure budget share in Nagaur district

Expenditure budget share	Share from total expenditure in (%)
Food expenditure (monthly)	63
Non-food expenditure (monthly)	18
Education expenditure (monthly)	17
Medical expenditure (monthly)	2

Source: Author's computations, based on household survey data, 2015

Out of monthly total expenditure for sampled households in Nagaur district, 63 percent goes to food purchase, 18 percent to non-food expenditure, 17 percent to education expenditure and the remaining 3 percept to medical expenditure monthly. Therefore, district level result indicates, food expenditure has lion share in family monthly expenditure in all three districts. Monthly detailed food expenditure list is prepared and presented on table 4.94.

Table 4.94: Total food expenditure share in Northern Rajasthan

Food type	Share from total expenditure in (%)
Cereal	28
Milk and milk product	22
Vegetables	17
Salt, sugar and oil	7
Tea and coffee	7
Spices	6
Pulses	5
Fruits	5
Processed and packed foods	0.6
Egg and meat	0.4
Others	2
Total	100

Source: Author's computations, based on household survey data, 2015

The result on table 4.94 depicts that in Northern Rajasthan rural area, of total food expenditure, 28 percent spent on cereals and cereal substitutes, 22 percent spent on milk and milk products, 17 percent spent on vegetables, 7 percent spent on salt, sugar and oil, 7 percent spent on tea and coffee, 6 percent spent on spices, 5 percent spent on pulses, 5 percent spent on fruits and insignificant amount also spent on egg and packed foods.

4.2.2.11. Households standard of living indicators

Economic resources such as types of material used to build houses of households, sources of drinking water and sources of domestic fuel provide a good basis for ascertaining the standard of living of households in rural systems. Type of ration card the household owned also serves to ascertain standard of living of status of the family in the study area. It is believed that, non-poor households are those who used adequate standard material to build their houses, are free from risk and their wellbeing is better than poor who used less quality standard material to build their houses in the society perspective. Accordingly, sampled households were asked about types of material they used to build their houses, type of ration card they owned, main sources of drinking water and domestic fuel. Their response is calculated in percentages by poverty status and is given in table 4.95.

Table 4.95: Material used to build house in Northern Rajasthan

Kind of material used to build house	Non-poor		Poor		Total	
	N = 248	Percent	N=52	Percent	N=300	Percent
Baked brick (concrete)	178	72	27	52	205	68
Baked bricks (mud bonded)	46	18	13	25	59	20
Unbaked bricks	30	12	12	23	42	14
Mud and Straw	49	20	20	39	69	23

Source: Author's computations, based on household survey data, 2015. Note:- Totals sum to more than 100%, because of multiple responses were permitted.

Majority of sampled households (68 percent) were built houses of baked brick (concrete) and 23 percent of sampled households used material of mud and straw. Twenty percent sampled households used baked bricks (mud bonded) and 14 percent households have houses of unbaked bricks. As far as poor household is concerned, 52 percent and 39 percent of poor households have made their houses of baked brick and mud and straw, respectively. Additionally, 25 percent and 23 percent poor households also have made their houses mud bonded bricks and unbaked bricks. Similarly, majority non-poor households (72 percent) has built houses of baked brick, 20 percent of mud and straw,18 percent of baked brick(mud bonded) and 12 percent of unbaked bricks.

Accesses to safe drinking water supply facilities to rural dwellers constitute essential ingredient of good and healthy living. Sources of drinking water supply available to households were assessed and the results are presented in table 4.96.

Table 4.96: Sources of drinking water in the Northern Rajasthan

Sources of drinking water	Non-poor		Poor		Total	
	N = 248	Percent	N=52	Percent	N=300	Percent
Public water system outside house	158	64	41	79	199	66
Hand pump	43	17	2	4	45	15
Open well	15	6	0	0	15	5
Pond	32	13	9	17	41	14
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

According to table 4.96**,** sixty-six percent overall sampled households receiving drinking water by public water system outside the house, 15 percent by hand pump, 14 percent by pond and 5 percent from open well. The results also show that, majority of the sampled poor households (79 percent) are getting drinking water by public water system outside the house followed by 17 percent by pond and 4 percent getting drinking water by hand pump. This table also shows that majority of non-poor households 64 percent are getting drinking water by public water system outside the house followed by 17 percent by hand pump, 13 percent by pond and 6 percent by open well.

To accesses sources of drinking water supply facilities, data was analyzed in detail at district level. Therefore, Bikaner district sources of drinking water among sampled households are presented in table 4.97.

Table 4.97: Sources of drinking water in Bikaner district

Sources of drinking water	Non-poor		Poor		Total	
	N = 83	Percent	N=17	Percent	N=100	Percent
Public water system outside house	46	55	13	76	59	59
Hand pump	32	39	2	12	34	34
Open well	5	6	2	12	7	7
Total	83	100	52	100	100	100

Source: Author's computations, based on household survey data, 2015

Table 4.97 shows**,** in the district 59 percent of overall, 55 percent of non-poor and 76 percent of poor sampled households getting drinking water by public water system outside the house. Further, 34 percent of overall, 12 percent of poor and 39 percent of non-poor sampled households are getting drinking water by hand pump. Insignificant households are getting drinking water from open well in Bikaner district. Similarly, Sri Ganganagar district sources of drinking water among sampled households are presented in table 4.98.

Table 4.98: Sources of drinking water in Sri Ganganagar district

Sources of drinking water	Non-poor		Poor		Total	
	N = 85	Percent	N=15	Percent	N=100	Percent
Public water system outside house	82	96	15	100	97	97
Hand pump	3	4	0	0	3	3

Source: Author's computations, based on household survey data, 2015

In Sri Ganganagar district, 96 percent of non-poor, 100 percent of poor and 97 percent of overall sampled households are getting drinking water by public water system outside the house. Only 3 percent overall and 4 percent of non-poor are getting drinking water by hand pump. In the same way, Nagaur district sources of drinking water among sampled households are presented in table 4.99.

Table 4.99: Sources of drinking water in Nagaur district

Sources of drinking water	Non-poor		Poor		Total	
	N = 80	Percent	N=20	Percent	N=100	Percent
Public water system outside house	49	61	11	55	60	60
Pond	31	39	9	45	40	40

Source: Author's computations, based on household survey data, 2015

Table 4.99 shows**,** 60 percent of overall, 61 percent of non-poor and 55 percent of poor sampled households getting drinking water by public water system outside the house. Significant number of sampled households, 45 percent of poor, 39 percent of non-poor and 40 percent of overall are getting drinking water from pond.

Data was also gathered about the sources of domestic energy in the study area. The sampled household response is calculated by poverty status and given in table 4.100.

Table 4.100: Sources of domestic fuel in the Northern Rajasthan

Sources of domestic fuel	Non-poor		Poor		Total	
	N = 248	Percent	N=52	Percent	N=300	Percent
LPG-03	177	71	17	33	194	65
Woods and dung cakes	243	98	52	100	295	98
Kerosene oil	52	21	4	8	56	19

Source: Author's computations, based on household survey data, 2015. Note:- Totals sum to more than 100%, because of multiple responses were permitted.

Of overall sampled households, 98 percent households use woods and dung cakes, 65 percent use LPG-03 and 19 percent only uses kerosene oil as sources of domestic fuel. The majority of non-poor (98 and 71 percent) use Woods, dung cakes and LPG-03 as sources of domestic fuel. Only 21 percent non-poor use kerosene oil as sources of domestic fuel. Similarly, 100 percent poor sampled households use woods and a dung cake, 33 percent uses LPG-03 and 8 percent use kerosene oil as sources of their domestic fuel.

To know sources of domestic energy in the study area data was analyzed at district level. Thus, Bikaner district sources of domestic fuel among sampled households result is presented on table 4.101.

Table 4.101: Sources of domestic fuel in Bikaner district

Sources of domestic fuel	Non-poor		Poor		Total	
	N = 83	Percent	N=17	Percent	N=100	Percent
LPG-03	33	40	4	24	37	37
Woods and dung cakes	83	100	17	100	100	100
Kerosene oil	2	2	0	0	2	2

Source: Author's computations, based on household survey data, 2015

All households use woods and dung cakes but, 37 percent use LPG-03 and 2 percent only uses kerosene oil as sources of domestic fuel additionally in Bikaner district. In the same manner, Sri Ganganagar district sources of domestic fuel among sampled households result is presented on table 4.102.

Table 4.102: Sources of domestic fuel in Sri Ganganagar district

Sources of domestic fuel	Non-poor		Poor		Total	
	N = 85	Percent	N=15	Percent	N=100	Percent
LPG-03	76	89	6	40	82	82
Woods and dung cakes	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

All households use woods and dung cakes but, 87 percent of overall, 89 percent of non-poor and 40 percent of poor use LPG-03 as sources of domestic fuel additionally in Sri Ganganagar district. Similarly, Nagaur district sources of domestic fuel among sampled households result is presented on table 4.103.

Table 4.103: Sources of domestic fuel in Nagaur district

Sources of domestic fuel	Non-poor		Poor		Total	
	N = 80	Percent	N=20	Percent	N=100	Percent
LPG-03	68	85	7	35	75	75
Woods and dung cakes	80	100	20	100	100	100
Kerosene oil	19	24	4	20	23	23

Source: Author's computations, based on household survey data, 2015

Table 4.103 result shows all sampled households use woods and dung cakes but, 75 percent of overall, 85 percent of non-poor and 35 percent of poor use LPG-03 as sources of domestic fuel. In the district, 24 percent of non-poor, 20 percent of poor and 23 percent of overall uses kerosene oil as sources of domestic fuel in Nagaur district.

4.2.2.11.1. Ration card

Economic status of the family can be forecasted by the type of ration card he owned. Antyodaya (extreme poverty level), below poverty line (BPL) and above poverty line (Normal) are currently used ration card by Indian government. Sampled households were assessed by the type of ration card they owned and the result is shown on table 4.104.

Table 4.104: Ration card owned in Northern Rajasthan

Type of ration card you have?	Non-poor		Poor		Total	
	N = 248	Percent	N = 52	Percent	N=300	Percent
Normal	208	84	19	37	227	76
BPL	40	16	33	63	73	24
Total	248	100	52	100	300	100

Source: Author's computations, based on household survey data, 2015

The distribution of sampled households by the ration card they owned indicates that, no household has owned Antyodaya or extreme poverty ration card among sampled households. But, considerable proportion of the sampled households (63 percent of the poor and 16 percent of the non-poor) had below poverty line (BPL) ration card. Yet, most of the sampled households (84 percent of the non-poor and 37 percent of the poor) owned normal ration card. Similarly, out of 300 sampled households, 76 percent owned normal ration card and 24 percent owned below poverty line ration card.

To assess economic status of the family in detail collected data was also analyzed at district level. Bikaner district sampled households were assessed by the type of ration card they owned and the result is shown on table 4.105.

Table 4.105: Ration card owned in Bikaner district

Type of ration card you have?	Non-poor		Poor		Total	
	N = 83	Percent	N = 17	Percent	N=100	Percent
Normal	66	80	6	35	72	72
BPL	17	20	11	65	28	28
Total	83	100	17	100	100	100

Source: Author's computations, based on household survey data, 2015

In Bikaner district, 65 percent of poor, 20 percent of non-poor and 28 percent of overall have below poverty line (BPL) ration card. Similarly, 80 percent of non-poor, 35 percent of poor and 72 percent of overall have normal ration card. In the same manner, Sri Ganganagar district sampled households were assessed by the type of ration card they owned and the result is shown on table 4.106.

Table 4.106: Ration card owned in Sri Ganganagar district

Type of ration card you have?	Non-poor		Poor		Total	
	N = 85	Percent	N = 15	Percent	N=100	Percent
Normal	69	81	5	33	74	74
BPL	16	19	10	67	26	26
Total	85	100	15	100	100	100

Source: Author's computations, based on household survey data, 2015

In the district, 67 percent of poor, 19 percent of non-poor and 26 percent of overall have below poverty line (BPL) ration card. Similarly,81 percent of non-poor, 33 percent of poor and 74 percent of overall have normal ration card. Equally, Nagaur district sampled households were assessed by the type of ration card they owned and the result is shown on table 4.107.

Table 4.107: Ration card owned in Nagaur district

Type of ration card you have?	Non-poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Normal	74	92	8	40	82	82
BPL	6	8	12	60	18	18
Total	80	100	20	100	100	100

Source: Author's computations, based on household survey data, 2015

In Nagaur district, 60 percent of poor, 8 percent of non-poor and 18 percent of overall have below poverty line (BPL) ration card. Similarly, 92 percent of non-poor, 40 percent of poor and 82 percent of overall have normal ration card. All the district level result indicates in all districts, poor are not targeted properly and non-poor are included in the programmes.

4.3. Determinants of poverty and average exit time in Northern Rajasthan

4.3.1. Determinants of poverty in Northern Rajasthan

The goal of the Indian government is 'a country free of poverty'. A poverty profile (measurement) that has been done to achieve the second objective describes the pattern of poverty, but is not principally concerned with explaining its causes and average exit time. Yet a satisfactory explanation of why some people are poor and when poverty might be eliminated is essential

if we are to be able to tackle the roots of poverty. The ‘head-count index’ simply counts the poor, while the ‘poverty gap index and squaring it, shows their average shortfall from the poverty line. Tabulated or graphical information we have discussed under descriptive analysis on the characteristics of the poor is immensely helpful in demonstrating a profile of poverty. However, it is not always enough to depend on descriptive result, when one wants to extract the relative contributions of different variables on poverty. By applying econometrics (regression) analysis we can address the poverty cause in logical way. It is believed that, econometrical analysis is essential to identify principal determinants of household poverty in Northern Rajasthan and its districts to develop an effective strategy to combat poverty. In this section, to achieve our third objective, first we can address determinants of poverty econometrically after that average poverty exit time.

To get appropriate answer for what causes poverty and to determine the factors “causing” poverty, the researcher used logit regression analysis. Following our methodology in chapter three (see section 3.2.3), in determinants of poverty study there is a heavy reliance on limited dependent variable models such as logit, due to the fact that many behaviours and outcomes from a household standpoint to poverty are binary in nature. Our regression analysis attempts to explain the probability of a household to be grouped in to poor or not poor, using a logistic regression model. In logistic regression case the dependent variable is binary, usually taking on a value of 1 if the family is poor and 0 otherwise. Independent variables are variables that show a possible correlation between the level of poverty and demographic, economic and social characteristics of households. It is vital to choose the independent variables carefully and to be sure that they are truly exogenous.

Prior to the estimation of the model parameters, it is crucial to check whether serious problem of multicollinearity and heteroscedasticity among and between the potential continuous explanatory variables of the model

estimation. To this end, the variance inflation factor (VIF) was used to test the degree of multicollinearity among the continuous variables (see Table 4.108).

To avoid serious problem of multicollinearity, it is quite essential to omit the variable with VIF value 10 and more from the logit analysis. As a rule of thumb**,** if the VIF of a variable exceeds 10, that variable is said be highly collinear (Gujarati, 2003). Based on the VIF result, depicted on table 3.1, for two variables (AGEH and ADULN) their VIF value exceeds 10. As a result, the researcher omitted two variables and retained and entered the fourteen explanatory variables into logistic regression analysis. Heteroscedasticity problem (different variance) was also diagnosed by using commonly used 'Robust' order in STATA-12.

The variable household's poverty status (HPSTAT) was used as a dichotomous dependent variable, with an expected mean value of 1, indicating the probability of being poor, 0 otherwise. Generally, there were fourteen explanatory variables included in the model analysis. In order to identify the most important factors from the hypothesized potential variables to influence poverty, binary logit model was estimated from the survey data. For the purpose, STATA Version 12 was employed. Codes, Wald values, marginal effect and the maximum likelihood binary logit estimates are presented in Table 4.109.

Table 4.108: VIF of the continuous explanatory variables

Northern Rajasthan			Bikaner District			Sri Ganganagar District			Nagaur District		
Variable	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**
AGEH	25.53	0.039	ROAD	4.42	0.226	MOFD	3.29	0.304	FAMEX	2.99	0.334
ADULN	22.53	0.044	MOFD	4.06	0.246	FAMEX	3.23	0.309	DEMED	2.72	0.368
MOFD	2.31	0.433	INCM	3.01	0.332	DEMED	3.11	0.321	MOFD	2.63	0.380
FARS	2.09	0.478	IRRLS	2.78	0.360	WIFE	2.94	0.341	FARS	2.34	0.428
DEMED	1.99	0.502	FAMS	2.67	0.375	DR	2.59	0.387	INCM	2.26	0.442
IRRLS	1.96	0.509	FARS	2.51	0.398	FAMS	2.26	0.441	WIFE	1.91	0.524
FAMEX	1.83	0.547	CRDT	2.23	0.448	FARS	2.22	0.451	NFAP	1.84	0.543
FAMS	1.73	0.577	NFAP	2.11	0.473	NFAP	2.07	0.484	FAMS	1.67	0.597
NFAP	1.69	0.592	DR	2.05	0.488	SAVG	1.91	0.523	IRRLS	1.65	0.605
INCM	1.66	0.601	SAVG	1.83	0.547	TLU	1.80	0.557	DR	1.63	0.613
DR	1.62	0.616	FAMEX	1.76	0.569	ROAD	1.76	0.569	SAVG	1.42	0.704
WIFE	1.57	0.636	DEMED	1.73	0.579	INCM	1.58	0.635	CRDT	1.39	0.718
SAVG	1.54	0.648	WIFE	1.64	0.609	IRRLS	1.35	0.740	ROAD	1.36	0.736
TLU	1.48	0.676	TLU	1.63	0.613	CRDT	1.13	0.883	TLU	1.35	0.741
ROAD	1.35	0.742									
CRDT	1.31	0.762									
Mean VIF	4.51		2.46			2.23			1.94		

Source: Own Computation, 2015

Table 4.109: Logit model estimates of explanatory variables for Northern Rajasthan

Variables	Coefficient	Std. Err	Z	P>|Z|	Wald	Marginal Effect
FAMS	0.4141	0.719	4.90	0.000***	33.16	0.05
FARS	-0.4262	0.081	4.05	0.000***	27.70	-0.051
IRRLS	-0.7132	0.169	-2.29	0.022**	17.66	-0.090
INCM	-0.00004	8.31e-08	-2.35	0.019**	28.19	-0.0000002
SAVG	-0.0001	2.23e-06	-1.64	0.100	6.95	-0.0000003
CRDT	-0.00002	2.27e-07	0.10	0.921	5.81	-
TLU	-0.889	0.147	-2.46	0.014**	36.58	-0.101
DEMED	-0.285	0.051	-2.56	0.010**	30.95	-0.0343
WIFE	-0.121	0.046	-2.93	0.003***	6.77	-0.017
DR	2.5011	0.304	-1.86	0.063*	67.51	0.1764
NFAP	-0.205	0.098	-1.89	0.059*	4.38	-0.016
FAMEX	-0.114	0.019	-3.81	0.000***	37.13	-0.014
ROAD	0.1593	0.028	3.03	0.002***	32.05	0.02
MOFD	0.8836	0.123	-0.90	0.368	51.83	-

LR chi2 (14)	239.54***
-2Log likelihood	37.14
Likelihood ratio test	275
Sensitivity	94.23%
Specificity	98.79%
Percent correctly predicted (count R^2)	98 %
H-L goodness-of-fit test Prob > chi2	1.0000
Sample size	300

Source: Model output

******Significant at less than 1% probability level***
***** Significant at less than 5% probability level***
****Significant at less than 10 % probability level***

Before interpreting significant variables we have to check how far logistic model correctly predicted our data. The likelihood ratio test statistics (275) exceeds the chi-square critical value (239.54) with 14 degree of freedom. The result is significant (p = 0.000) at less than 1 percent probability level indicating that the null hypothesis (see section 3.2.3.1.3 in methodology) that the coefficient except the intercept are equal to zero is rejected. Another measure of goodness of fit used in logistic regression analysis is the count R^2. Count R^2 is the number of correctly predicted observations using the model divided by the total number of observations. It measures how well the model predicts the correct value of the dependent variable, using known values. The count R^2 is based on the principle that if the estimated probability of the event is less than 0.5, the event will not occur and if it is greater than 0.5 the event will occur (Maddala, 1989).The H-L(Hosmer-Lemeshow) test also revealed that the model has H-L value 1.00 which indicates convergence between expected and observed probabilities value is not statistically significant at less than 5 percent probability level, therefore the model is quite a good fit, or indicating that the model prediction does not significantly differ from the observed. In other words, the ith observation is grouped as a poor if the computed probability is greater than or equal to 0.5, and as a non-poor otherwise. The model results show the logistic regression model correctly predicted 294 of 300, or 98 percent of the sample households. The sensitivity (correctly predicted poor) and the specificity (correctly predicted non-poor) of the logit model are 94.23 percent and 98.79 percent, respectively. Thus, the model predicted both groups accurately. Therefore, all the model goodness of fit indicators shows the model (regression line) has fitted the data reasonably, at this time, we can interpret significant variables.

4.3.1.1. Discussion on the significant explanatory variables in Northern Rajasthan

Out of the fourteen variables hypothesized to influence household's poverty, eleven were found to be statistically significant. The maximum likelihood estimation result of the logistic regression model showed that the coefficients of

family size (FAMS), cultivated land size (FARS), irrigated land size (IRRLS), income (INCM), livestock holding in (TLU), decision maker's education (DEMED), wife education (WIFE), dependency ratio (DR), number of farm participant (NFAP), farming experience (FAMEX) and main road distance (ROAD) are significantly different from zero. These variables were significant and major determinants of poverty in the Northern Rajasthan. However, as shown in the table, saving (SAVG), credit (CRDT) and months of food deficit (MOFD) do not show any significant influence on household poverty.

That means, the coefficient of family size, wife education, cultivated land size, farming experience and main road distance were statistically significant at less than 1 percent probability level of significance followed by irrigated land size, income, livestock holding and decision maker education variables were statistically significant at less than 5 percent probability level of significance and dependency ratio and number of farm participant were statistically significant at less than 10 percent probability level of significance. Moreover, the results verified that, almost all of the explanatory variables obtained in the model had the signs that confirm with the prior expectations. In light of the above summarized model results, all possible explanation and references for each significant independent variable should be made to the same table. Explanations for each significant independent variable are given consecutively as follows:

Family size (FAMS):- Number of people in household is found to be highly significant to determine household's poverty in Northern Rajasthan. Family size revealed a positive relationship with household poverty, which indicates the probability of being poor increases with an increase in the family size. The coefficient for family size of households is significantly different from zero at $p < 0.1$. As family size increases by one unit, *cetaris paribus,* the probability that a household falls into poverty increases by 5 percent. The result is consistent with previous findings, Mehta and Bhide (2010) in their paper; they found similarly, households that were poor in 1970/71 and had larger number of members

tended to remain poor in 1981/82 relative to those with fewer members. Thus, even if poor households chose larger size for additional earning potential, it did not help them escape poverty. Increase in household size and in the proportion of children also increases the probability of persistence of poverty, whether moderate or severe. Similarly, Chadwick *et al.,* (2015) in their study conclude that, the negative impact of large family size on household savings has both a macroeconomic impact and a household impact; indeed larger family size reduces household savings contributing to the already low national savings. Decreasing family size increases saving for both China and India. Ray (1999) in his study also found that, household size and composition significantly affect child schooling – children from larger families are less likely to receive schooling than those from smaller families. This picture seems quite robust to child gender. Many researches done on poverty show that poverty and family size are positively correlated (see Puja M., 2015, Melkamu and Mesfin, 2015,Ray R., 2000, Sharma M.,2012, Pal and Palacios,2006).

Farm size (FARS):- Economic theories identify natural capital (e.g., land) as an important determinant of welfare and economic development (Lundgren, 2005). Ownership of agricultural land was hypothesized to influence poverty negatively. The results of the logit model indicated that it is considered as main factor that can extricate a household from poverty. Sample household which had larger farm size had more possibility of being non-poor. The coefficient for farm size of households is significant at less than 1 percent probability level. As farm size increases by one hectare, *cetaris paribus,* the probability that a household falls into poverty decreases by 5.1 percent. This is because; large landholding size means the farmer can produce different verities of crops which can feed the family in different seasons and also sell the marketable surplus. Large landholding again, removes the constraint for establishment of other nonfarm enterprises and is also an asset which enables households to easily access both input and credit markets. According to National Council for Applied Economic Research (NCAER, 1996) research results, the incidence of rural poverty is

much higher for those living in landless households; dependent on wage earnings; from scheduled castes or tribes; or living in households headed by women. In 1994, 37 percent of rural households were landless, but the incidence of poverty in that group was 52 percent. Not surprisingly, they represented the largest group of rural poor (49 percent). Commenting on such scenario, Schubert (1994) noted, the poor own little or qualitatively poor land for agricultural production to work with and little or no access to capital. Similarly, Walker and Ryan (1990) found correlates of the chronically poor households in the states of Andhra Pradesh and Maharashtra over a 9-year period between 1975/76 and 1983/84 were landless and relied on agricultural wage earnings. Furthermore, Sukhvir (2012) study in rural Punjab revealed an inverse relationship between the percentage of the marginal and small farmers living below the poverty line and farm-size. Melkamu and Bannor(2015) also conclude that a hectare increase in land size will result in 8.9 percent decrease in the probability of a person being poor in Chencha, Ethiopia. But, Bhanu Pratap Singh, former minister of state for agriculture government of India, argued that, income from farming does not depend only on the size of the farm, but on the capital invested on it, both in monetary terms and in technological know-how. This result is consistent with many research results done in India and outside India (see, Kajisa and Palanichamy 2006: Kurosaki's, 2006).

Irrigated land size (IRRLS):-this variable is found to be significant at less than 5 percent probability level and has negative association with the household poverty. Availability and improved access to irrigation infrastructure will increase crop yield, agricultural production, and farm income and reduce poverty. Irrigated agriculture is one of the critical components of world food production, which has contributed significantly to maintaining world food security and to the reduction of rural poverty. About 17 percent of global agricultural land is irrigated and contributes about 40 percent of the global production of cereal crops (WCD, 2000). These shows, recently farm household income depends more on water than land. Estimation result indicated that as irrigated landholding size of the

household increases by one hectare, the probability of the household falling into poverty decreases by 9 percent. This amount is because, Rajasthan state owns more than 10 percent of country's irrigated area and availability and access to irrigation visibly determines the status of household poverty in the area. Pandya and Bhatt (2010) in their study conclude that, among all the variables selected for analysing the poverty measure in this study, they found that, irrigation has the strongest influence in explaining the reduction in poverty. Bhattarai, *et al.*(2003) also found that, extending access to irrigation to a large number of farmers and investing in human capital development are crucial to increasing agricultural productivity and reducing poverty in India." This result is in agreement with the findings of Bhattarai, *et al.*(2002) who found that the gross cropped irrigated area as a percentage of the total gross cropped land in Haryana is nearly double that of Bihar, and the per capita income in Haryana is nearly triple that of Bihar. Likewise, more than half of the rural population in Bihar was below the poverty line, while it was only about 15 percent in Haryana in the early 1980s. Beero and Narayanamoorthy (2014) found similar result and concluded that poverty level is higher in un-irrigated village and lower in irrigated villages and irrigation is the crucial factor in alleviating poverty in Tamil Nadu.

Income (INCM):- This represents the total amount of income any member of the household has earned in the year. For rural people agriculture is the main source of income. The evidence that growth in agriculture is on average at least twice as effective in reducing poverty as growth outside agriculture is thus no surprise. Agricultural growth reduces poverty directly, by raising farm incomes, and indirectly, through generating employment and reducing food prices (World Bank, 2008). As expected, the contribution of income is negatively and significantly (below 5 percent probability level) associated with household poverty. The marginal effect indicates that, other things being constant, the probability of the household to be poor decreases by a factor of insignificant amount as the household earned one rupee per adult equivalent. But, The probability that a household falls into poverty decreases by 0.2 percent, as family income

increases by one lakh rupees, *cetaris paribus.* Higher annual income per adult equivalent would reduce the probability of being poor by providing a continuous source of cash flow to buffer agriculture and family associated risk and encourage for future investments like education. This outcome is consistent with the finding from a research conducted by Radhakrishna R. *et al.* (2007) in India, who found that the probability of a household falling into chronic poverty both in rural and urban areas decreases as household income (total expenditure) increases. Again, Radhakrishna and Rao (2008) in their study conclude that, improvement in household income is crucial for reducing the incidence of both chronic poverty and other poverty. A 10 percent increase in the per capita expenditure of chronically poor households would lift about one 'third of these families from chronic poverty and one-sixth of them from poverty. Roughly, a 60 percent increase in per capita expenditure would be required to lift all chronically poor households from poverty.

