A STUDY OF POVERTY IN RURAL HARYANA

A THESIS SUBMITTED

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Dr. KIRAN LAMBA

ASSISTANT PROFESSOR

DEPARTMENT OF ECONOMICS

B.P.S.M.V. KHANPUR KALAN

SUBMITTED BY:

ANJALI

Regn. No. 2016041100022357

DEPARTMENT OF ECONOMICS

BHAGAT PHOOL SINGH MAHILA VISHWAVIDYALYA

KHANPUR KALAN–131305, (SONIPAT), HARYANA

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Department of Economics

Bhagat Phool Singh Mahila Vishwavidyalaya

Khanpur Kalan- 131305, Sonipat (Haryana)

CANDIDATE DECLERATION

I hereby undertake that the thesis entitled **'A Study of Poverty in Rural Haryana'** submitted to the Department of Economics, **Bhagat Phool Singh Mahila Vishwavidyalaya, Khanpur Kalan (Sonipat)** in fulfillment of the requirement for the degree of Doctor of Philosophy in Economics is original and result of my own efforts. I further declare that it has not been submitted either in parts or full for the award of any Degree or Diploma in any University or Institution. My obligation to others work has been duly acknowledged at related places.

Date:

Anjali

Regn. No. 2016041100022357

Countersigned by

Dr. Kiran Lamba
Assistant Professor
Department of Economics
B.P.S.M.V Khanpur Kalan

Department of Economics

Bhagat Phool Singh Mahila Vishwavidyalaya

Khanpur Kalan- 131305, Sonipat (Haryana)

CERTIFICATE

It is to be certified that **Anjali**, a Ph.D. scholar in the Department of Economics, **Bhagat Phool Singh Mahila Vishwavidyalaya, Khanpur Kalan (Sonipat)**, has completed her Ph.D. thesis entitled **'A Study of Poverty in Rural Haryana'** under my supervision. This research work is the result of her own efforts and in my opinion, has not been submitted fully or partly to any institute or university for the award of any diploma or degree. This research work is fit for submission and evaluation for the award of the degree of Doctor of Philosophy in Economics.

Date:

Supervisor

Dr. Kiran Lamba

(Assistant Professor)

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NUMBERING AND REFERRING SCHEMES

- The present study numbered the chapters as 1, 2, 3, 4, 5, and 6.
- Every chapter is divided into some sections where sections in chapter- 1 are shown as 1.1, 1.2, 1.3 etc. chapters in chapter-2 shown as 2.1, 2.2, 2.3 and so on. Where each one of the chapter followed the same pattern as presented in chapter- 1 and chapter- 2. So, all the sections are denoted as one decimal point.
- But some of the sections has sub-sections which are denoted by two decimal points. For example sub-section under a section 1.1 is denoted as 1.1.1, 1.1.2, 1.1.3 and so on.
- Tables, figures, and equations also have their number as per their respected chapter. For example tables in chapter 4 have serial number as table- 4.1, 4.2 etc., figures have their own numbering as figure- 4.1, 4.2 etc, and equation in a chapter have their own numbering scheme with respect to their chapter i.e. eq…(4.1), eq…..(4.2) etc.

ABBREVIATIONS

APL	Above Poverty Line
BMI	Body Mass Index
BPL	Below Poverty Line
GSDP	Gross State Domestic Product
GSVA	Gross State Value Added
MPI	Multidimensional Poverty Index
NFHS	National Family Health Survey
OPHI	Oxford Poverty & Human Development Initiative
PCI	Per Capita Income
UNDP	United Nations Development Programme
WHO	World Health Organization

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CHAPTER-1
INTRODUCTION

1.1 Introduction

In spite of the unprecedented growth of the world economy in the last century, poverty is still a crucial question for the policy makers and it continues to be a serious problem in the development process of many countries for a long period of time. Even we can never imagine the development without reducing the poverty because of traps and vicious circle associated with the problem. Development is a multidimensional concept as in the words of Dudly Seers, "*The questions to ask about country's development are: What has been happening to poverty? What has been happening to unemployment? What has been happening to inequality? If all three of these have declined from higher levels, then beyond doubt this has been a period of development for a country concerned"* (Dudley Seers, 1969). Further economist Mahbub ul haq said *"we were taught to take care of our GNP as this will take care of poverty. Let us reverse this and take care of poverty as this will take care of the GNP"* (Mahbub ul-haq, 1971). Famous welfare economist Amartya Sen elaborate as "*Development requires the removal of major sources of unfreedom: poverty as well as tyranny, poor economic opportunities as well as systematic social deprivation, neglect of public facilities as well as intolerance or overactivity of repressive states. Despite unprecedented increases in overall opulence, the contemporary world denies elementary freedoms to vast numbers-perhaps even the majority-of people*" (Sen, 1999).

Poverty is a real risk for poor, non-poor, and for the city and these poor people are habitual of their poverty at some level. Diseases, ignorance, sin, lack of opportunities, and social injustice are the major causes of poverty (Almy, 1920). "*To live in poverty may be sad, but to 'offend or harmful to society', creating problem for those who are not poor' it would appear the real tragedy*" (Amartya Sen 1981). Poverty is a deep-rooted concept and is categorized in chronic and transitory terms. In the case of chronic poverty, a person is poor every time in the sample or for a long period of time apart from that a temporary fall in income is transitory poverty

(Morduch, 1994). It is a cause as well as an effect of large socio-economic problems such as hunger, disease, squalor, malnutrition, mental and physical distress (Peerzade, 1997).

The calorie or food-based definition of the poverty line is a most common and simple criterion. But only calorie based criterion is not a sufficient measure of poverty because a more realistic poverty measure is needed that calculate the poverty in human terms and constructed in the form of some fundamental economic as well as non-economic needs such as nutrition level, healthcare, clothing, sanitation, shelter, access to water and education (Guruswamy and Abraham, 2006). The lower-income of poor adversely affect the development of their children, and income is not only meant to fulfill the basic requirement of households but it also necessary to provide better health, education, and other important needs, child development depends on economic conditions of their family. The poor children have low physical health, low verbal and learning abilities, low years of schooling, and they face more inner and outward problems like fighting, anxiety, and depression in comparison to non-poor families children (Gunn and Duncan, 1997).

1.2 Problem of Poverty at Global Level

The meaning and measurement of poverty have always changed temporarily and regionally where richer countries tend to have higher poverty lines definitions, whereas poorer countries have lower poverty lines in terms of per capita income/ expenditure. In 1990, the World Bank and a group of researchers analyzed the national poverty lines from some of the poorest countries in the world and converted these national poverty lines into a common currency per day per capita $1 as an international poverty line by using Purchasing Power Parity (PPP) exchange rate. In 2005, by using the national poverty lines from the world's fifteen poorest countries this poverty line has been revised as per day per capita income $ 1.25 as an international poverty line (in terms of PPP). In 2011 due to change in the cost of living across the nations, the World bank again updated this international poverty line (per day per capita $1.90) in 2011 (World bank). As per a world bank report in 2000, 1.2 billion people were living below the international income poverty line (per day per capita $ 1) in the world where South Asia was home to 43.5 percent of the world’s poor, 24.3 percent of the world’s poor

were living in sub-Saharan Africa, 23.2 percent of world's poor were living in East Asia and Pacific, 6.5 percent of world poor people were living in Latin America and the Caribbean, whereas 2 percent and 0.5 percent of these world poor were living in Europe and Central Asia, and the Middle East and North Africa respectively. This indicates that most underdeveloped and developing countries are the home of the world poor's (World Bank, 2000/01). The level of extremely poor people according to the international poverty line (per day per capita $ 1.90) has been declined from 1.9 billion in 1990 to nearly 736 million in 2015 (World bank group, 2020).

Income poverty measures are important but not sufficient measures of poverty because the availability of limited income does not give a guarantee of human welfare in terms of better education, knowledge, skills, good health, and an adequate standard of living and there are many examples where an individual have sufficient level of income but deprived in other important dimensions of well-being. In 1997, UNDP introduce a new poverty measure 'The Human Poverty Index (HPI)' that examines poverty by using some important dimensions of well beings. Human Poverty Index measured poverty in human deprivation terms by using three important aspects of human living, first is the deprivation related to survival which includes the percentage of the population who are not expected to survive till the age of 40. Second is deprivation in knowledge, that includes the adult illiteracy rate and the third aspect related to deprivation in an adequate standard of living that includes three variable i) percentage of people without access to health services, ii) the percentage of children without access to safe drinking water, and iii) the percentage of underweight below 5 age group (Human Development Report, 1997). People in developing countries were highly affected by human poverty where 40 percent of the population in Sub-Saharan Africa and South Asia were affected by human poverty according to this measure (Human Development Report, 1997).

But Human Poverty Index (HPI) is a simple composite index that used country averages to reflect aggregated deprivation in health, education, and standard of living. But it could not identify which specific individuals, households, or large groups of people are jointly deprived. Considering this shortcoming, United Nations Development Program (UNDP) replaced the Human Poverty Index (HPI) with Multidimensional Poverty Index (MPI) in 2010. Where MPI measures how many

people or households experience multidimensional poverty and how many deprivations they face on average (Human Development Report, 2010). The most important advantage of the MPI method is that it gives proper information about which dimensions and indicators have how much contribution in MPI which directly helps in policy making. According to Alkire and Foster (2010), MPI examines the level of deprivations in the three HDI dimensions—health, education, and living standards where these dimensions include total ten indicators where two indicators (school attainment and school attendance) are related to the education dimension, two indicators (nutrition and child mortality) are related to health dimension, and six indicators (assets, electricity, cooking fuel, flooring, drinking water, and sanitation) are related to the standard of living dimensions (Alkire and Santos, 2010). As per Human Development Report, 1.44 billion people in the world are below the income poverty line (per day per capita $ 1.25) whereas 1.75 billion people are multidimensionally poor which is much higher than income poor (Human Development Report, 2010).

In 2019, United Nations Development Program (UNDP) and Oxford Poverty & Human Development Initiative (OPHI) measured the global multidimensional poverty index which covers total 101 countries that including 31 low-income countries, 68 middle-income countries, and 2 high-income countries. In these 101 countries, 1.3 billion (23.1 percent) people are multidimensionally poor and there is a huge inequality on the basis of multidimensional poverty among these countries. Two developing regions Sub-Saharan Africa and South Asia are the poorest regions which are home to 84.5 percent of the total MPI poor. In the case of age-specific poverty, children under age 18 show a weak performance where 663 million (nearly 50 percent) children are multidimensionally poor out of a total of 1.3 billion multidimensionally poor people. Further South Asia and sub-Saharan Africa again present a poor performance where more than 85 percent of MPI poor children are living in these two regions (Global Multidimensional Poverty Index, 2019). As per global MPI, the rural population is poorer as compared to the urban population where 84.2 percent of the total multidimensionally poor's are living in rural areas. In South Asia, the rural multidimensional poverty rate is 37.6 percent whereas the urban multidimensional poverty rate is only 11.3 percent. Multidimensionally poor people in sub-Saharan

Africa, South Asia, and other developing countries are highly deprived in cooking fuel, sanitation, and drinking water (Global Multidimensional Poverty Index, 2020).

1.3 Problem of Poverty at National Level

Measurement of poverty in India is always a matter of debate among politicians, social reformers, policy makers and researchers since the time of independence. In 1901, one of the earliest estimations of poverty was done by Dadabhai Naoroji in his book "*Poverty and the Un-British Rule in India".* He decided annual per capita income from Rs. 16 to Rs. 35 as a poverty line in India on the basis of 1867-68 prices where this poverty line was depends on the cost of a subsistence diet including rice or flour, dhal, mutton, vegetables, ghee, vegetable oil, and salt. After that in 1938, the National Planning Committee (NPC) under the supervision of Jawahar Lal Nehru recommended the per month per capita income ranging from Rs. 15 to Rs. 20 as a poverty line for attaining a minimum standard of living. In 1944, the Bombay plan (a group of industrialists and technocrats) recommended annual per month Rs. 75 as a poverty line in India (Gaur and Rao, 2020).

In 1962, the Planning commission establish an expert group for the measurement of a minimum standard of living for the Indian population where this expert group suggested a monthly minimum consumption expenditure criterion for a family of five members should be Rs. 100 for rural India, and Rs. 125 for urban India based on 1961-62 prices where expenditure on education and health is not included because the experts of this group assumed that expenditure on education and health is provided by the government (Planning commission, 2014). In 1971, V.M. Dandekar and N. Rath in their seminal work did a systematic study on poverty based on National Sample Survey (NSS) data where they used a minimum calorie based criterion (per day per capita calorie 2250 for rural as well as urban people). As per the average calorie basis, they recommended an annual per capita expenditure of Rs. 170.80 as a poverty line at 1960-61 prices for rural households and annual per capita expenditure Rs. 271.70 as a poverty line at 1960-61 prices for urban households in India (Planning commission, 1993).

In 1977, the planning commission under the chairmanship of Y.K. Alagh set up a task force on "Projection of Minimum Needs and Effective Consumption Demand".

This committee submitted their report in 1979 and provide the national level poverty line for rural and urban areas. The committee suggested per month per capita consumption expenditure (food and non-food) Rs. 49.09 in rural areas that fulfilled per day per capita calorie intake 2400 and per month per capita consumption expenditure Rs. 56.64 for urban areas which provide per day per capita calorie intake 2100. Further, in 1993 an expert group under the chairmanship of D. T. Lakdawala submitted their report to the planning commission where the committee did not redefine the poverty line rather used the Alagh expert group suggested poverty line for rural and urban areas. This was the first time when a committee had provided a state-specific poverty line in India by using inter-state price differences (Planning commission, 2014).

In 2004-05, the expert group of the planning commission headed by professor S. Tendulkar defined the state-wise poverty line for rural as well as for urban population of India. This expert group declared a monthly per capita consumption expenditure of Rs. 446.68 as poverty line for the rural population and monthly per capita expenditure Rs. 578.8 for the urban population at the national level. As per their poverty estimates total 37.2 population was living under the poverty line comprised 41.8 percent of the rural population and 25.7 percent of the urban population in India (Planning commission, 2009).

In 2011-12 the expert group of planning commission headed by Dr. C. Rangarajan suggested monthly per capita consumption expenditure Rs. 972 for rural India and Rs. 1407 for urban India as a poverty line. As per the Rangarajan committee poverty estimates for the year 2011-12, in India, 29.5 percent of the population are below the poverty line, out of which 30.9 percent belong to rural areas and 26.4 percent belong to urban areas (Planning commission, 2014). According to poverty estimates released by the planning commission the level of poverty in India has decreased by 33 percent from 1973-74 to 2011-12 where rural poverty has decreased by 30.7 percent from 1973-74 to 2011-12 and the urban poverty rate has decreased by 35.31 percent from 1973-74 to 2011-12 (Planning commission). All the measures discussed above are the official poverty measures in India which are based on income criterion but the limited monetary criterion does not provide sufficient results on poverty because some households may be above the poverty line and are yet deprived in some basic amenities like health, education, toilet facilities, electricity, etc. So, Multidimensional Poverty

Index (MPI) has the ability to pinpoint such information on deprivation that the poor person is facing. As per the recent study of UNDP, in India, 21.2 percent population is below the income poverty line whereas 27.9 percent population is multidimensional poor where an average poor person is 43.9 percent deprived in all the MPI dimensions (education, health, and standard of living) and 19.3 percent population is vulnerable to multidimensional poverty in 2015-16 (Global Multidimensional Poverty Index, 2020).