Livestock holding in (TLU):- The livestock sector is an important sector of the rural economy in India. The contribution of the livestock sector toward family income is quite substantial. Livestock ownership is hypothesized to influence poverty negatively. Empirical finding suggests that total livestock holding is important in explaining the poverty status of the sampled households in the area. Sampled households, which had larger livestock number had more possibility of being non-poor. The coefficient for ownership of livestock is negative and significant at less than 5 percent probability level implying that, as livestock ownership increases by one TLU, *cetaris paribus,* the probability that a household falls into poverty decrease by 10.1 percent. Martin Upton (2004) in his working paper evidently identified that, livestock is vital to the economies of many developing countries. Animals are a source of food, more specifically protein for human diets, income, employment and possibly foreign exchange. Livestock also contribute to rural livelihoods, employment and poverty relief. They integrate with and complement crop-production, embody savings and provide a reserve against risks. Some livestock have special roles in traditional culture. Livestock can

provide income, quality food, fuel, draught power, building material and fertilizer, thus contributing to household livelihood, food security and nutrition (FAO, 2009). According to this research livestock serve as an engine of growth, poverty reduction and long-term food security. Ali (2007) in his study in India conclude that, livestock rearing has significant positive impact on equity in terms of income and employment and poverty reduction in rural areas as distribution of livestock is more egalitarian as compared to land. In India, over 70 percent of the rural households own livestock and a majority of livestock owning households are small, marginal and landless households. Small animals like sheep, goats, pigs and poultry are largely kept by the land scarce poor households for commercial purposes due to their low initial investment and operational costs. Livestock sector is likely to emerge as an engine for agricultural growth in the coming decades. It is also considered as a potential sector for export earnings. FAO (2008) explains the importance of the sector; livestock products provide an example of high-value agricultural produce, with roughly three out of four agricultural households already keeping livestock. With steadily increasing consumer demand for meat, milk and other livestock products, arising from population increases, greater urbanization and income growth, the majority of the rural poor have a significant stake in this sub-sector of agriculture that can contribute to poverty reduction both through enhanced crop yields and increased production of high value livestock products and by-products.

Decision maker education (DEMED):- The coefficient of decision maker education as measured by years of schooling is statistically significant at less than 5 percent probability level and it is negatively related to poverty. As decision maker education measured by years of schooling increases by one unit, *citrus paribus,* the probability that a household falls into poverty decrease by 3.43 percent. This implies that, the more educated an individual, the greater the potential to exploit resources and technology and avoid poverty. This conforms to other studies concluding that education attainment decreases poverty (e.g. World Bank, 2002). With an increase in educational attainment, a household

head could secure a job and take opportunities which would otherwise not be possible and he is better poised to cope with risk and uncertainty and therefore less vulnerable to poverty. This outcome is consistent with the finding from a research conducted by Brück (2001) in Mozambique and concluded that that, the return to an additional year of effective education for the best educated household member is 5.1 percent for income, 2.4 percent for consumption, and 4.9 percent for food consumption (all per capita). According to Sen (2001) poverty is the lack of capability to function effectively in society. Inadequate education can thus be considered a form of poverty. Amartya Sen suggests that education contributes to development directly, because of its relevance to the wellbeing and freedom of people, indirectly through influencing social change and economic production. Education is potentially good for income generation, but it also has a strong potential to improve a person's self-esteem. "Education is not a way to escape poverty - It is a way of fighting it." Julius Nyerere, former President of the United Republic of Tanzania. No country has succeeded if it has not educated its people. Panagariya and More (2013) in their study concluded that, no matter which year or region we consider, the higher the level of education of the head of the household, the lower the poverty ratio. Even in rural areas, rising level of education of the head of the household is associated with sharply declining poverty rates. For households headed by individuals with secondary or higher secondary education in rural areas, the poverty rate drops below the average poverty rate in urban areas. Furthermore, Dutta (2013) also in his study found that middle to higher secondary education has a positive significant impact on household income. Amazingly, Krishna (2010) found and concluded, the education level of the household head did not make a significant difference to the probability of escape from poverty.

Wife education (WIFE):- Women education is important indicators of the quality of life of household members. The result of the logit analysis shows the coefficient of wife education is statistically significant at less than 1 percent probability level in determining the household poverty, implying that as wife

education measured by years of schooling increases by one unit, *citrus paribus,* the probability that a household falls into poverty decrease by 1.7 percent. A large body of microeconomic evidence shows that increases in women's education generally lead to increases in their labour force participation as well as in their earnings (Subbarao and Raney,1995). The same source identified that, educated women's greater participation in labour market work and their higher earnings are thought to be good for their own status within the household, and are good for their children because it appears that a greater proportion of women's income than men's is spent on child goods.

It reveals that more hygienic and better nutrition conditions will cause to keep households non-poor. Wife education serves as a suitable poverty alleviation strategy by improving well-being of family members especially children. Further, Blumberg (2005) conclude that, with greater economic power and education, women gain more say in household decisions and tend to promote – and spend their own money disproportionately on – the nutrition, health and education of daughters as well as sons. Moreover, women’s economic empowerment is linked to less corruption and armed conflict and, over the long run, less violence against females. It even is somewhat linked to better environmental stewardship and, possibly, reduced HIV prevalence. Sometimes having enough financial resources are not enough to alleviate family poverty, unless it is associated with wife education variable.

Women's education matters in family livelihood improvement, different literatures supported this idea with research. This outcome is consistent with the finding from a research conducted by Radhakrishna *et al* (2005) in India and found female illiterate households among casual labour are associated with higher risk of chronic poverty in rural and urban areas. Educated women contribute to the welfare of the next generation by reducing infant mortality, lowering fertility, and improving the nutritional status of children (World Bank 2005h, 2001a; Lagerlöf 2003; Klasen 1999; Smith and Haddad 1999). The economic argument draws on

the fact that women tend to reinvest their income in improved nutrition, health and education for household members, thus increasing living standards and reducing “non- income poverty” in the long term (Krogh *et al*.,2009).

Dependency Ratio (DR):- This variable is found to be significant at less than 10 percent probability level in determining the household poverty. The result shows that the variable is found to have positive impact on the probability of being poor in the study area. As dependency ratio increases by one adult equivalent, *cetaris paribus,* the probability that a household falls into poverty increases by 17.64 percent. This may be due to the fact that a household with many dependents tends to exert more pressure on the limited household resources. More dependents mean more economically non-active members in a family, which reduces income per head. For a given household size, a larger number of children and elderly members would imply a smaller number of earners in the household. This outcome is consistent with the outcome of a study conducted by Vijayakumar (2013), he found that age dependency ratio has had a tremendous impact on poverty and poverty has had a relatively very high impact on the age dependency ratio. Radhakrishna *et al.* (2005) also found that the probability of a household falling into chronic poverty increases with number of children per household, dependency ratio.

According to Pal and Palacios(2006), as people live longer and into much advanced age (say 75 years and over), they need more intensive and long term care, which in turn may increase financial stress in the family. They conclude that, after correcting for the possible sources of bias (including the survivorship bias), there is evidence that poverty is increased by the presence of older elderly (75 and above) in all states. Prasad (2011) in his study conclude that, Population ageing is profound, having major consequences and implications for all facets of human life. In the economic area, population ageing will have an impact on economic growth, savings, investment and consumption, labour markets, pensions, taxation and inter-generational transfers. There are a lot of literatures

which supports this result, (see, Chronic Poverty Research Centre Report (2008/09:Sundaram K.(2004): Haughton and Khandker)

Number of farm participant (NFAP):- The poverty-reducing effort of household depends on the participation of adult members in the production process. This variable is found to be significant at less than 10 percent probability level and has negative association with the household poverty. As number of farm participant increases by one adult person, *cetaris paribus,* the probability that a household falls into poverty decrease by 1.6 percent. It reveals that more participation of household members in agriculture will increase agricultural resource and family labour use efficiency and finally improve output and income of household. The decision of households to supply labour to own farm work and to hire farm labour depends on the seasonal nature of agriculture along with many other socio-economic features. Shortage of farm labour supply may lead to low farm productivity. The premise that family members have stronger work incentives compared to hired labour. This means, when the family labour input increases by one percent, farm output will increase by about 0.34 percent (Amsalu, 2013). Furthermore, Cancian and Reed (2009) conclude that, generally relying on the earnings of only one adult, are more than five times as likely to be poor as earnings of four adult families. Babatunde *et al.* (2008) in their study also found that, large adult equivalents can be said to be poverty-enhancing. Households that have other working members appear to be better-off than those which do not have. This is not surprising because, more members would be contributing to the household total income and it agrees with our earlier assumption.

Farming experience (FAMEX):- This refers to the number of years household head has engaged in farming. The variable is significant at less than 1 percent probability level and it had a negative co-efficient which implied that it had an inverse effect. All things being equal, an experienced household head is expected to have more insight and ability to diversify his or her production to minimize risk of poverty or household head with longer farming experience are

expected to be more knowledgeable and skilful. Years of practicing an act makes the practice more effective and efficient. Efficiency leads to cost minimization, increased profit and thus, improved standard of living. An experienced farmer is also expected to have adequate knowledge in pest and disease management as well as good knowledge of weather. As farming experience of household increases by one year, *cetaris paribus,* the probability that a household falls into poverty decrease by 1.4 percent. Research findings revealed an inverse relationship between farming experience and household poverty status (e.g., Feleke *et al.,* 2003, Oluyole *et al.,* 2009).

Main road distance (ROAD):- represents the household access to main road and it is significant at less than 1 percent probability level. It has a positive co-efficient which indicates, main road distance is positively related with household poverty. As main road distance increases by one kilometre, *citrus paribus,* the probability that a household falls into poverty increase by 2 percent. That is, distant the household access to main road, the higher the probability of being poor. It is an important factor that determined the level of being poor in Northern Rajasthan. This might be because access to road improves farmers' marketing and production choice by minimizing cost of production. Many investments in infrastructure are built on the belief that they will ineluctably lead to poverty reduction and income generation. Shahidur *et al.* (2009) in their study concludes that, households near to all season roads can better exploit agricultural and non-agricultural opportunities to employ labour and capital more efficiently. Farmers with access to new roads are more likely to use chemical fertilizer and hybrid seeds on their farms. Road can be seen from the reduction in the time, money, and information costs of accessing markets can also manifest itself in other economic outcomes. Gachassin *et al.,* (2010) in their study found that access to roads is only one factor contributing to poverty reduction. Research in Viet Nam showed that poor households living in rural communes with paved roads have a 67 percent higher probability of escaping poverty than those in communes without paved roads (Glewwe *et al.,* 2000).

4.3.2 District wise determinants of household poverty

Availability of differences in infrastructure, geography, demography and culture among districts in Northern Rajasthan, this study believe that the determinants of poverty differ from one district to the next. That means, separate regressions were estimated for households in Bikaner, Sri Ganganagar and Nagaur districts.

4.3.2.1. Discussion on the significant explanatory variables in Bikaner district

Explanations for each significant independent variable for Bikaner district are given consecutively as follows:

Table 4.110: Logit model estimates of explanatory variables in Bikaner

Variables	Coefficient	Std. Err	Z	P>|Z|	Wald	Marginal Effect
FAMS	0.5046	0.139	4.41	0.000***	12.99	0.058
FARS	-3.1063	1.022	-6.51	0.000***	9.24	-0. 085
IRRLS	-0.6761	0.257	-2.81	0.005***	6.94	-0. 1600
INCM	-0.000102	0.00003	-17.25	0.000***	9.42	-0.0000003
SAVG	-0.000149	0.00008	0.46	0.644	3.15	-
CRDT	-0.000035	0.00002	-1.48	0.139	6.14	-
TLU	-2.179782	0.536	-13.92	0.000***	16.52	-0.144
DEMED	-0.43396	0.167	-2.76	0.006***	6.79	-0.05
WIFE	-0.1986	0.076	-2.77	0.006***	6.88	-0.026
DR	2.47549	0.579	11.28	0.000***	18.30	0.184
NFAP	-0.114165	0.196	-0.58	0.559	0.34	-
FAMEX	-0.541466	0.150	-16.72	0.000***	13.00	-0.025
ROAD	1.954	0.555	2.51	0.012**	12.40	0.04
MOFG	0.91361	0.220	4.61	0.000***	17.20	0.023

Source: Model output

******Significant at less than 1% probability level***
***** Significant at less than 5% probability level***
****Significant at less than 10 % probability level***

Alike to Northern Rajasthan, out of the fourteen variables hypothesized to influence household's poverty in Bikaner district, eleven were found to be

statistically significant. The maximum likelihood estimation result of the logistic regression model on table 4.110 showed that the coefficients of family size (FAMS), cultivated land size (FARS), irrigated land size (IRRLS), income (INCM), livestock holding in (TLU), decision maker education (DEMED), wife education (WIFE), dependency ratio (DR), months of Food deficit (MOFD), farming experience (FAMEX) and main road distance (ROAD) were significantly different from zero. However, as shown in the table, saving (SAVG), credit (CRDT) and number of farm participant (NFAP) do not show any significant influence on household poverty.

The result on table 4.110 indicates family size is positively related with household poverty and significant at less than 1 percent probability level, implying that as family size increases by one member in adult equivalent, *citrus paribus,* the probability of that household to falls into poverty increase by 5.8 percent. That is, the larger the household size, the higher the probability of being poor. Poverty increases with increasing in family size because large family size tends to reduce the per capita income available to the household.

Expectedly, farm land and irrigated land size decreases the extent of poverty. Farm size was negatively and significantly related to the probability of a household being poor. It is significant at less than 1 percent probability level in Bikaner. As farm size increases by one hectare, *cetaris paribus,* the probability that a household falls into poverty decrease by 8.5 percent in the district. Irrigated land size is also important and significant at less than 1 percent probability level factor, which determines the level of being poor in Bikaner district. As irrigated land increases by one hectare, *cetaris paribus,* the probability that a household falls into poverty decrease by 16 percent.

Furthermore according to the results, as household income increases by one rupee, *cetaris paribus,* the probability that a household falls into poverty decrease by immaterial percent, but the probability that a household falls into poverty

decreases by 0.03 percent, as family income increases by one lakh rupees. However, as livestock ownership increases by one TLU, *cetaris paribus,* the probability that a household falls into poverty decrease by 14.4 percent. This result shows livestock asset is important factor that determined the level of being poor in the study area negatively.

The education of both decision maker and wife was significant at less than 1 percent probability level and determines poverty negatively. As decision maker education measured by years of schooling increases by one unit, *cetaris paribus,* the probability that a household falls into poverty decrease by 5 percent and also as wife education increases by one unit, the probability that a household falls into poverty decrease by 2.5 percent. Better education has the effect of enabling households accessing and conceptualizing information on good farming methods.

Dependency ratio is positively related with household poverty and significant at less than 1 percent probability level, implying that, as dependency ratio increases by one unit, the probability that a household falls into poverty increases by 18.4 percent in Bikaner district. Larger dependency ratio means, higher incidence and intensity of poverty in a household. This could be as a result of much pressure exerted on the limited resources at the household level. Years of farming experience was significant at less than 1 percent probability level. It had a negative co-efficient which implied that it had an inverse effect. As farming experience of household increases by one year, *cetaris paribus,* the probability that a household falls into poverty decrease by 2.5 percent. That is, the lower the number of years of farming experience, the higher the probability of being poor. In addition, household access to main road and months of food deficit were significant at less than 5 and 1 percent probability level respectively. Both had direct effect which implies that, as main road distance increases by one kilometre, *cetaris paribus,* the probability that a household falls into poverty

increase by 4 percent and as months of food deficit increases by one month, the probability that a household falls into poverty increase by 2.3 percent.

4.3.2.2. Discussion on the significant explanatory variables in Sri Ganganagar district

The maximum likelihood estimates of the logit model for Sri Ganganagar district is presented on table 4.111.

Table 4.111: Logit model estimates of explanatory variables in Sri Ganganagar district

Variables	Coefficient	Std. Err	Z	P>|Z|	Wald	Marginal Effect
FAMS	0.2629	0.09166	3.15	0.002***	8.23	0.03
FARS	-0.3475	0.16055	-2.19	0.028**	4.69	-0.041
IRRLS	-1.0696	0.44638	-2.55	0.011**	5.74	-0.114
INCM	0.000044	0.0000154	-7.30	0.000***	8.4	-0.0000002
SAVG	-0.0000759	0.0000486	-1.59	0.112	2.44	-
CRDT	-0.00000031	0.0000007	-0.43	0.664	0.19	-
TLU	-0.47938	0.1694	-3.01	0.003***	8.01	-0.054
DEMED	-0.3156	0.1207	-2.74	0.006***	6.83	-0.035
WIFE	-0.2281	0.12035	-1.89	0.058*	3.59	-0.03
DR	4.49438	1.16679	5.59	0.000***	14.84	0.168
NFAP	0.31582	0.20575	1.56	0.118	2.36	-
FAMEX	-0.07125	0.02986	-0.10	0.918	5.69	-
ROAD	1.5181	0.36998	4.98	0.000***	16.84	0.104
MOFG	1.4174	0.5132	11.79	0.000***	7.63	0.033

Source: Model output

******Significant at less than 1% probability level***
***** Significant at less than 5% probability level***
****Significant at less than 10 % probability level***

Table 4.111 results shows, maximum likelihood estimates of the determinants of Sri Ganganagar district. Out of the fourteen variables hypothesized to influence household's poverty in Sri Ganganagar district, ten were found to be statistically

significant. That means, the coefficient of family size, income, livestock holding, decision maker education, dependency ratio, main road distance and months of food deficit were statistically significant at less than 1 percent probability level. Whereas, cultivated land size and irrigated land size variables were statistically significant at less than 5 percent probability level. Wife education was statistically significant at less than 10 percent probability level of significance in Sri Ganganagar district.

Household size represents total number of household members who live and consume from the same source. In Sri Ganganagar district, like other districts family size is positively associated with household poverty. As family size increases by one adult equivalent, *cetaris paribus,* the probability that a household falls into poverty increases by 3 percent. An increase in household size implies more people to be fed from the limited resources. Predictably, irrigated and farm size are salient poverty variables in Sri Ganganagar district and they were significant at less than 5 percent probability level. Estimation result indicated that as irrigated landholding increases by one hectare, *cetaris paribus* the probability of the household falling into poverty decreases by 11.4 percent and as farm size increases by one hectare, the probability that a household falls into poverty decrease by 4.1 percent. Households with large irrigated land are less likely to be poor and vice versa.

Total family income is negatively and significantly associated with household poverty in the area, but as income increases by one rupee, *cetaris paribus;* the probability of the household falling into poverty is almost zero. However if income increases by one lakh, *cetaris paribus,* the probability of the household falling into poverty decrease by 0.02 percent.

Next to irrigated land, livestock holding is prominent sources of wealth to farm households in Sri Ganganagar district. It is statistically significant and negatively related to the incidence of poverty in a household. As livestock ownership

increases by one TLU, *cetaris paribus,* the probability that a household falls into poverty decrease by 5.4 percent. The more assets a household owned, in form of livestock, the less likely is for the household to be poor. This is because asset holdings are both an economic and source of social prestige. In rural areas livestock are store of wealth for the poor (Ranldolp *et al*, 2007).

Furthermore according to our results, both decision maker and wife education were an important variable determining household poverty significantly. As decision maker education measured by years of schooling increases by one unit, *cetaris paribus,* the probability that a household falls into poverty decrease by 3.5 percent and similarly, as decision maker wife education increases by one unit the probability that a household falls into poverty also decrease by 3 percent. This is because educated households have a better chance of managing their farm by adopting improved practices, which in turn increases total yield. This outcome agrees with Bigsten *et al.,* (2002) who found out that, it is mother's attendance of primary education that positively contributes to poverty alleviation.

Dependency ratio also influence in the same direction like household size in Sri Ganganagar district and significant at less than 1 percent probability level. As dependency ratio increases by one unit, *cetaris paribus,* the probability that a household falls into poverty increases by 16.8 percent. A household with more inactive productive labour force compared to the active age shows a high dependency ratio and it is more likely to be poor. In addition, In Sri Ganganagar district main road distance and months of food deficit were important variable determining household poverty significantly at less than 1 percent probability level. Positive associations were seen between access to the nearest main road and months of food deficit and household poverty. As main road distance increases by one kilometre, *cetaris paribus,* the probability that a household falls into poverty increase by 10.4 percent and as months of food deficit increases by one month, the probability that a household falls into poverty increases by 3.3

percent. Closeness to main road creates easy access to information on inputs and transportation.

4.3.2.3. Discussion on the significant explanatory variables in Nagaur district

The maximum likelihood estimates of the logit model for Nagaur district is presented on table 4.112.

Table 4.112: Logit model estimates of explanatory variables for poverty in Nagaur district

Variables	Coefficient	Std. Err	Z	P>|Z|	Wald	Marginal Effect
FAMS	0.971867	0.212	8.12	0.000***	21.02	0.101
FARS	-0.5276	0.132	-7.89	0.000***	16.04	-0.052
IRRLS	-0.56766	0.274	-2.12	0.034**	4.29	-0.083
INCM	-0.000071	0.000026	-5.05	0.000***	7.55	0.0000004
SAVG	-0.000073	0.0000505	-1.46	0.145	2.10	-
CRDT	-0.000442	0.001	-0.40	0.689	0.16	-
TLU	-1.051627	0.289	-4.69	0.000***	13.19	-0.137
DEMED	-0.445335	0.109	-7.32	0.000***	16.63	-0.048
WIFE	0.06565	0.062	1.08	0.279	1.14	-
DR	2.42056	0.515	7.41	0.000***	22.12	0.215
NFAP	-0.39987	0.171	-2.51	0.012**	5.47	-0.060
FAMEX	-0.14897	0.04	-4.88	0.000***	13.86	-0.020
ROAD	0.131873	0.041	3.83	0.000***	10.48	0.020
MOFG	0.69495	0.1511	10.86	0.000***	21.15	0.050

Source: Model output

******Significant at less than 1% probability level***
***** Significant at less than 5% probability level***
****Significant at less than 10 % probability level***

The use of logit model in Nagaur district enabled us to look at how particular variables affect the extent of household poverty. The results of the maximum

likelihood estimates presented in Table 4.112 depicts that the signs of most of the estimated parameters conform to our prior expectations. In general, eleven among fourteen variables were found to be statistically significant in the logit model at less than 10 percent probability level. Among eleven statistically significant explanatory variables, we found cultivated land size, income, irrigated land owned, livestock holding, decision maker education and farming experience to be negatively related to extent of household poverty. Whereas family size, dependency ratio, number of farm participant , main road distance and months of food deficit are variables that are positively correlated with the probability of being non-poor.

Family size reflects the number of units among which household resources need to be allocated according to the weights of each unit. Family size may have an ambiguous role in poverty status of rural households depending on the relative strength of size economies in consumption as against the diminishing return to scale. In our result, family size is positively associated with household poverty. As family size increases by one adult equivalent, *cetaris paribus,* the probability that a household falls into poverty increases by 10.1 percent.

Predictably, the result indicates that the size of land cultivated, as a basic input in farming, is negatively associated and significant at less than 1 percent probability level with poverty status of a household. As farm size increases by one hectare, *cetaris paribus,* the probability that a household falls into poverty decrease by 5.2 percent in Nagaur district. This means households with large cultivated land produce more for household consumption and for sale and have better chance to get additional income than those having relatively small size of cultivated land. Similarly, access to irrigated land is essential for household welfare. The coefficient irrigated land owned is significant at less than 5 percent probability level in determining the probability of being non-poor. The marginal effects indicate that a household with better access to irrigation is 8.3 percent more likely to be non-poor in Nagaur district.

Income is negatively and significantly associated with household poverty in the area, but as income increases by one rupee, *cetaris paribus,* the probability of the household falling into poverty is almost zero. However if income increases by one lakh, *cetaris paribus,* the probability of the household falling into poverty decrease by 0.04 percent.

Furthermore, livestock holding is another variable which was found to have a negative and significant impact on household poverty in the district (at $p < 1\%$). As livestock ownership increases by one TLU, *cetaris paribus,* the probability that a household falls into poverty decrease by 13.7 percent. In India, most households in the rural communities accumulate their wealth in terms of livestock. Results here support such a practice where households with relatively large livestock size were found to be less vulnerable to poverty.

According to human capital theories (Muller, 2002), household earnings are largely explained by the education attainment. Our result coincides with this idea and decision maker education was negatively associated and significant at less than 1 percent probability level with poverty status of a household. As decision maker education measured by years of schooling increases by one unit, *cetaris paribus,* the probability that a household falls into poverty decrease by 4.8 percent. Implying that, households with less-educated head are poorer than those with more educated head when other things are constant.

Likewise, the coefficient of dependency ratio is statistically significant and positively related with poverty status of a household. As dependency ratio increases by one unit, *cetaris paribus,* the probability that a household falls into poverty increases by 21.5 percent. This implies that the larger the dependency ratio, the higher the incidence and intensity of poverty in the household. This could be as a result of high number of children and old aged family members put much pressure on the limited resources at the household level. In addition, farming experience is expected to be associated with skills enhancement,

accumulation of resources, extensive social capital and others that ought to contribute positively to well-being (Bashaasha *et al.,* 2006). Our outcome also coincides with this idea.

Farming experience of household head is found to be negative and significant at less than 1 percent probability level, implying that as farming experience of household increases by one year, *cetaris paribus,* the probability that a household falls into poverty decrease by 2 percent. Moreover, number of farm participant was significant at less than 5 percent probability level and associated negatively with poverty status of a household. As number of farm participant increases by one adult person, *citrus paribus,* the probability that a household falls into poverty decrease by 6 percent.

The implication of this finding is that more number of farm participant improves efficiency and diversifies time and sources of agricultural income to reduce the risk associated with income from a single source. In addition, in Nagaur district months of food deficit and main road distance were important variable determining household poverty significantly at less than 1 percent probability level. They were associated positively with poverty status of a household. As main road distance increases by one kilometre, *cetaris paribus,* the probability that a household falls into poverty increase by 2 percent and as months of food deficit increases by one month, the probability that a household falls into poverty increase by 5 percent. Closeness to main road creates easy access to information on inputs and transportation.

4.3.2. Average poverty exit time

The goal of the Indian government is ‘a country free of poverty’. Not only Indian government, international organizations also set their objectives based on time. Currently proposed Sustainable Development Goal (SDG) for 2030 has a theme of end poverty. It has set numerical targets of end poverty and hunger by 2030. In their backdrop, there is alarming need to have meaningful poverty analysis,

identifying the time required to escape the poverty trap under sustainable growth scenarios. This can be achieved if FGT (Foster-Greer-Thorbeecke) measures of poverty are supplemented with a cardinally meaningful measure - Average Exit Time Measure of Poverty.

It is well known that simply counting the poor and calculating their proportion in the population can be a misleading indicator of poverty because no allowance is made for how far below the poverty line they fall (other problems with these world poverty counts are discussed by Deaton, 2000). A further problem with this head-count measure of poverty is that it may give perverse incentives to target poverty reduction towards the least poor because a given transfer will push more of them over the poverty line. Even 'poverty gap' measures, based on the average shortfall between the incomes of the poor and the poverty line, can be criticized because they are invariant to regressive transfers to a poor person from someone who is poorer (Sen, 1976). But despite these shortcomings, the head-count and poverty gap measures remain the most widely used indicators of poverty, and this popularity may not just reflect their simplicity.

However, in this section we searched answer for the question how long are poor going to stay in poverty? Assumed economic growth based on the current country performance and average exit time in Northern Rajasthan following Morduch J.(1998) approach is this section outline. Despite the Watts poverty index has been proposed in the literature quite a long time ago, the index however has never been widely used since this index cannot be cardinally interpreted. Morduch (1998), transforms Watts poverty index to make it more useful and could be applied widely in poverty studies. In this study to compare the performance of the average exit time measure of poverty with that of the more familiar headcount ratio index result, our household survey data were used. The average time to exit poverty measure is based around the number of years that it would take poor households to grow out of poverty given a hypothetical, steady growth of income (economy). A Watts Index and headcount ratio index

comparison for overall sampled household in Northern Rajasthan is depicted on table 4.113.

Table 4.113: Aggregate poverty indicators in Northern Rajasthan

Area	Watts Index	Headcount ratio index
North Rajasthan	0.6994	0.173

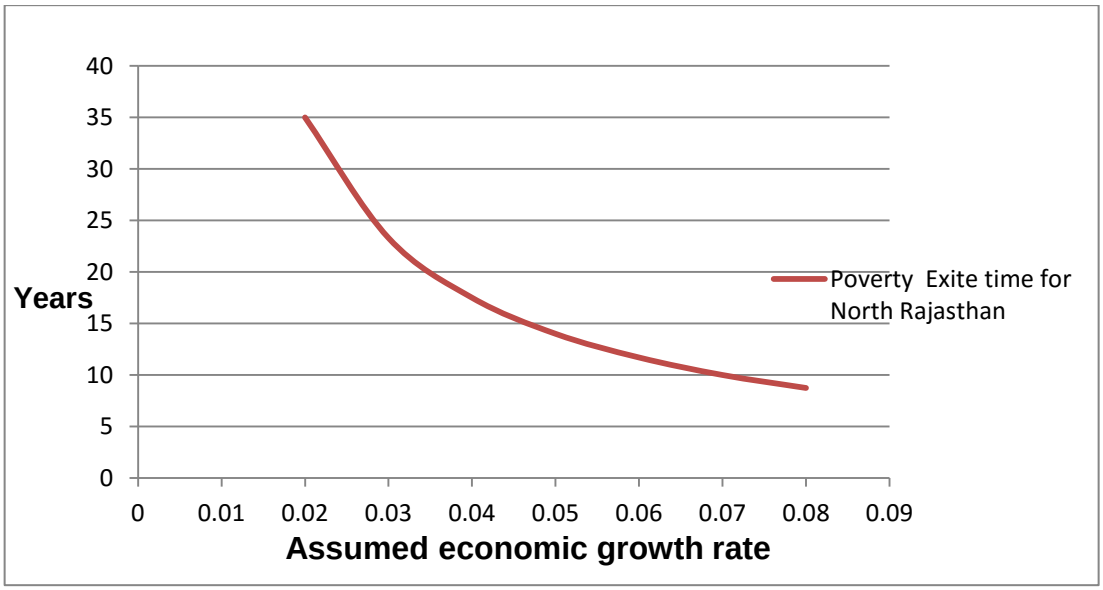
Source: Survey data (2015)

Table 4.113 shows the calculated Watts poverty index as well as the headcount ratio index in North Rajasthan. Watts poverty index in North Rajasthan is consistent with the headcount ratio index in the area. Both Watts poverty index (0.6994) and headcount ratio index (0.173) shows the highest value for overall sampled respondents. According to our objective two analysis result, out of three hundred sampled households in the study area, fifty two households were categorized as poor. This means 17.3 percent of sampled households are under poverty line in Northern Rajasthan. For fifty two households consumption expenditure is less than ₹1036 per person per month. According to 2011/12 report of the expert group, Rajasthan state total percentage of the population below the poverty line was 21.7 percent. Within four years interval between 2011/12 to 2014/15 the average poverty status of sampled household reduced from 21.7 percent to 17.3 percent in Northern Rajasthan. Poverty declined by 4.4 percentage points over the four years. In each year poverty declined 1.1 percentage points. This result agrees with objective one general trend result in the country. Based on the result it is possible to say the benefits of growth, in terms of income and employment has been adequately shared by the poor in the country.

Exit times provide clear tools to summarize data in ways that can inform policy debate on growth-based poverty strategies. The “average exit time” is based on the number of years that it would take a poor household to grow out of poverty given a hypothetical, steady growth rate of income. Accordingly, exit times for

overall sampled household in Northern Rajasthan based on our methodology calculation are shown in figure 4.7 for assumed growth rates.

Figure 4.7: Average poverty exit time Northern Rajasthan



Source: Author's Own, 2015

The graph shows, if the country attains high economic growth, it would need less average time of poverty exit and vice versa in the study area. If the country economy grows with 5 percent per year, as actual average growth performance of the Indian economy between 2012/13 to 2014/15, it would take 14 years for poor of Northern Rajasthan to exit from poverty. Further the graph shows that, the average time taken to exit from poverty would reduce to 9 years, if this growth rate would be 8 percent per annum. On the other hand, the time would increase to 35 years, if the country economy attained inexperienced growth rate of 2 percent per annum.

To make Watts Index and headcount ratio index comparisons easier and understandable we expand our data analysis range to district level. One of the advantages of both Watts Index and headcount ratio is the ability to decompose their measures by sub-population like residents of different districts. The critical feature for decomposition is that the sub-groups are distinct from each other (so

that there is no overlap in membership) and that together they encompass the entire population. All additive indexes are decomposable, and all of the measures discussed below share the feature.

Table 4.114: Aggregate poverty indicators in study districts

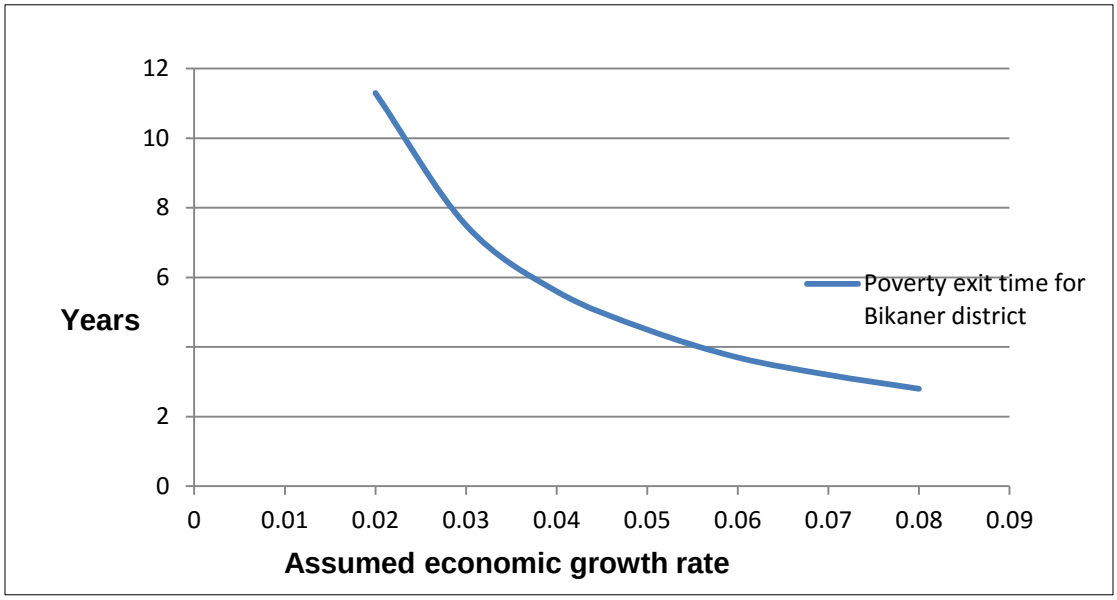
District	Watts Index	Headcount ratio index
Nagaur	0.294	0.20
Bikaner	0.225	0.17
Sri Ganganagar	0.181	0.15

Source: Survey data (2015)

Table 4.114 shows the calculated Watts poverty index as well as the headcount ratio index in the study districts. The Watts poverty index at district level appears to be the highest in Nagaur (0.294), followed by Bikaner (0.225) and Sri Ganganagar (0.181). Interestingly, the pattern of poverty as indicated by the Watts poverty index is consistent with the headcount ratio index. Besides, the Watts poverty index, the headcount ratio index at district also shows that, poverty is the highest in Nagaur (0.20), followed by Bikaner (0.17), while it is the lowest in Sri Ganganagar (0.15). This shows in Nagaur 20 percent, in Bikaner 17 percent and in Sri Ganganagar 15 percent sampled households are under poverty line. Thus, the agricultural resource, especially irrigated land accessibility to the local economy seems to have an important bearing on the magnitude of poverty. Our results show that districts with more irrigation access (Sri Ganganagar and Bikaner) recorded the lowest poverty incidence, perhaps due to higher production and income opportunities. Thus, households in Sri Ganganagar and Bikaner district could get more income by increasing frequency of production. On the other hand, Nagaur district which depends on rainfed agriculture, i.e. nature dependent agricultural, has the highest poverty incidence. In agrarian economy, rainfed agriculture generates stagnant local economy than moving type. Perhaps, in a stagnant local economy (Nagaur district), farmers did not have the opportunities to diversify their production and income sources as

farmers in Sri Ganganagar and Bikaner districts. Poverty exit time for Bikaner district is presented on figure 4.8.

Figure 4.8: Average poverty exit time for Bikaner district



Source: Author's Own, 2015

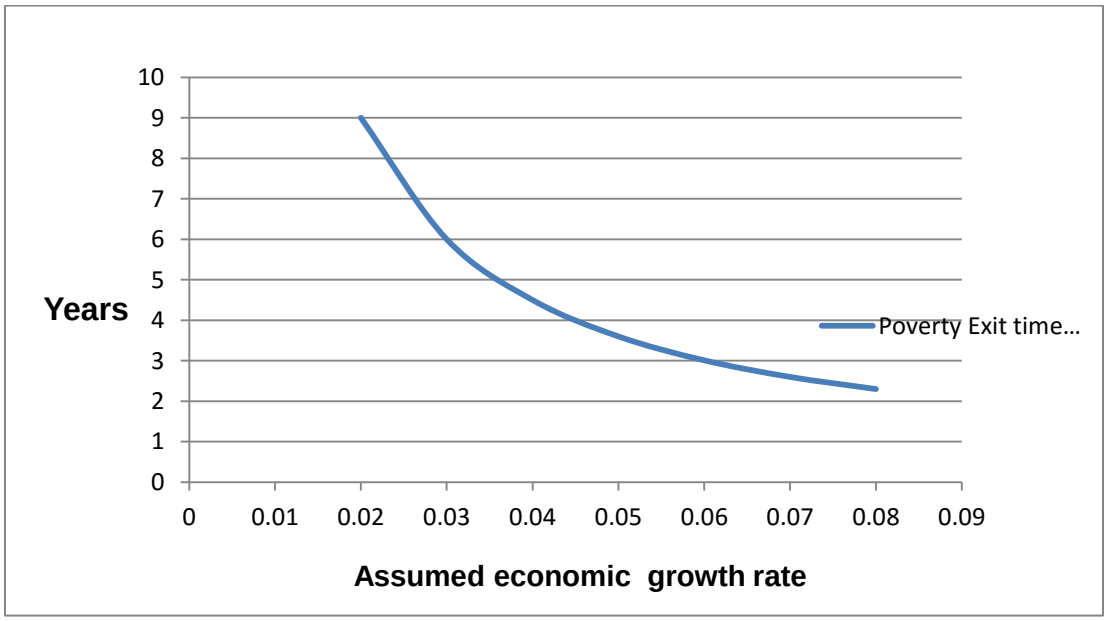
The plotted graph shows the average time of poverty exit for the poor in Bikaner district. It is plotted for an assumed potential growth rate that ranges between 1 percent and 9 percent. It revealed existence of inverse relationship between economic growth and average time of poverty exit in the study area. From the graph we can easily understand, if the country economy grow with 5 percent per year, it would take Bikaner district poor to exit from poverty 4.5 years. This assumed growth rate is consistent with the actual average growth performance of the Indian economy between 2012/13 to 2014/15. The average time taken to exit from poverty would reduce further to 2.8 years, if this growth rate would be, 8 percent per annum. In other way, the time would increase to 11.3 years, if the country economy show inexperienced growth rate of 2 percent per annum.

From the above result we can easily identify that, the objective of poverty reduction in a nation will only be successful provided that the economy of the nation grows continuously and at the same time the poor groups of rural households are taken in to account by policy makers. Hence, the concept of

average time needed to exit poverty is central to lift majority of the poor households from poverty.

Similarly average poverty exit time for Sri Ganganagar district is depicted on figure 4.9.

Figure 4.9: Average poverty exit time for Sri Ganganagar district

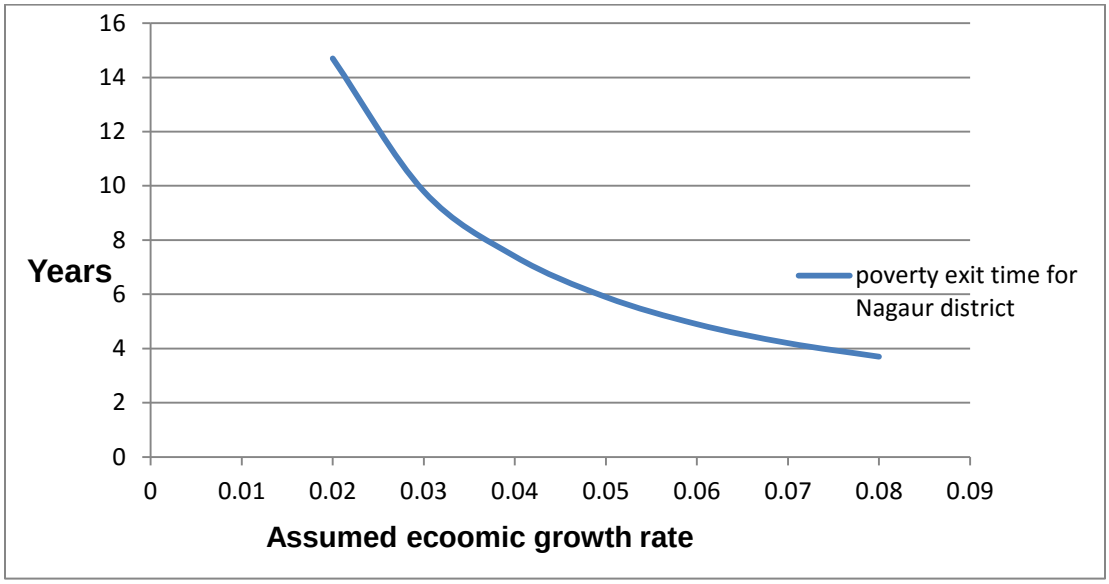


Source: Author's Own, 2015

Figure 4.9 shows the average time of poverty exit for the poor in Sri Ganganagar district. If the country economy grows with average real growth rate, that is 5 percent per year, it would take the district poor to exit from poverty 3.6 years. In the district the average time would reduce further to 2.3 years, if this growth rate would be, 8 percent per annum. But, if the country economies grow unexpectedly 2 percent per year, it would take the district poor to exit from poverty 9 years. Even if poor's in Bikaner and Sri Ganganagar districts face the same economic growth rate, the poor in the latter district needs less time to exit from poverty than the former. Factors which contribute for this significant difference might be the major agricultural resource accessibility, such as irrigation schemes.

Average poverty exit time for Nagaur district is depicted on figure 4.10.

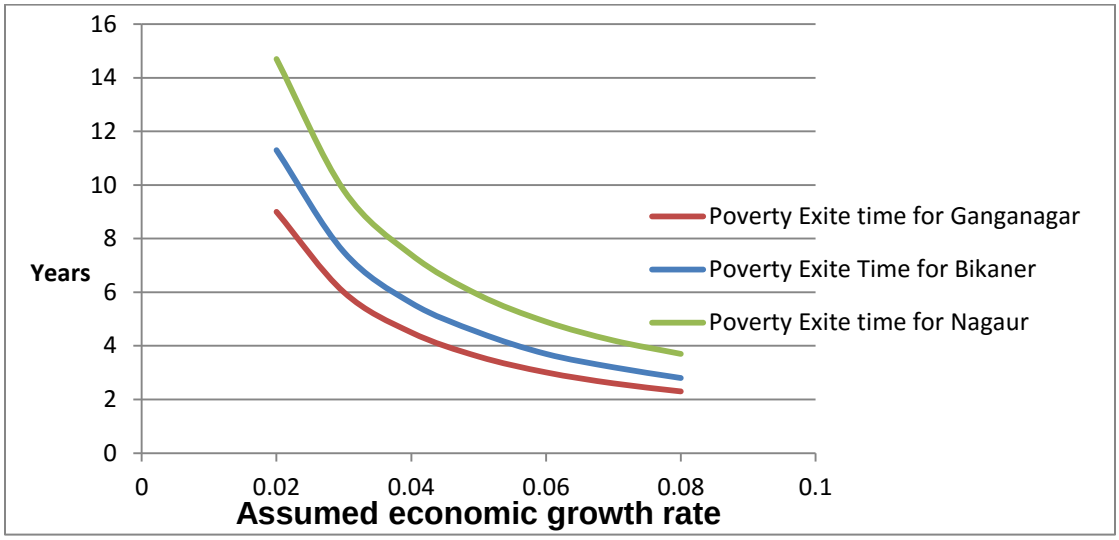
Figure 4.10: Average poverty exit time for Nagaur district



Source: Author's Own, 2015

Figure 4.10 also depicts the inverse relationship between hypothetical economic growth rate and the average time of poverty in Nagaur district. The result shows poor household in Nagaur district would need more time to exit from poverty than Bikaner and Sri Ganganagar districts. If the country economy grows with 5 percent per year, it would take Nagaur district poor to exit from poverty 6 years. Our findings show that, the average time taken to exit from poverty would reduce further to 3.7 years, if this growth rate would be 8 percent per annum. On the other hand, the time would increase to 15 years, if the country economy attained inexperienced growth rate of 2 percent per annum unexpectedly. To see the three districts simultaneously, it is depicted on figure 4.11.

Figure 4.11: Average poverty exit time among districts



Source: Author's Own, 2015

Figure 4.11 shows the average time of poverty exit for the poor in three districts using hypothetical economic growth rate. What is more interesting is that there is clear differences in the average time of poverty exit for households in three districts. Our findings show that households that reside in an area where the local economy is characterized by irrigated agricultural, their average time of poverty exit is the shortest (Sri Ganganagar) and the graph is near to the origin. Our results appear to lend support to our preconceived view those households who live in areas where access to irrigation will have higher probability to diversify and maximize household income and hence, push them out of poverty.

In contrast, the average time of poverty exit for households that reside in an area where the local economy is characterized by rainfed agricultural is significantly longer. In areas where agriculture strongly depends on rainfed, there is lower probability for the households to diversify and maximize household income. As a result, households in this area derive their income mainly from nature dependent rainfed agriculture and family wage value is less as compared to irrigated area. As there are not significant additional income sources, this will require them longer period to exit from poverty. From the graph (figure 4.11), we can easily

understand that, if the country economy grows with 5 percent per year, as actual average growth performance of the Indian economy between 2012/13 to 2014/15, the poor households that reside in Sri Ganganagar districts will take only 3.6 years to exit poverty, while it takes 6 years for the poor households in Nagaur district and 4.5 years for the poor households in Bikaner district. If growth rate would be continuous and uniform across the population at 8 percent per annum, it would take only 2.3 years for Sri Ganganagar poor households to exit from poverty, almost 4 years for Nagaur district and 2.8 years for Bikaner district. Nevertheless, the time would increase to 11 years in Sri Ganganagar, 15 years in Nagaur and 11 years in Bikaner districts, if the country economy attained inexperienced growth rate of 2 percent per annum.

To summarize our average poverty exit time analysis, all the study area districts and overall sampled households average exit time depicted in table 4.115 and figure 4.12.

Table 4.115: Summery of average poverty exit time in years

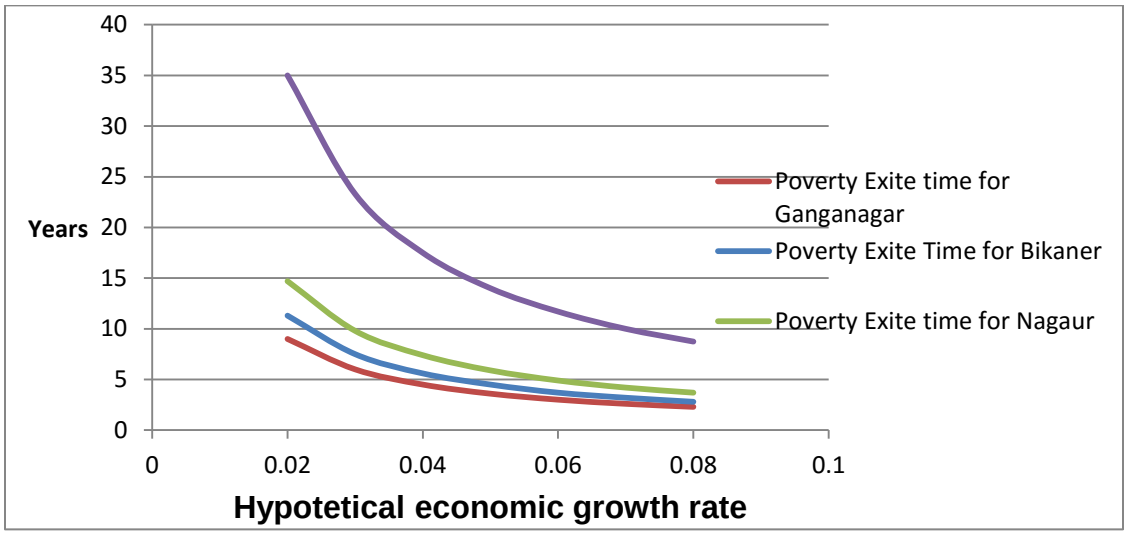
Economic growth rate	Bikaner exit years	Sri Ganganagar exit years	Nagaur exit years	North Rajasthan exit years
2%	11.3	9	14.7	35
3%	7.5	6	9.8	23.3
4%	5.6	4.5	7.4	17.5
5%	4.5	3.6	5.9	14
6%	3.7	3.01	4.9	11.7
7%	3.2	2.6	4.2	10
8%	2.8	2.3	3.7	8.74

Source: Author's Own, 2015

From the summery table and graph, we can see that, it would take more years of exit for total respondents in Northern Rajasthan than district level. Northern Rajasthan exit time graph is far from origin and above all district exit time graph. As the number of poor increase it requires more time with the assumed economic growth rate. With 2012/13 and 2013/14 Indian economic growth rate (averaged 5 percent), Northern Rajasthan will be free of poverty after 14 years or in 2029

earlier than global poverty zero time of 2030. Currently increasing in growth performance in agriculture sector may also contribute to lessen the time in the future.

Figure 4.12: Average poverty exit time for districts Northern Rajasthan



Source: Author's Own, 2015

4.4. Relative poverty (Income and resource inequality)

Relative' poverty, defined as having little in a specific dimension compared to other members of society. This concept is based on the idea that the way individuals or households perceive their position in society is an important aspect of their welfare. Among the most important economic challenges facing Rajasthan, the increases in the inequality of economic outcomes needs attention like poverty. Inequality measurement is an important factor in economy that indicates whether benefits of the growth or resources have been concentrated or "trickled down" sufficiently to the society. Inequality is concerned with distribution. The overall level of inequality in a country, region or population group – and more generally the distribution of income, resource or other attributes – is also in itself an important dimension of welfare in that group. Inequality measures can be calculated for any distribution—not just for income or other monetary variables,

but also for land, livestock and other continuous and cardinal variables (world Bank, 2011).

In this fourth objective, inequality was calculated for agricultural resource and total family income by using Lorenz curve and Gini coefficients. The study utilized simplest way to measure inequality by dividing the sampled households into fifths (quintiles) from poorest to richest, and reporting the levels or proportions of income or resource that accrue to each level using descriptive analysis.

The study first investigated the status of agricultural resource inequality among sampled households in Northern Rajasthan generally and in Bikaner, Sri Ganganagar and Nagaur districts specifically. Then, it assesses total income inequality among sampled households in the study area. To make the analysis easy to understand in this research, income is disintegrated in to farm and non-farm income.

Furthermore our agricultural resource inequality analysis focused on agricultural land holding, irrigated land holding and livestock holding using Lorenz curve and Gini coefficients among sampled households both in Northern Rajasthan and its districts. The shape of the Lorenz curve is good visual indicator of how much inequality there is in an income or resource distribution. A popular measure of inequality is the Gini coefficient, derived from the Lorenz curve, which ranges from 0 (perfect equality) to 1 (perfect inequality or one household has all the income or land; all others have none).

4.4.1 Resource inequality

To make inequality analysis complete, analysing suspected sources for income inequality in rural economy among surveyed households is essential. Theoretically, there are several reasons for the existence of income inequality, most of them are actually related and many of them respond to the same underlying economic forces. In rural economy perhaps one of the most important

long-established causes of income inequality is land and water concentration. Land distribution as a source of income inequality is naturally related with the rural context of societies, where production and the generation of wealth were highly associated with agricultural activities. Traditional measures of inequality, such as the Gini coefficient computed for a single year, do not capture much about what is happening over time and/or within particular societies' income distribution. To realize income inequality in rural economy, it is essential to distinguish inequality in asset (wealth) distribution. In rural economy land, livestock and irrigated land size have very different effect on inequality.

4.4.1.1. Agricultural land distribution households

Land is the fundamental means of production in an agrarian society without which no agricultural production can take place. An understanding of the pattern of operational holdings distribution of land among states is therefore of central importance to assist the process of planning and targeting of poverty reduction. The pattern of land distribution among surveyed households divided into fifths (quintiles) from poorest to richest in Northern Rajasthan is determined and results are shown in table 4.116.

Table 4.116 shows agricultural land distributions among surveyed households in Northern Rajasthan. Upper 20 percent land holders took the lion share which is represented by 50.05 percent of total agricultural land whiles the lowest 20 percent sampled household share is less than one percent. Majority middle 60 percent households owned 49.46 percent of total agricultural land. If each individual had the same agricultural land holding in Northern Rajasthan, a household in each quintile can averagely owned 5.81 hectare. Conversely, a household from upper 20 percent owned averagely 14.53 hectare but household from lowest 20 percent owned only 0.142 hectare agricultural land averagely. The uppermost 20 percent land holding is 2.5 times more than the assumed equal distribution rate, more than 102 times more than lowest 20 quintiles holding and more than six times the lowest 40 percent quintiles. All these shows land is

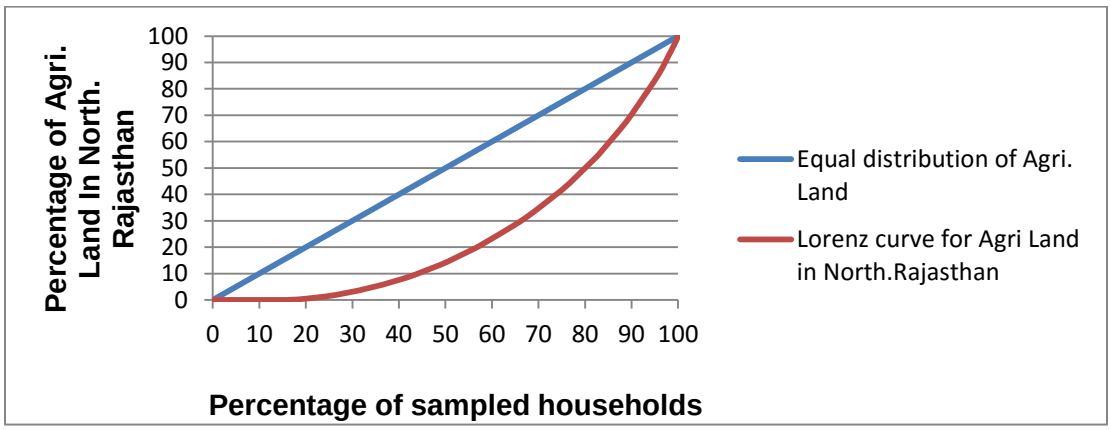
unequally distributed among sampled households in Northern Rajasthan. Lorenz curve for agricultural land distribution in Northern Rajasthan is depicted in the Figure 4.13.

Table 4.116: Categorization of farm land in Northern Rajasthan

Farm land (quintiles)	households number	Cumulative frequency of households (%)	Total farm land in (ha)	Share of total farm land (%)	Per household farm land (ha)
Lowest 20%	60	20	8.5	0.49	0.142
Low-mid 20%	60	40	123.75	7.1	2.063
Middle 20%	60	60	273.1	15.67	4.55
Mid-upper 20%	60	80	465.15	26.69	7.75
Upper 20%	60	100	871.9	50.05	14.53
Overall	300		1742.4	100	5.81

Source: Author's computations, based on household survey data, 2015

Figure 4.13: Lorenz curve for farm land in Northern Rajasthan



Source: Author's Own, 2015

The Lorenz curve locus for agricultural land holding shows, existence of skewed distribution among sampled households. Gini-coefficient value (0.499) obtained from the data shows existence of unequal distribution of agricultural land among sampled households. This means few households hold major agricultural land and the rest households hold little agricultural land. This result coincides with Melkamu and Bannor (2015), who found and concluded Gini coefficient(0.6) value and the shape of the Lorenz curve shows existence of skewed distribution

of land holding among Indian states and only five states hold more than 50 percent of operational holdings of the country.

To understand land distribution among sampled households, the study analysed district level distribution among sampled households. Accordingly, agricultural land distribution among surveyed households in Bikaner district is determined and results are shown in table 4.117.

Table 4.117: Categorization of farm land in Bikaner district

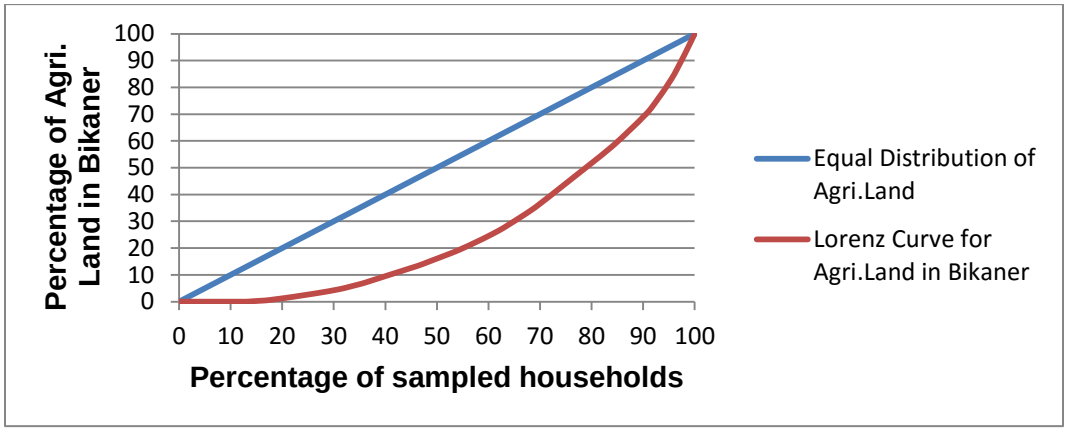
Farm land (quintiles)	Households number	Cumulative frequency of households (%)	Total farm land in (ha)	Share of total farm land (%)	Per household farm land (ha)
Lowest 20%	20	20	5	1.23	0.25
Low-mid 20%	20	40	33.75	8.29	1.69
Middle 20%	20	60	61.1	15.01	3.06
Mid-upper 20%	20	80	110.8	27.21	5.54
Upper 20%	20	100	196.55	48.26	9.83
Overall	100		407.2	100	4.072

Source: Author's computations, based on household survey data, 2015

Share of lowest 20 percent in total agricultural land in Bikaner is only 1.23 percent on the other hand upper 20 percent share is 48.26 percent. More than half of agricultural land is owned by majority mid 60 percent households. If every household maintained equal land holding in Bikaner district, a household in each quintile can averagely possessed 4.072 hectare. However, each household from upper 20 percent owned averagely 9.83 hectare however a household from lowest 20 percent owned averagely less than one hectare. The agricultural land holding of uppermost 20 percent quintiles is more than 39 times higher than the lowest 20 percent quintiles and more than 2 times higher than the hypothesized equal distribution value in Bikaner district. These all indicates presence of agricultural land holding distribution inequality in Bikaner district. To understand the situation in more detail, Lorenz curve is depicted in figure 4.14.