1.4 Problem of Poverty at State Level

The use of a single all India poverty line is not appropriate for poverty measurement because due to cultural changes, different states have different expenditure patterns, food habits, dietary patterns, and preferences, and along with it, the prices of the goods and services also differ within the states (in rural as well as in urban areas). The expert group Lakdawala, used per month per capita income Rs. 49.95 as a poverty line for rural Haryana and Rs. 52.42 for urban Haryana in 1973-74. As per the recommendations of different expert groups, the poverty line in Haryana has been changed by the planning commission at different time periods.

The first time, the Below Poverty Line (BPL) Survey was organized by District Rural Development Agencies (DRDAs) in rural areas of Haryana in 1981, where annual family income Rs.3500 was considered as the poverty line for measuring the BPL families in Haryana. The first, a household survey was conducted during 1981-1984, where total 12,35,066 families were surveyed from 93 blocks in which total 5, 19,444 (42.06 percent) families were found below the poverty line. Out of total BPL families, nearly 40 percent belonged to Scheduled Caste (SC) category. In the state, Jind was the highly poor district where 76.16 percent of families were living below the poverty line whereas Bhiwani was the less poor district (25.20 percent of families were below the poverty line) among all the districts of Haryana in 1981-1984. The next BPL Survey was conducted in rural areas of the State in 1991-92, where annual family income Rs. 11000 was taken as the poverty line for measuring the BPL families in Haryana where the survey was conducted from total 18,82,390 families. The result of the survey finds that there were total 6,28,860 families were found Below the poverty line comprised 40.6 percent of Scheduled Caste (SC) category families, 21.5 percent of

families were from the Other Backward Caste (OBC) category and 37.9 percent of families were belong to other categories.

Another BPL Survey in Haryana was conducted in 1997-98, and used per month per capita expenditure Rs. 289.31 as a poverty line. In this year, total 21, 05,117 families were surveyed, where 30.34 percent of families were found below the poverty line in the state. In 2007, BPL Survey adopted a different poverty criterion that used five important indicators such as land, housing, household goods, educational status, the standard of living, and means of livelihood for measurement of poverty in Haryana. A total 31, 59,222 families were surveyed in Haryana where 27.17 percent were found below the poverty line and from all these below poverty line families 50.20 percent belong to Scheduled Caste (SC) category and 31.17 percent belongs to other backward categories. Fathehabad was highly poor where 35.5 percent of households are BPL and Rohtak was the less poor district where 18.64 percent of families were below the poverty line among all the districts of Haryana in 2007 (Rural development department, Haryana). In 2011-12, Rangarajan Committee recommended the poverty line for rural Haryana is per month per capita income Rs. 1127.82 and urban poverty line in Haryana are Rs. 1528.31 where according to these definitions 11.2 percent population in Haryana is found below the poverty line which includes 11.6 percent in rural areas and 10.3 in urban areas (Planning commission, 2014).

1.5 Need and Significance of the Study

Haryana is one of the wealthiest states of India based on Per Capita Income (PCI) and Gross State Domestic Product (GSDP). The income poverty ratio of the state is also quite low as compared to India but the performance based on social indicators like sex ratio, gender equality, and some other social indicators is not very pleasant. Aggregate measure of poverty based on income does not provide sufficient information regarding the situation of people of Haryana. In the state, some people may be above poverty line based on income criteria but deprived or poor by some important functions of living. Since poverty is an economic and social problem there is need of such work which measures the poverty from social as well as economic perspective. There is need to look more analytically trickle-down effect of economic development in Haryana that will clarify whether the benefit of high PCI and GSDP growth is percolated to all the

citizens of Haryana (in terms of better education, better health and adequate standard of living) or not. The present study is conducted in rural Haryana where majority of population is directly or indirectly dependent of agriculture sector. Hence this study is an attempt to investigate income poverty as well as multidimensional poverty in rural Haryana by using some important indicators of wellbeing such as nutrition level, child mortality rate, school attainment, school attendance, electricity, drinking water, sanitation, Cooking fuel and assets. It would provide the basic understanding of poverty from an academic perspective and aid the policy makers to overcome the problems which are faced by people and households in rural Haryana.

1.6 Scope of the Study

The present study is based on primary data collected from rural households in Haryana. This study covers the income as well as multidimensional poverty measures which shows the performance of rural households in education, health and standard of living which are considered the important dimensions of human well-being. The study also shows the status of poverty among different social categories (General, OBC, and SC), the slabs of multidimensional poverty in Haryana i.e. how many households are vulnerable to poverty? and who are the severely poor households? This study also provides the determinants of poverty among households in rural Haryana. Hence, the study would provide exposure from an academic perspective and aid the policy makers to overcome the problems which are faced by people and households in rural Haryana.

1.7 Objectives of the Study

The major objective of the study is to analyze and measure the poverty by using multidimensional poverty approach in the rural Haryana. Following are sub-objectives of the study:-

- To analyze socio-economic conditions of households of rural Haryana.
- To measure income poverty through head count ratio in rural Haryana.
- To analyze the level of deprivation based on health.
- To analyze the level of deprivation based on education.
- To analyze the level of deprivation based on standard of living.

- To analyze intensity and slabs of poverty through MPI of rural Haryana.
- To analyse the determinants of multidimensional poverty in rural Haryana.

1.8 Data Sources and Research Methodology

This study is primarily based on primary data which is collected from 1040 rural households from Haryana but the study also used secondary data (for the analysis of socio-economic conditions of Haryanvi households) which is collected from various sources such as all the rounds of National Family Health Survey (NFHS 1992-93, NFHS 1998-99, NFHS 2005-06, and NFHS 2015-16), various reports of Planning Commission, Census of India, Economic Survey of Haryana, and Rural Development Department, Haryana, etc. The study used Foster Greer and Thorbecke (1984) method for income poverty measurement and Alkire and Foster (2009) methodology for multidimensional poverty analysis. The determinants of multidimensional poverty are analyses by using a binary logistic regression model (the detailed discussion on data sources and research methodology is presented in chapter-3).

1.9 Limitations of the Study

The present study analyses the poverty in rural Haryana through primary data in terms of the income poverty line and multidimensional perspective where the multidimensional poverty method includes important dimensions of well-being. This study also analyses the determinants of poverty among rural households. But this study also has some limitation which are presented as follows:

- This study covers only rural households hence there is a score for comparative analysis of poverty in rural as well as in urban areas in Haryana.
- There are total twenty two districts in Haryana but this study covers only six districts.
- This study follows the UNDP criterion for providing the weightage to different dimensions where they provide equal weightage to all the dimensions for measuring the Multidimensional Poverty Index (MPI). There is scope of analysis while assigning different weights to the dimensions which present study is not attempted.

1.10 Chapterisation of the Study

The present study is organized into total six chapters which are given as below:

Chapter 1 Introduction: This chapter consists of basic concepts of poverty, significance, scope, objectives, and planning of the study.

Chapter 2 Review of Literature: This chapter pertains to the existing literature on poverty which provides insight on the research methodology and research gap related to the study.

Chapter 3 Research Methodology: This chapter presents the data sources, sample design, and methodology adopted for analysis in the study.

Chapter 4 Socio-Economic Conditions and Income Poverty in Haryana: This chapter presents the level of Income poverty through head-count ratio and socio-economic conditions through the indicators which reflect the quality of life of the households like their housing conditions, level of adults education and health and availability of other facilities such as drinking water, toilets, and electricity among households in Haryana from secondary data sources.

Chapter 5 Estimates of Rural Poverty in Haryana: Results and Interpretations: This chapter discusses the estimates of income and multidimensional poverty in rural Haryana. This chapter shows the results on the level of deprivation in education, health and standard of living dimension, intensity and slabs of multidimensional poverty, and determinants of poverty in rural Haryana which primarily based on primary data analysis.

Chapter 6 Conclusions and Policy Implications: The final chapter presents the major conclusions and policy implications of the study.

CHAPTER – 2
REVIEW OF LITERATURE

2.1 Introduction

Poverty is an ancient term and its meaning does not only differ from nation to nation but it also differs within a nation at different time periods. Poverty and hunger are the significant social, cultural, and economic problems because if someone is not capable to fulfill his basic needs than he realizes that he is deficient to maintain his life (Banerji, 1981). Poverty is a deep rooted concept which is cause as well as an effect of many socio-economic and political problems. There has always been a debate among economists and researchers about the identification and measurement of poverty and these theoretical studies have helped explore the knowledge about poverty measures that has helpful further empirical analysis. The major theoretical contribution in poverty measures has come from Godard (1892), Almy (1920), Orshansky (1963 and 1965), Sen (1976), Sen (1981), **Foster, Greer, and Thorbecke (1984)**, Morduch (1994), Martinetti (1994), Ravallion (1996), Anand and Sen (1997), Mowafi and Khawaja (2005), Sumner (2007), Spicker (2007), Alkire and Foster (2009), Alkire and Santos (2010).

The present chapter pertains to the existing literature related to the study that is divided into six sections. The second section of this chapter is related to theoretical aspects of poverty which discuss the concept, and different measures of poverty. The third section reviews the empirical studies on poverty at global level The fourth section of this chapter is presents the empirical studies related to India. The fifth section of this chapter is devoted to empirical studies of Haryana, and the last section of the chapter is a concluding one. Some of the studies related to poverty and deprivation has been presented in the following sections.

2.2 Studies Related to Concept and Measurement of Poverty

Poverty and its measurement have always been a matter of concern among economists for a very long period of time. **J. G. Godard** in his book *Poverty; Its Genesis and Exodus: An Inquiry into Causes and the Method of Their Removal (1892),* said

"Roughly, we may define poverty as "An insufficiency of necessaries"; or more fully, as "An insufficient supply of those things which are requisite for an individual to maintain himself and those dependent upon him in health and vigour." And the degree of poverty will obviously be determined by the extent of the insufficiency. Of course, this leads to the further question as to what things are requisite: and it must at once be stated that there is no sharply defined line between necessaries and unnecessaries… Obviously, however, an adequate supply of wholesome food and suitable clothing, and a sanitary dwelling, with sufficient sleeping apartments, are amongst the first requisites. To these must be added the means of obtaining some amount of education. Recreation also, …and leisure to enjoy it … And freedom…"

The different poverty lines for different family sizes and for different family types have developed by **Orshansky** in 1963 where she provided separate poverty cut-off for different sizes of the family with children under eighteen years. But the author extended her work in 1965 and adapted the poverty threshold not only by family size but by gender of the household head, by farm and non-farm household, by the households with or without children's, by age, and by occupation and work. She adjusted the poverty cut-off as per family size because when households have more members in the family need more money to maintain their minimum living.

Sen (1976) developed a poverty measure that is popular as the Sen poverty index and this index is a combination of poverty head count ratio, income gap, and Gini coefficient.

$$P = H [I+ (1- I) G]$$

Where P = Sen poverty index, H = poverty head count ratio, I = income gap, G = Gini coefficient. This index is a suitable measurement of poverty that is sensitive to the distribution of income among the poor and the index satisfied two important axioms; monotony axiom and transfer axiom. The former axiom implies a reduction of a poor person's income increase the measure of poverty and the later axiom implicit a transfer of income from a poor person to a non-poor person increases the poverty measure. It is a relative poverty measure which is a normalized weighted sum of the income shortfall of the poor and used rank order weighting criterion (ordinal criterion) where rank is assigned to all the poor households and this ranking scheme is based on strict ordering.

Sen insisted that higher weight has been assigned to poorer households. Sen poverty index has a major contribution to the theoretical aspect but this method is not decomposable across subgroups and only limited to analysing regional data therefore this measure is not much popular in the empirical literature.

Foster, Greer, and Thorbecke (1984) extended Sen's measurement of poverty and propounded a class of decomposable income poverty measures that applies the contribution of different sub-groups into the total poverty and this poverty measure is very famous in the empirical literature. The FGT measures satisfied the basic properties of the Sen poverty index and with it, the measure also satisfied additive decomposability criterion that shows overall poverty is a weighted mean of the subgroups poverty and subgroup consistency criterion that implies that if income in a given subgroup has changed (other remains constant) then total poverty also moves to the same direction. The Foster Greer and Thorbecke index is expressed as:

$$P_{\propto} = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{gi}{z}\right)^{\propto}$$

Where gi is the income shortfall of poor households or $gi = z - yi$, z is the income poverty line, yi is the income of ith poor households, q is the number of poor households, n is the total number of households. Here α is a poverty aversion parameter and ≥ 0. If α = 0 then the measure is equal to poverty headcount ratio, if α = 1 then the measure is simply the poverty gap index, and α = 2 is square of normalized gap (weights the gaps by gaps) which obtained the square poverty gap index P_2 .

Martinetti (1994) has developed a new approach to measuring well-being and poverty based on fuzzy set theory. This approach used both quantitative as well as qualitative indicators related to human well-being where a given set A contained all the units (xi) related to the finite set of X.

A = {x1, x2,……,xi,…….xn] where x ϵ X. After that ϕ_A: X → [0,1] assigned to each x ϵ X.

ϕ_A (x) = 1 if x ϵ A

ϕ_A (x) = 0, otherwise

Set A defines the level of achievements among individuals in a given indicator (where xi is an achievement of an ith individual in x indicator) and a grade value one shows the presence of absolute deprivation, and value zero shows the absence of deprivation in respective indicator Whereas in case of indicators with ordinal nature values are not only 0 and 1 rather in this situation values lies between 0-1 where a proper score of modalities have been decided based on a different degree of hardship. In the case of quantitative indicators, it firstly needs to determine the limit value that will allow identifying either deprivation is present or absent, and in the case of a qualitative variable with dichotomous nature, value one is assigned in the situation of hardship and value zero otherwise.

Ravallion (1996) critically examined the monetary criterion (based on income or consumption poverty line) of poverty measurement and said these implicit welfare indicators (always has been debates about these indicators like how it should be valued, how and at what level this line should be set on an average) fails to measures the actual level of living among households. The further author suggested four "non-income" dimensions that are useful in identifying the actual or explicit welfare among households i)level of per adult real expenditure that including all market goods and services, ii) accessibility of non-market goods i.e. education and health, iii) indicators that measure gender disparities and children's nutritional status among households, and iv) indicators that are restraint among households from get away from poverty i.e. physical handicaps or impairments because of past chronic malnourishment.