The Lorenz curve drawn to see how agricultural land is distributed among surveyed households in Bikaner district is shown on figure 4.14. The figure shows the existence of skewed distribution. The Lorenz curve is far from the equality distribution line. Gin-coefficient value of 0.481 also guarantees the existence of inequality in agricultural land holding distribution among sampled households in the area. It means that 48.1 percent agricultural land is distributed unequally in Bikaner district.

Figure 4.14: Lorenz curve for farm land in Bikaner district



Source: Author's Own, 2015

Similarly, Sri Ganganagar district agricultural land distribution among surveyed households is calculated and results are shown in table 4.118.

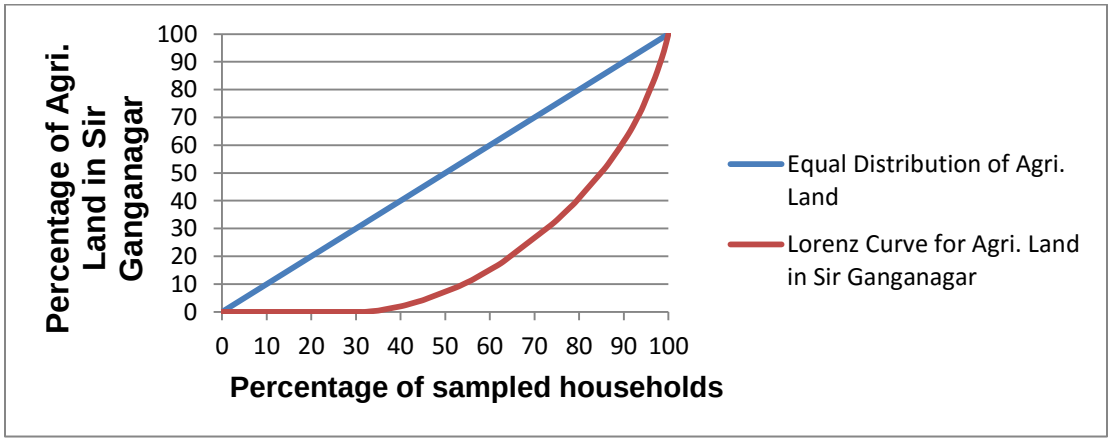
Table 4.118: Categorization of farm land in Sri Ganganagar district

Farm land (quintiles)	Households number	Cumulative frequency of households (%)	Total farm land in (ha)	Share of total farm land (%)	Per household farm land (ha)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	6.5	2	0.33
Middle 20%	20	60	42.8	13.16	2.14
Mid-upper 20%	20	80	84.1	25.86	4.21
Upper 20%	20	100	191.8	58.98	9.59
Overall	100		325.2	100	3.25

Source: Author's computations, based on household survey data, 2015

Results depicted on table 4.118 illustrate agricultural land distributions among surveyed households in Sri Ganganagar district. More than half of the districts total agriculture land is owned by upper 20 percent quintiles and lowest 20 percent quintiles do not own any agricultural land holding. Majority mid-60 percent owned 41.02 percent of total agriculture land in Sri Ganganagar district. If every household owned equal agricultural land in Sri Ganganagar district, every single household in each quintile can averagely possessed 3.25 hectare. However, each household from upper 20 percent averagely possessed 9.59 hectares on the other hand household from lowest 20 percent possessed no agricultural holding. The uppermost 20 percent agricultural land holding is almost 30 times more than the lowest 40 percent quintiles and 3 times higher than the assumed equal distribution rate. Agricultural land in Sri Ganganagar district is unequally distributed among sampled households. To see the situation graphically, Lorenz curve is drawn for the sampled households on figure 4.15.

Figure 4.15: Lorenz curve for farm land in Sri Ganganagar district



Source: Author's Own, 2015

The graphical representation of landholding in Sri Ganganagar district is depicted in figure 4.15. The shape of the Lorenz curve for agricultural land holding depicts greater variability among sampled households in land holding. The Gini coefficient value which is 0.603, suggests that the distribution of landholding in Sri Ganganagar district is highly skewed. The Gini coefficient of Sri Ganganagar

district (0.603) has the higher agricultural land holding inequality than the Bikaner district (0.481). So, in Sri Ganganagar district relatively, agricultural land holding distribution is worse than Bikaner district.

In the same way, Nagaur district agricultural land distribution among surveyed households is calculated and results are shown in table 4.119.

Table 4.119: Categorization of farm land in Nagaur district

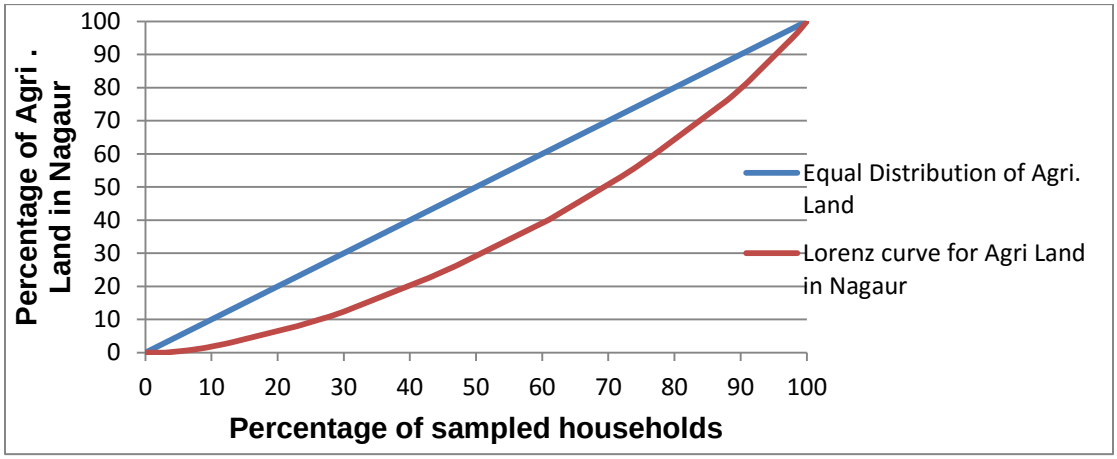
Farm land (quintiles)	Households number	Cumulative frequency of households (%)	Total farm land in (ha)	Share of total farm land (%)	Per household farm land (ha)
Lowest 20%	10	20	66	6.53	3.3
Low-mid 20%	20	40	139	13.76	6.95
Middle 20%	20	60	190	18.81	9.5
Mid-upper 20%	20	80	255	25.26	12.75
Upper 20%	20	100	360	35.64	18
Overall	100		1010	100	10.1

Source: Author's computations, based on household survey data, 2015

Table 4.119 shows the level of agricultural land distributions among surveyed households in Nagaur district. The results show that lowest 20 percent owned 6.53 percent share in total agricultural land on the other hand the share of upper 20 percent is 35.64 percent. Middle 60 percent households owned 57.83 percent of total agricultural land. If each individual have the same agricultural land, household from each quintile owned 10.1 hectares of land. The agricultural land holding of uppermost 20 percent quintile is more than 5 times higher than lowest 20 percent quintile and almost 2 times higher than the assumed equal distribution rate in Nagaur district. All the results indicates presence of inequality in agricultural land distributions, but as compared to Bikaner and Sri Ganganagar districts, agricultural land distribution in Nagaur district has diffusion from upper 20 percent to lowest 20 percent households. To see this diffusion graphically, Lorenz curve is depicted on figure 4.16.

The Lorenz curve drawn to see how agricultural land is distributed among surveyed households in Nagaur district shows the existence of moderate inequality. The Lorenz curve is not far from the perfect distribution line, which shows as compared to other resource distribution in the district agricultural land distribution is not much skewed. The Gini-coefficient (0.295) is also not much far from zero, shows existence of inequality but that inequality in agricultural land holding in Nagaur district is not serious as compared to other districts in the study area. The Gini coefficient result in three districts shows that Nagaur district (0.295) have the lowest agricultural land distributions inequality followed by Bikaner (0.481) and Sri Ganganagar (0.603) districts.

Figure 4.16: Lorenz curve for farm land in Nagaur district



Source: Author's Own, 2015

4.4.1.2 Livestock distribution among surveyed households

Livestock is capital assets produced in the past and contributing to future product output. In India livestock is the source of food, income, employment and foreign exchange hence has potential key role in reducing rural poverty. For low income producers, livestock can serve as a store of wealth; provide draught power and organic fertilizer for crop production. Livestock sector in its bid to help rural poor recently introduced technology which is applicable for landless households. This land-saving technology is alternative solution for household income poverty

alleviation. Therefore understanding of the pattern of operational holdings distribution of livestock among sampled households is central importance to assist the process of planning and targeting of poverty reduction. Surveyed households livestock holding in TLU in Northern Rajasthan is calculated and results are shown in table 4.120.

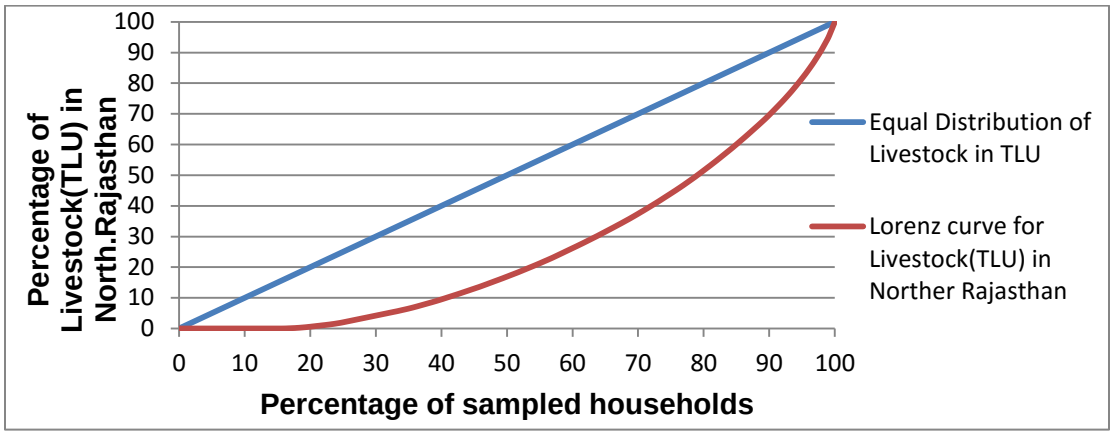
Livestock distributions among surveyed households in Northern Rajasthan are depicted on table 4.120. The results show, the lowest 20 percent households owns just 0.56 percent of total livestock holdings and highest 20 percent households own 48.45 percent of total livestock holdings. The middle 60 percent households own 50.99 percent of total livestock holdings in Northern Rajasthan. If every household possessed equal number of livestock in TLU, a household in each quintile can averagely owned 2.84 livestock in TLU. However, averagely each household from upper 20 percent possessed 6.9 livestock in TLU whereas each household from lowest 20 percent averagely owned only 0.08 livestock in TLU. The uppermost 20 percent quintiles livestock holding is more than 86 times higher than the lowest 20 percent quintiles and more than 2 times the expected equal distribution amount. The livestock distribution results also indicate presence of uneven distribution of livestock among sampled households in Northern Rajasthan. To realize graphically, the distribution trend, Lorenz curve is prepared and depicted on figure 4.17.

Table 4.120: Categorization of livestock holding in Northern Rajasthan

Livestock holding (quintiles)	Households number	Cumulative frequency of households (%)	Total livestock in (TLU)	Share of total livestock (%)	Per household livestock (TLU)
Lowest 20%	60	20	4.94	0.56	0.08
Low-mid 20%	60	40	75.93	8.91	1.3
Middle 20%	60	60	142.43	16.72	2.4
Mid-upper 20%	60	80	216.03	25.36	3.6
Upper 20%	60	100	412.96	48.45	6.9
Overall	300		852.29	100	2.84

Source: Author's computations, based on household survey data, 2015

Figure 4.17: Lorenz curve for livestock in Northern Rajasthan



Source: Author's Own, 2015

The Lorenz curve depicted on figure 4.17 is drawn to see how livestock is distributed among surveyed households in northern Rajasthan. The curve shows the existence of inequality. The Gini-coefficient (0.476) also supports existence of inequality in livestock holding among sampled households. This result agrees with Melkamu and Bannor (2015), who found Gini coefficient (0.54) value for Indian livestock distribution among states and their Lorenz curve shape showed existence of skewed distribution for livestock distribution. They finally conclude that only five states owned more than 55 percent share and the countries 90 percent livestock population is accumulated only in 14 states.

To understand the pattern of livestock holdings distribution among sampled households, the study further analyzed at district level. Therefore, Bikaner district livestock distribution among surveyed households is calculated and results are shown in table 4.121.

Table 4.121 demonstrates livestock distribution among surveyed households in Bikaner district. The results show that majority middle 60 percent households owned 48.7 percent of total livestock holdings in the district. The lowest 20 percent population owned just 4.04 percent of total livestock holdings and upper 20 percent households owned 47.26 percent of total livestock holdings. If every

household owned equal number of livestock in TLU, a household in each quintile can averagely have 3.37 livestock in TLU. However, averagely each household from upper 20 percent owned 7.97 livestock in TLU whereas each household from lowest 20 percent averagely possessed only 0.68 livestock in TLU. The uppermost 20 percent quintiles livestock holding in Bikaner is more than 11 times higher than the lowest 20 percent quintiles and more than 2 times higher than the assumed equal distribution proportion. All the data result specifies clear presence of inequality in livestock distribution among sampled households. Graphically, the data is presented on Lorenz curve on figure 4.18.

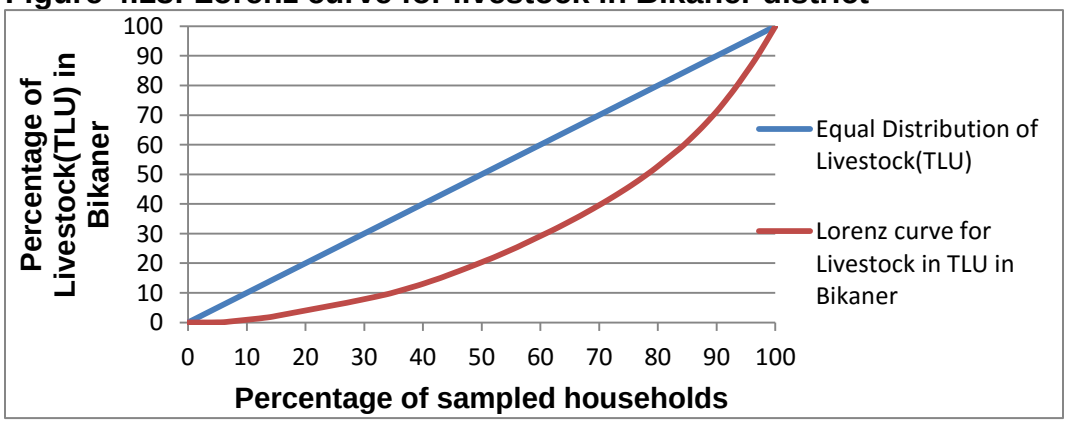
Table 4.121: Categorization of livestock holding in Bikaner district

Livestock holding (quintiles)	Households number	Cumulative frequency of households (%)	Total livestock in (TLU)	Share of total livestock (%)	Per household livestock (TLU)
Lowest 20%	20	20	13.62	4.04	0.68
Low-mid 20%	20	40	30.33	9	1.52
Middle 20%	20	60	54.43	16.14	2.72
Mid-upper 20%	20	80	79.45	23.56	3.97
Upper 20%	20	100	159.4	47.26	7.97
Overall	100		337.23	100	3.37

Source: Author's computations, based on household survey data, 2015

The Lorenz curve illustrated on figure 4.18 is far from the perfect distribution line, which specifies existence of livestock holding inequality among sampled households in Bikaner district.

Figure 4.18: Lorenz curve for livestock in Bikaner district



Source: Author's Own, 2015

The Gini-coefficient value (0.428) calculated from the data also shows existence of inequality in livestock holding among sampled households.

Following the same procedure, livestock distribution among surveyed households in Sri Ganganagar district is calculated and results are shown in table 4.122.

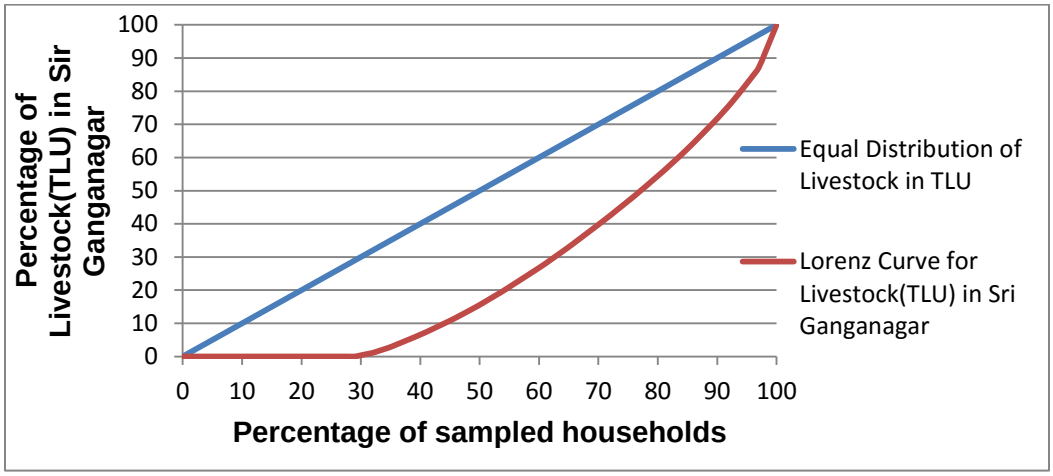
Table 4.122: Categorization of livestock holding in Sri Ganganagar district

Livestock holding (quintiles)	Households number	Cumulative frequency of households (%)	Total livestock in (TLU)	Share of total livestock (%)	Per household livestock (TLU)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	22.35	6.58	1.12
Middle 20%	20	60	68.4	20.15	3.42
Mid-upper 20%	20	80	94.06	27.71	4.7
Upper 20%	20	100	154.7	45.56	7.74
Overall	100		339.51	100	3.39

Source: Author's computations, based on household survey data, 2015

Table 4.122 shows livestock distributions among surveyed households in Sri Ganganagar district. The result shows that in Sri Ganganagar district, the lowest 20 percent households owned no livestock. The middle 60 percent households owned 54.44 percent of total livestock and highest 20 percent households owned as much as 45.56 percent of the total livestock. If every household owned equal number of livestock in TLU in Sri Ganganagar district, a household in each quintile can averagely possessed 3.39 livestock in TLU. Conversely, each household from upper 20 percent households owned averagely 7.74 livestock in TLU whereas lowest 20 percent households do not owned any livestock. The upper most 20 percent quintiles livestock holding is nearly 7 times higher than the lowest 40 percent quintiles and about two times higher than the assumed equal level of livestock holding distribution in the district. The results show that in Sri Ganganagar district, livestock distribution is skewed among sampled households. To see further Lorenz curve is depicted for the district livestock distribution among sampled households on figure 4.19.

Figure 4.19: Lorenz curve for livestock in Sri Ganganagar district



Source: - Author's Own, 2015

Figure 4.19 shows Lorenz curve of livestock distribution in Sri Ganganagar district. The curve location from point of perfect distribution also specifies existence of skewed distribution. The Gini-coefficient value of 0.477 further approves the presence of livestock distribution inequality among surveyed households in the district. The Gini coefficient of Sri Ganganagar district (0.477) has the higher livestock distribution inequality than the Bikaner district (0.428). So, in Sri Ganganagar district relatively, livestock distribution among sampled household is worse than Bikaner district.

Similarly, Nagaur district livestock distribution among surveyed households is calculated and results are shown in table 4.123. From the table we can easily understand that upper 20 percent owned more than 40 percent of total livestock whereas lowest 20 percent owned almost one percent. Majority of middle 60 percent owned 58.27 percent of total livestock. If every household owned equal number of livestock in TLU in Nagaur district, a household in each quintile owned averagely 3.57 livestock in TLU. Otherwise, averagely each household from upper 20 percent possessed 3.57 livestock in TLU but, every household from lowest 20 percent owned averagely 0.09 livestock in TLU. The uppermost 20 percent quintiles livestock holding is more than 39 times higher than the lowest 20 percent quintiles and 2 times more than the assumed equal distribution rate.

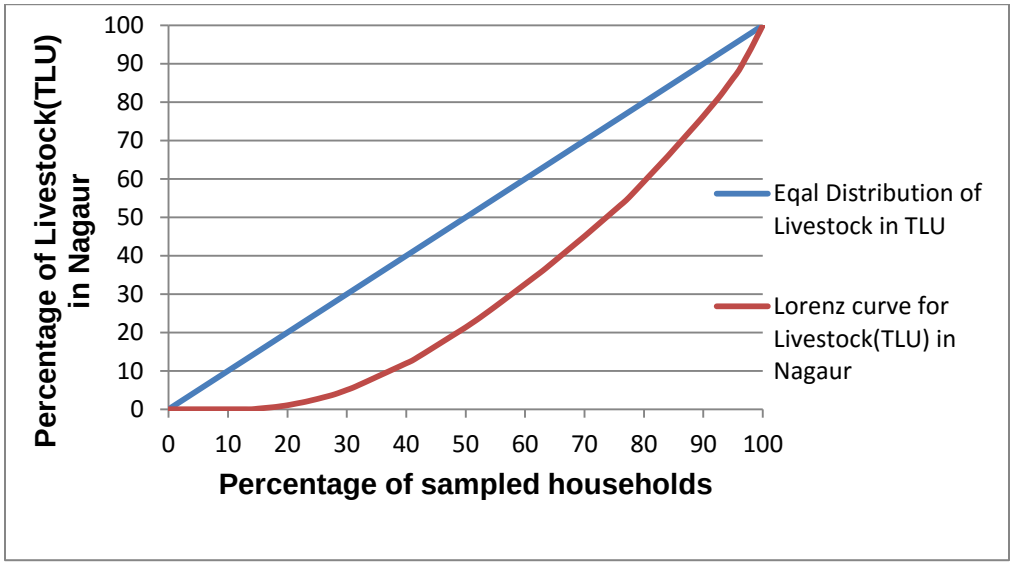
All the data result indicates the availability of livestock holding inequality in Nagaur district. To see graphically, Lorenz curve is depicted for the district livestock distribution among sampled households on figure 4.20.

Table 4.123: Categorization of livestock holding in Nagaur district

Livestock holding (quintiles)	Households number	Cumulative frequency of households (%)	Total livestock in (TLU)	Share of total livestock (%)	Per household livestock (TLU)
Lowest 20%	20	20	1.82	1.04	0.09
Low-mid 20%	20	40	19.19	10.93	0.96
Middle 20%	20	60	36.25	20.65	1.81
Mid-upper 20%	20	80	46.86	26.69	2.34
Upper 20%	20	100	71.43	40.69	3.57
Overall	100		175.55	100	1.76

Source: Author's computations, based on household survey data, 2015

Figure 4.20: Lorenz curve for livestock in Nagaur district



Source: Author's Own, 2015

The Lorenz curve drawn to see how livestock distributed among surveyed households in Nagaur district shows the existence of inequality in figure 4.20. The Lorenz curve deviation from the line of perfect equality and the Gini-coefficient value of 0.399 both indicates the presence of inequality in livestock

distribution among surveyed households in the district. The Gini coefficient result in three districts shows that Nagaur district (0.399) have the lowest livestock distributions inequality followed by Bikaner (0.428) and Sri Ganganagar (0.477) districts. Sri Ganganagar district livestock distributions inequality is the worst among the three districts.

4.4.1.3 Irrigated land distribution among households

Recently farm household income depends more on water than land. Whereas land was the primary resource affecting agricultural production in the early decades of the twentieth century, access to irrigation has taken on increasing importance in recent decades. Improved access to irrigation infrastructure will increase crop yield, agricultural production and farm income within a region. The irrigated land distribution among households of Northern Rajasthan is presented in table 4.124.

Table 4.124: Categorization of irrigated land in Northern Rajasthan

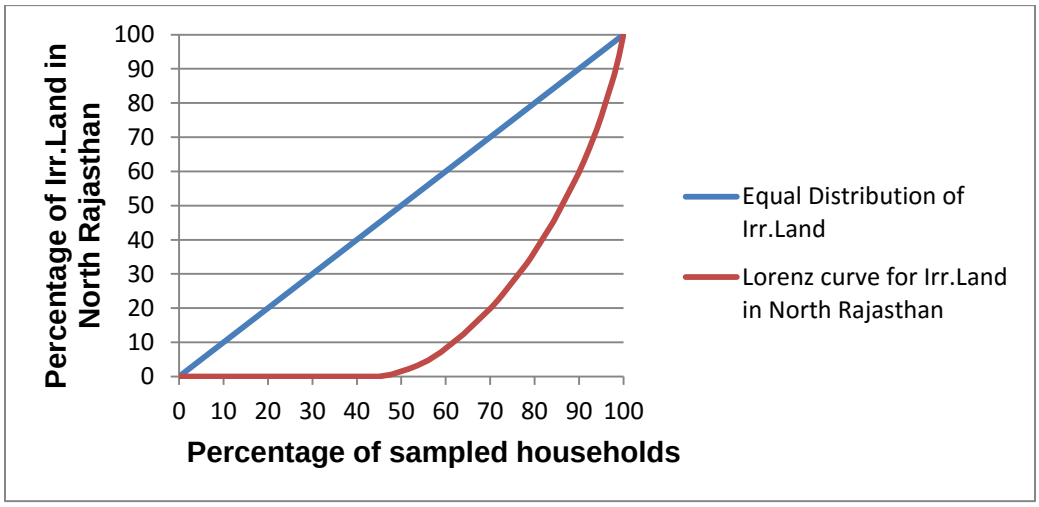
Irrigated land (quintiles)	Total households	Cumulative frequency of households (%)	Total irrigated Land in (ha)	Share of total irrigated Land (%)	Per household Irr. land (ha)
Lowest 20%	60	20	0	0	0
Low-mid 20%	60	40	0	0	0
Middle 20%	60	60	59.5	8.22	0.99
Mid-upper 20%	60	80	204.5	28.27	3.41
Upper 20%	60	100	459.4	63.51	7.66
Overall	300		723.4	100	2.41

Source: Author's computations, based on household survey data, 2015

According to table 4.124, lowest 20 percent and low-mid 20 percent household's do not owned any irrigable land. Upper 20 percent owned more than 63 percent of total irrigated land. The mid-40 percent owned 36.49 percent of total irrigated land in Northern Rajasthan. If every household owned equal irrigated land holding in Northern Rajasthan, a household in each quintile can averagely possessed 2.41 hectare irrigated land. Each household from upper 20 percent in

Northern Rajasthan averagely owned 7.66 hectare of irrigated land according to the results, on the other hand household from lowest 20 percent and low-mid 20 percent do not owned any irrigable land. Surprisingly, uppermost 20 percent quintiles irrigated land holding is almost 8 times higher than the lowest 60 percent quintiles and more than 3 times greater than the assumed equal distribution rate. All the data result indicates irrigated land is controlled by few people in Northern Rajasthan. To see the distribution of irrigated land among sampled households graphically, Lorenz curve is drawn and depicted on figure 4.21.

Figure 4.21: Lorenz curve for irrigated land in Northern Rajasthan



Source: Author's Own, 2015

The Lorenz curve locus move far away from line of perfect equality in figure 4.2. It shows existence of unequal distribution of irrigated land among sampled households. Gini coefficient value (0.67) obtained from the data shows existence of skewed distribution of irrigated land among sampled households. This outcome agrees with Melkamu and Bannor (2015), who found almost equal value of Gini coefficient (0.66) for irrigated land distribution in India and showed existence of big difference in irrigation land distribution among states and concluded that five states own more than 56 percent of irrigated area of the country and more than 90 percent of irrigated land found in only 11 states.

Access to irrigation has taken on increasing importance in recent decades because recently farm household income depends more on water than land. Understanding this, the study try to analyze district level irrigated land distribution. Accordingly, Bikaner district irrigated land distribution among surveyed households is calculated and results are shown in table 4.125.

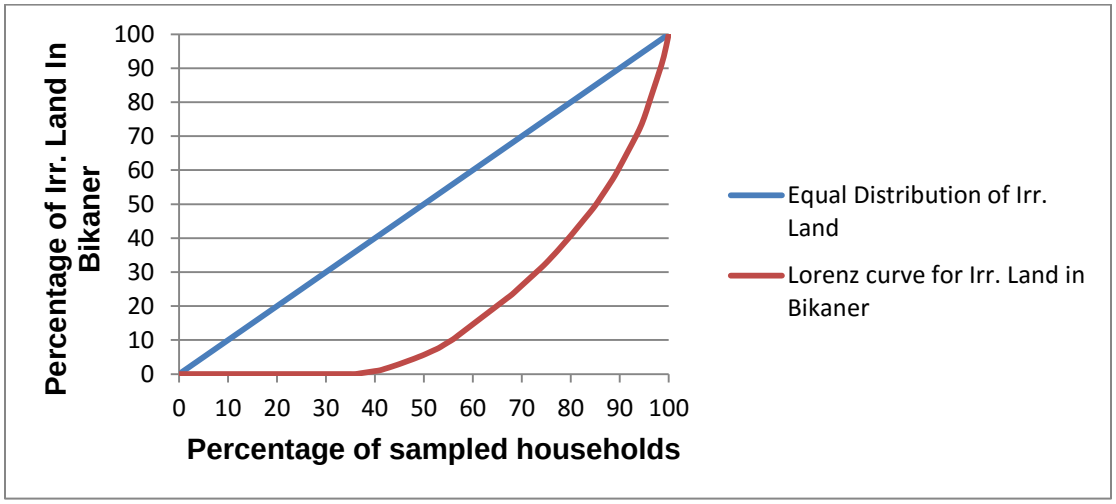
Table 4.125: Categorization of irrigated land in Bikaner district

Irrigated land (quintiles)	Households number	Cumulative frequency of households (%)	Total irrigated land in (ha)	Share of total irrigated land (%)	Per household Irr. land (ha)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	2	0.88	0.1
Middle 20%	20	60	31.4	13.78	1.57
Mid-upper 20%	20	80	59.4	26.06	2.97
Upper 20%	20	100	135.1	59.28	6.76
Overall	100		227.9	100	2.28

Source: Author's computations, based on household survey data, 2015

Table 4.125 shows irrigated land distributions among surveyed households in Bikaner district. The lowest 20 percent households owned no irrigated land in Bikaner district whereas upper 20 percent owned more than 59 percent of irrigated land. Majority mid-60 percent owned 40.72 percent of irrigated land. If each household owned equal irrigated land holding in Bikaner, a household in each quintile can averagely possessed 2.28 hectare. However, each household from upper 20 percent averagely owned 6.78 hectare irrigated land but household from lowest 20 percent do not owned any irrigated land. Amazingly, uppermost 20 percent quintiles irrigated land holding is more than 67 times higher than the lowest 40 percent quintiles and nearly 3 times greater than the supposed equal distribution rate. All the data result indicates irrigated land is distributed unequally among sampled households in Bikaner district. To see the distribution of irrigated land among sampled households graphically, Lorenz curve is drawn and depicted on figure 4.22.

Figure 4.22: Lorenz curve for irrigated land in Bikaner district



Source: Author's Own, 2015

Figure 4.22 describes Lorenz curve drawn to see how irrigated land is distributed among surveyed households in Bikaner district. The Lorenz curve is far from the perfect distribution line. It shows the existence of inequality. Gin-coefficient value of 0.613 also indicates the existence of high inequality in irrigated land holding distribution among sampled households in Bikaner district. It means that 61.3 percent of irrigated lands are distributed unequally in Bikaner district.

In similar manner, irrigated land holding distribution among surveyed households in Sri Ganganagar district is calculated and results are shown in table 4.126.

Table 4.126: Categorization of irrigated land in Sri Ganganagar district

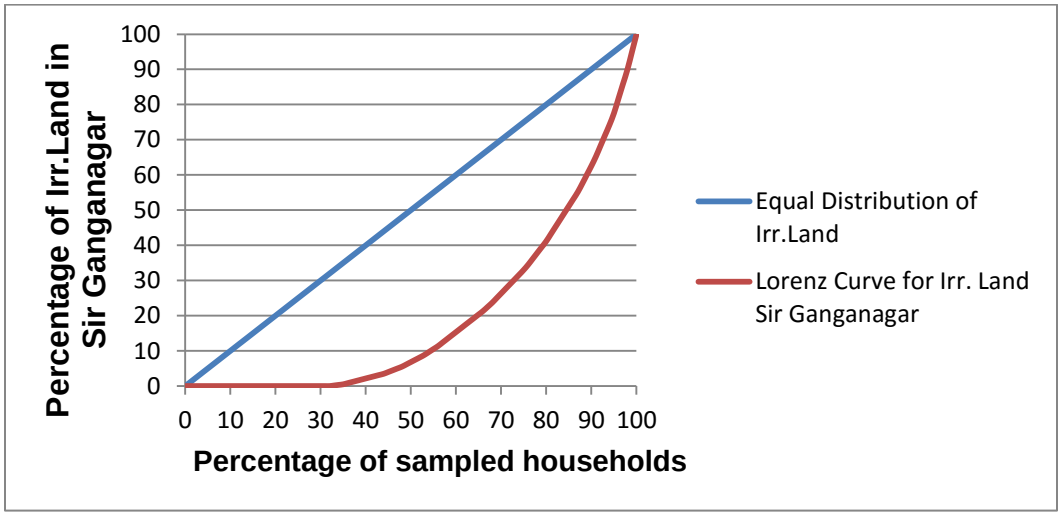
Irrigated land (quintiles)	Households number	Cumulative frequency of households (%)	Total irrigated land in (ha)	Share of total irrigated land (%)	Per household irr. land (ha)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	6.5	2.16	0.32
Middle 20%	20	60	39.6	13.18	1.98
Mid-upper 20%	20	80	77.6	25.82	3.88
Upper 20%	20	100	176.8	58.84	8.84
Overall	100		300.5	100	3.01

Source: Author's computations, based on household survey data, 2015

Table 4.126 demonstrates the result of irrigated land holding distributions among surveyed households in Sri Ganganagar district. The lowest 20 percent households owned no irrigated land but upper 20 percent owned more than half (58.84 percent) of total irrigated land. Majority mid-60 percent owned 41.16 percent of total irrigated land. If each household owned equal irrigated land holding in Sri Ganganagar district, a household in each quintile can averagely owned 3.01 hectare. However, each household from upper 20 percent averagely owned 8.84 hectare irrigated land but household from lowest 20 percent do not owned any irrigated land. The uppermost 20 percent quintiles irrigated land holding is more than 27 times higher than the lowest 40 percent quintiles and nearly 3 times greater than the supposed equal distribution rate. All the data result indicates irrigated land distribution inequality among sampled households in Sri Ganganagar district. To see the distribution of irrigated land among sampled households graphically, Lorenz curve is drawn and depicted on figure 4.23.

The Lorenz curve in figure 4.23 is farther away from the line of equality (45° line), indicating of high inequality dominates the distribution of irrigated land holding in the district. The Gini-coefficient result (0.6) also shows it is very far from 0 which indicates above average inequality in irrigated land holding distribution. For irrigated land holding distribution among sampled households, the Gini coefficient of Sri Ganganagar district (0.6) is almost equal to Gini coefficient of Bikaner district (0.613). So, in both districts, irrigated land holding distribution is skewed. Following the same procedure, irrigated land holding distribution among surveyed households in Nagaur district is also calculated and results are shown in table 4.127.

Figure 4.23: Lorenz curve for irrigated land in Sri Ganganagar district



Source: Author's Own, 2015

Table 4.127: Categorization of irrigated land in Nagaur district

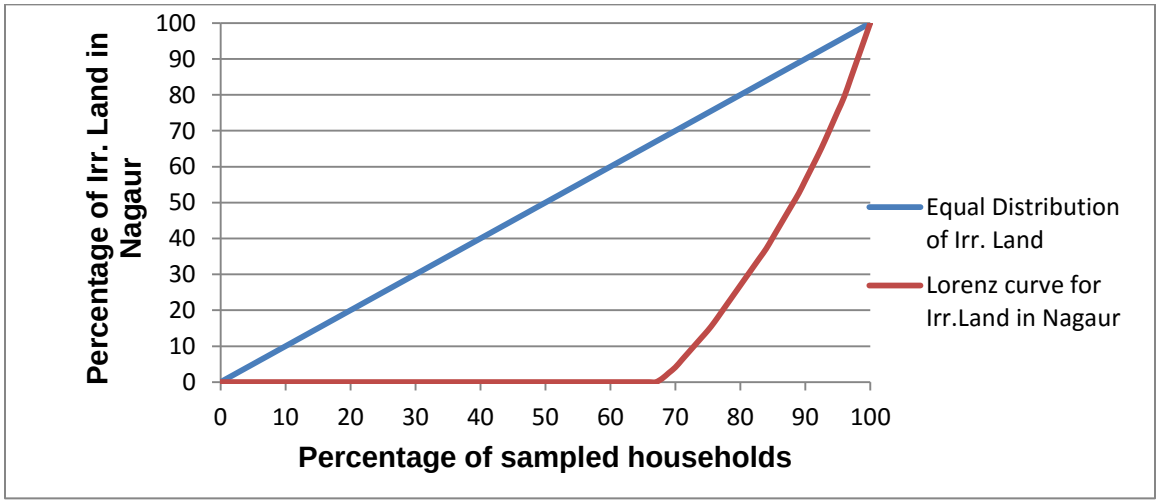
Irrigated land (quintiles)	Households number	Cumulative frequency of households (%)	Total irrigated land in (ha)	Share of total irrigated land (%)	Per household irr. Land (ha)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	0	0	0
Middle 20%	20	60	0	0	0
Mid-upper 20%	20	80	52.5	26.92	2.63
Upper 20%	20	100	142.5	73.08	7.13
Overall	100		195	100	1.95

Source: Author's computations, based on household survey data, 2015

Results of irrigated land holding distribution among surveyed households in Nagaur district is demonstrated on table 4.127. The lowest 20 percent, low-mid 20 percent and middle 20 percent do not owned any irrigated land in Nagaur district. The upper 20 percent owned more than 73 percent of total irrigated land in the district. If each household owned equal irrigated land holding in Nagaur district, a household in each quintile can averagely owned 1.95 hectare. However, each household from upper 20 percent averagely owned 7.13 hectare irrigated land but household from majority lowest 60 percent do not owned any

irrigated land. This uppermost 20 percent quintiles irrigated land holding is much more than the lowest 60 percent quintiles and nearly 4 times greater than the supposed equal distribution rate. All the indicators show existence of highly skewed distribution of irrigated land holding in Nagaur district. Graphically, Lorenz curve is presented for irrigated land holding distributions on figure 4.24.

Figure 4.24: Lorenz curve for irrigated land in Nagaur district



Source: Author's Own, 2015

The Lorenz curve in figure 4.24 is far from the perfect distribution line, it is an indication for high inequality presence in irrigated land holding among sampled households in the district. The Gini-coefficient result (0.735) also shows it is very far from 0 which indicates high inequality in irrigated land holding distribution in Nagaur district. It means that 73.5 percent of irrigated lands are distributed unequally in Nagaur Bikaner district. The Gini coefficient result in three districts shows that Nagaur district (0.735) have the highest irrigated land holding inequality followed by Bikaner (0.613) and Sri Ganganagar (0.60) districts.

4.4.2 Income inequality

Income inequality refers to the extent to which income is distributed in an uneven manner among a population. It is unequal distribution of household or individual income across the various participants in an economy. Income inequality is often

presented as the percentage of income to a percentage of population. It is often associated with the idea of income "fairness". It is generally considered "unfair" if the rich have a disproportionally larger portion of a country's income compared to their population. To understand total income inequality among sampled households in the study area, income is disintegrated in to farm and non-farm income.

In Northern Rajasthan rural income is derived mainly from farm and non-farm sources. To clarify the income inequality in more detail in the study area, the researcher disaggregated total income into two components viz farm income from crop production and livestock rearing and non-farm income from other sources.

4.4.2.1 Farm income distribution among surveyed households

The result of farm income distribution among surveyed households in Northern Rajasthan is generated in table 4.128.

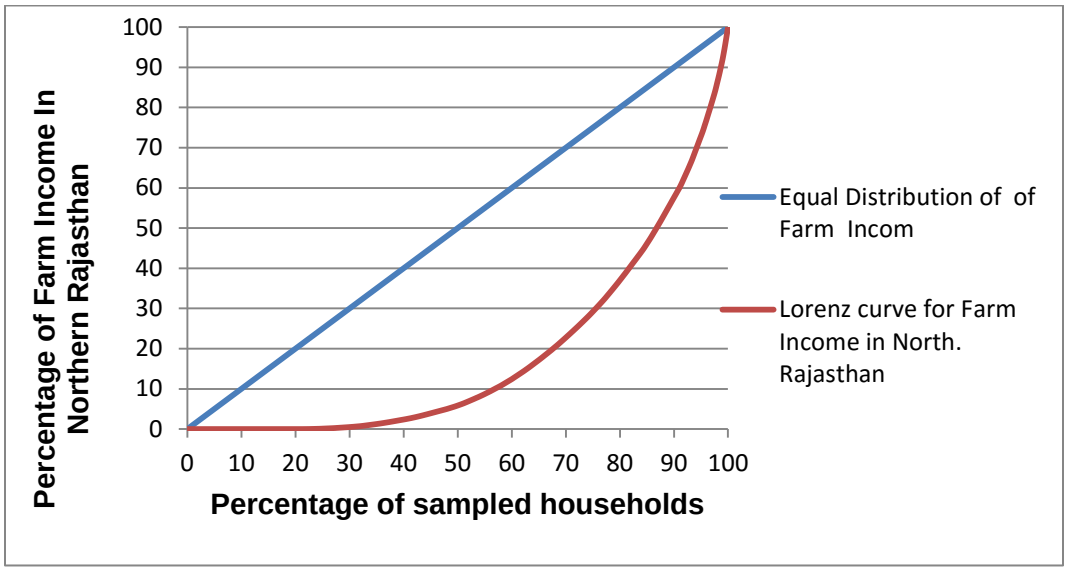
Table 4.128 shows farm income distributions among surveyed households in Northern Rajasthan. The lowest 20 percent households do not possessed farm income. The share of the middle 60 percent households accounted for 37.03 percent and upper 20 percent households owned almost 63 percent of the total farm income in Northern Rajasthan. If each household maintained equal farm income in Northern Rajasthan, a household in each quintile can averagely owned ₹167,820 farm income annually. Conversely, every household from upper 20 percent averagely maintained ₹528,383 farm income annually, whereas a household from lowest 20 percent do not possessed any farm income annually. Surprisingly, uppermost 20 percent annual farm income is more than 26 times greater than the lowest 40 percent quintiles and three times higher than hypothetical equal distribution rate (₹167,820). Graphically, Lorenz curve is presented for farm income distribution among sampled households in Northern Rajasthan on figure 4.25.

Table 4.128: Categorization of farm income in Northern Rajasthan

Farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total farm income (in ₹)	Share of Total farm income (%)	Per household farm income (in ₹)
Lowest 20%	60	20	0	0	0
Low-mid 20%	60	40	1,195,000	2.37	19,917
Middle 20%	60	60	5,055,000	10.04	84,250
Mid-upper 20%	60	80	12,393,000	24.62	206,550
Upper 20%	60	100	31,703,000	62.97	528,383
Overall	300		50,346,000	100	167,820

Source: Author's computations, based on household survey data, 2015

Figure 4.25: Lorenz curve for farm income in Northern Rajasthan



Source: Author's Own, 2015

The Lorenz curve drawn to see how farm income is distributed among the surveyed households in Northern Rajasthan shows the existence of skewed distribution. Gin-coefficient value of 0.636 is very far from zero and also approves the existence of high inequality in farm income in the study area. It means that, 63.6 percent farm income in Northern Rajasthan is distributed unequally.

Northern Rajasthan economy is mainly agriculture. To understand farm income distribution among sampled households, the study analyzed farm income at

district level. Accordingly, farm income distribution among sampled households in Bikaner district is calculated and results are given in the table 4.129.

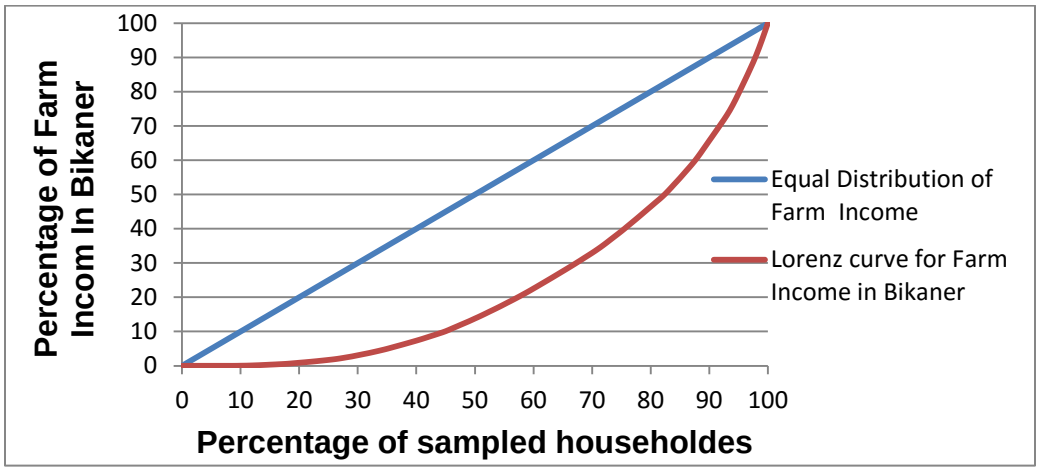
Table 4.129: Categorization of farm income in Bikaner district

Farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total farm income (in ₹)	Share of total farm income (%)	Per household farm income (in ₹)
Lowest 20%	20	20	183,000	0.89	9,150
Low-mid 20%	20	40	1,321,500	6.45	66,075
Middle 20%	20	60	3,116,000	15.21	155,800
Mid-upper 20%	20	80	4,898,000	23.9	244,900
Upper 20%	20	100	10,972,000	53.55	548,600
Overall	100		20,490,500	100	204,905

Source: Author's computations, based on household survey data, 2015

Results from Table 4.129 shows, the lowest 20 percent households owned less than one percent of farm income whereas upper 20 percent households maintained more than 53 percent of total farm income in Bikaner district. Majority middle 60 percent households accounted 45.56 percent of total farm income. If each household possessed equal farm income in Bikaner district, a household in each quintile group can averagely maintained ₹245,312 farm income annually. Nevertheless, each household from lowest 20 percent maintained only ₹9,150 farm income annually on the other hand every household from upper 20 percent owned averagely ₹548,600 farm income yearly. Uppermost 20 percent household's annual farm income is more than two times higher than assumed equivalent rate, 60 times higher than lowest 20 percent households and more than 7 times higher than lowest 40 percent households. These all shows in Bikaner district farm income is distributed unequally. To make our understanding clear, the Lorenz curve for the farm income among sampled households is illustrated on figure 4.26.

Figure 4.26: Lorenz curve for farm income in Bikaner district



Source: Author's Own, 2015

The Lorenz curve drawn to see how farm income is distributed among surveyed households in Bikaner district shows the existence inequality. The Lorenz curve is far from the perfect distribution line, which indicates presence of significant farm income inequality among surveyed households in Bikaner district. Gin-coefficient value of 0.523 also guarantees the existence of inequality in farm income distribution among sampled households in the area. It means that 52.3 percent farm income is distributed unequally in Bikaner district.

Similarly, the farm income distribution in Sri Ganganagar district is calculated and results are given in the table 4.130.

Table 4.130: Categorization of farm Income in Sri Ganganagar district

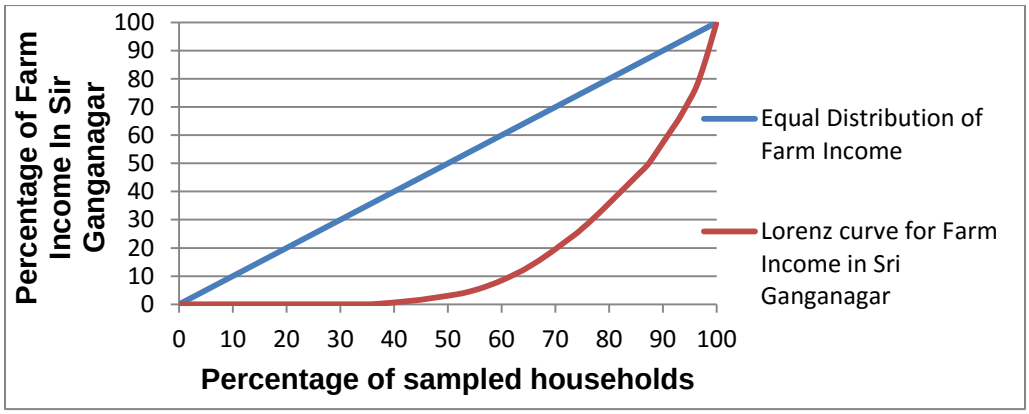
Farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total farm income (in ₹)	Share of total farm income (%)	Per household farm income (in ₹)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	135,000	0.64	6,750
Middle 20%	20	60	1,653,000	7.82	82,650
Mid-upper 20%	20	80	5,788,000	27.4	289,400
Upper 20%	20	100	13,565,000	64.14	678,250
Overall	100		21,141,000	100	211,410

Source: Author's computations, based on household survey data, 2015

Table 4.130 demonstrates the results of farm income distribution among surveyed households in Sri Ganganagar district. The lowest 20 percent households do not have any farm income share. In the district the major part of farm income is owned by upper 20 percent households, they owned more than 64 percent. The middle 60 percent households' owned 35.86 percent of farm income share. If each household maintained equal farm income in Sri Ganganagar district, a household in each quintile group can averagely possessed ₹211,410 farm income annually. However, each household from lowest 20 percent do not owned any farm income annually on the other hand every household from upper 20 percent maintained averagely ₹678,250 farm income yearly. This means the uppermost 20 percent annual farm income is more than 3 times higher than equivalent value and 100 times higher than the lowest 40 percent quintiles. All descriptive results show existence of inequality in farm income distribution in Sri Ganganagar district. To visualize the magnitude of inequality graphically Lorenz curve is depicted on figure 4.27.

The Lorenz curve shows a deviation from the line of perfect equality and the Gini-coefficient value of 0.664 also indicates the presence of high farm income inequality among surveyed households in the district. The Gini coefficient of Sri Ganganagar district (0.664) indicates the presence of higher farm income inequality as compared to Bikaner district (0.523).

Figure 4.27: Lorenz curve for farm income in Sri Ganganagar district



Source: Author's Own, 2015

In the same manner, Nagaur district farm income distribution is calculated and results are given in the table 4.131.

Table 4.131: Categorization of farm income in Nagaur district

Farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total farm income (in ₹)	Share of total farm income (%)	Per household farm income (in ₹)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	192,500	2.21	9,625
Middle 20%	20	60	820,000	9.41	41,000
Mid-upper 20%	20	80	2,173,000	24.93	108,650
Upper 20%	20	100	5,529,000	63.45	276,450
Overall	100		8,932,300	100	89,323

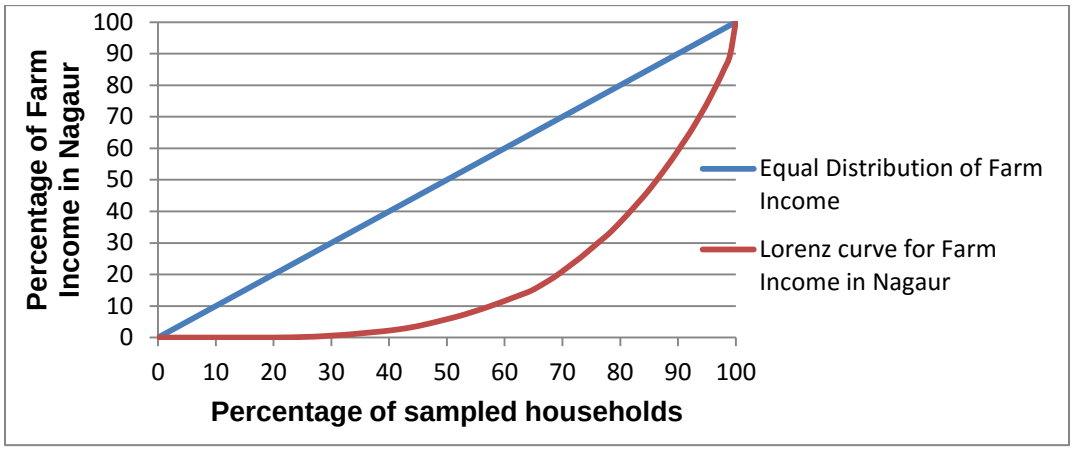
Source: Author's computations, based on household survey data, 2015

Table 4.131 results show that more than 63 percent total farm income owned by upper 20 percent households while lowest 20 percent household do not possessed any farm income. Majority middle of 60 percent households owned only 36.55 percent of total farm income, which is much less than upper 20 percent total farm income share (63.45 percent) in Nagaur district. If farm income would have been distributed equally, every sampled household in Nagaur district would maintain ₹89,323 farm income annually. Conversely, a household from upper 20 percent maintained averagely ₹276,450 farm income yearly on the other hand a household from lowest 20 percent possessed no farm income yearly. Uppermost 20 percent household's annual farm income is more than 3 times greater than equal distribution rare and more than 28 times higher than the lowest 40 percent households in Nagaur district. All the indicators show presence of unequal distribution of farm income among sampled households in the district. To realize further, Lorenz curve was prepared and depicted on figure 4.28.

Figure 4.28 depicts Lorenz curve for Nagaur district and it visibly shows a deviation from the line of perfect equality (45^0 line). This shows that, farm income

is unequally distributed in the study area. This is further confirmed by the Gini-coefficient of 0.639, it also shows that income is unequally distributed in the study area. The Gini coefficient result in three districts shows that Sri Ganganagar district (0.664) have the highest farm income inequality followed by Nagaur (0.639) and Bikaner (0.523) districts.

Figure 4.28: Lorenz curve for farm income in Nagaur district



Source: Author's Own, 2015

4.4.2.2 Non-Farm Income distribution households

Non-farm income referred to income that is not derived from agriculture sector. For Northern Rajasthan non-farm income is calculated and presented on table 4.132.

Table 4.132: Categorization of non-farm income in Northern Rajasthan

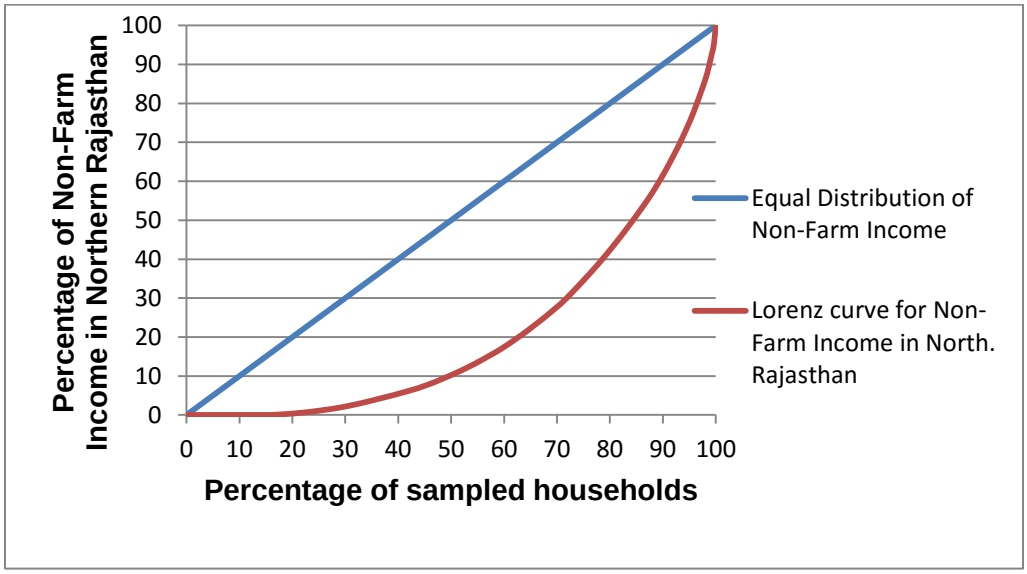
Non-farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total non-farm income (in ₹)	Share of total non-farm income (%)	Per household non-farm income (in ₹)
Lowest 20%	60	20	112,078	0.36	1,868
Low-mid 20%	60	40	1,591,787	5.06	26,530
Middle 20%	60	60	3,777,352	12.03	62,956
Mid-upper 20%	60	80	7,814,036	24.9	130,233
Upper 20%	60	100	18,112,535	57.65	301,876
Overall	300		31,283,700	100	104,279

Source: Author's computations, based on household survey data, 2015

Non-Farm income distributions quintiles among sampled households in Northern Rajasthan were presented in Table 4.132. This revealed that the lowest bottom 20 percent of the sampled household controlled barely less than one percent of the total non-farm income, while the uppermost 20 percent commanded more than 57 percent of the overall non-farm income in the area. The middle 60 percent of sampled household share is 41.99 percent which is less than upper 20 percent share. If each household owned equal non-farm income in Northern Rajasthan, a household in each quintile group can averagely maintained ₹104,279 non-farm income annually. However, each household from lowest 20 percent averagely maintained only ₹1,868 non-farm income yearly whereas every household from upper 20 percent maintained averagely ₹301,876 non-farm income yearly. The uppermost 20 percent annual non-farm income is almost 3 times more than assumed equivalent rate and 161 times higher than the lowest 20 percent household's annual non-farm income in Northern Rajasthan. All indicators assure non-farm distribution in the area is skewed. Graphically, using Lorenz curve the non-farm distribution in Northern Rajasthan is presented on figure 4.29.