Anand and Sen (1997) propounded the 'Human Poverty Index' that measures the level of deprivation in human lives. This composite index measured the deprivation in three components: (1) deprivation in survival (P_1), (2) deprivation in education (P_2), (3) deprivation in economic provisions (P_3), and all these three components survival, education, and economic provisions are also included in Human Development Index (HDI) but HDI use these characteristics for conglomerative perspective whereas HPI uses these characteristics for deprivation perspective. The survival component using the proportion of people who can't survive at the age of 40, education component using the percentage of illiterate people, and economic provision component is a mean of three sub-components (a) proportion of people without safe water (P_{31}), (b)

percentage of underweight children (P_{32}), and (c) percentage of people without access to healthcare (P_{33}), and P_3 can be expressed as:

$$P_3 = \frac{1}{3}[\, P_{31} + P_{32} + P_{33} \,]$$

Anand and Sen proposed Human Poverty Index ($P_{(\alpha)}$) is a weighted mean of order α of the deprivation components that can be expressed as follows:

$$P_{(\alpha)} = [(\frac{1}{3})\, P_1{}^{\alpha} + (\frac{1}{3})\, P_2{}^{\alpha} + (\frac{1}{3})\, P_3{}^{\alpha}]^{\frac{1}{\alpha}}$$

Mowafi and Khawaja (2005) discussed various measurements of poverty and those households or individuals who have lack of financial resources to meet their basic needs are called economically poor and further author's defined economic poverty in absolute and relative terms where absolute poverty refers to the households or individuals who are unable to maintain a minimum level of living whereas relative poverty related to the households level of deprivation regarding other households in their society. The author's further discuss human poverty which is human-centered and directly related to an individual's capacity building such as health care, education, and life expectancy. After that author's discussed the multidimensional poverty measure that measured the level of deprivation not only in terms of material goods but also measure in some other important terms such as social capital, human capital, power, and voice.

Sumner (2007) analysed poverty in economic and non-economic terms where economic poverty is measured in terms of GDP per capita, real wages, unemployment rate, income or expenditure poverty line, and income inequality. On the other hand non-economic poverty is defined in the terms of education, health, nutrition, household infrastructure, access to adequate sanitation, and access to an improved water source. The author pointed out that the economic measure is highly reactive but the non-economic measure is more convenient because it provides a direct result of the policy-related with the determined objectives such as education, health, and nutrition.

Spicker (2007) defined poverty in twelve forms as non- availabilities of material needs (food, shelter, and clothing, and these needs are directly related to income, resources, and wealth), inequality (people may be poor because they are pitfall as compare to others), low standard of living, poor circumstances (i.e. the social class

that is related to the economic position and socioeconomic status), dependency, lack of basic security, lack of entitlement, exclusion (in terms of education, health, housing, etc.), and poverty as a moral judgment (people are also considered poor when their material conditions are morally unacceptable).

Alkire and Foster (2009) have discovered a new methodology popular as 'A-F methodology' to measuring poverty in multidimensional perspective and provide equal weight $w_j = 1$ to each dimension j. The methodology adopted a dual cut-off criterion to identify the poor where firstly, dimension-specific deprivation cut-off (z) is determined to identify the household deprivation within the dimensions, and secondly, across dimensions poverty cut-off (k) is determined to identify the level of poverty. This methodology is applicable for cardinal as well as ordinal variables, and multidimensional poverty computed by A-F methodology is sensitive to changes in poverty cut-offs, it also fulfill the decomposability criterion by sub-groups and by dimensions and indicators, therefore it has good policy implications.

2.3 Empirical Studies on Poverty at Global Level

Walt (2004) measured the multidimensional poverty in the eastern cape province of South Africa. The study used household-level data from the census 96 dataset, and the fuzzy set approach is used for poverty measurement in different dimensions i.e. dwelling, crowding, cooking fuel, income, water, telephone, sanitation, employment, and education. The result affirms that 53.1 percent of households are living in traditional huts or shacks or homeless and 73.4 percent of households use traditional cooking fuel i.e. coal, wood, and dung, 41 percent of households used dam/river/stream water in eastern cape province. The study also shows that flush or chemical toilet is available to only 30.8 percent of households, whereas 6.3 percent and 29.1 percent of households used bucket latrine and other toilet facilities respectively. The author reveals that 48.7 percent of household heads never went to school or not even completed primary education, 50.2 percent of household head are unemployed, and the empirical result shows that households with the female head are more deprived as compared to male-headed households, and there is an inverse relationship between education of household head and level of deprivation experienced by households.

Duclos et al. (2006) have compared the rural and urban spatial poverty in three African countries i.e. Ghana, Madagascar, and Uganda, and used household-level data from Ghana Living Standards Survey (1988), National Household Survey in Madagascar (1993), and National Household Survey in Uganda (1999). The study is based on univariate and bivariate analysis of poverty where univariate analysis used only one variable per capita expenditure but bivariate technique measured poverty in terms of per capita expenditure and children health variables. The authors find that univariate poverty which is based on per capita expenditure is more in rural areas as compared to urban areas in these countries. But bivariate poverty is higher in urban areas in comparison to rural areas because there is a high correlation exists between per capita expenditure and children's height in urban areas.

Kubi et al. (2007) analysed the multidimensional poverty and living conditions in Ghana for the period 1991-1999. The study used household data from third (1991-92) and fourth (1998-99) rounds of Ghana Living Standard Surveys (GLSS3 and GLSS4) and applied Fuzzy set approach for measuring deprivation in five dimensions such as housing conditions, living conditions, household assets, capabilities, and household expenditure/ welfare and these five dimensions further used fifteen indicators. The authors included three indicators roofing materials, flooring materials, and wall materials in housing conditions dimension, six indicators cooking fuel, light, water distance, type of water, number of rooms, and toilet in living conditions dimension, two indicators education, and health are included in capability dimension, two indicators household durable, and household livestock are included in household assets dimension, and two indicators food expenditure, and non-food expenditure indicators are included in household expenditure/welfare dimension. The study concluded that the level of deprivation has increased from 0.212 in 1991-92 to 0.2137 in 1998-99. In this country household asset is the most deprived dimension where the level of deprivation is 0.72 (in which rural deprivation is 0.65 and urban deprivation is 0.55), followed by capabilities dimension (deprivation level is 0.37), household expenditure dimension (deprivation level is 0.30), living conditions dimension (deprivation is 0.17) and housing condition dimension (deprivation level is 0.077) in 1998-99. The authors observed that there are huge disparities based on deprivation among rural and urban households where the level of rural deprivation is much higher

than urban deprivation in all the selected dimensions except household expenditure dimension in 1998-99.

Kruijk and Rutten (2007) created a new composite index for poverty measurement that is the human vulnerability index for the Maldives from 1997-2004. This composite index is based on twelve standard dimensions i.e. income poverty, electricity, transport, communication, education, health, drinking water, consumer goods, housing, and environment. These dimensions consists of different indicators and a deprivation score is assigned to each indicator which lies between 0 – 1 where 0 value shows no deprivation and 1 shows 100 percent deprivation in a particular indicator. In the study weights given to each dimension are based on respondent's priority (households provide rank to all dimensions which are based on their priority and importance for these dimensions). The empirical result shows that the value of the human vulnerability index is found lower when priority weights are used as compared to results based on arbitrary (equal) weights for each dimension. And respondents highly priorities dimensions i.e. education and health present low poverty than respondents with low priorities dimensions i.e. consumer goods and communication. Communication, health, education, income, and electricity presents high progress among all the dimensions from 1997-2004 in the Maldives.

Chaudhry (2009) examined the factors that determined the rural poverty in south Punjab of Pakistan. The study is based on primary survey which was conducted in one of the areas of the Bahawalpur Rural Development Project (BRDP) through a simple random sampling technique. The study used the poverty line that is used by Malik (1992) and the logit model is adopted to analyzing the factors which affect rural poverty. The author found that education, female labour force participation, market access and production for the market, assets, overall participation rate, and population of livestock have an inverse relationship with household poverty. Whereas, household size, age of household head, persons per room in the household are positively related to rural poverty.

Alkire and Santos (2010) have adopted the A-F methodology to develop a new multidimensional poverty index for developing countries. The authors estimated acute multidimensional poverty by using standard of living, health, and education dimensions

where equal weight is provided to each dimension, and further these dimensions consists of ten indicators. In this study, the standard of living dimension included electricity, sanitation, drinking water, cooking fuel, flooring, and assets indicators, health dimension included the child mortality, and nutrition indicators, and under the education dimension indicators school attainment, and school attendance was included. The study observed that incidence of poverty is highest in Sub-Saharan Africa and there is a huge variation among different countries where multidimensional poverty in Niger is 93 percent whereas the percentage of multidimensional poor in South Africa is only 3 percent, and standard of living is the most deprived dimension of multidimensional poverty in most of the sub-Saharan African countries. The level of multidimensional poverty is highest in South Asia where 65 percent of the people in Nepal are multidimensionally poor, 55 percent in India, 58 percent in Bangladesh, 51 percent in Pakistan, but Sri Lanka has only 5 percent of multidimensional poverty. Water is a less deprived indicator among multidimensionally poor households in South Asia. Deprivation in child mortality is high in Pakistan, and Nepal whereas deprivation in nutrition is high in Nepal, India, and Bangladesh. Deprivation in school attendance is a matter of concern in India, and Pakistan where 25 percent and 24 percent of poor in India and Pakistan respectively live in a household in which one or more school-going age children are not going to school. In the list of developing countries, Latin America and the Caribbean is less poor region.

Jamal (2011) appraised the multiple deprivations in terms of education, housing conditions, electricity, drinking water, cooking fuel, sanitation, assets ownership, etc., in four provinces of Pakistan i.e. Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan for the period 2008-09, and collected data from Pakistan Social and Living Standard Measurement (PSLM). The study used Foster Greer and Thorbeke (FGT) index and multivariate statistical technique (categorical principal component analysis and cluster analysis). The study finds that 57.30 percent population is multidimensionally poor in 2008-09 in Pakistan and the rural population is highly deprived where 53.35 percent of people live in multidimensional poverty while urban poverty is 25.68 percent. Balochistan province is more deprived among other provinces where 78.53 percent of people are living with multiple deprivations followed by

Khyber Pakhtunkhwa, Sindh, and Punjab where 56.10 percent, 47.63 percent, and 36.93 percent population is multidimensionally deprived respectively.

Levine et al. (2012) explored the poverty in dimensions of education, health, and living condition in Uganda for the time 2000-01 to 2005-06, and collected data from Uganda Demographic Health Surveys (DHS). This study was based on Alkire and Foster (2007) methodology. The study shows that the incidence of poverty has decreased from 76.1 percent in 2000-01 to 72.7 percent in 2005-06 where rural poverty is much higher than urban poverty. But rural area shows better improvement where poverty has declined from 81.8 percent in 2000-01 to 77.9 percent in 2005-06 whereas poverty has increased in urban areas from 35.5 percent in 2000-01 to 36.9 percent in 2005-06.

Masood et al. (2012) used household data from Pakistan Social and Living Standard Measurement Survey (PSLM) for the time 2015-16 for analysing multidimensional poverty in nine important dimensions such as housing, water, sanitation, electricity, assets, education, land, household expenditure on non-durable and food items and employment in four provinces i.e. Balochistan, North West Frontier Province (NWFP), Sindh and Punjab of Pakistan. The study is based on Alkire and Foster (2007) methodology. The study reveals that in the Punjab region level of multidimensional poverty at K= 3 (a household is at least deprived in three dimensions) is 57 percent where an average poor is more than 50 percent deprived in all the dimensions, in Sindh region multidimensional poverty is 63.3 percent and these poor people are more than 55 percent deprived, in NWFP region 66.7 percent households are multidimensionally poor and an average poor person is more than 54 percent deprived, and in Balochistan region, more than 89 percent households are living in multidimensional poverty and an average household is 68.3 percent deprived. In all the regions level of multidimensional poverty and adjusted headcount ratio has declined with an increase in poverty cut-off (k) but the level of intensity of poverty has increased. The result of this study presented that Balochistan is a highly poor region followed by NWFP, Sindh, and Punjab where poverty within the region among rural and urban households also shows huge difference where rural poverty is much higher than urban poverty in these selected regions.

Salahuddin and Zaman (2012) have examined poverty in multiple dimensions i.e. living conditions, water and sanitation, health, cooking fuel, assets, education, and livelihood in Pakistan. This analysis is based on Alkire and Foster (2007) methodology. The empirical finding shows that 92.5 percent of people in Pakistan are poor in any two dimensions and 28.5 percent people are highly poor with low living standard, unsafe drinking water, and low sanitation, use dirty cooking fuel, have no asset or limited assets, illiterate or very low level of education and improper livelihood.

Ali and Ahmad (2013) have empirically investigated the impact of human capital (education and health) on the incidence of poverty, poverty gap, and severe poverty in the Punjab province of Pakistan. The study collected data from different sources such as Statistical Pocket Book of Punjab (SPBP, 2011), Punjab Development Statistics (PDS, 2011), and Jamal (2012)and used the ordinary least square (OLS) regression method for analysis. The empirical result shows that improvement in education and health conditions has played a positive and crucial role in poverty reduction and economic development in Punjab province. Improvement in education level is beneficial in increasing health conditions i.e. reduction in infant mortality rate, on the other hand, better health services are beneficial in improving the enrolment rate and decline dropout ratio so, health and education both are positively interrelated to each other.

Battiston et al. (2013) have empirically investigated the multidimensional poverty in six Latin American countries i.e. Argentina, Brazil, Chile, El Salvador, Mexico, and Uruguay during 1992-2006. The study used Socio-Economic Database for Latin America and the Caribbean (SEDLAC) for measuring poverty in terms of income, school attendance of children, education of household head, sanitation, water, and shelter indicators. In the study for Argentina and Uruguay countries, data is available only for urban areas but the other four countries used data from both urban and rural areas. The study declared that in most of the cases multidimensional poverty is significantly reduced during 1992-2006 excluding the Uruguay where multidimensional poverty reduction is less and in Argentina multidimensional poverty is almost stagnant. El Salvator is a highly poor country among all countries and rural deprivation is more severe compared to urban deprivation in these countries. Education

of household head and sanitation are highly deprived indicators among all the indicators in selected countries.

Roche (2013) explored child poverty in several dimensions i.e. nutrition, water, sanitation, information assets, shelter, and health in Bangladesh during 1997-2007. The study is based on data from Bangladesh Demographic Household Survey (BDHS) and used Alkire – Foster (2007,2011) methodology for analysis. The study revealed that the value of the multidimensional child poverty index has decreased from 0.55 in 1997 to 0.40 in 2007, and the censored headcount ratio shows all the dimensions present a better performance where the percentage of child deprivation has declined throughout the period. Child deprivation in health dimensions has declined from 41.3 percent to 18.3 percent, in nutrition 68.4 percent to 48.5 percent, in water 4.6 percent to 2.9 percent, in sanitation 69.8 percent to 52.0 percent, in shelter 82.6 percent to 65.3 percent and in information assets 66.0 percent to 52.9 percent from 1997 to 2007 respectively.