The Lorenz curve shown in figure 4.29 is at a far distance from the 45° line shows higher levels of non-farm income inequality than the one closer to the 45° line. If everybody receives ₹314,078 in Northern Rajasthan, Lorenz curve coincides with 45° line. Table 4.9 showed that, the income was distributed unequally among sampled households with the Gini coefficient value of 0.578. It means that 57.8 percent farm income is distributed unequally in Northern Rajasthan.

Figure 4.29: Lorenz curve for non-farm income in Northern Rajasthan



Source: Author's Own, 2015

To understand non-farm income distribution among sampled households, the study analyzed non-farm income also at district level. Accordingly, non-farm income distribution among sampled households in Bikaner district is calculated and results are given in the table 4.133.

Table 4.133: Categorization of non-farm income in Bikaner district

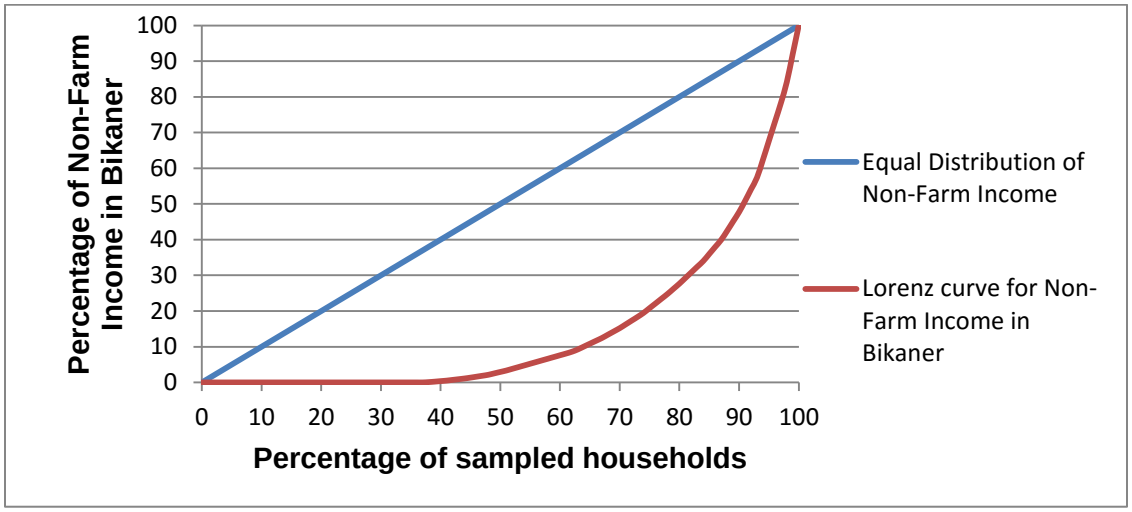
Non-farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total non-farm income (in ₹)	Share of total non-farm income (%)	Per household non-farm income (in ₹)
Lowest 20%	20	20	0	0	0
Low-mid 20%	20	40	27,900	0.37	1,395
Middle 20%	20	60	549,000	7.24	27,450
Mid-upper 20%	20	80	1,520,000	20.05	76,000
Upper 20%	20	100	5,483,000	72.34	274,150
Overall	100		7,459,500	100	74,595

Source: Author's computations, based on household survey data, 2015

Table 4.133 shows non-farm income distributions among surveyed households in Bikaner district. The lowest 20 percent surveyed households do not owned any

non-farm income whereas highest 20 percent households owned more than 72 percent of total non-farm income. The lowest 40 percent of surveyed household owned less than one percent of non-farm income in Bikaner district. The majority mid 60 percent possessed (35.64 percent), which is less than half of upper 20 percent household owned. If everybody owned the same level of non-farm income in Bikaner district, a household in each quintile can averagely maintained ₹74,595 non-farm income yearly, but a household from upper 20 percent possessed averagely ₹274,150 non-farm income annually on the other hand a household from lowest 20 percent do not owned any non-farm income annually. Surprisingly, the annual non-farm income of uppermost 20 percent is 196 times more than the lowest 40 percent households and more than 3 times higher than the assumed equivalent rate in Bikaner district. So, all these point the availability of inequality in non-farm income distribution among sampled households in the district. To see the non-farm income distribution among sampled households graphically, Lorenz curve is presented on figure 4.30.

Figure 4.30: Lorenz curve for non-farm income in Bikaner district



Source: Author's Own, 2015

Figure 4.30 depicts Lorenz curve for non-farm income distribution for Bikaner district. The curve distance from line of equality visibly shows existence of skewed distribution on non-farm income. A Gini-coefficient value 0.711 obtained

for the district is much far from zero and it confirms availability of high degree of non-farm inequality in the district. It means that 71.1 percent non-farm income is distributed unequally in Bikaner district.

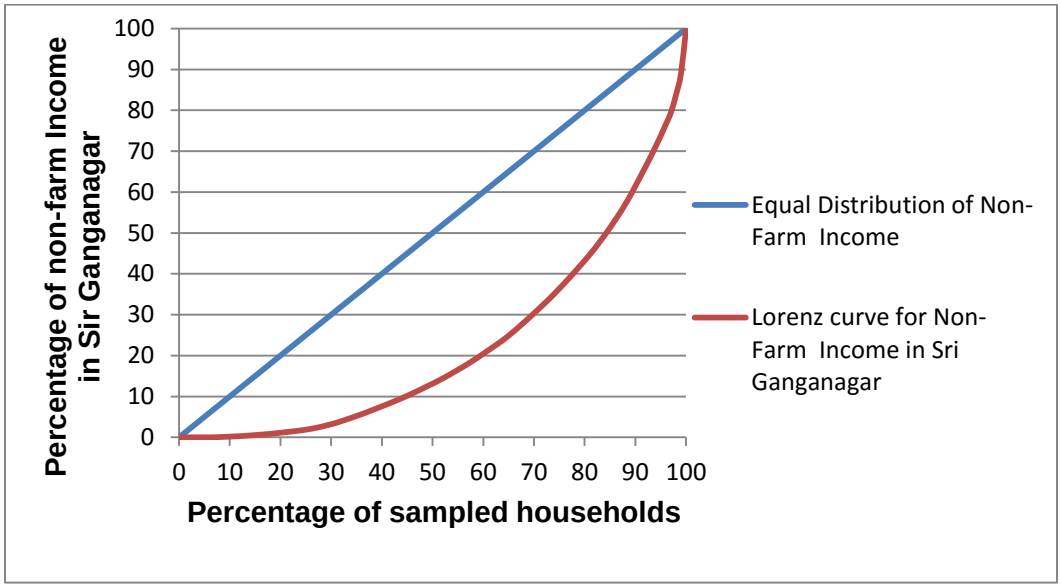
Similarly, non-farm income distribution among surveyed households in Sri Ganganagar district is presented in Table 4.134. The results revealed that lowest 20 percent households owned only 1.12 percent of total non-farm income while upper 20 percent owned 56 percent of total non-farm income in Sri Ganganagar district. Majority middle 60 percent possessed 42.11 percent of total non-farm income. If everybody possessed the same level of non-farm income in Sri Ganganagar district, a household in each quintile can averagely maintained ₹132,310. However, a household from upper 20 percent maintained averagely ₹375,590 non-farm income annually but every household from lowest 20 percent averagely maintained only ₹7,381 non-farm income yearly. The annual non-farm income of uppermost 20 percent quintiles is more than 50 times higher than the lowest 20 percent quintiles and almost 3 times higher than hypothetical equivalent distribution amount. Non-farm income distribution among sampled households in Sri Ganganagar district shows presence of inequality. To understand in detail, Lorenz curve for non-farm income distribution is presented on figure 4.31.

Table 4.134: Categorization of non-farm income in Sri Ganganagar district

Non-farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total non-farm income (in ₹)	Share of total non-farm income (%)	Per household non-farm income (in ₹)
Lowest 20%	20	20	147,629	1.12	7,381
Low-mid 20%	20	40	855,171	6.46	42,759
Middle 20%	20	60	1,701,264	12.86	85,063
Mid-upper 20%	20	80	3,015,265	22.79	150,763
Upper 20%	20	100	7,511,809	56.77	375,590
Overall	100		13,231,000	100	132,310

Source: Author's computations, based on household survey data, 2015

Figure 4.31: Lorenz curve for non-farm income in Sri Ganganagar district



Source: Author's Own, 2015

Figure 4.31 shows Lorenz curve, which is graphical illustration of non-farm income distribution among sampled households in Sri Ganganagar district. The graph shows a deviation from the line of perfect equality. This shows that non-farm income is unequally distributed in the study area. The Gini coefficients value (0.664) revealed that there is high degree of unequal distribution of non-farm income in Sri Ganganagar district. The Gini coefficient of Sri Ganganagar district (0.664) has the lower non-farm income inequality than the Bikaner district (0.711). So, in Sri Ganganagar district relatively, non-farm income distribution is better than Bikaner district.

Equally, Nagaur district non-farm income distribution is calculated and results are given in the table 4.135.

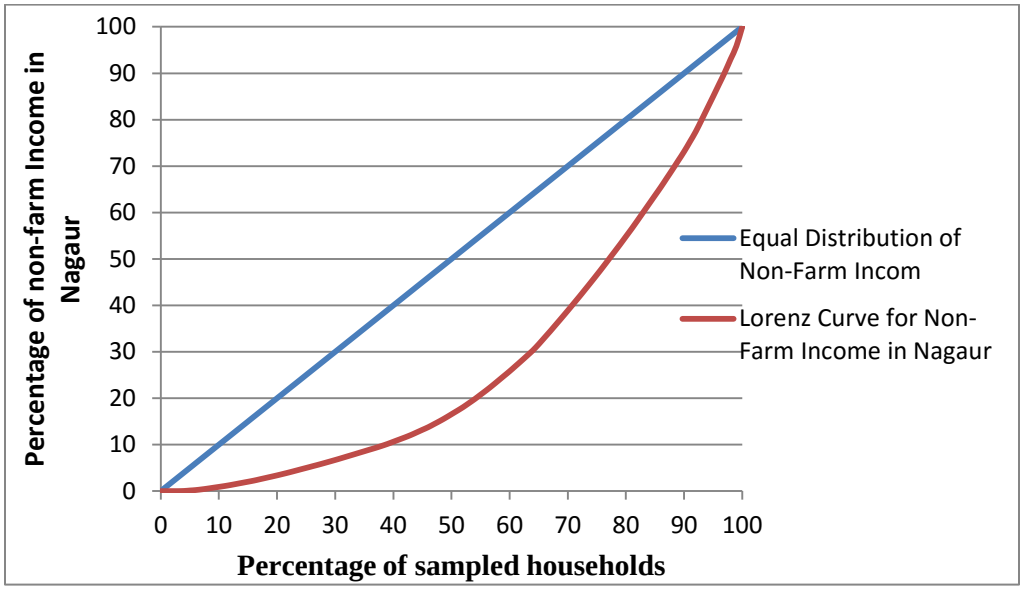
Table 4.135: Categorization of non-farm income in Nagaur district

Non-farm income (quintiles)	Households number	Cumulative frequency of households (%)	Total non-farm income (in ₹)	Share of total non-farm income (%)	Per household non-farm income (in ₹)
Lowest 20%	20	20	359,000	3.39	17,950
Low-mid 20%	20	40	767,750	7.25	38,387
Middle 20%	20	60	1,609,000	15.17	80,450
Mid-upper 20%	20	80	3,076,000	29.03	153,800
Upper 20%	20	100	4,785,000	45.16	239,250
Overall	100		10,596,750	100	105,967

Source: Author's computations, based on household survey data, 2015

Table 4.135 results show non-farm income distribution among surveyed households in in Nagaur district. The lowest 20 percent households have 3.39 percent share in total non-farm income. The share of the middle 60 percent households accounted for 51.45 percent and upper 20 percent households owned almost 45.16 percent of the total non-farm income in Nagaur district. If each household owned equal non-farm income in Nagaur district, a household in each quintile group can averagely possessed ₹105,967 non-farm income annually. However, each household from lowest 20 percent averagely owned only ₹17,950 non-farm income annually on the other hand every household from upper 20 percent averagely owned ₹239,250 non-farm income yearly. The annual non-farm income of uppermost 20 percent is more than 13 times higher than lowest 20 quintiles and more than 2 times greater than equivalent rate in the district. In Nagaur district there is non-farm distribution inequality among sampled households, but as compared to Bikaner and Sri Ganganagar districts, in Nagaur district, there is diffusion of non-farm income among surveyed households. To see graphically, Lorenz curve is depicted on figure 4.32.

Figure 4.32: Lorenz curve for non-farm income in Nagaur district.



Source: Author's Own, 2015

The Lorenz curve drawn to see how farm income is distributed among surveyed households in Nagaur district shows the presence of inequality. Gin-coefficient value of 0.444 also assurances the existence of inequality in non-farm income distribution among sampled households in the area. The Gini coefficient result in three districts shows that Bikaner district (0.711) has the highest non-farm income inequality followed by Sri Ganganagar (0.664) and Nagaur (0.444) districts.

4.4.2.3 Total income distribution among surveyed households

Total income is defined as household's disposable income in a particular year. It consists of farm or non-farm income or both. In this particular study, total income is sum of farm and non-farm income of a family member in a particular year (March 2014 to April 2015). To start total income inequality analysis, the pattern of total income distribution among the surveyed households of Northern Rajasthan is calculated and results are reported in table 4.136.

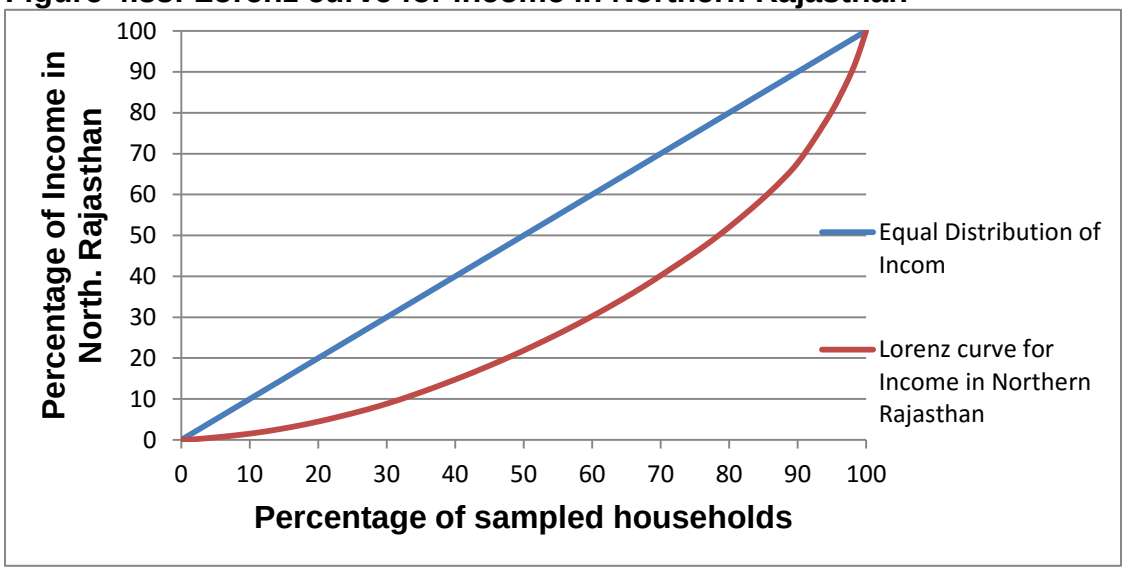
Table 4.136: Categorization of total income in Northern Rajasthan

Income (quintiles)	Households number	Cumulative frequency of households (%)	Total income (in ₹)	Share of total income (%)	Per household income (in ₹)
Lowest 20%	60	20	3,663,280	4.48	61,055
Low-mid 20%	60	40	8,399,080	10.27	139,985
Middle 20%	60	60	12,660,631	15.49	211,011
Mid-upper 20%	60	80	17,805,221	21.78	296,754
Upper 20%	60	100	39,225,576	47.98	653,759
Overall	300		81,753,788	100	272,513

Source: Author's computations, based on household survey data, 2015

Table 4.136 shows income distributions among the surveyed households in Northern Rajasthan. The share of the lowest 20 percent households in income was 4.48 percent. The share of the middle 60 percent households accounted for 47.54 percent and uppermost 20 percent households owned as much as 47.98 percent of the total income. If each individual had the same income in Northern Rajasthan, a household in each quintile possessed ₹272,513 income annually. Conversely, averagely each household from upper 20 percent maintained ₹653,759 income annually whereas a household from lowest 20 percent maintained ₹61,055 income annually. The upper 20 percent share is more than two times higher than equal distribution and more than ten times higher than lowest 20 percent share. The result shows that in Northern Rajasthan, income is not equally distributed. However, as compared to other inequality indicators, there is lower degree of income inequality.

Figure 4.33: Lorenz curve for income in Northern Rajasthan



Source: - Author's Own, 2015

The Lorenz curve drawn to see how total income is distributed among the surveyed households in Northern Rajasthan shows the existence skewed distribution. Gin-coefficient value of 0.425 also approves the existence of inequality in income distribution in the study area. This outcome agrees with Melkamu and Bannor (2015), who found and concluded existence of per capita income inequality in India. They finally conclude that, inequality in per capita income in the country is not serious like other resources inequality.

Total income is good indicator of family welfare than any other variable. Districts vary in different ways in Northern Rajasthan, to understand total income inequality in more detail among sampled households; the study analyzed total income inequality at district level. Accordingly, Bikaner district income distribution among surveyed households, calculated and results presented on table 4.137.

Results in table 4.137 show income distribution among surveyed households in Bikaner district. It indicates how sampled households are clustered in to five quintiles based on their annual income level. The share of lowest 20 percent households from total income is just 4.09 percent and the middle 60 percent households owned 46.13 percent share. However, highest 20 percent

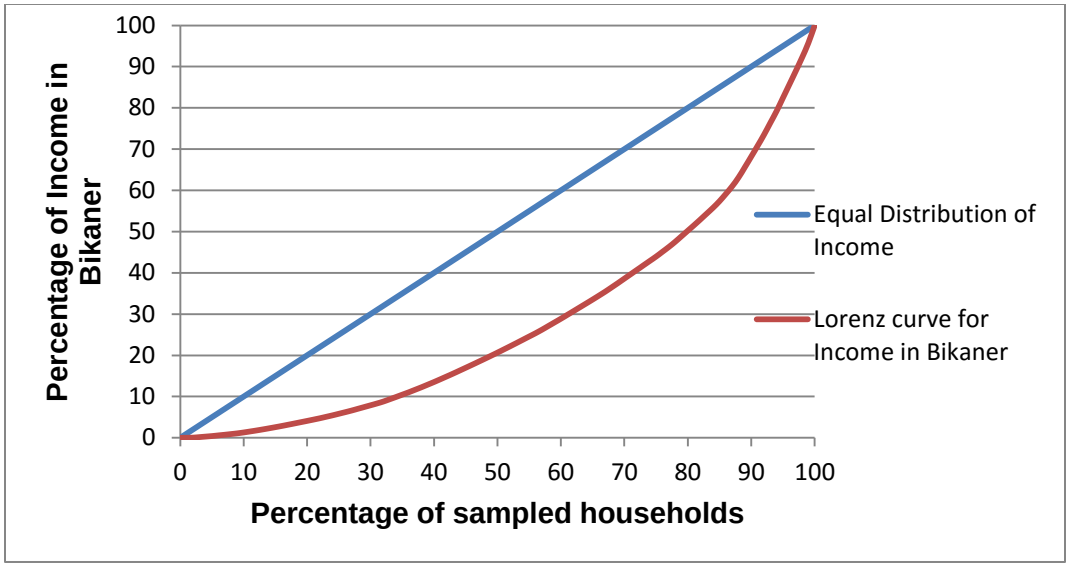
households account for 49.78 percent of the total income in Bikaner district. If each household maintained equal annual income in the district, a household in each quintile can averagely possessed ₹280,704 annually. But, household's income from uppermost is more than two times higher than equal annual income level and more than 12 times higher than lowest 20 percent household's income. All these indicate presence of income inequality in Bikaner district. To see further Lorenz curve is depicted for the district income distribution among sampled households on figure 4.34.

Table 4.137: Categorization of total income in Bikaner district

Income (quintiles)	Households number	Cumulative frequency of households (%)	Total income (in ₹)	Share of total income (%)	Per household income (in ₹)
Lowest 20%	20	20	1,149,400	4.09	57,470
Low-mid 20%	20	40	2,647,000	9.43	132,350
Middle 20%	20	60	4,308,000	15.35	215,400
Mid-upper 20%	20	80	5,992,000	21.35	299,600
Upper 20%	20	100	13,974,000	49.78	698,700
Overall	100		28,070,400	100	280,704

Source: Author's computations, based on household survey data, 2015

Figure 4.34: Lorenz curve for income in Bikaner district



Source: - Author's Own, 2015

Figure 4.34 shows graphical representation of Lorenz curve drawn to see how income is distributed among surveyed households in Bikaner district. It shows the existence of skewed distribution. Gin-coefficient value of 0.44 also supports the existence of inequality in total income distribution in Bikaner district. As compared to other inequality measured in the district, income inequality is relatively at lower degree.

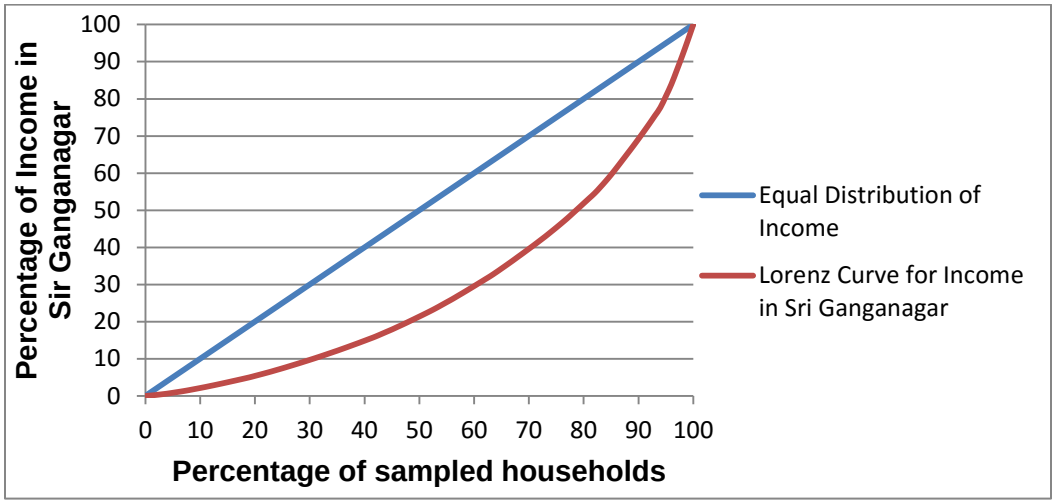
In a similar manner, the total income distribution in Sri Ganganagar district is calculated and results are given in the table 4.138. The results show income distribution among households in Sri Ganganagar district. The lowest 20 percent households have 5.4 percent share of the total income and highest 20 percent owned 48.1 percent of the total income. However, the share of the middle 60 percent households is 46.5 percent. If income would have been distributed equally in Sri Ganganagar district, every household would get ₹343,721 annually. Conversely, each household from upper 20 percent averagely maintained ₹827,477 income annually whereas each household from lowest 20 percent averagely possessed only ₹92,427 income annually. The income of uppermost 20 percent is more than 2 times higher than assumed equal distribution rate and nine times higher than lowest 20 present quintiles annual income. Similarly, in Sri Ganganagar district also income inequality is significant among sampled households.

Table 4.138: Categorization of total income in Sri Ganganagar district

Income (quintiles)	Households number	Cumulative frequency of households (%)	Total income (in ₹)	Share of total income (%)	Per household income (in ₹)
Lowest 20%	20	20	1,848,535	5.4	92,427
Low-mid 20%	20	40	3,255,628	9.5	162,781
Middle 20%	20	60	5,057,447	14.7	252,872
Mid-upper 20%	20	80	7,660,992	22.3	383,049
Upper 20%	20	100	16,549,536	48.1	827,477
Overall	100		34,372,138	100	343,721

Source: Author's computations, based on household survey data, 2015

Figure 4.35: Lorenz curve for income in Sri Ganganagar district



Source: - Author's Own, 2015

Figure 4.35 shows Lorenz curve of income distribution in Sri Ganganagar district. The Gini-coefficient value of 0.421 also indicates the presence of income inequality among surveyed households in the district. The Gini coefficient value of Sri Ganganagar district (0.421) is smaller than Bikaner district (0.44). It indicates that, in Sri Ganganagar district relatively, income distribution is better than Bikaner district.

Equally, calculated total income distribution results for Nagaur district are given in the table 4.139.

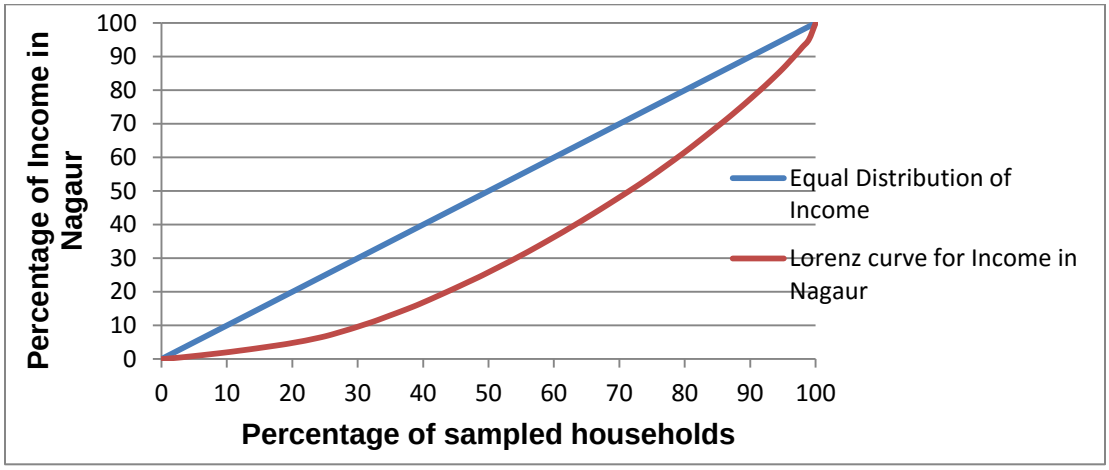
Table 4.139: Categorization of total income in Nagaur district

Income (quintiles)	Households number	Cumulative frequency of households (%)	Total income (in ₹)	Share of total income (%)	Per household income (in ₹)
Lowest 20%	20	20	924,250	4.8	46,212
Low-mid 20%	20	40	2,328,000	12.06	116,400
Middle 20%	20	60	3,753,500	19.43	187,675
Mid-upper 20%	20	80	4,887,500	25.31	244,375
Upper 20%	20	100	7,418,000	38.4	370,900
Overall	100		19,311,250	100	193,112

Source: Author's computations, based on household survey data, 2015

Table 4.139 demonstrates the results of income distribution among surveyed households in Nagaur district. In the district, upper 20 percent owned 38.4 percent of total income and lowest 20 percent households owned only 4.8 percent of the total income. If each household possessed equal income in Nagaur district, a household in each quintile can averagely maintained ₹193,112 income annually. Yet, averagely each household from upper 20 percent owned ₹370,900 income annually whereas a household from lowest 20 percent owned only ₹46,212 income annually. Which means annual income of uppermost 20 percent is near to two times more than equivalent annual income and 8 times more than annual income of lowest 20 percent households. Like other two study districts, income inequality is also visible in Nagaur district. To understand the inequality of income in detail, we depicted the Lorenz curve for the district in figure 4.36.

Figure 4.36: Lorenz curve for income in Nagaur district



Source: - Author's Own, 2015

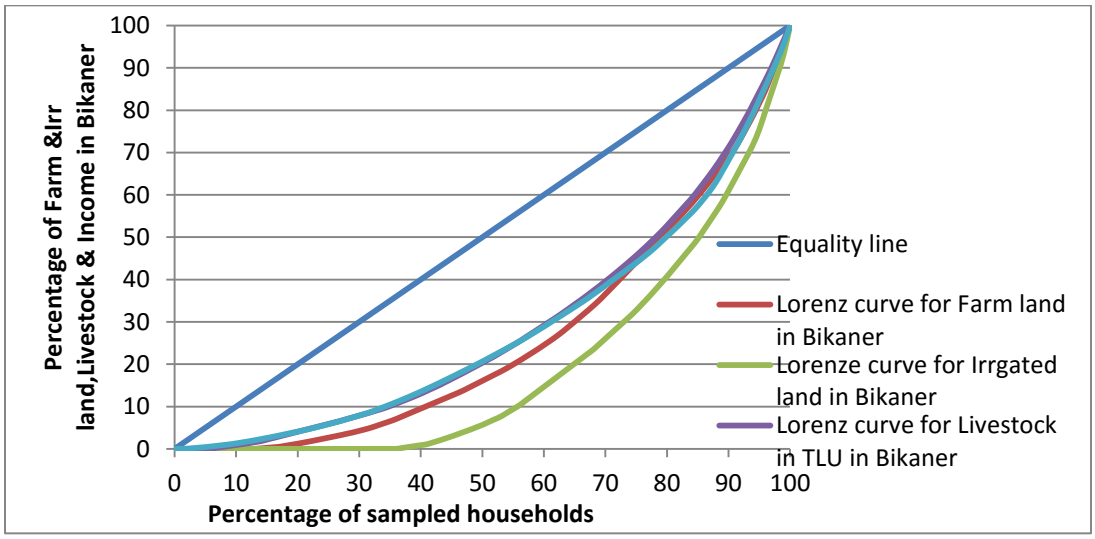
The Lorenz curve drawn to see how income is distributed among surveyed households in Nagaur district shows the existence skewed distribution. Gin-coefficient value of 0.341 also demonstrates the existence of inequality in income distribution among sampled households. The Gini coefficient of Nagaur district (0.341) has the lowest income inequality than the Bikaner district (0.44) and Sri

Ganganagar (0.421) districts. So, in Nagaur district relatively, income distribution is better than Bikaner and Sri Ganganagar districts.

4.4.2.4 Inequality Summary

In summary, a detailed profile and correlates of resource and income inequality based on the household survey data of 300 households have been constructed. The evidence from empirical analysis suggests that irrigated land and farm land inequality have highest Gin-coefficient. Income and livestock relatively diffused better than other resources distribution among sampled households in the study area.

Figure 4.37: Lorenz curve summary in Bikaner district



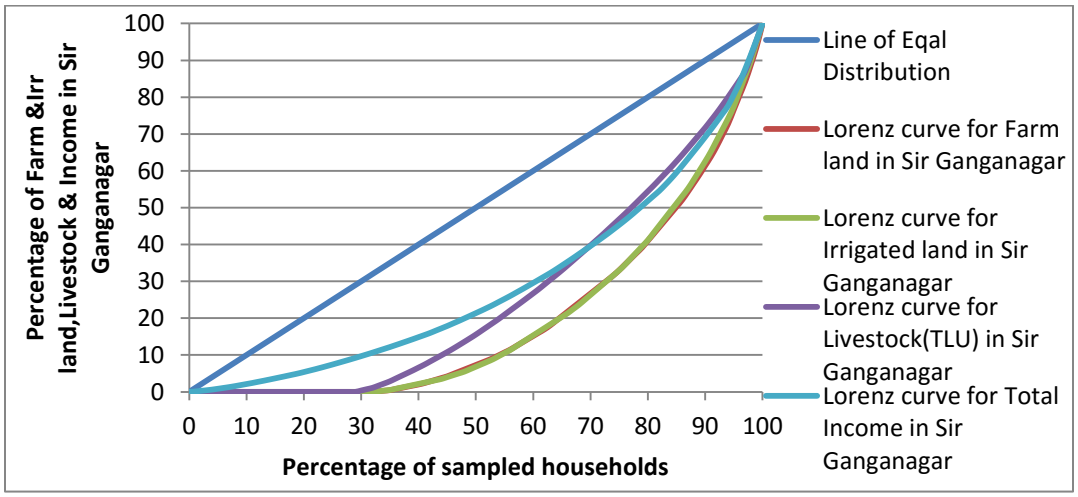
Source: - Author's Own, 2015

In Bikaner district, as shown figure 4.37, livestock and income distribution overlap, which indicates almost equal Gin-coefficient (0.428 and0.440) and relatively have better distribution. Irrigated land is far from the line of equality.

In Sri Ganganagar district, as shown figure 4.38, Irrigated land and farm land overlap, and they are far from the equality line, that indicates high inequality but, income distribution is relatively better than others followed by livestock. Income

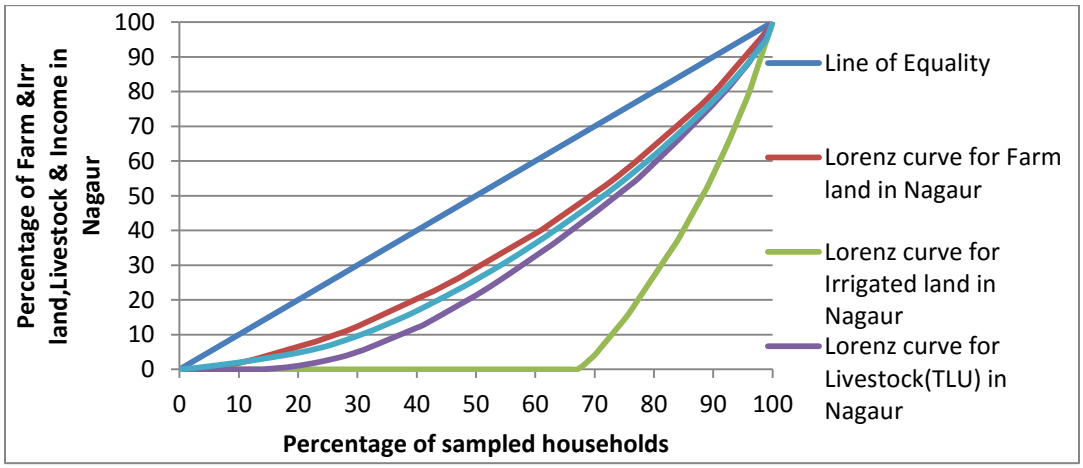
and livestock relatively diffused better than other resource in Sri Ganganagar district.

Figure 4.38: Lorenz curve summary in Sri Ganganagar district



Source: - Author's Own, 2015

Figure 4.39: Lorenz curve summary in Nagaur district



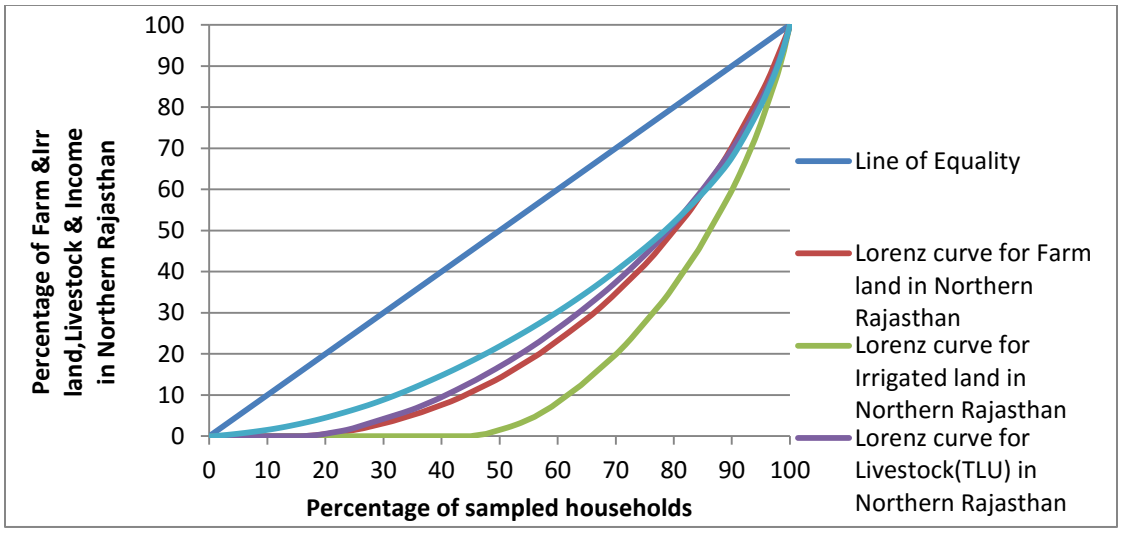
Source: - Author's Own, 2015

Figure 4.39 shows, in Nagaur district, irrigated land inequality has highest Gin-coefficient. Agricultural land, income and livestock relatively diffused better than other resource in Nagaur district. In the district, irrigated land is owned by few people but farm land is relatively owned by many people.

Figure 4.40 result indicates that, district trend has also happened in Northern Rajasthan. Irrigated land is owned by few people in Northern Rajasthan. Income

relative to other resources distributed fairly among people, followed by livestock in the area. Farm land is also not owned by many people in Northern Rajasthan.

Figure 4.40: Lorenz curve summary in Northern Rajasthan



Source: - Author's Own, 2015

The Gin-coefficient values also coincide with the above Lorenz curve position.

Table 4.140: Overall Gin-coefficient summary

District	Gin-Coefficient			
	Farm Land	Irrigated Land	Livestock	Income
Bikaner	0.481	0.613	0.428	0.440
Sri Ganganagar	0.603	0.600	0.477	0.421
Nagaur	0.295	0.735	0.399	0.341
Northern Rajasthan	0.499	0.67	0.476	0.425

Source: - Author's Own, 2015

4.5. Principal coping strategies used in Northern Rajasthan

Household coping strategies are thus, step by step strategic acts based on a conscious assessment of existing, past events and future expectations on factors that are correlated with family welfare. Households choose own family coping strategies, which are proportionately the most useful to them, using their past experience, availability of internal and external household resources (monetary and non-monetary) and agreement with the community norms. It does not mean

that all households are using similar coping strategies, but some coping strategies are common to all households.

The main focuses of this section is to get answer for the following key questions to achieve our last objective. What are the most widely used poverty coping strategies by the households in Northern Rajasthan? Is coping strategies the same among poor and non-poor households? Is there coping strategies ranking agreement among poor and non-poor sampled households? To answer these questions we focused on individual household's response on ranking of coping strategies in Northern Rajasthan to maintain a minimal level of consumption for their families.

The researcher a prior expectation are that, coping strategies differ among poor and non-poor sampled households because of difference in asset, income and saving. In this case we could evaluate each group separately, to get comprehensive agreement or dis-agreement coefficient figures on coping strategies. Sampled households coping strategies ranked according to the survey is presented in table 4.141.

Table 4.141: Coping strategies in Northern Rajasthan

Coping strategies	Sum of ranks	Ranking
Searching for subsidy price	437	1
Sale of livestock	574	2
Wage employment	902	3
Purchase food on credit	1189	4
Limit portion of size at meal	1480	5
Relay on less preferred foods	1816	6
Consumption of seed stock	2003	7

Source: Author's computations, based on household survey data, 2015

The results on table 4.141 depict common coping strategies in Northern Rajasthan. It is important to note that the sums of ranks were arranged from the least to the highest and the least sum of rank was considered the 1st rank. The reason for this is that, seven coping strategies were ranked and a value of one

(1) was assigned to the most immediate coping strategies and seven (7) the last coping strategies to survive always the same level of welfare. The results show that searching for subsidy price, sale of livestock and wage employment are the three topmost coping strategies by the sampled household in Northern Rajasthan. Consumption of seed stock was ranked the least in terms of their ranking. More than comparing total ranking scores, averages gives a good picture of overall household coping strategies agreement and helps to see degree of agreement with the order of ranking of the coping strategies.

Table 4.142: Mean ranked coping strategies in Northern Rajasthan

Coping strategies	Mean rank
Searching for subsidy price	1.46
Sale of livestock	1.92
Purchase food on credit	3.02
Wage employment	3.97
Limit portion of size at meal	4.92
Relay on less preferred foods	6.04
Consumption of seed stock	6.67
Number of observation	300
Kendall's Coefficient of Concordance (*W)*	0.856
Chi-square	1540
df	6
Assymp. Sig.	0.000

Source: Author's computations, based on household survey data, 2015

Table 4.142 show sampled households coping strategies in Northern Rajasthan according to the survey. The Kendall's 'W' is found to be 0.856 and significant at 1% level. The result indicates that there is high level of agreement among the coping strategies by sampled households. The null hypothesis is rejected in support of the alternate hypothesis. The Kendall's 'W' of 0.856 indicates that there is 85.6 percent agreement between the respondents in the ranking of the coping strategies in Northern Rajasthan. Among the identified coping strategies, searching for subsidy price, sale of livestock, purchase food on credit and wage employment are the top four most coping strategies in the area (Table 4.142).

Purchasing items from subsidized centres is common and topmost coping strategies in Northern Rajasthan. In economics subsidized centre buying is called ‘price buying’, price buying does save money, but it costs a great deal of time. People engage in time consuming shopping trips to save a few rupees. In Northern Rajasthan, each livestock species playing an integral and interconnected role in rural households lives not only in regular time but also in critical time. In the study are households meaningfully using sale of livestock as their coping strategies. The process is generally selective and gradual.

At the time of data collection, key informants informed that, depending on type and level of severity of the crisis faced by household, households start by selling their smaller stock, followed by young cattle, then cows and finally buffalo. Selling buffalo is the last option to cope with the crises. Also, at time of heavy income stress, households often resort to selling small animals so as to get money. In the study area, households can take coping strategy actions such as purchase food on credit when they do not have enough food or money to buy food. Households purchase food on credit from private stores, shops, to increase short-term availability of food. This coping strategy choose also agrees with the outcome of Gupta, *et al.,* (2015) on their research around Delhi, they found that, 13.2 percent households used purchase food on credit as coping strategy.

Similarly, households in the study area also practiced wage employment, limit portion of size at meal, relay on less preferred foods and consumption of seed stock coping strategies but they ranked them as the last option coping strategies. Poor and non-poor differ in asset and income; they use their asset and income in different ways. This study assumes asset and income difference among poor and non-poor also can create difference in coping strategies they adopt. Table 4.143 presents the rankings of the coping strategies poor households choose to live always the same level of welfare. The total sum of their ranks on each coping strategies is then used to determine the relative importance of coping strategies.

Table 4.143: Poor coping strategies in Northern Rajasthan

Coping strategies	Sum of ranks	Ranking
Wage employment	74	1
Relay on less preferred foods	117	2
Limit portion of size at meal	122	3
Searching for subsidy price	221	4
Sale of livestock	262	5
Consumption of seed stock	323	6
Purchase food on credit	336	7

Source: Author's computations, based on household survey data, 2015

As expected, poor sampled households coping strategy is different from non-poor. For Poor households, wage employment, relay on less preferred foods and limit portion of size at meal are topmost three coping strategies. The immediate coping strategy for poor households is wage employment; they tend to increase labour supply to maintain a minimal level of consumption for their family members. They depend on labour supply because they do not have sufficient savings. Poor household also cope by relay on less preferred foods. They cope with this strategy because less preferred foods cost less price and increase continuous availability of food in the family. Further, they cope with limiting portion of size at meal, by shrinking usual kitchen dishes to smaller size to prepare lesser volume of food. Additionally, poor household cope with depending on subsided price, sale of livestock, consumption of seed stock and purchase food on credit. For poor households, purchase food on credit is last option because they do not have secured future income for compensation of the debt.

The rankings made by poor sampled household on coping strategy agree to each other or not is presented on table 4.144. The coefficient of concordance is 0.879 with 6 degrees of freedom. This coefficient is significant at 1 percent. This implies that, there is 87.9 percent agreement among rankings of the respondents concerning the coping strategies of poor households choose to live always the same level of welfare. The asymptotic significance was 100%, which represents the fact that, there was a 100% agreement among the various rankings that 87.9

percent of the coefficient of concordance is correct. Hence, hypothesis two (see methodology), the null hypothesis which states that there is no agreement among rankings of coping strategies of poor households concerning the coping strategies chooses ranking to live always the same level of welfare is rejected in favour of the alternative thus; there is agreement among rankings of coping strategies of poor households concerning the coping strategies chooses ranking to live always the same level of welfare.

Table 4.144: Mean coping strategies of poor in Northern Rajasthan

Coping strategies	Mean rank
Wage employment	1.42
Relay on less preferred foods	2.25
Limit portion of size at meal	2.35
Searching for subsidy price	4.25
Sale of livestock	5.05
Consumption of seed stock	6.22
Purchase food on credit	6.46
Number of observation	52
Kendall's Coefficient of Concordance (*W)*	0.879
Chi-square	274.12
df	6
Assymp. Sig.	0.000

Source: Author's computations, based on household survey data, 2015

Results from Kendall's Coefficient of concordance also match with the sum of ranking result on table 4.144 to identify principal coping strategies. Indicate that, wage employment had a mean rank of 1.42, representing the most immediate option ranking order by poor households, relay on less preferred foods with mean rank of 2.25, limit portion of size at meal with mean rank of 2.35, searching for subsidy price with mean rank of 4.25, Sale of livestock with mean rank of 5.05, consumption of seed stock with mean rank of 6.22 and purchase food on credit with mean rank of 6.46 were found in similar order as revealed on table 4.143.

Table 4.145: Non-poor coping strategies in Northern Rajasthan

Coping strategies	Sum of ranks	Ranking
Searching for subsidy price	322	1
Sale of livestock	455	2
Purchase food on credit	748	3
Wage employment	975	4
Limit portion of size at meal	1232	5
Consumption of seed stock	1510	6
Relay on less preferred foods	1702	7

Source: Author's computations, based on household survey data, 2015

Table 4.145 depicts non-poor sampled households coping strategies ranking in the study area. Searching for subsidy price is topmost immediate option of coping strategy choose by non-poor households to live always the same level of welfare. Sale of livestock, purchase food on credit and wage employment were amongst some of the pressing coping strategies ranking 2nd, 3rd and 4th with the total sum rank of 455, 748 and 975 respectively. Relay on less preferred foods and consumption of seed stock coping strategies were ranked as last option coping strategies with the total sum rank of 1,702 and1,510 respectively. The possible reason is that, non-poor households more likely to use existing assets like livestock and saving to buy preferred foods from subsidized shops rather than consuming seed stock. More than comparing total ranking scores, averages gives a good picture of overall household coping strategies agreement and establishes baseline for monitoring trends of coping strategies overtime. Accordingly, averaged ranking agreement result among non-poor sampled households presented on table 4.146 also helps to see how coping strategies ranked by non-poor households agree to each other in the study area.

Table 4.146 result shows that Kendall's coefficient of concordance is 0.943 with 6 degrees of freedom. This coefficient is significant at 1 percent. The value of W shows that 94.3 percent of the sampled non-poor households were in agreement with the order of ranking of the coping strategies. The asymptotic significance was 100%, which represents the fact that, there was a 100 percent agreement among the various rankings that 94.3 percent of the coefficient of concordance is

correct in ordering ranking of the coping strategies. Hence, hypothesis three (see methodology), the null hypothesis which states that there is no agreement among rankings of coping strategies of non-poor households concerning the coping strategies chooses ranking to live always the same level of welfare is rejected in favour of the alternative thus; there is agreement among rankings of coping strategies of non-poor households concerning the coping strategies chooses ranking to live always the same level of welfare.

Table 4.146: Mean non-poor coping strategies in Northern Rajasthan

Coping strategies	Mean rank
Searching for subsidy price	1.30
Sale of livestock	1.83
Purchase food on credit	3.02
Wage employment	3.94
Limit portion of size at meal	4.96
Consumption of seed stock	6.08
Relay on less preferred foods	6.86
Number of observation	248
Kendall's Coefficient of Concordance (*W)*	0.943
Chi-square	274.12
df	6
Assymp. Sig.	0.000

Source: Author's computations, based on household survey data, 2015

Due to varying degrees of wealth among non-poor households, different coping behaviours are adopted by households at different livelihood levels. But, the following coping strategies were identified to be the most used in the study area by non-poor households. Searching for subsidy price was identified as the most immediate option coping strategies while relay on less preferred foods was identified as the last option coping strategies by sampled non-poor respondents, with a mean rank of 1.30 and 6.86 respectively. Next to subsidy price, depending on the status of family livelihood, non-poor household can adopt also livestock sale with mean ranking of 1.83 and at the last stage consumption of seed stock with mean ranking of 6.08 coping strategies. Generally clear differences exist in the use of the strategies depending on the welfare level of households.

5. SUMMERY, CONCLUSION AND RECOMMENDATION

5.1. Summery

Poverty measurement is important as it serves as a barometer of the extent to which growth and development are inclusive, and as an indicator of the success or failure of strategies for growth and poverty reduction. In India, the war on poverty was officially launched in 1947 by late Prime Minister Jawaharlal Nehru, up to current Narendra Modi, all fourteen Prime Ministers of India were challenged by poverty. Reduction of poverty, especially rural poverty is therefore, critical for the attainment of national and international goals.

Yet, rural poverty situation in India remains a paradox, at least from four perspectives. Firstly, the bulk of agricultural production in India takes place in the rural areas and paradoxically, the level and incidence of poverty is very pronounced in rural areas. Secondly, rural poverty in India is a paradox considering rural area's immense natural wealth potentials. Thirdly, economic growth in the country recorded a significant change, rural poverty paradoxically still remain main development challenge in India. Fourthly, successive governments in India have been devoted huge human and material resources to poverty reduction in rural areas but poverty situations have not declined reasonably.

To address the problem of rural poverty, the Indian government is committed to the barest minimum and even eradicate if possible hence rural poverty alleviation has remained the declared goal for Central, State and District level governments. In order to reduce or eradicate poverty, since independence successive governments have launched several poverty alleviation programmes to curtail problem of poverty in the country and certain areas of the country such as Northern part of Rajasthan. These programmes have ensured reduction in poverty; however, the pace of poverty reduction over the past decade has been slow. This phenomenon calls for assessment of not only poverty trend to

understand what has really happened to poverty levels in the past, but also getting answers for, who are the poor in Northern Rajasthan? What is the poverty situation (extent) in Northern Rajasthan? Why some people are poor? When will absolute poverty be eliminated? And how equally is income and resource distributed among households, are fundamental questions to achieve our seated objectives.

The present study was based on these objectives: (i) to study poverty trend in the country and in the study area,(ii)to measure extent of poverty and socio-economic characteristics in the study area,(iii)to determine the principal factors contributing to household poverty and average exit time in the study area,(iv)to measure income and resource inequality in the study area and to assess common coping strategies to tackle risk in the study area. To achieve the stated objectives, detailed primary and secondary data were collected on poverty trend, poverty situation, determinants and exit time of poverty, income and resource inequality and common coping strategies in the study area. Multistage stratified random sampling procedure was adopted for the selection of 300 sampled respondents from three randomly selected districts namely Bikaner, Sri Ganganagar and Nagaur.

This study explored poverty trend in India in seven decades (1951-2011) using graphical and Semi-log growth model to achieve first objective. The study used three poverty dimension instruments that were identified by (Foster, Greer, and Thorbecke, 1984) to achieve second objective related to the extent of poverty in Northern Rajasthan. These included headcount index; the poverty gap index; and severity index. Once we identified who the poor and non-poor are, we examined the causes for that poverty. To address principal determinants of household poverty in the study area, to achieve third objective, the study used, logit model. To address resource and income inequality, the study used Lorenz curve, Gini coefficients and dividing the sampled households into fifths (quintiles) approach.Finally the study identified common coping strategies in Northern

Rajasthan to achieve last objective using Kendall's coefficient of concordance approach and the following results were summarized after analysis.

The seven decade trend shows overall incidence of poverty in the country has been declining. The incidence of poverty, as measured by head count index, declined from 45.3 percent in 1951/52 to 21.9 percent in 2011/12. The 1954/55 and 1966/67 were the two historical years that Indian poverty rate has reached maximum, 61.1 percent and 62 percent, respectively. Between 1952 and 1967, the share of the population in poverty moved up and down cyclically, without a trend in response to good or bad monsoons. The 1970s and 1980s were decades in which poverty trend only contentiously decline without rise. Both urban and rural poverty declined, the incidence of rural poverty was higher than that of urban poverty throughout the period. The incidence of rural poverty was 47.4 percent in 1951/52 and it was decline to 25.7 in 2011. On the other hand, the incidence of urban poverty was 35.5 percent in 1951/52 and decline to 13.7 in 2011. The trend clearly shows the country poverty history was directly connected with rural poverty, which is not surprising given that a large proportion of India's population lives in rural areas.

Semi-log growth trend model output indicates that, overall poverty declined between 1951-2011 development plan period at the rate of -0.012 per year, or at 1.2 percentage points per year in India. One year increase in time resulted in 1.2 percentage points per year decrease in poverty until eleventh development plan period (1951-2011). The same result indicates that, during second development plan period poverty declined at the rate of -0.018 per year, or at 1.8 percent point per year. One year increase in time resulted in 1.8 percent point decrease in poverty. Similarly, in fourth development plan period poverty declined at the rate of -0.021 per year or at 2.1 percent point per year. One year increase in time resulted in 2.1 percent point decrease in poverty. During fifth and sixth development plan periods poverty declined during fifth development plan period at the rate of -.026 per year, or at 2.6 percentage points per year and declined

during sixth development plan period at the rate of -0.0101 per year, or at 1.01 percentage points per year. This means, one year increase in time resulted in 2.6 percentage points decrease in each year in poverty during fifth development plan period and 1.01 percentage points per year decrease in poverty during sixth development plan period. Equally, in eleventh development plan period poverty declined at the rate of -0.023 per year, or at 2.3 percentage point per year. One year increase in time resulted in 2.3 percentage point per year decrease in poverty. But, during third development plan period poverty raised and showed statistically significant upward trend. Poverty rose during third development plan period at the rate of 0.044 per year, or at 4.4 percentage point per year. One year increase in time resulted in 4.4 percentage point per year increase in poverty during third development plan period.

The poverty headcount (incidence of poverty) in Northern Rajasthan was 0.173 which means in 17.3 percent of sampled households are under poverty line. Within four years interval between 2011/12 to 2014/15 the average poverty status of Rajasthan reduced from 21.7 percent to 17.3 percent. Poverty declined by 4.4 percentage points over the four years. In each year poverty declined 1.1 percentage points. The poverty gap index was 0.04 for the study area. In Northern Rajasthan on average 4 percent of the poverty line monthly cash transfer needed to lift each poor person out of poverty. The squared poverty gap index result in the study area also shows poverty is less sever among sampled poor's and the value of squared poverty gap index (0.0121) is not closer to one; rather it is closer to zero, which indicates poverty is not highly serious in Northern Rajasthan.

The average expenditure clearly shows how poor the poor are. Northern Rajasthan poor person average expenditure in all three districts is far from the poverty line of ₹1036 per person per month. Poor person in Nagaur district averagely spent ₹747 per person per month followed by ₹794 in Bikaner and ₹867 in Sir Ganganagar districts. Poor's in Nagaur are seriously poorer than

poor's in Bikaner and Sir Ganganagar districts. Similarly, poor person in Northern Rajasthan averagely spent ₹797 per person per month which is not far from district average. This result agrees with squared poverty gap index at district level. But, non-poor in all three districts averagely spent far more than the expected poverty line. This unequal and skewed type of expenditure shows the existence of income source inequality among the districts in Northern Rajasthan.

In Northern Rajasthan a poor person needs ₹239 per person per month cash transfer to reach the poverty line. In Nagaur district a poor person needs averagely ₹272, in Bikaner district ₹242 and in Sri Ganganagar district ₹169 per person per month cash transfer to reach the poverty line. These results would work if we perfectly targeted to the poor in each district appropriately.

Logit analysis result indicates, out of the fourteen variables hypothesized to influence household's poverty, in Northern Rajasthan, eleven were found to be statistically significant. The maximum likelihood estimation result of the logistic regression model showed that the coefficients of family size, cultivated land size, irrigated land size, income, livestock holding in (TLU), decision maker education, wife education, dependency ratio, number of farm participant, farming experience and main road distance are significantly different from zero and major determinants of poverty in the Northern Rajasthan. However, saving, credit and months of food deficit do not show any significant influence on household poverty in the study area. As family size increases by one unit, *cetaris paribus,* the probability that a household falls into poverty increases by 5 percent and as dependency ratio increases by one adult equivalent, *cetaris paribus,* the probability that a household falls into poverty increases by 17.64 percent. As farm size increases by one hectare, *cetaris paribus,* the probability that a household falls into poverty decrease by 5.1 and as irrigated land holding size of the household increases by one hectare, the probability of the household falling into poverty decreases by 9 percent. These shows, recently farm household income depends more on water than land. The probability that a household falls

into poverty decreases by 0.2 percent, as family income increases by one lakh rupees, *cetaris paribus.* As livestock ownership increases by one TLU, *cetaris paribus,* the probability that a household falls into poverty decrease by 10.1 percent. As decision maker education measured by years of schooling increases by one unit, *cetaris paribus,* the probability that a household falls into poverty decrease by 3.43 percent and as wife education measured by years of schooling increases by one unit, *cetaris paribus,* the probability that a household falls into poverty decrease by 1.7 percent. As number of farm participant increases by one adult person, *citrus paribus,* the probability that a household falls into poverty decrease by 1.6 percent and as main road distance increases by one kilometer, *citrus paribus,* the probability that a household falls into poverty increase by 2 percent.