Salazar et al. (2013) measured multidimensional poverty index in education, health, employment, household utilities, and living conditions dimensions in Colombia from 1997 to 2010 where equal weight was provided to each dimension, and data was collected from Colombian Living Standards Measurement Surveys (LSMS). The study is based on Alkire and Foster (2011) methodology. The multidimensional poverty ratio was decreased from 60.4 percent in 1997 to 30.4 percent in 2010, and an average poor person deprivation (intensity of poverty) was decreased from 48 percent in 1997 to 43 percent in 2010 and percentage of reduction in multidimensional poverty and intensity of poverty was higher in rural areas as compared to urban areas.

Santos (2013) documented poverty in terms of consumption expenditure and some other crucial measures such as health, education, availability of electricity, drinking water, sanitation, dwelling, road facility, and land ownership in Bhutan from 2003-07. The study is based on secondary data from sources as Bhutan Living Standard Survey (BLSS 2003 and 2007) and used Alkire and Foster (2007, 2011) methodology for poverty analysis. The result shows that multiple deprivations in Bhutan had decreased from 2003 to 2007 and nearly all the income-poor people were multidimensionally poor and deprivation in roads, electricity, water, education, and

sanitation indicators declined 40-60 percent whereas poverty in dwelling, health, and land indicators declined with 20-40 percent over the period.

Siani (2013) attempted to examine did multidimensional poverty has the decline in Cameroon from 2001-2007 and used data from living standard surveys (ECAM 2 and ECAM 3) for analysis. The study is based on Alkire and Foster (2007, 2009) methodology and used six dimensions income, education, health, electricity, water, and sanitation for poverty analysis where equal weight is provided to each dimension and excerption of these dimensions are rendered by millennium development goals. The study found that multidimensional poverty is increased 61.3 percent in 2001 to 71.1 percent in 2007 at poverty cut-off 50 percent where an average poor person deprivation has increased from 67.2 percent to 72.9 percent. The result also shows that sanitation is the most deprived dimension in Cameroon followed by education, health, electricity, income, and water dimension.

Yu (2013) investigated poverty in terms of income, standard of living, health, education, and social security in China during 2000-2009. The study was based on secondary data that is collected from China health and nutrition survey and used Alkire and Foster (AF) methodology for poverty analysis. He finds that deprivation in income dimension and all the indicators of standard of living dimension has declined continuously where integrated village development program plays an important role in declining deprivation in all dimensions of living standard, on the other hand, deprivation in education dimension has increased from 7.96 percent in 2000 to 12.43 percent in 2009 instead of declining and, significant reason of increasing deprivation in education dimension was the migration of educated households.

Le et al. (2014) analyzed and compared the multidimensional poverty and income-based poverty in Vietnam for the period 2010 and 2012 using the data from Vietnam Household Living Standard Survey (VHLSS). The study used the Alkire and Foster (2007, 2011) methodology in which authors select five dimensions i.e. health, education, social insurance and assistance, living conditions and access to information and social participation. The study finds that at 0.5 cut-off level multidimensional poverty decreased from 11.4 percent to 10.6 percent in 2010 to 2012 respectively. The result shows social insurance and social assistance dimension contribute highly to

poverty whereas the living standard dimension brings less to the total poverty. The study shows a very small portion (only 2.2 percent of households) are poor in both multidimensional as well as income-based measures. About 9.6 percent of households are income-based poor but non-poor by multidimensional poverty whereas 8.4 percent of households are multidimensional poor but their income is more than the poverty line.

Alkire et al. (2014) presented a global multidimensional poverty analysis in 2014 for 108 countries. The study used different datasets for different countries like USAID'S Demographic and Health Survey (DHS), UNICEF'S Multiple Indicators Cluster Survey (MICS), WHO's World Health Survey (WHS), and the study used six special surveys which covered urban Argentina (ENNYS), Brazil (PNDS), Mexico (ENSANUT), Morocco (ENNVM), the occupied Palestinian territories (PAPFAM) and South Africa (NIDS). The study is based on Alkire and Foster (2011) methodology in which poverty is measured in three important dimensions education, health, and standard of living. The authors find that more than 30 percent of people are multidimensionally poor in these countries in which 71 percent of poor people live in middle-income countries where South Asia and Sub-Saharan Africa are homes of 52 percent and 29 percent of world's poor respectively. The study analyzed that data on destitution is only available for 49 countries and the result shows that half of the multidimensional poor people are destitute in these countries where 28.5 percent of the Indian population is destitute, and Niger is the home to 68.8 percent of deprived people that shows the highest share among these countries.

Alkire and Housseini (2014) discovered poverty in three dimensions i.e. health, education, and standard of living in 37 Sub-Saharan African countries. They used USAID'S Demographic and Health Survey (DHS), UNICEF'S Multiple Indicators Cluster Survey (MICS), WHO's World Health Survey (WHS), and National Income Dynamics Study (NIDS) during 2000-2007. They found that 462 million people are multidimensionally poor in Sub-Saharan Africa where 36.3 percent, 36 percent, 14.5 percent, and 13.3 percent are living in West Africa, East Africa, Central Africa, and South Africa respectively. Nigeria is highly poor among these countries where 71.2 million people are poor in these dimensions. Poverty in rural areas is higher than in urban areas where 85.8 percent of the rural population is poor in terms of education, health, and standard of living.

Correa (2014) in his study examined the poverty at the individual as well as household level for four countries of South America i.e. Chile, Colombia, Ecuador, and Peru where individual poverty was measured for three age groups, i.e. children (12 indicators), adults, and elderly (13 indicators). The study used data from Living Standard Measurement Survey (LSMS) for each country and use Atkinson (2003), Sen (1976), and Silber and Yalotnezky (2014) methodology for individual poverty measurement and Alkire-Foster (2011) for measuring household multidimensional poverty. The result shows that the elderly (older than 59 years) age group is highly deprived among all subgroups in each country and lack of accessibility of income sources and minimum years of schooling are more responsible factors of their deprivation but in the case of Ecuador and Peru countries, health-related factors perform badly. Children and adults subgroups have worse performance in the standard of living indicators which is the leading source of deprivation. Chile is the less multidimensionally poor country at the household level among all countries.

Dhongde (2015) unfolded the multidimensional poverty among adults and old age population in four dimensions i.e. health, education, the standard of living, and housing (and eight important indicators) in the United States (U.S.) for the year 2011 and used data from American Community Survey (ACS). The study shows that 20.1 percent population is poor in two or more indicators wherein female (20.6 percent) and adult population (21.2 percent, 18 to 64 age group) present more multidimensional poverty as compared to the male population (19.7 percent) and old age group population (16.4 percent, 65 or more age group) respectively. The study also reveals that 14.7 percent of people are without health insurance and 11.8 percent of people have not completed their high school education.

Ray and Sinha (2015) have compared the multidimensional poverty and deprivation in India, China, and Vietnam. This analysis was based on secondary data from sources as China Health and Nutrition Survey (CHNS) conducted during (1989-2006) for China, National Family Health Survey (NFHS) from (1992-2006) for India, and the Vietnamese Living Standard Survey (VLSS) from (1992-2004) for Vietnam. The study is based on Principle Component Analysis. It found that China shows better performance in most of the dimensions than India and Vietnam while both of the

countries India and Vietnam are more deprived and multidimensionally poor as compared to China.

Siani (2015) analyzed the poverty in Cameroon for the period 2007. The study is based on secondary data third round of Cameroon living condition survey (ECAM3) and the author used the Fuzzy Sets approach for measuring poverty in ten indicators such as income, education, health, refrigerator, television, housing, electricity, water accessibility, sanitation, and occupancy status. The study found that the incidence of poverty is high in Cameroon that is 55.31 percent. More than 50 percent deprivation exist in seven indicators out of ten where ownership of refrigerator is highly deprived that is (0.8999) followed by water (0.6175), television (0.6094), and education (0.5695) whereas deprivation in health is very low that is (0.1278) among these indicators.

2.4 Empirical Studies on Poverty at National Level

Bardhan (1973) focused on the occurrence of poverty in rural India for the period 1960-61 to 1968-69 and used per month per capita income Rs. 15 as a poverty line at 1960-61 prices and revised this poverty line at current prices of 1964-65, 1967-68, and 1968-69 and updated poverty line was per month per capita Rs. 21.6, Rs. 30, and Rs. 29.4 respectively. In the absence of a general consumer price index for rural poor's, the author used consumer price index numbers for agricultural labourers for updating these poverty lines. The study found that the ratio of people in a rural area who live under the minimum standard of living had notably increased from 38 percent in 1960-61 to 54 percent in 1968-69. And one of the significant reasons behind this increasing ratio was a continuous drought in the years 1965-66 to 1966-67 which make the agricultural economy unable to return to a normal situation till the end of 1968-69.

Kakwani and Subbarao (1990) measured the effect of per capita consumption expenditure and average consumption expenditure inequality on poverty in fifteen significant states of rural India for the period 1972-1983 and using National Sample Survey (NSS) data for this measurement and the poverty line defined by planning commission (1979), was about Rs 50 per month per capita expenditure. They said for measuring poverty, we require to analyze the economic well-being of every person in the community which is measured by per capita consumption expenditure. The study shows that with high growth in per capita consumption expenditure, average

consumption expenditure inequality increased with a high rate that declined the overall impact on poverty reduction during 1973-77. From 1977-83 per capita, consumption expenditure increased at slow rate and average consumption expenditure inequality was declined and with their impact poverty declined. So, the result shows that poverty was inversely related with per capita consumption expenditure and a positive relationship between average consumption expenditure inequality and poverty.

Ravallion and Datt (1996) analysed the trends of poverty in India from 1950 to 1992 and collected data from National Sample Survey (NSS) and used the poverty line described by the planning commission of India. The results shows that there are variations in poverty rate in India from 1950 to 1970 sometimes it have increasing trends and the sometimes poverty rate was decreasing but from 1971 to 1992 headcount ratio in India in both the areas rural as well as urban was continuously falling. The study also shows that rural poverty was much higher than urban poverty in India over whole period.

Ray (2000) unfolded the poverty and child well-being in India and raised some important questions in his study, firstly; does class and gender of household head influence the level of poverty. Secondly; what are the determinants of child schooling and child labour. The study used data from different published and unpublished sources such as household budget survey, accompanying employment survey, and National Sample Survey (NSS) 50th round. Official Poverty Line (OPL) is used to measure poverty and the logit model is used for measuring the determinants of child labour and child schooling. He found that both backward classes and female-headed households are probably poorer than others wherein backward classes have more possibility to poverty in comparison to female-headed households. Educated adults in the family contribute as a crucial and positive role in declining households poverty and children from backward classes have less involvement to attend schools and highly involve in child labour in comparison to other children. The study also finds that the children enrolment ratio in schooling is higher in urban areas than rural areas in India and male children are highly involved in both (child work and schooling) as compared to female children at urban as well as rural level.

Murgai et al (2003) analysed the condition of poverty in Karnataka state. The study used data from National Sample Survey (NSS) 55 round for Karnataka. The study was based on planning commission rural and urban poverty lines for Karnataka for measuring poverty. The authors found that urban poverty is 6 percent more in comparison to rural poverty and the important cause of this high rate of poverty in the urban area is higher poverty line for urban area that is nearly 65 percent more (Rs 511.44 in the urban area and Rs 309.59 in the rural area) than rural poverty line in the state, and district-level poverty is inversely and highly correlated with agricultural wages.

Kumar and Aggarwal (2003) investigated the condition of poverty in Delhi slums in 2001. The study is based on primary data that is collected from 196 households involving 980 members and these households were randomly selected and used Sundaram's poverty measure in which per month per capita food expenditure Rs 451.19 is used as a poverty line for the urban area. The study found that about 57 percent slum population is below the poverty line in which female poverty is much higher (58.31 percent) in comparison to male poverty that is 55.74 percent. The study also shows that female unemployment among the above fourteen years age group is higher (91.40 percent) in comparison to male unemployment (21.85 percent) that represent a worse economic status of the female population in comparison to the male population in slum area.

Srinivasan and Mohanty (2004) documented the deprivation in some basic assistance i.e. adult literacy, drinking water, housing condition, availability of electricity, availability of land, radio, bicycle, and television and toilet facilities in India for the period 1992-1999. The study is based on secondary data collected from the first and second rounds of the National Family Health Survey (NFHS-I and NFHS-II). The study shows that the percentage of extreme and modest deprivation has declined from 4.4 percent and 25.4 percent in 1992-93 to 2.8 percent and 19.5 percent in 1998-99 respectively in India where Bihar is the most deprived state and, Himachal Pradesh is the less deprived state in India throughout the period. The study also shows that deprivation in rural areas is higher in comparison to urban areas whereas the percentage of extreme deprivation is highest in the scheduled caste category, on the other hand, the scheduled tribe's category is highly modest deprived over the period.

John and Mutatkar (2005) studied the poverty among different religious groups in India for the period 1999-2000. The study is based on secondary data from the fifty-fifth round of the National Sample Survey (NSS-55) and used the poverty line given by the planning commission (1999-2000) for analysis. The study declared that the Sikh population shows better performance among all religious groups in rural as well as urban areas, on the other hand, Hindu's are highly poor where 27.63 percent of people are below the poverty line in comparison to Muslims (27.01 percent BPL), Christians (19.62 percent BPL) and Sikhs (3.04 BPL) in a rural area while in urban area Muslims are poorer in India followed by Hindu (21.35 percent BPL), Christians (11.40 percent BPL) and Sikh (10.04 percent BPL). The study also reveals that the depth and severity of poverty are also highest among Hindus in comparison to other religious groups.

Srivastava et al (2007) attempted to examine the pattern of poverty in Rural Madhya Pradesh for the year 2003. The study is based on primary data and information is collected from 2208 households in eleven districts where households are divided into two groups, focused group involved agricultural labourers, marginal farmers, SC, ST, below poverty cardholders, and female-headed households and, remaining households included in another group. The authors observed that the focused group is highly unemployed where 11.41 percent male and 12.82 percent female are unemployed as compared to another group where male and female unemployment ratio is 3.67 percent and 5.05 percent respectively. The study also shows that level of education is very poor in the focused group as compared to another group and, the proportion of female education is very low as compared to the proportion of male education in both of the sample groups. So, the result represents the huge socio-economic and gender disparities in which female, agricultural laborers, marginal farmers, SC, ST, and below poverty cardholders show worse performance as compared to another group of household and male members.

Antony and Laxmaiah (2008) measured the situation of poverty, health, and nutrition in India for the period 1973 to 2005. The study is depended on secondary data which was collected from National Family Health Survey (NFHS), National Nutrition Monitoring Bureau (NNMB), Human Deprivation Reports (HDRs), and National Sample Survey (NSS) and used univariate, bivariate, and multivariate methods for

analysis. The study disclosed that poverty has been declined from 56.4 percent in 1973-74 to 25.7 percent in 2004-05 in the rural area and from 49 percent in 1973-74 to 25.7 percent in 2004-05 in urban area which shows that the rural population is highly poor as compared to urban population in India. Malnutrition in preschool children is a serious public issue in India and the low position of women and lack of nutrition knowledge are the significant causes of malnutrition among children.

Abraham and Kumar (2008) analyzed the vulnerability to poverty and multidimensional poverty for fifteen states of India from 1993-94 to 1999-2000 in terms of consumption, sanitation, level of education, cooking fuel, source of water, and dwelling. The study is based on secondary data from sources as National Sample Survey (NSS) reports and used a fuzzy set approach which is suggested by Qizilbash (2002) for analyzing poverty and vulnerability. The study shows that all the states at the rural level performing badly in terms of sanitation and cooking fuel excluding Kerala and Assam and urban areas show satisfactory results in all multiple dimensions as compared to the rural area.

Kumari and Singh (2009) empirically investigated the effect of poverty on education, health, and other basic requirements i.e. availability of electricity, toilet facilities, safe drinking water, and bathroom facilities in Samastipur and West Champaran districts of Bihar. The analysis is based on primary data that is collected through random sampling wherein two blocks were selected (one from each district), where information was collected from total 200 households (50 poor households and 50 non-poor households from these two villages). The study shows that poor households are more energy deficient (59.9 percent) and highly illiterate (69.2 percent) as compared to non-poor households where only 19.7 percent of households are energy deficient and 29.3 percent of households are illiterate. The study also reveals that most of the poor households cannot fulfill their basic needs.

Dhamija and Bhide (2010) used panel data for 250 villages throughout various states of India to measure the trends of poverty in India across a period of three decades from 1970-71 to 1998-99 and the data is collected from the National Council of Applied Economic Research (NCAER). The author's used the official poverty line at the state level to categorize the households as poor or non-poor and Foster-Greer-

Thorbecke methodology to describe and measure the extent of poverty. The study shows that the headcount ratio is decreased from 50.26 percent in 1970-71 to 40.29 percent in 1981-82 but it increased in 1998-99 and this increasing value is 42.51 percent. The study also found that the depth and severity of poverty are decreased over the period but this declining rate is higher in 1970-1981 as compared to 1981-1998 period.

Sivakumar and Sarvalingam (2010) inspected human deprivation in terms of below poverty line, illiteracy rate, and infant mortality rate in fifteen states of India from 1981 to 2001. The study is based on secondary data from planning commission, first and second round of national family health survey, national sample survey, and census of India, and used multiple regression method for measuring the association between human deprivation and below poverty line, illiteracy rate and infant mortality rate. The study unravels that the value of the human deprivation index has decreased from 72.69 in 1981 to 42.96 in 2001 in India which shows better performance over the period. Where Orrisa is a highly deprived state among all states where the value of the human deprivation index is 98.55 and 60.46 in 1981 and 2001 respectively while Kerala shows better performance among these states over the period. The study also reveals that all three variables (below the poverty line, illiteracy rate, and infant mortality rate) have an identical impact on human deprivation. In most of the states (Assam, Bihar, Gujrat, Haryana, Maharashtra, Orrisa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal) illiteracy is the prime factor that dominated the deprivation index and in the remaining states (Andhra Pradesh, Karnataka, Kerala, and Madhya Pradesh) impact of below poverty line is high on deprivation index and infant mortality rate shows better performance among the three variables in every state.

Kumar and Mohanty (2011) studied the condition of child health in four important variables such as underdevelopment, stunting, wasting, and infant mortality between poor and non-poor in urban India for the period 1992-2005 using the first and third round of National Family Health Survey (NFHS-1 and NFHS-3) data. The study used descriptive analysis for measuring the difference in child health between poor and non-poor and the chi-square test is used to find the significant relationship between health status and poverty. The study shows that percentage of children associated with underweight and stunting declined among both the poor as well as non-poor households

throughout the time of 1992-2005. But the proportion of weak children has increased among the poor from 18 percent to 20 percent in 1992-2005 respectively whereas it has been constant between non-poor households (15 percent) in the country. The study also found that infant mortality rates vary considerably between poor and non-poor throughout the time.

Rani (2011) analysed the poverty in Punjab state of India and used primary data for a study that was collected from 240 households comprised 160 households from rural Punjab and 80 households from urban Punjab. The study used different poverty measures such as headcount ratio, poverty gap index, Sen index, square poverty gap index, Thon poverty index, and deprivation index. The study constructed deprivation index based on twenty-three variables as scooter/bike, car, cooler, cycle, education, electricity, fan, LPG as a fuel, heater, kitchen, land, microwave, ownership of a house, refrigerator, number of rooms, work, sewing machine, television, telephone, washing machine, toilet, and drinking water, and every variable is assigned a weight based on Principle Component (PCA) technique. For every household, a deprivation value is assigned to each variable where value '0' shows non-availability or deprivation in selected variable and value '1' shows non-deprivation so, a deprivation index value near zero indicated high deprivation while a deprivation index value near one indicates low deprivation. The result of this study revealed that 18 percent of people are living below the poverty line in Punjab of which 16 percent are urban below the poverty line and 19 percent are rural below the poverty line as per headcount ratio. Most of these poverty measures show that the level of rural poverty is higher than urban poverty. As per the Thon poverty index, the incidence of poverty in Punjab is 0.069 in which rural poverty is 0.072 and urban poverty is 0.061. Sen poverty index also shows the same results as the Thon index where the value of the Sen index is 0.07 for rural areas and 0.06 for urban areas. According to step-wise regression analysis per capita income, Gini coefficient, and labour productivity ratio are the main determinants of poverty in rural Punjab whereas, in urban Punjab percentage of casual labour, per capita income, Gini coefficient, percentage of expenditure on education, and percentage of agricultural labour are the main determinants of poverty.

Rath (2011) discussed different poverty measures from the pre-independence era to the post-independence era in India. He discussed that Gopal Hari Deshmukh and

Dadabhai Naoroji firstly talked about Indian poverty under British rule and in 1930 Indian national congress discussed the poverty among poor farmers and farm labourers in India but national planning commission in 1936 firstly talked about minimum standard of living. But after independence, a committee of six scholars and public men was set up by prime minister Nehru for measuring poverty all over India and this committee submitted their report to the planning commission and put per month per capita minimum expenditure of Rs. 20 as a poverty line. In 1971 V.M. Dandekar and Nilakantha Rath define poverty in terms of two square mill per day. In 1991 Lakdawala committee of experts set up the poverty line in terms of calories where 2400 calories per day per person was decided for rural people and 2100 calories per day per person was decided for urban people.

Srivastava and Mohanty (2012) measured poverty among the elder peoples in India. The study is based on secondary data collected from different rounds of NSSO. The authors found that poverty is directly related to the household size where large household size results in a higher incidence of poverty and small household size tend to have a low incidence of poverty. In the majority of states of poverty and small household size tends to have a low incidence of poverty. In the majority of states of India poverty among elderly households is higher than non-elderly households in rural as well as urban areas. The study also reveals that the percentage of elderly households living below the poverty line is higher in poor states (Jharkhand, Madhya Pradesh, and Chhattisgarh) and lower in less poor states of India.

Shubhabrata and Ramsundar (2013) analysed the multidimensional poverty in terms of unavailability of land, housing, capital assets, sanitation, nutrition, and financial empowerment in the Sundarban region of West Bengal in India for the period 2012. The study is based on primary data where 500 households are randomly selected for gathering information on poverty and used Alkire and Foster (2008) methodology for analysis. They find that 99 percent of households are deprived in at least three dimensions where landholding and education indicators are more deprived variables whose contribution is highest in poverty, on the other hand, livelihood, labour force, and nutrition indicators are less deprived and their contribution toward poverty is 1 percent and 0 percent respectively.

Alkire and Seth (2013) measured the poverty and deprivation in education, health, and living condition dimensions in India for 1999-2006. The study is based on secondary data from the second and third rounds of the National Family Household Survey (NFHS2, NFHS3) and used Alkire and Santos (2010,2013) and Alkire and Foster (2011) methodology. The study disclosed that poverty in these dimensions has decreased from 56.8 percent in 1999 to 48.5 percent in 2006, furthermore, an average deprivation score of a poor person has also declined from 52.9 percent to 51.7 percent in 2006. Each of the indicators from these dimensions shows a better picture in which their performance in deprivation has improved throughout the period for India.

Planning commission (2014) presented the new expert group (Rangarajan Committee) report on poverty. This expert group used consumption basket related to food and non-food items in which the food poverty line basket is based on the average requirement of calories (2155 for rural areas and 2089 for urban areas), fats (28 grams for rural and 26 grams for urban areas), and proteins (48 grams for rural areas and 50 grams for urban areas) whereas non-food poverty line basket is based on private expenditure on education, shelter, clothing, and mobility. The expert group endorses per month per capita income Rs. 972 for rural areas and Rs. 1407 for urban areas for all India levels where the Fisher index is used to calculate inter-state prices differential and national poverty line are disaggregated into state-wise poverty line (separate poverty line for rural and urban areas) in 2011-12. This report concluded that 29.5 percent of people living under the poverty line in 2011-12 of which 30.9 percent are rural poor, and 26.4 percent are urban poor. The report also reveals that Chhattisgarh is a highly poor state in which 47.9 percent of people are below the poverty line and Goa is the less poor state where the below poverty line population ratio is only 6.3 percent in 2011-12.

Unjum (2018) empirically investigated the level of multidimensional poverty in rural Kashmir. The study is based on primary data collected from 2526 households from eight villages and used the Alkire-Foster methodology for analysis. The author used eight dimensions such as economic, education, health, wealth, work and employment, ownership of productive assets, empowerment and social participation and these dimensions used total twenty seven indicators in which (1) economic dimension included two indicators (i) household monthly income (ii) household

monthly expenditure, (2) education dimension includes three indicators (i) years of schooling (ii) child enrolment (iii) adult literate members in the household, (3) health dimension include four indicators (i) child mortality (ii) underweight child (iii) anemic women (iv) physical access to healthcare facility, (4) wealth dimension includes nine indicators (i) primary residence (ii) housing condition (iii) separate kitchen (iv) toilet facility (v) persons per room (vi) access to safe drinking water (vii) electricity (viii) fuel for cooking (ix) consumer durable, (5) work and employment dimension includes only one variable that is whether any member of the household is working or not, (6) ownership of productive assets dimension again used one indicator that is agricultural land, (7) empowerment dimension used two indicators (i) allowed to travel to market, healthcare center, natal home, outside village/community/area (ii) decision making to access health services for own needs, and (8) social participation dimension used five indicators (i) participation at village level (ii) participation at panchayat level (iii) participation at community level (iv) participation at block level, and (v) participation at district level or more where equal weight was provided to each dimension. The study divulges that 69.66 percent of households living either in kuccha or semi-pucca houses, 53.56 percent of households are deprived of toilet facilities, education deprivation is a serious problem in Kashmir where the illiteracy rate is 43.24 percent, 92 percent of household drink government-supplied water but drinking water is not accessible to every household. The study also disclosed that 85.66 percent of households are 33.3 percent or more deprived of in selected indicators and women in 96.27 percent of households can't go to the doctor by themselves and need permission either from the household head or her husband to go to the doctor.

Tripathi and Yenneti (2020) analysed the multidimensional poverty in India where data was collected from two rounds of Natipnal Sample Survey (NSS) in 2004-05 and 2011-12 where Alkire and Foster (2011) methodology was used for analysing the multidimensional poverty. For the measurement of multidimensional poverty this study used education, income and standard of living dimensions. further these three dimensions used total nine indicators where education attainment indicator was taken for education dimension, Monthly Per Capita Expenditure (MPCE) was taken for income dimension, and remaining seven indicators (employment, agriculture land, irrigated land, source of lighting, cooking fuel, dwelling unit, and ration card) were

taken for standard of living dimension. The authors finds that multidimensional poverty at national level has declined from 62.2 percent to 38.4 percent in 2004-05 to 2011-12, where average deprivation level of poor's has declined from 61.6 percent to 54.7 percent in 2004-05 to 2011-12. In India, education dimension has highest contribution in Multidimensional Poverty Index (MPI) followed by income and standard of living dimensions. The multidimensional poverty declining rate is higher in rural areas as compared to urban areas. The study also shows that Kerala, Mizoram, Nagaland, Punjab and Haryana are the least poor states whereas Jharkhand, Uttar Pradesh, Rajasthan, Orissa, Bihar, Chhattisgarh, and Arunachal Pradesh are highly poor states in India.

Seth and Alkire (2021) measured the multidimensional poverty in India during 2005-06 to 2015-16. The authors used National Family Health Survey 2005-06 (NFHS-3) and National Family Health Survey 2011-12 (NFHS-4) and Alkire and Foster (2011) methodology for analysing the multidimensional poverty. The result finds that the level of MPI has declined from 0.283 in 2005-06 to 0.123 in 2015-16 which is declined by 8 percent annually. The incidence of multidimensional poverty in India has reduced to half in 2015-16 (27.9 percent) as compared to 2005-06 (55.1 percent) which is declined by 6.6 percent annual growth rate. All the Indian states shows declining trends of multidimensional poverty over the years where Bihar is highly multidimensionally poor as well as deprived state (head count ratio is 52.5 percent) and Kerala is least multidimensionally poor state of India where multidimensional poverty rate is only 1.1 percent in 2015-16.

2.5 Empirical Studies on Poverty at State Level

Bhalla (1995) found that the poverty ratio in Haryana state is decreased at a 4 percent annual rate in rural areas from 1970-71 to 1987-88. Haryana is among those six states where along with population growth the number of rural poor is declined in 1987-88 in comparison to two decades ago. The decrease in inequality, increase in the income of farmers, rise in the demand of agriculture and other wage labour, and anti-poverty programmes play a very crucial role in rural poverty reduction in the state. Even though the state shows good performance in declining headcount poverty ratio, where the number of rural poor decline, but the condition of state in non-

economic indicators like sex ratio, child mortality ratio is very poor and there is a huge difference between male and female child mortality rate.

Sharma (2014) empirically analysed the multidimensional poverty in rural Haryana by using education, health and standard of living dimensions and this analysis was based on primary data which was collected from 300 rural households of six districts (Mewat, Mahendragarh, Jhajjar, Faridabad, Sonipat, and Rohtak) and used Alkire and Foster (2010) methodology for measuring the poverty. The author finds that multidimensional poverty among households in Haryana is more than double (35 percent) of income poverty which was only 16 percent and intensity of poverty was 60 percent that shows an average multidimensionally poor household is 60 percent deprived and the value of overall MPI is 0.21. The poverty estimates shows a huge regional disparities among districts on the basis of poverty where Mahengragarh and Mewat are the highly poor as well as deprived districts while Rohtak and Sonipat are least poor districts. At aggregated level, cooking fuel is the highly deprived indicator which has 21 percent contribution in MPI, followed by school attainment, nutrition, sanitation, school attendance, drinking water, housing condition, electricity, child mortality and asset indicators.