Poverty exit time detail analysis revealed that, if the country attains high economic growth, it would need less average time of poverty exit and vice versa in Northern Rajasthan. If the country economy grows with 5 percent per year, as actual average growth performance of the Indian economy between 2012/13 to 2014/15, it would take Northern Rajasthan poor to exit from poverty 14 years, Bikaner district poor 4.5 years, Sri Ganganagar district poor 3.6 years and Nagaur district poor 6 years. In three districts there is a clear difference in the average time of poverty exit for households. Our findings show that, households that reside in an area where the local economy is characterized by irrigated agricultural, their average time of poverty exit is the shortest (Sri Ganganagar) and the graph is near to the origin. It would take more years of exit for total respondents in Northern Rajasthan than district level. Northern Rajasthan exit time graph is far from origin and above all district exit time graph. As the number of poor increase it requires more time with the assumed economic growth rate. With 2012/13 and 2013/14 Indian economic growth rate (averaged 5 percent), Northern Rajasthan will be free of poverty after 14 years or in 2029. Current increase in growth performance in agriculture sector may also contribute to lessen the time in the future.

The inequality analysis result indicates the problem of inequality is serious in the study area. The evidence from empirical analysis suggests that irrigated land and farm land inequality have highest Gini-coefficient. Income and livestock relatively diffused better than other resource in Northern Rajasthan.

Agricultural land distributed unequally in Northern Rajasthan. This means a few households hold major portion of agricultural land and the rest households hold a small portion of agricultural land. Upper 20 percent land holders take the lion share and owned 50.05 percent of total agricultural land whiles the lowest 20 percent sampled household having less than one percent share in agricultural land holding. The uppermost 20 percent land holding is 2.5 times more than the assumed equal distribution rate, more than 102 times more than lowest 20 quintiles and more than six times the lowest 40 percent quintiles. All these shows the potential agricultural resource, land is unequally distributed among sampled households in Northern Rajasthan. The Lorenz curve locus for agricultural land holding shows, existence of skewed distribution among sampled households. Gini-coefficient value (0.499) obtained from the data shows 49.9 percent of agricultural land is distributed unequally in Northern Rajasthan.

All the data result indicates irrigated land is controlled by few people in Northern Rajasthan. Gini-coefficient value (0.67) obtained from the data shows 67 percent of irrigated land is distributed unequally in Northern Rajasthan. Lowest 20 percent and low-mid 20 percent household do not owned any irrigated land. Upper 20 percent owned more than 63 percent of total irrigated land. Surprisingly, uppermost 20 percent quintiles irrigated land holding is almost 8 times higher than the lowest 60 percent quintiles and more than 3 times greater than the assumed equal distribution rate.

The livestock distribution results also indicate presence of uneven distribution of livestock among sampled households in the area. The Gini-coefficient result is 0.476. It means that 47.6 percent of livestock are distributed unequally in Northern Rajasthan. The lowest 20 percent households owned just 0.56 percent of total livestock holdings and highest 20 percent households owned 48.45 percent of total livestock holdings. The uppermost 20 percent quintiles livestock holding is more than 86 times higher than the lowest 20 percent quintiles and more than 2 times the expected equal distribution amount.

However, as compared to other inequality indicators, there is lower degree of income inequality. Gini-coefficient value is 0.425 for income distribution in Northern Rajasthan. It means that 42.5 percent of incomes are distributed unequally in Northern Rajasthan. The share of the lowest 20 percent household's income was 4.48 percent and uppermost 20 percent households owned as much as 47.98 percent of the total income. The upper 20 percent share is more than two times higher than equal distribution and more than10 times higher than lowest 20 percent share. Furthermore, district level inequality analysis results also shows, resource and income inequality problem is also serious at district level.

Searching for subsidy price, sale of livestock and wage employment are the three topmost coping strategies by the sampled household in Northern Rajasthan. Consumption of seed stock was ranked the least in terms of their ranking. The Kendall's 'W' of 0.856 indicates that there is 85.6 percent agreement between the respondents in the ranking of the coping strategies in the study area. The result indicates that there is high level of agreement among the coping strategies by sampled households.

Poor sampled households coping strategy is different from non-poor. For poor households, wage employment, relay on less preferred foods and limit portion of size at meal are topmost three coping strategies. Whereas, searching for subsidy

price is topmost immediate option of coping strategy choose by non-poor households to live always the same level of welfare. Sale of livestock, purchase food on credit and wage employment were amongst some of the pressing coping strategies ranking 2nd, 3rd and 4th with the total sum rank of 455, 748 and 975 respectively. The coefficient of concordance is 0.879 with 6 degrees of freedom. This coefficient is significant at 1 percent. This implies that, there is 87.9 percent agreement among rankings of the respondents concerning the coping strategies of poor households choose to live always the same level of welfare. Kendall's coefficient of concordance shows that 94.3 percent of the sampled non-poor households were in agreement with the order of ranking of the coping strategies.

Results indicate that the general sequence of coping strategies that all households follow depends on the assets they own and agrees each other. Further the result shows there is a general sequence of different types of strategies that households adopt sequentially as stress becomes more prolonged, initially adopting strategies that will not jeopardize future earnings, and only resorting to strategies that will reduce future earnings if necessary.

5.2. Conclusion

This study explored poverty trend, extent, determinants and exit time and income and resource inequality in Northern Rajasthan of India. On the basis of the results obtained in the present study, the following conclusions can be drawn: The seven decade trend shows overall incidence of poverty in both urban and rural has been declining. The period up to the mid-1960s, is characterized by fluctuations in poverty without a trend. The 1970s and 1980s were decade in which poverty trend only contentiously decline without rise. Poverty has fallen far more rapidly and significantly after 1990s than previously. The trend shows the country poverty history was directly connected with rural poverty. During first and third development plan years, the incidence of poverty increased, but in remaining nine development plans, poverty has been declined. Semi-log growth trend model output indicates, overall, poverty declined between 1951-2011

development plan period at the rate of -.012 per year, or at 1.2 percentage points per year. One year increase in time resulted in 1.2 percentage points per year decrease in poverty until eleventh development plan period (1951-2011).

In Northern Rajasthan, 17.3 percent of sampled households are under poverty line. District level decomposed poverty measures also shows, the poverty headcount (incidence of poverty) was 0.17 in Bikaner, 0.15 in Sri Ganganagar and 0.2 in Nagaur districts. This means 17 percent of sampled households in Bikaner, 15 percent of Sri Ganganagar and 20 percent of Nagaur districts are under poverty line. Within four years interval between 2011/12 to 2014/15 the average poverty status of Northern Rajasthan reduced from 21.7 percent to 17.3 percent. In each year poverty declined 1.1 percentage points. The poverty gap index was 0.04 and on average 4 percent of the poverty line monthly cash transfer needed to lift each poor person out of poverty in Northern Rajasthan.

The logit model result showed that, out of the fourteen variables hypothesized to influence household poverty in Northern Rajasthan, eleven were found to be statistically significant and major determinants of poverty in the Northern Rajasthan. The maximum likelihood estimation result of the logistic regression model showed that the coefficients of family size, cultivated land size, irrigated land size, income, livestock holding in (TLU), decision maker education, wife education, dependency ratio, number of farm participant, farming experience and main road distance are significantly different from zero and major determinants of poverty in the Northern Rajasthan. However, saving, credit and months of food deficit do not show any significant influence on household poverty in the study area.

Poverty exit time detail analysis revealed that, existence of inverse relationship between economic growth and average time of poverty exit in the study area. Average poverty exit time result specifies that, if the country economy grows with 5 percent per year, as actual average growth performance of the Indian economy

between 2012/13 to 2014/15, it would take Northern Rajasthan poor 14 years, Bikaner district poor 4.5 years, Sri Ganganagar district poor 3.6 years and Nagaur district poor 6 years to exit from poverty.

The inequality analysis result indicates the problem of inequality is serious in the study area. The evidence from empirical analysis suggests that irrigated land and farm land inequality have highest Gini-coefficient. Income and livestock relatively diffused better than other resource in Northern Rajasthan. Gini-coefficient values were (0.499) for agricultural land, (0.476) for livestock holding (0.67) for irrigated land and (0.425) for income distribution. It means that 49.9 percent of agricultural land, 47.6 percent of livestock, 67 percent of irrigated land and 42.5 percent of income were distributed unequally in Northern Rajasthan. However, as compared to other inequality indicators, there is lower degree of income inequality. The Lorenz curve position from equal distribution coincide with Gini coefficient results and quintiles division analysis results.

In Northern Rajasthan sequence of coping strategies that all households follow depends on the assets they own and agrees each other.

5.3. Recommendation

1. To speed up the poverty reduction process in the country, achieving higher aggregate economic growth is only one element of an effective strategy. All the result shows that poverty reduction in India has been very closely connected to economic growth in the country, promoting poverty reduction significantly when the economy was growing rapidly, and poverty rises proportionally when the economy is not growing. Policies that encourage higher aggregate economic growth are advisable. Quantitative and qualitative availability of productive resources including natural, skilled manpower and capital resources are keys for economic growth.

2. Poverty in India is overwhelmingly a rural phenomenon. Growth in sectors of the economy where the poor are concentrated will have a greater impact on reducing poverty than growth in other sectors. Growth in the agricultural and tertiary sectors has had a major effect on reducing poverty. For effective poverty alleviation Indian government policy should focus on agricultural and rural area.
3. The study findings suggest that in selecting priority intervention areas, any poverty reduction strategy should consider statistically significant variables as the most important areas. Large family size contributes for high rate of population growth and poverty. Hence, the government and NGOs, particularly operating at the local levels should implementation programs related to population policy in to effect. To this end, a focus on family planning and integrated health service must catch the attention of decision-making bodies. Also, government policy should focus and emphases on improving infrastructure development, women participation in the economy, diversify and increase household income and improved market access.
4. Inequality issue matters in India for effective poverty reduction. Policies that help to limit or reverse inequality are important for economic growth by increasing participation of poor people in the economy. There's no surer ticket out of poverty than a solid education. When more workers have high skill levels, inequality in wages decline.
5. This study stress that targeting is a means toward the end of poverty. Scarce government resources and poverty reduction programmes should focus on reaching the poor by properly targeting poor households.
6. Research and technology development is the foundation of productivity gain to accelerate economic growth. Government should spend enough and pay attention on research and technology development to alleviate poverty.

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Poverty and Its Determinants in Northern Rajasthan of India

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Abstract

This study explored poverty trend, extent, determinants and exit time and income and resource inequality in Northern Rajasthan. Poverty trend in seven decades (1951-2011) was addressed using graphical and semi-log growth model and extent of poverty was addressed using the FGT poverty measure approach. To address principal determinants of household poverty, the study used, logit model and equally, to address average poverty exit time the study adopted Morduch, J.(1998) approach. Also, to address resource and income inequality in the study area, the study used Lorenz curve and Gini coefficient approaches. To achieve objectives, the study used both primary and secondary data. Primary data was collected from 300 households following multistage random sampling process. In this study minimum consumption expenditure per person per month was used as standard of measurement to categorize households into poor and non-poor. Collected data were analyzed in detail at Northern Rajasthan level and district level according to their importance and the the study found that:

The seven decade trend shows overall incidence of poverty in both urban and rural of the country has been declining. 1954/55 and 1966/67 were the two historical years that Indian poverty rate has reached maximum, 61.1 percent and 62 percent, respectively. The period up to the mid-1960s, is characterized by fluctuations in poverty without a trend. The 1970s and1980s were decade in which poverty trend only contentiously decline without rise. Poverty has fallen far more rapidly and significantly after 1990s than previously. The trend shows the country poverty history was directly connected with rural poverty.

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Semi-log growth trend model output indicates, overall, poverty declined between 1951-2011 development plan period at the rate of -.012 per year, or at 1.2 percentage points per year. One year increase in time resulted in 1.2 percentage points per year decrease in poverty until eleventh development plan period (1951-2011).

In Northern Rajasthan, 17.3 percent of sampled households are under poverty line. Within four years interval between 2011/12 to 2014/15 the average poverty status of Northern Rajasthan reduced from 21.7 percent to 17.3 percent. In each year poverty declined 1.1 percentage points. The poverty gap index was 0.04 and on average 4 percent of the poverty line monthly cash transfer needed to lift each poor person out of poverty. The squared poverty gap index was 0.0121.

The logit model result showed that, out of the fourteen variables hypothesized to influence household poverty in Northern Rajasthan, eleven were found to be statistically significant and major determinants of poverty in the Northern Rajasthan. These are family size, cultivated land size, irrigated land size, income, livestock holding in (TLU), decision maker education, wife education, dependency ratio, number of farm participant, farming experience and main road distance. However, saving, credit and months of food deficit do not show any significant influence on household poverty in the study area. If the country economy grows with 5 percent per year, as actual average growth performance of the Indian economy between 2012/13 to 2014/15, it would take Northern Rajasthan poor 14 years, Bikaner district poor 4.5 years, Sir Ganganagar district poor 3.6 years and Nagaur district poor 6 years to exit from poverty.

Income and resource inequality analysis result found that in Northern Rajasthan 49.9 percent of agricultural land, 47.6 percent of livestock, 67 percent of irrigated land and 42.5 percent of total incomes were distributed unequally and also in Northern Rajasthan sequence of coping strategies that all households follow depends on the assets they own and agrees each other.

भारत के उत्तरी राजस्थान में गरीबी के निर्धारक

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अनुक्षेपण

वर्तमान अध्ययन उत्तरी राजस्थान में गरीबी की प्रकृति सीमा उसके निर्धारकों तथा उसकी निवृति व आय के संसाधनों में असमानता के बारे में किया गया। सात दशकों (1951–2011) में गरीबी की प्रकृति हेतु चित्रमय व अर्द्ध लोग विकास मॉडल तथा गरीबी का विस्तार मापने हेतु थ्ळज् दृष्टिकोण का उपयोग किया गया था । घरेलू गरीबी के लिए मुख्य निर्धारक लोजिट मॉडल का उपयोग किया गया तथा परस्पर औसत गरीबी के लिए व उसे दूर करने के लिए मारडच. जे (1998) दृष्टिकोण का उपयोग किया गया। संसाधन व आय में असमानता मापने के लिए लोरेज वक्र व गिनी गुणांक दृष्टिकोण का उपयोग किया गया था । दद्वेश्यों की प्राप्ति के लिए प्राथमिक व द्वितीय आकड़ों का उपयोग किया गया था।

प्राथमिक आकड़े (बहुमंच) मल्टी स्टेज या दच्छिक नमूना प्रक्रिया द्वारा 300 परिवारों से इकट्ठे किए गए। इस अध्ययन में प्रतिमाह कम से कम उपयोग खर्च मापक के रूप में उपयोग किया तथा घरों को गरीब तथा गैर–गरीब की श्रेणी में लाया गया। उत्तरी राजस्थान में एकत्रित आकड़ों का महत्व देखते हुए जिला स्तर पर विस्तार पूर्वक अध्ययन किया गया व अध्ययन में पाया गया किः–

पिछेले सात दशकों में ग्रामीण तथा शहरी क्षेत्र में गरीबी में गिरावट आई है। 1954–55 व 1966–67 इन दो वर्षो में ऐतिहासिक गरीबी रही, जो कि 61.1 तथा 62 प्रतिशत क्रमशः रही। मध्य 1960 के दशक में गरीबी की प्रकृति में कोई उतार– चढाव नहीं रहा 1970 तथा 1980 के दशक में गरीबी की प्रकृति में लगातार गिरावट रही। पहले की बजाय 1990 के बाद गरीबी गिरावट में काफी वृद्धि रही इससे यह पता चलता है कि देश की गरीबी ग्रामीण गरीबी से जुड़ी हुई है। अर्द्ध लोग विकास मॉडल से इंगित होता है कि 1951–2011 के बीच विकास योजना के कारण –0.012 व 1.2 प्रतिशत की गिरावट रही। 1951 से 2011 तक विकास योजना के समय गरीबी में 1.2 प्रतिशत प्रतिवर्ष की गिरावट रही।

उत्तरी राजस्थान के नमूना परिवारों में 17.3 प्रतिशत गरीबी रेखा से नीचे पाए गए। इस क्षेत्र में 2011–12 से 2014–15 तक के चार सालों के अन्तराल में गरीबी 21.7 प्रतिशत से घटकर 17.3 प्रतिशत हो गई। प्रतिवर्ष 1.1 प्रतिशत की गिरावट रही। गरीबी अन्तर सुचकांक 0.04 तथा चुकता गरीबी अन्तर 0.0121 रहा। गरीबी रेखा से ऊपर उठने हेतु प्रतिमाह औसतन 4 प्रतिशत नगदी हस्तांरतरण की आवश्यकता है।

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* **शोधार्थी विद्यावाचस्पति (कृषि अर्थशात्र), कृषि महाविद्यालय, स्वामी केशवानन्द राजस्थान कृषि विश्वविद्यालय,बीकानेर**

** **कृषि अर्थशात्र में विद्यावाचस्पति की उपाधि प्राप्ति की हेतु प्रस्तुत शोध ग्रंथ कार्य डॉ. एन.के.सिंह, आचार्य (कृषि अर्थशात्र), कृषि महाविद्यालय, स्वामी केशवानन्द राजस्थान कृषि विश्वविद्यालय, बीकानेर के निर्देषन में प्रस्तुत किया गया।**

ोजिट मॉडल के परिणाम यह दर्शाते है कि उत्तरी राजस्थान में घरेलु गरीबी को प्रभावित करने वाले कुल चौदह निर्धारकों मे से ग्यारह मुख्य निर्धारक आदर्श पाए गए जो कि परिवार का आकार, खेती योग्य भूमि का आकार, सिंचित भूमि का आकार, आय, कुल पशुधन, मुखिया का शैक्षिणिक स्तर, ग्रहिणी का शैक्षिणिक स्तर, तथा मुख्य सड़क से दूरी रहे। जबकि बचत, ऋण तथा महिने में भोजन की कमी घरेलू गरीबी को प्रभावित नही कर पाए। भारतीय अर्थ व्यवस्था मेंवृद्धि दर 2012–13 से 2014–15 के बीच 5 प्रतिशत रही, इसके अनुरूप सम्पूर्ण राजस्थान को गरीबी से उढने के लिए 14 वर्षो बीकानेर जिले को 4.5 साल गंगानगर को 3.6 साल व नागौर को 6 साल लगेगें।

आय और संसाधान असमानता विश्लेषण में पाया गया कि उत्तरी राजस्थान में 49.9 प्रतिशत खेती योग्य भूमि, 47.6 प्रतिशत पशुधन, 67 प्रतिशत सिंचित खेती तथा 42.5 प्रतिशत कुल आय जो कि असमान वितरित पाए गए। उत्तरी राजस्थान में सभी घरों के पालन अनुक्रम जो कि उनकी खुद की तथा सभी की परिसम्पतियों पर निर्भर है।

APPENDIXS

Appendix-I :- Conversion Factors to Estimate Tropical Livestock Unit equivalents

Livestock type	TLU (Tropical livestock unit)
Camel	1.10
Buffalo	1
Cows	0.7
Buffalo Heifer	0.65
Cow Heifer	0.55
Sheep/Goat	0.13
Sheep/Goat (young)	0.06
Chicken	0.013

Source: Storck, et at. (1991)

Appendix-II- Conversion Factors Used to Compute Adult-Equivalent (AE)

Age Category (Year)	Male	Female
0—1	0.33	0.33
1.1—2	0.46	0.46
2.1—3	0.54	0.54
3.1—5	0.62	0.62
5.1—7	0.74	0.70
7.1—10	0.84	0.72
10.1—12	0.88	0.78
12.1—14	0.96	0.84
14.1—16	1.06	0.86
16.1—18	1.14	0.86
18.1—30	1.04	0.80
30.1—60	1.00	0.82
> 60	0.84	0.74

Source: Storck, et at. (1991)

Appendix-III- Questionnaire (schedule) for primary data collection

COLLEGE OF AGRICULTURE
SK RAJASTHAN AGRICULTURAL UNIVERSITY
Structured Interview for Households in Northern Rajasthan
TOPIC: Poverty and its determinants in Northern Rajasthan of India

This research is purely academic exercise and all information given shall be used solely for that purpose. I would be grateful if you could provide the necessary answers to questions stated. All information given would be treated as confidential.

Name of District---------- Date of Interview----------
Name of Tehsil (Taluka)---------- Name of the enumerator-
Name of Village---------- Signature ----------
Household head Name---------- Name of Supervisor -----
Signature----------

A. Household Characteristics

1. How many people are there in your household?.....
2. Can I check some details of the adult and child members of your household?

Households' members name	Sex	Age	Educational level of the households' members	Relationship to respondent (e.g. spouse, son or daughter)

3. How many family members are involved in farming activity?.....

B. Unemployment

4. Is any member of the household a regular salary earner?
Yes ☐ No ☐
5.If yes, number of regular salary earners ----------
*6. I*s any member of the household unemployed?
Yes ☐ No ☐
7.If yes, number of members who graduated above college----------
8.If yes, number members who finished high school ----------

C. Land use information

9.Does the households' own agricultural land?
Yes ☐ No ☐
10. If yes, what is the total area of the agricultural land? ----------Hectare----------
acre----------Other

11.Do you have irrigable land?

Yes ☐ No ☐

12. If yes how much is it? ----------Hectare or----------acre----------Others (specify)

13.How many years' experience you have in Agriculture occupation?---------- years

14. Is your own production enough for your households' consumption until next production?

Yes ☐ No ☐

15. If No, for how many months do you consume your own production during normal production? ----------months

16. Did your family buy any food crop from the market this year?(April 2014 - April2015)

Yes ☐ No ☐

17. If yes in which months do you buy more usually, please tell me the months?--

D. Access to various services

18. How far is the regulated market from your house that you can buy and sell goods?

In Km----------

In hours----------

19. How far is the approach main transport road from your house that you can transport goods?

In Km----------

In hours----------

20. How far is the nearest hospital from your house?

In Km----------

In hours----------

21. Is there any credit providing facility /institute in your area?

Yes ☐ No ☐

22. In the past three years, have you taken any loan?

Yes ☐ No ☐

23. If yes, please how much is it in Rs----------

24. Do you have money saving habit in formal institutions?

Yes ☐ No ☐

25. f yes, amount saved last year ---------- rupees.

26. Do you have access to the following communication ways

Radio ☐ Mobile ☐

Tv ☐ Post office ☐

E. Livestock production and management

27. Does your family own livestock's?

Yes ☐ No ☐

28. If yes, please give the list and their number

Type of livestock	Number currently owned
Cow	
Buffalo	
Oxe	
Sheep	
Goat	
Poultry	
camel	

F. Off- farm income

29. Has anyone from your households' migrated in search of job in the past year?

Yes ☐ No ☐

30. If yes, where did they go?

Within district---------

Outside Rajasthan---------- Outside India----------

31. Does your family have any job other than agriculture that increase households' income?

Yes ☐ No ☐

32. If yes, would you please tell total family off-farm income? ----------rupees

33. Does the household possess ration card? Yes ☐ No ☐

34. If yes type of ration card is

Antyodaya ☐ BPL ☐ others specify ----------

G. Remittance

35. Does some member of your family *(not a household member at present!)* work somewhere else in India or in a foreign country, and did he or she send you money during the past 12 months?

Yes ☐ No ☐

36. If yes, how much money did this person send you during the past 12 months?----------rupees

37. Type of drinking water supply (source)

Hand pump ☐ Pond ☐

Public water system outside hose ☐ others specify--

Open well ☐

38. What is the most important source of domestic fuel?

LPG-03 ☐ Woods and Dung cakes ☐

Kerosene oil ☐ Other Specify----------

39.What kind of material did you use to build your house?

Baked brick (concrete) ☐ Baked bricks (mud bonded) ☐

Unbaked bricks ☐ Mud and Straw ☐

Others specify----------

H. Household Expenditure

S.No	Items groups	Value of consumption (in Rs.)
1	How much does your household usually spend **per month** for buying cereals & substitute (rice, wheat, bajra, ragi, other cereals)	
2	How much does your household usually spend **per month** for buying pulses & products (arhar, tur, gram, moong, masur, urd, peas, other pulses and pulses products	
3	How much does your household usually spend **per month** for buying milk & milk products (liquid milk, powder milk, baby food, curd, ghee, butter, ice-cream , other milk products	
4	How much does your household usually spend **per month** for buying salt & sugar(salt, sugar, gur, candy, misri, honey	
5	How much does your household usually spend **per month** for buying edible oil (mustard oil, groundnut oil, coconut oil, soybean oil, other oils	
6	How much does your household usually spend **per month** for buying egg, fish & meat (eggs, fish, goat meat, chicken	
7	How much does your household usually spend **per month** for buying vegetables (potato, onion, tomato, brinjal, radish, carrot, green chillies, lady's finger, parwal, cauliflower, cabbage, gourd, pumpkin, peas, beans, barbate, lemon (no.) other vegetables	
8	How much does your household usually spend **per month** for buying Fruits(banana, jackfruit, watermelon, pineapple, coconut, green coconut, guava, singara, ber,Aonla,orange, papaya, mango, apple, grapes, leechi, berries, pears/nashpati, kharbooza other fruits	
9	How much does your household usually spend **per month** for buying Spices(ginger, garlic, jeera, dhania, turmeric, black pepper, dry chillies, amarind, curry powder, oilseeds, other spices	
10	How much does your household usually spend **per month** for buying **beverages:(** tea: leaf, coffee, cold beverages:, mineral water, fruit juice	
11	How much does your household usually spend **per month** for buying **served processed food:(** cooked meals purchased, samosa puri, paratha, burger, chowmein, idli, dosa, vada, chops, pakoras, pao	
12	How much does your household usually spend **per month** for buying **packaged processed food:(** pan: leaf, pan: finished, ingredients for pan	
13	How much does your household usually spend **per month** for buying **Tobacco:(** bidi, cigarettes, leaf tobacco, snuff, hookah tobacco, cheroot, zarda, kimam, surti, other tobacco products	
14	How much does your household usually spend **per month** for buying **intoxicants:(** beer, country liquor or wine ,foreign/refined liquor or wine	
15	How much does your household usually spend **per month** for buying fuel and light (coke, electricity, firewood and chips, dung cake, kerosene – PDS, matches (box), LPG, charcoal, candle, gobar gas, petrol, diesel	

16	How much does your household usually spend **per month** for buying rent (house rent, garage rent (actual), hotel lodging charges, residential land rent	
17	How much does your household usually spend **per year** for buying Medical (Instt & non-instt) (medicine ,X-ray, ECG, pathological test, doctor's/surgeon's fee, hospital & nursing home charges, other medical expenses	
18	How much does your household usually spend **per year** for buying clothing & bedding(dhoti, saree, coat, jacket, sweater, school/college uniform: boys and girls, kurta-pajama suits male and female, shirts, T-shirts, shorts, trousers, Bermudas, infant clothing, **clothing: second-hand**	
19	How much does your household usually spend **per year** for buying **bedding** (bed sheet, bed cover, rug, blanket, pillow, quilt, mattress, cloth for upholstery, curtains, tablecloth, mosquito net, bedding: others)	
20	How much does your household usually spend **per year** for buying footwear (leather boots, shoes, leather sandals, chappals, rubber / PVC footwear, other footwear, footwear:	
21	How much does your household usually spend **per year** for buying Education(books, journals, newspapers, stationery, photocopying charges, tuition and other fees (school, college, private tutor/ coaching centre, other education fee	
22	How much does your household usually spend **per month** for buying **minor durable-type goods(**spectacles, torch, lock, umbrella, raincoat,	
23	How much does your household usually spend **per month** for buying **toilet articles(**toilet soap, toothbrush, comb, powder, snow, cream, lotion, perfume, hair oil, shampoo, hair cream, shaving blades and crame, shaving stick,	
24	How much does your household usually spend **per month** for buying **consumer services(**telephone charges(both landline and mobile),domestic servant/cook, attendant, sweeper, barber, beautician, washerman, laundry, ironing, tailor, grinding charges, postage & telegram, legal expenses, repair charges for non-durables, internet expenses	
25	How much does your household usually spend **per month** for paying **Entertainment(**cinema, theatre, picnic, sports goods, toys, club fees, goods for recreation and hobbies, photography, VCD/ DVD hire, cable TV, other entertainment	
26	How much does your household usually spend per month for buying other household consumables(electric bulb, tubelight, electric batteries, bucket, water bottle, washing soap/soda/powder, other washing requisites	

I. Household Income

S.No	Source of income		Amount received in(Rs)
1	Agricultural income	Revenue from sale of crops	
		Revenue from the sale of vegetables	
		Revenue from the sale of Livestock (Cow, Buffalo, sheep ,Goat, Chicken, Camel or others	
		Revenue from the sale of Livestock products and by-products (Milk, ghee, butter, Egg, Dung, wool, others	
2	Household Labour Income	Government Permanent salary income	
		Casual labour income	
		Long-term labour income	
3	Business and trade nonfarm activities income		
4	Income from forest produce		
5	Remittances received from relatives during the past 12 months		
6	Income from rent of land received during the past 12 months		
7	Income from rent of other property received during the past 12 months		
8	Social and insurance (life and non-life) income received during the past 12 months		
9	Profit and dividend received as partner/ share holder during the past 12 months		
10	Lottery/ prize bond/ other similar income received in cash the past 12 months		
11	Interest received during the past 12 months		
12	Any other income		

J. Coping mechanisms

40. What do you do when you don't have enough money to buy food, and don't have enough food?

S.N	Coping mechanisms	Rank
1	Rely on less preferred and less expensive foods	
2	Purchase food on credit	
3	Sale of livestock	
4	Search for subsidized prices and relay on it	
5	Consume seed stock held for next season	
6	Wage employment	
7	Limit portion size at mealtimes	

Note: 1 acre = 0.4047 hectare