Tanwar and Hooda (2017) used three dimensions i.e. drinking water, sanitation and housing conditions for measurement of multidimensional poverty in rural Haryana. The study used secondary data collected from 69th round of NSSO survey and Alkire and Foster methodology for analysing multidimensional poverty. The results of the study shows that Rohtak district is highly deprived in drinking water indicator where principle source of drinking water is not available to any household after Rohtak, Palwal and Jhajjar districts are highly deprived where more than 70 percent of households are deprived in drinking water whereas Ambala is least deprived district (principle source of drinking water is available to every household) among all the districts of Haryana. In case of sanitation indicator, Panchkula and Mewat are highly deprived districts where more than 70 percent of households don't have toilet facilities while Kaithal and Faridabad districts are least deprived districts in which toilets are available to 84.3 percent of households. In housing conditions indicator, all the districts shows good performance as compared to sanitation and drinking water indicators. But the level of multidimensional poverty is very high in rural Haryana

where Rohtak, Jhajjar, Mewat, and Palwal are the highly poor districts in which all the households are multidimensionally poor whereas Bhiwani (37.5 percent) is least poor districts among all the districts of Haryana. The authors also suggested that there is a need of water connections at households level, and construction of toilets at households, school and village level.

Tanwar et al. (2019) analysed the multidimensional poverty by using drinking water, sanitation and housing condition dimensions in urban Haryana. The study was based on secondary data collected from 69th round of National Sample Survey Organization (NSSO) and used Alkire and Foster (2011) methodology for poverty measurement. The study finds that Mewat and Mahendargarh are the highly deprived districts where toilet facilities are not available to 52.1 percent and 51.4 percent of households respectively whereas Gurugram is least deprived district where toilet facilities are accessible to every household. In case of drinking water indicator, Bhiwani and Jhajjar are the highly deprived districts where principal source of drinking water is not available to nearly 60 percent of households while Karnal and Kurukshetra are the least deprived districts where principle source of drinking water is available to every household. The housing conditions in Mewat and Fathebad districts are very poor where 44.4 percent and 41.7 percent of urban households respectively are living in bad housing conditions whereas Kurukshetra, Kaithal, Karnal, Jind, Sirsa, and Mahendragarh district shows a good performance where all the households are living in well-structured houses. In multidimensional poverty also shows similar results where Mewat and Fatehabad district presents weak performance in which more than 80 percent of households are poor by multidimensional criterion but Hisar is more deprived districts where an average poor household is 55 percent deprived of MPI indicators, while Karnal and Panchkula shows good performance where no household was found to be multidimensionally poor in these districts.

2.6 Conclusion and Research Gaps

The existing review of literature presents that poverty is a dynamic concept that is attracting the attention of economists, researchers, and policy makers across the world therefore poverty measurement has always been the subject of debate among them. The available review of the literature indicates that poverty measurement techniques have

changed from a unidimensional approach to a multidimensional approach in the last few decades. Most of the empirical studies presented in this chapter have been done in developed and developing countries. These studies find that both types of countries have different types of problems related to poverty that's why their poverty measurement variables are also different. Most of the developed countries face the problem of relative poverty whereas developing countries have to fight absolute poverty. In India, most of the studies reveal that illiteracy, poor health, malnutrition, unsafe drinking water, dirty cooking fuel, poor sanitation are the major problems among poor households, and the level of poverty and deprivation among rural people is higher as compared to urban people. There are very few studies are available on poverty based on primary data (particularly studies on multidimensional poverty) in India particularly in Haryana and available studies don't provide the insights of deprivation and poverty by social categories in Haryana. Hence, the present study attempts to investigate the level of multidimensional poverty in rural Haryana by social categories that are based on primary data collected from 1040 rural households. The available literature is very helpful to understand the various techniques and methodology related to the study which has been helpful further in solving the grassroots parameters of poverty in rural Haryana. There is a need to focus on rural poverty through the collection of primary data as most of the studies are based on secondary data. There is a need to look at the determinants of poverty hence the present study aims to identify the most significant causes of poverty in Haryana. Further, this study is also attempt to focus and identify the location of poor according to indicators through sensitivity analysis. Haryana is always considered as a wealthy state on the basis of economic criterion, hence it is worthwhile to see, whether this economic well-being is also percolated in other dimensions of wellbeing like health, education, and standard of living or not.

CHAPTER- 3
RESEARCH METHODOLOGY

3.1 Introduction

The present study is descriptive cum explanatory in nature which is mainly based on primary data collected from rural households of Haryana. Hence, his chapter presents the sample design, data sources, and tools and techniques used for the analysis of poverty in the study. It further analyses the poverty in rural Haryana which covers the income as well as multidimensional poverty measures. The performance of rural households in education, health, and standard of living which are considered the important dimensions of human well-being are analysed. Further research work also focus on the extent of poverty among different social categories (General, OBC, and SC) in Haryana. The present study also attempts to analyse the determinants of poverty among households in rural Haryana.

This chapter is divided into five sections where the second section presentes the objectives of the study, the third section includes the data sources of the study, the fourth section presents the methodology for poverty measurement, and the fifth section is the concluding one.

3.2 Objectives of the Study

As already discussed in first chapter the major objective of the study is to analyze and measure the poverty by using multidimensional poverty approach in the rural Haryana. Following are the sub-objectives of the study:-

- To analyze socio-economic conditions of households of rural Haryana.
- To measure income poverty through head count ratio in rural Haryana.
- To analyze the level of deprivation based on health.
- To analyze the level of deprivation based on education.
- To analyze the level of deprivation based on standard of living.
- To analyze intensity and slabs of poverty through MPI of rural Haryana.
- To measure the determinants of multidimensional poverty in rural Haryana.

The results related to the first objective (based on secondary data) is presented in chapter-4 (Socio-economic conditions and income poverty in Haryana), whereas results of the remaining 6 objectives (based on primary data) are shown in chapter-5 (estimates of rural poverty in Haryana: results and interpretation) of this study.

3.3 Data Sources

The present study is based on primary as well as secondary data where primary data is collected through probability sampling method and secondary data was collected from many sources such as central statistical organization (CSO), national family health survey (NFHS), Planning Commission, Census of India, economic survey of Haryana and government reports and publications. The present study used different techniques and methods for measuring poverty.

3.3.1 Primary Data

The major analysis work is primarily depends on primary data which is collected from 1040 rural households of Haryana and the complete data collection procedure is going through the following ways:

- **Sample Design**

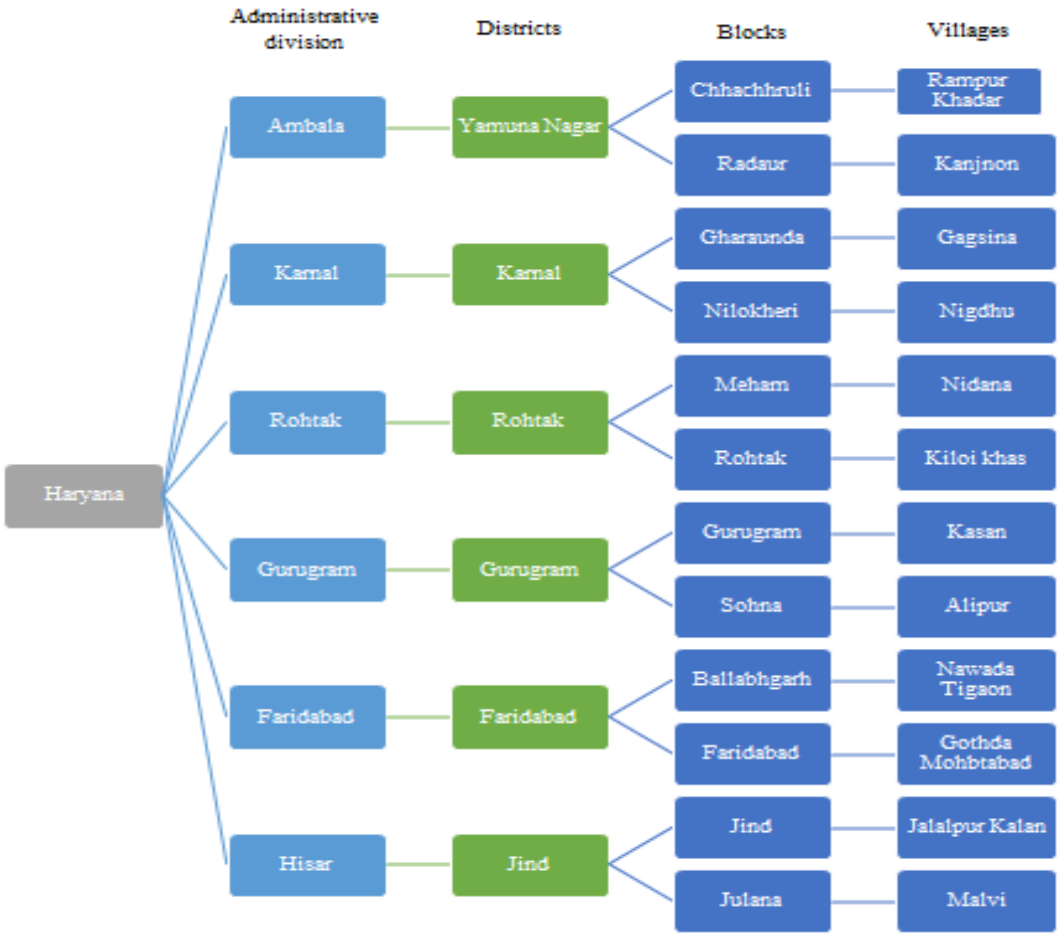
Primary data is collected through a multistage random sampling method where the complete sample design process was going through a total of **five stages** and the sample has been obtained in such a way that all the units have equal possibilities of selection. In the **first stage** of the sampling, the state was divided into six administrative divisions as Ambala, Karnal, Rohtak, Gurugram, Faridabad, and Hisar where each administrative division consists of different districts. **Further, the districts were selected**, in which a district was taken from each administrative division such as Yamuna Nagar district from Ambala division, Karnal district from Karnal division, Rohtak district from Rohtak division, Gurugram district from Gurugram division, Faridabad district from Faridabad division, and Jind district from Hisar division and all these districts contained different blocks.

The **selection of blocks is done at the third stage** of sampling where two blocks were taken from each selected district where Chhachhruli and Radaur blocks were taken from Yamuna Nagar district, Gharaunda and Nilokheri blocks were taken from Karnal district, Meham and Rohtak blocks were taken from Rohtak district, Gurugram and Sohna blocks were taken from Gurugram districts, Ballabhgarh and Faridabad

blocks were taken from Faridabad district, and Jind and Julana blocks were taken from Jind district. At the **fourth stage** of sampling, the study selected one village from each selected block. So total twelve villages are the part of the study (list of these villages and their respective blocks is shown in table- 3.1) and at the last or **fifth stage** of the sampling, a survey was conducted of about 10 percent of households from each village by using stratified random sampling method where according to social categories the households are divided into three strata's (General, OBC and SC category households) and after that nearly 10 percent of households were studied for the study. The list of total households in these villages and their respective blocks were taken from the district census handbook of their respective district but the rough idea about the total number of households according to their social categories (general, OBC, and SC) at the village level has been collected at panchayat level.

The complete sample design process has presented by following diagram- 3.1:

Figure: 3.1 Distribution of Sample in Haryana



Hence the information related to the study was collected from a total of 1040 rural households in Haryana (list of sampled households from the different social categories at the district level is shown in **table- 3.2**) that includes a total 4717 people in which 2565 are males (54.4 percent) and 2152 (45.6 percent) are females (share of males and females in the study at the district level is presented in **the table- 3.3**) that were collected through a scheduled questionnaire method which contained close-ended as well as open-ended questions, and the **entire survey was conducted from February 2019 – October 2019**.

Table: 3.1 List of Districts, Blocks, Villages, and Households Selected for the Study

Sr. No.	Administrative divisions	Name of districts	Name of blocks	Name of villages	No. of Households	
					Sampled	Total
1	**Ambala**	Yamuna Nagar	Chhachhruli	Rampur Khadar	25	226
			Radaur	Kanjnon	35	321
2	**Karnal**	Karnal	Gharaunda	Gagsina	145	1449
			Nilokheri	Nigdhu	150	1503
3	**Rohtak**	Rohtak	Meham	Nidana	70	707
			Rohtak	Kiloi khas	115	1133
4	**Gurugram**	Gurugram	Gurugram	Kasan	175	1723
			Sohna	Alipur	60	591
5	**Faridabad**	Faridabad	Ballabhgarh	Nawada Tigaon	50	502
			Faridabad	Gothda Mohbtabad	54	534
6	**Hisar**	Jind	Jind	Jalalpur kalan	56	560
			Julana	Malvi	105	1035
7	**Total**				1040	10284

Table: 3.2 Distribution of Households by their Social Categories in Sample Districts

Sr. No.	District	General		OBC		SC		Total	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
1.	Faridabad	17	16.4	75	72.1	12	11.5	104	100
2.	Gurugram	115	48.9	66	28.1	54	23	235	100
3.	Jind	112	69.6	26	16.1	23	14.3	161	100
4.	Karnal	158	53.6	28	9.5	109	36.9	295	100
5.	Rohtak	91	49.2	42	22.7	52	28.1	185	100
6.	Yamuna Nagar	13	21.7	37	61.7	10	16.7	60	100
7.	Haryana	506	48.7	274	26.3	260	25	1040	100

Source: Author's calculations based on primary data.

Table: 3.3 Number of Males and Females in Respondent Households

Sr. No.	District	Social Category	Male		Female		Total	
			Number	Percentage	Number	Percentage	Number	Percentage
1.	**Faridabad**	General	43	52.4	39	47.6	82	100
		OBC	191	52.8	171	47.2	362	100
		SC	30	60	20	40	50	100
		Total	**264**	**53.4**	**230**	**46.6**	**494**	**100**
2.	**Gurugram**	General	272	54.9	223	45.1	495	100
		OBC	149	55.8	118	44.2	267	100
		SC	125	53	111	47	236	100
		Total	**546**	**54.7**	**452**	**45.3**	**998**	**100**
3.	**Jind**	General	278	55	227	45	505	100
		OBC	80	56.3	62	43.7	142	100
		SC	66	56.4	51	43.6	117	100
		Total	**424**	**55.5**	**340**	**44.5**	**764**	**100**

Cont…….

Sr. No.	District	Social Category	Male		Female		Total	
			Number	Percentage	Number	Percentage	Number	Percentage
4.	**Karnal**	General	380	52.3	347	47.7	727	100
		OBC	72	53.7	62	46.3	134	100
		SC	278	55	227	45	505	100
		Total	**730**	**53.4**	**636**	**46.6**	**1366**	**100**
5.	**Rohtak**	General	214	56.3	166	43.7	380	100
		OBC	99	56.3	77	43.7	176	100
		SC	116	52.5	105	47.5	221	100
		Total	**429**	**55.2**	**348**	**44.8**	**777**	**100**
6.	**Yamuna Nagar**	General	39	57.3	29	42.7	68	100
		OBC	99	53.8	85	46.2	184	100
		SC	34	51.5	32	48.5	66	100
		Total	**172**	**54.1**	**146**	**45.9**	**318**	**100**
7.	**Haryana**	General	1226	54.3	1031	45.7	2257	100
		OBC	690	54.5	575	45.5	1265	100
		SC	645	54	546	46	1195	100
		Total	**2565**	**54.4**	**2152**	**45.6**	**4717**	**100**

Source: Author's calculation based on primary data.

3.3.2 Sources of Secondary data

In this study secondary data has also been used along with the primary data. The main sources of this secondary data are presented in the following table.

Table: 3.4 Secondary Data Sources for the Study

Sr. no.	Variables	Data Source
1.	Sex Ratio	Census of India, 2011.
2.	Infant mortality	National family health survey (1992-93), National family health survey (1998-99), National family health survey (2005-06), National family health survey (2015-16).
3.	Child mortality	National family health survey (1992-93), National family health survey (1998-99), National family health survey (2005-06), National family health survey (2015-16).
4.	Child nutrition	National family health survey (1992-93), National family health survey (1998-99), National family health survey (2005-06), National family health survey (2015-16).
5.	Data on standard of living indicators i.e. electricity, drinking water, toilet facilities, cooking fuel and pucca houses	National family health survey (1992-93), National family health survey (1998-99), National family health survey (2005-06), National family health survey (2015-16).
6.	Adult education	National family health survey (1992-93), National family health survey (1998-99), National family health survey (2005-06), National family health survey (2015-16).
7.	Below poverty line	Planning commission and rural development department, Haryana.
8.	Consumer price index	Economic survey of Haryana,2015-16
9.	List of blocks and their villages in Haryana	District census handbook Haryana (Series-07)

Source: Author's compilation.

3.4 Methodology for Poverty Measures

This study used the following tools and techniques for empirical analysis.

3.4.1 Income Poverty Measurement Techniques

The study used **Foster, Greer, and Thorbecke (1984)** method for measuring income poverty.

(i) Income Head Count Ratio (H_Y)

The simple head count ratio presents the percentage of the population whose income is fell below the income/ consumption threshold which is measured by using the following formula:

$$\mathbf{H_Y = \frac{q}{n}}$$

where H_Y= income poverty head count ratio, q= number of poor households whose income fell below the income threshold, and n= total population. The present study used the updated version of Rangarajan committee recommended poverty line for measuring the level income poverty in Haryana which is shown as follows:

- **Updated Poverty Line**

The study used per month per capita Rs. 1127.82 at 2011-12 prices poverty line for rural Haryana that is recommended by the Rangarajan committee (Planning Commission, 2014). To update this poverty line at current prices this study using general Consumer Price Index for rural Haryana prepared by Economic Survey of Haryana where prices based on general Consumer Price Indices has increased by 42.8 percent from 2011-12 to 2018-19. So, this study updated the poverty line by using the following formula:

$$\mathbf{PLR_U = \frac{MPCI \times CPI_R}{100}}$$

Where PLR_U = updated poverty line at current prices for rural Haryana, MPCI = monthly per capita Income at 2011-12 prices, and CPI_R = general consumer price index for rural Haryana.

$$\mathbf{PLR_U = \frac{1127.82 \times 142.8}{100} = 1610.52\ Rs.}$$

Hence monthly per capita income updated to Rs. 1610.52 at 2018-19 prices from original Rangarajan committee official poverty line that is per month per capita Rs. 1127.82 at 2011-12 prices. So, this study updated poverty line (per month per capita income Rs. 1610.52) for measuring the income poverty among sampled households in rural Haryana.

(i) Poverty Gap Index (P_1)

The poverty gap index presents the depth of poverty among the entire population. The value of P_1 lies between 0-1 where 0 implies no poverty and 1 implies that all the poor households having zero income. Poverty gap index (P_1) is calculated by using the following formula:

$$\mathbf{P_1 = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - yi}{z} \right)}$$

Where n= total population, q= number of poor households whose income fell below the income threshold, z= income poverty line, and yi= income of the poor household.

(ii) Square Poverty Gap Index (P_2)

The square poverty gap index presents the severity of poverty which takes the square of the poverty gap. Where poverty gap index measures the poverty gap of the poor households which indicates that an average poor household is how much below from the poverty line whereas the square poverty gap index measures the income inequality among poor households. The value of Square Poverty Gap Index (P_2) is calculated by using the following formula:

$$\mathbf{P_2 = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - yi}{z} \right)^2}$$

Where n= total population, q= number of poor households whose income fell below the income threshold, z= income poverty line, and yi= income of the poor household.

3.4.2 Multidimensional Poverty Measurement

The study used Alkire and Foster (2009) methodology to measure the multidimensional poverty in rural Haryana.

(i) Dimensions and indicators of Multidimensional Poverty measures

For Multidimensional poverty analysis total of three dimensions has been taken as education, health, and standard of living in which two indicators (school attainment and school attendance) are applied for the education dimension, two indicators (nutrition and child mortality) are applied for health dimension and six indicators (drinking-water, electricity, sanitation, cooking fuel, floor and assets) are applied for the standard of living dimension (Alkire and Santos, 2010; Alkire, 2011; Levine et al., 2012; Pasha, 2015; Alkire and Foster, 2016).

Table: 3.5 Dimensions and Indicators for Multidimensional Poverty Measurement and their Deprivation Cut-off for Different Indicators

Sr. No.	Dimensions	Indicators	Deprivation cut-off or Deprived if
1.	**Education**	School Attainment	A household member has not completed at least six years of schooling.
		School Attendance	A school-going age child (6-14 years) is not going to school.
2.	**Health**	Nutrition	A household member is malnourished and their nutrition level is calculated by Z-score (for 0-5 years old children's) and body mass index (for more than 5 years old).
		Child Mortality	A child (0-5 years) died in the household during five years span before the survey.
3.	**Standard of Living**	Electricity	If electricity is not available in the house.
		Drinking Water	If clean drinking water is not available in the household or it is available more than 30 minutes away by walking.
		Sanitation	If improved toilet facility is not available to the household.
		Flooring	If the house has dirt, dung, or sand floor.
		Cooking Fuel	If the household is using dirty cooking fuel (Dung cake, charcoal, wood).
		Assets	If a minimum of one asset related to information gathering source (TV, Radio, Mobile, and Telephone) is not available with the household, a minimum of one asset related to mobility (truck, tractor, car, bike, motorbike, animal cart, and motorboat) is not available with household, and a minimum of one asset related to livelihood (refrigerator, arable land, and livestock) is not available with household.

Source: Alkire and Santos (2010).

Table- 3.5 presents the deprivation cut-off at the level of the indicators, and i^{th} household is considered deprived in an indicator if the household achievement in this indicator is less than indicator deprivation cut-off (Zi). For t**he education dimension** the study applied two indicators, school attainment, and school attendance to measure the education level in rural Haryana. A household is considered deprived in school attainment indicator if a single adult member has not completed at least six years of schooling and school attainment is important for every person because it provides basic education skills like literacy, numeracy, and understanding of education (Alkire and Santos, 2013). In the case of the second indicator of education dimension if any school-going age children (6-14 years) of a household is not going to school then the households is considered deprived in school attendance indicator.

Health dimension also used two indicators in which one is nutrition indicators and second is child mortality indicators and if any of the members of the household in the house is found underweight then the household is considered to be deprived in nutrition indicator. Generally, undernutrition shows a functioning failure which has a lifetime effect in terms of the physical and mental development of a child and make any person at risk for other health- related issues. The second indicator of this dimension is child mortality which is a direct health functioning failure and if any child between 0-5 age group has died in the household during five years before the survey then the household is considered deprived in this indicator (Alkire and Santos, 2013).

The third dimension of MPI is **the standard of living** that comprises six indicators electricity, safe drinking water, sanitation, flooring, cooking fuel, and assets. If an electricity connection is not available to the household then that household is considered to be deprived of an electricity indicator. Accessibility of safe drinking water is considered to the households if they get clean drinking water from improved water sources (the sources which are protected from outside contamination) i.e. piped water from dwelling, public taps, tube well/ bore well, hand pump etc. is available nearly and time should be less than 30 minutes away by walking. However the household is considered deprived if safe drinking water from these improved water sources is not available or it is available more than 30 minutes away by walking. In the case of sanitation indicator if a household has not assessed with improved toilet facilities and if improved toilet facilities available but shared with other households

then the household is deprived. A household with dirt, dung and send floor is considered as deprived in flooring indicator. If a household either using only dirty fuel (dung cake, coal, wood fire, and agricultural crop waste) or using mixed type fuel (using both clean cooking fuel as well as dirty cooking fuel) for cooking purposes then the household is considered deprived in cooking fuel indicator but if the household using only clean fuel (LPG, electricity, etc.) then the household as non-deprived. If a minimum of one asset related to information gathering source (TV, Radio, Mobile, and Telephone) is not available with the household, a minimum of one asset related to mobility (truck, tractor, car, bike, motorbike, animal cart, and motorboat) is not available with household, and a minimum of one asset related to livelihood (refrigerator, arable land, and livestock) is not available with household then the household is deprived in assets (Alkire and Santos, 2013; Pasha,2015).

(ii) Weightage to Dimensions and Indicators

Alkire and Foster methodology is flexible in giving weights to various dimensions which depend on their relative importance (Siani, 2013). In this study equal weight is assigned to each dimension because it is assumed that all the chosen dimensions (education, health, and standard of living) are equally important for measuring poverty in rural Haryana and no single dimension is more important than others. And all the indicators within each dimension is also received equal weight. So, each of the dimensions gets $\frac{1}{3}$ or 33.3 percent weight in which each indicator inside the health and education dimension obtained $\frac{1}{6}$ or 16.7 percent weight and each indicator inside the standard of living dimension obtained $\frac{1}{18}$ or 5.6 percent weight (Alkire and Santos, 2010; OPHI and UNDP).

(iii) Multidimensional Poverty Cut-off

This study considered a household multidimensionally poor if the household is deprived in $\frac{1}{3}$ dimensions (or 33.3 percent) or deprived in at least one out of three dimensions then that household is considered to be multidimensionally poor (Alkire and Santos, 2010; UNDP). But the present study also make a sensitivity analysis of poverty measures where the analysis was done by using various poverty cut-offs from K=1 to K=10. Hence poverty cut-off K=1 identifies the households who are deprived in

at least one indicator (out of total 10 indicators, K=2 identifies the households who are deprived in at least two indicators, K=3 identifies the households who are deprived in 3 indicators and so on.

(iv) Method of Measuring Multidimensional Poverty

- **Notation**

Multidimensional poverty method measures the poverty in d dimensions and n number of households. Let $x = [xij]$ denotes n×d matrix of achievement for n households across d dimensions where xij present achievement of household i (= 1,2,3……,n) in dimension j (= 1,2,3…….d).

$$\boldsymbol{x}=\begin{bmatrix} \boldsymbol{x11} & \boldsymbol{x12} & \dots & \boldsymbol{x1d} \\ \boldsymbol{x21} & \boldsymbol{x22} & \dots & \boldsymbol{x2d} \\ \vdots & \vdots & \dots & \vdots \\ \boldsymbol{xn1} & \boldsymbol{xn2} & \cdots & \boldsymbol{xnd} \end{bmatrix}_{\mathbf{n\times d}}$$

The representative entry in the achievement matrix $xij \geq 0$ represents household i's achievement in dimension d. Each row vector $xi = [x11 \quad x12 \quad \cdots \quad x1d]$ gives household i's achievements in different dimensions, whereas each column vector $xj = [x11 \quad x21 \quad \dots \quad xn1]$ gives the distribution of achievements in dimension j across different households.

- **Identification**

To identify who is poor among the population, the multidimensional poverty method used duel cut-off criterion. **First is within dimension deprivation cut-off (Zj):** To identify all the households who are deprived in any dimension j, let Zj > 0 be the deprivation cut-off for i's household in dimension j and Z be the vector of deprivation cut-off for each of the dimensions of multidimensional poverty. Define a deprivation matrix $g^0 = [gij^0]$ that is derived from achievement matrix x as follows:

$$\boldsymbol{gij^0}=\begin{cases} \boldsymbol{wj \;\; if \; xij < Zj} \\ \boldsymbol{0 \;\; if \; xij \geq Zj} \end{cases}$$

If $xij < Zj$ then household i is deprived in dimension j and put $gij^0 = wj,$ and if $xij \geq Zj$ than household i is not deprived in dimension j and put $gij^0 = 0$. Here value of the ij^{th} element of the matrix g^0 has been equal to dimension weight wj if the household i is deprived in dimension j otherwise "0" if household i's not deprived in

dimension j. By taking weighted sum of each row of g^0, a column vector C was obtained where Ci element presents the number of deprivation suffered by household i (= 1,2,3……n). Formally:

$$\mathbf{Ci} = \sum_{\mathbf{j=1}}^{\boldsymbol{d}} \boldsymbol{gij^0}$$

Second is cross dimensional poverty cut-off (K): there is a need to identify who is considered to be multidimensionally poor and to measure the multidimensional poverty, poverty cut-off K > 0 has been selected and applied over the column vector C. If Ci ≥ K then households i's considered multidimensionally poor otherwise non-poor. After getting the multidimensionally poor households, the study has been focused on poor households by censoring the deprivation of non-poor households at given K and construct a censored matrix g^0(K), obtained from g^0 by replacing '0' even when deprivation score of these non-poor households was non-zero. The g^0(K) censored matrix entails weighted deprivations of poor households and exclude deprivations of non-poor's. From this g^0(K) matrix, a censored vector of deprivation counts C(K) has been obtained which counts '0' deprivation for non-poor. If Ci ≥ K then C(K) = Ci, but if Ci < K then C(K) = 0. So, C(K) presents deprivation score of only poor households as per given criterion.

- **Multidimensional Poverty Measures**

The multidimensional poverty measures such as head count ratio, intensity of poverty, Multidimensional Poverty Index (MPI), contribution of various dimensions and indicators in MPI are shows as follows:

(i) Multidimensional Head Count Ratio (H_M)

Incidence of multidimensional poverty or **multidimensional head-count ratio (H_M)** is the proportion of those households whose deprivation score is equal or more than the multidimensional poverty cut-off (K). The multidimensional head count ratio is calculated by using following formula:

$$\mathbf{H_M} = = \frac{\mathbf{q}}{\mathbf{n}}$$

Where H= head-count ratio, q = number of multidimensionally poor households, and n = total households. But the head-count ratio is insensitive to the number of dimensions in which poor household i is deprived and violates 'dimensional monotonicity' principle, which says if a poor household becomes newly deprived in an additional dimension then H value should increase. Therefore this methodology measures the level of depth of deprivation of poor households by intensity of poverty.

(ii) Intensity of Poverty (A)

Intensity of poverty represents the ratio of the weighted component dimensions in which, on average, poor people are deprived. It provide important information about multidimensional poverty that shows the fraction of possible dimensions d in which an average poor household is deprived. For measuring the level of depth, deprivation scores of poor households are summed and divided by the total number of poor households.

$$\mathbf{A} = \frac{\mathbf{1}}{\mathbf{q}} \sum_{\mathbf{i=1}}^{\mathbf{q}} \mathbf{C(K)}$$

Where q= number of multidimensionally poor households, C(K)= deprivation score of poor.

(iii) Multidimensional Poverty Index or Adjusted Head Count Ratio (MPI or $\mathbf{M_0}$)

Multidimensional Poverty Index (MPI) interprets as the total number of deprivation faced by the poor households or 'C(K) = g^0(K)' divided by the maximum number of deprivation that could possibly be faced by all households. In other words, simply M_0 is the product of H and A which is calculated by using following formula:

$$\mathbf{M_0 = H \times A}$$

M_0has two significant characteristics, first it satisfies 'dimensional monotonicity' principle that say if a poor person becomes deprived in new dimension then M_0 will increase or if a poor person becomes non-deprived in already deprived dimension then

the M_0 will be decreased. Another key characteristic is that it is decomposable by dimensions and indicators.

(iv) Decomposing Multidimensional Poverty Index (MPI) by Dimensions and Indicators

MPI decompose the deprivation by dimensions and indicators which shows what is the contribution of different dimensions deprivation (and indicators of these dimensions) in MPI which is calculated by using following formula's.

$$\textbf{Contribution}_j = \frac{\frac{1}{n}\sum_{i=1}^{q} C_j(K)}{M_0}$$

Where, M_0 is Multidimensional Poverty Index (MPI), $Contribution_j$= contribution of dimension j in M_0, and $C_j(K)$ = poor's deprivation score in dimension j, n= total households, q= number of multidimensionally poor households.

$$Contribution_I = \frac{\frac{1}{n}\sum_{i=1}^{q} C_I(K)}{M_0}$$

Where, $Contribution_I$= contribution of indicator I in MPI, and $C_I(K)$ = poor's deprivation score in indicator I.

(v) The Slabs/ Extent of Multidimensional Poverty

On the basis of the percentage of household deprivation in MPI indicators, households are divided into four categories.

1) **Non-poor:** If the deprivation score of a household is 0-0.200 (or 0 - 20.0 percent) in total MPI indicators.
2) **Near to poverty (Vulnerable):** If the deprivation score of a household is 0.201-0.332 (or 20.1-33.2 percent) in total MPI indicators.
3) **Moderate Poor:** If the deprivation score of a household is 0.333- 0.499 (or 33.3- 49.9 percent) in total MPI indicators.

4) **Severely poor:** If the deprivation score of a household is 0.500 - 1 (or 50.0-100 percent) in total MPI indicators.

- **Techniques of Measuring Nutrition Level**

To measure the health status in terms of nutrition among adults and children is measured by body mass index and Z score respectively. **Z score measure the malnutrition of children** under five year age and these children's are considered malnourished when their Z score value is more than the percentage of median.

$$\textbf{Z score} = \frac{\textbf{Measured value} - \textbf{Median of refrence population}}{\textbf{Standard deviation of reference population}}$$

$$\textbf{Percentage of median} = \frac{\textbf{Measured weight of children}}{\textbf{Median weight of the reference population}} \times 100$$

The malnutrition status of children under five years is measured by Anthro software which is developed by World Health Organization (WHO) and this software measured the malnutrition in case of weight for age (underweight), height for age (stunting), and weight for height (wasting). In case of weight for age children whose Z score is below -2 standard deviation or 'Z score < -2 SD' from the median of the reference population are called stunted (short of their age). If children's weight for height Z score < -2 SD from their reference population are called wasted and the children whose weight for age Z score is less than – 2 SD from the reference population are called underweight (National Family Health Survey, 2015).

- **Body Mass Index**

Body Mass Index (BMI) is most significant tool of measuring malnourishment in adults that is based on individual's weight and height. BMI has been calculated by individual weight (Kg) divided by height $(m)^2$ and an individual is considered underweight if their BMI value is less than 18.5.

$$\textbf{BMI} = \frac{\textbf{weight (Kg)}}{\textbf{height (m)}^2}$$

Table: 3.6 Adult Nutrition Based on Body Mass Index (BMI)

Sr. No.	BMI Score	Weight Status
1.	Below 18.5 or < 18.5	Underweight
2.	18.5 - 24.9	Normal
3.	25.0 – 29.9	Overweight
4.	30 and above or ≥ 30	Obese

Source: Centre for disease control and prevention

3.4.3 Binary Logistic Regression Method for Analysis of Determinants of Poverty

Binary logistic regression is an econometric method that is used to predict the relationship between dependent and independent variables in that case when the nature of the dependent variable is binary or dichotomous and independent variables either may be continuous or categorical (Gujrati, 2003). This study used the binary logistic regression method to analyses the determinants of multidimensional poverty where the dependent variable has two categories (multidimensionally poor= 1, or multidimensionally non-poor= 0) and total sixteen variables are used as independent variables (all are categorical).

In this study the following equation has been used for binary logistic regression:

$$\mathbf{P(y) = \frac{1}{1+e^{-(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots\ldots\ldots + \beta_{16} X_{16} + e_i}}} \quad \ldots\ldots\ldots\ldots \quad (Eq.\ 3.1)}$$

In equation (3.1) P(y) is the probability of happening y, e is base of natural logarithmic, is intercept term, ’s are coefficient of their respective independent variable, is a random term, and X’s are independent variables presented in the table- 3.7 as follows:

The present study used the following variables for the binary logistic regression model as presented below in table- 3.7:

Table: 3.7 Model Specification for Binary Logistic Regression

Code	Variable	Nature	Category
Dependent Variable			
Yi	Multidimensionally poor or non-poor	Binary	Poor-1, non-poor-0
Independent Variables			
X_1	Head of family	Binary	Male-1, female-0
X_2	Social category	Binary	Unreserved-1, reserved-0
X_3	Type of family	Binary	Nuclear-1, Joint-0
X_4	Dependent population in house (children below age 15 and old age person)	Binary	Absent-1, present-0
X_5	Ration card	Binary	APL-1, BPL-0
X_6	Arable land	Binary	Yes-1, no-0
X_7	Main occupation	Categorical	Labourer-1, agriculture and allied activities-2, government job-3, private job-4, self-employed-5
X_8	Annual income	Categorical	Less than 1 lakh-1; 1 lakh to 2 lakh-2; 2.1 lakh to 3 lakh-3; more than 3 lakh-4
X_9	Adult female education	Binary	Matric or more-1, Less than matric-0
X_{10}	Adult male education	Binary	Matric or more-1, Less than matric-0
X_{11}	Adult female health	Binary	Healthy-1, malnutrished-0
X_{12}	Adult male health	Binary	Healthy-1, malnutrished-0
X_{13}	Health facility at village level	Binary	Yes-1, no-0
X_{14}	Cooking fuel	Binary	Clean-1, dirty-0
X_{15}	Toilet facilities	Binary	Improved-1, Not-improved-0
X_{16}	Drinking water	Binary	Safe-1, Unsafe-0

Source: Author's own computation.

- **Odd Ratio (Exp (B))**

In the case of binary logistic regression, **the odd ratio (**which is presented as **(Exp (B))** in SPSS) is very important which shows the constant effect of an independent

variable on the probability of outcome variable in the favour of an event occurrence. The odd of an event happening is the ratio of the probability of an event occurring and probability of an event not occurring which is presented in following eq. 3.2:

$$\textbf{Exp (B)} = \frac{P}{1-P} \text{ ….……. (Eq. 3.2)}$$

Where P is the probability of occurrence and 1-P is the probability of not occurrence. The value of odd lies between 0 to infinity. In the case, when the value of odd ratio is greater than one it shows that increase in an independent variable also increase the odd ration but if the value of odd ratio is below the one it means that increase in independent variable decline the odd ratio.

The **natural logarithmic of odd is called a logit**. In the case of categorical dependent variables, the observed data does not have a linear relationship but after applying the natural logarithmic on odd ratio the non-linear data gets transformed into a linear form. Here, natural logarithmic has been applied on (eq. 3.2) after which equation (3.3) has been received as follows:

$$\textbf{In } \left(\frac{P}{1-P}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \ldots\ldots\ldots + \beta_n X_n \quad \text{……..(Eq. 3.3)}$$

Where the value of In $(\frac{P}{1-P})$ or logit (which is presented as B in SPSS) lies between – infinity to + infinity. The positive value of logit indicates that as the value of independent variable increase the odd of the outcome happening (being multidimensionally poor) also increases and value of odd is greater than one whereas negative value of logit shows that as the value of independent variable increase the odd of the outcome happening (being multidimensionally poor) decreases and value of odd is less than one.

In case of logit regression model, Cox and Snell R square (R^2cs) and Nagelkerke R square (R^2N) are one of the measures which are applies for measuring goodness of fit. Where statistical value of Cox and Snell R square measure is never reach to maximum of its theoretical value 1. So that Nagelkerke R square (R^2N) (similar as R square in linear regression) provide an extension form of Cox and Snell measure that is considered an important model of goodness of fit for logit regression analysis (Field, 2009).

The Wald statistics in logit regression model is similar as the t statistics in linear regression where it shows whether the β coefficient has significance contribution in predictions of dependent variable or not. If the value of β coefficient is significantly different from zero then it is pretended that the independent variable of related β has contribution to the prediction of dependent variable (y). The formula of Wald statistics is presented as below:

$$\textbf{Wald} = \frac{\beta}{SE_{\beta}}$$

Where β is coefficient of independent variable, SE_{β} is Standard Error of β coefficient.

3.5 Conclusion

The present chapter presents the research methodology used for the analysis of the study where the study primarily depends on primary data collected from 1040 rural households from rural Haryana. But some secondary data is also used in this study that is collected from various sources such as all the rounds of the National Family Health Survey (NFHS 1992-93, NFHS 1998-99, NFHS 2005-06, and NFHS 2015-16), various reports of Planning Commission, Census of India, Economic Survey of Haryana, and Rural Development Department, Haryana, etc. The study used FGT (1984) method for income poverty measurement, Alkire and Foster (2009) methodology is used for multidimensional poverty, and the binary logit regression method is applied to analyse the determinants of multidimensional poverty in Haryana.

CHAPTER 4

SOCIO - ECONOMIC CONDITCIONS AND INCOME POVERTY IN HARYANA

4.1 Introduction

Haryana is an agrarian state where nearly 65 percent of the population is living in rural areas. The state economy shows a huge structural transformation in the last four decades (1969-70 to 2019-20) where the share of the agricultural sector in GSDP has declined due to the high progress of the service and industrial sector. As per the economic survey of Haryana, the service sector presents a higher contribution in Gross State Value Added (GSVA) which is 50.6 percent followed by the industrial sector (32.8 percent) and agriculture sector (16.6 percent) in 2019-20. It is one of the wealthiest states of India based on Per Capita Income (PCI) which is the highest in India after Goa and Sikkim. The Gross State Domestic Product (GSDP) annual growth rate (7.7 percent in 2018-19) of the state is higher as compared to all India annual Gross Domestic Product (GDP) growth rate (5 percent in 2018-19) (Economic Survey of Haryana, 2019-20). Haryana is also known for rural success as the agricultural sector in the state is very productive where the production of food grains in the state is at sixth place in India after Utter Pradesh (U.P.), Madhya Pradesh (M.P.), Punjab, Rajasthan, and West Bengal (Indian Council of Food and Agriculture, 2015-16).

There is an acute need to analyse whether this prosperity is percolated in terms of better health, education, and standard of living or not. This chapter presents the status of income poverty and socio-economic conditions of rural households in Haryana through secondary data. Hence, this chapter shows the trends of Poverty and socio-economic conditions i.e. sex ratio, literacy rate, child and adult nutrition, infant and child mortality rate, deprivation in electricity, deprivation in drinking water, deprivation in sanitation, using dirty fuel, and deprivation in pucca houses in Haryana and India. The data on these variables is collected from various sources such as planning commission, various rounds of National Family Health Survey (National family health survey (1992-93); National family health survey (1998-99); National

family health survey (2005-06); and National family health survey (2015-16), Office of the Registrar General & Census Commissioner, economic survey of Haryana, etc.

The data relating to the socio-economic condition at the national as well as at state level is collected from different rounds of the National Family Health Survey where the first round of NFHS came in 1992-92, second round came in 1998-99, third round came in 2005-06 and its last round has come in 2015-16.

The chapter is divided into four sections where the first section is the introductory section, the second section of this chapter is associated with trends of income poverty and socio-economic conditions of Haryana and India, the third section shows the trends of income poverty and socio-economic conditions among various districts of Haryana and last section of this chapter is concluding one.

4.2 Socio-Economic Conditions and Income Poverty at State and National Level

Socio-economic indicators show the quality of life of the population, therefore, considered the good measurement of human welfare. This section presents the socio-economic conditions in terms of education, health, and standard of living dimensions, where the first three sub-sections present the socio-economic conditions in various dimensions and the fourth sub-section presents the Income Poverty in Haryana and India.

The sex ratio is one of the important social indicators and a measure of gender inequality which shows the number of females per 1000 males. So, the sex ratio in different states of India is shown as follows:

Table: 4.1 Sex Ratio in Different States of India in 2011

Rank	State	Sex Ratio (no. of females per 1000 males)
1	Kerala	1084
2	Tamil Naidu	996
3	Andhra Pradesh	993
4	Chhattisgarh	991
5	Meghalaya	989
6	Manipur	985
7	Orissa	979
8	Mizoram	976
9	Goa	973
9	Karnataka	973
10	Himachal Pradesh	972
11	Uttarakhand	963
12	Tripura	960
13	Assam	958
14	West Bengal	950
15	Jharkhand	948
16	Andhra Pradesh	938
17	Nagaland	931
17	Madhya Pradesh	931
18	Maharashtra	929
19	Rajasthan	928
20	Gujrat	919
21	Bihar	918
22	Uttar Pradesh	912
23	Punjab	895
24	Sikkim	890
25	Jammu and Kashmir	889
26	**Haryana**	**879**
India		943

Source: Census of India, 2011

Table- 4.1 shows the state-wise sex ratio in various states of India in 2011. The results show that the sex ratio in India is 943 that shows the number of females are 943 per

1000 males where Kerala shows the highest (1084 females per 1000 males) and Haryana shows the lowest (879 females per 1000 males) sex ratio among all the states of India it seems that there is a huge gender disparity in Haryana as compared to other states of India.

4.2.1 Education Dimension

Education is an important factor that portrays a major contribution to the socio-economic development of any country. It is the main determinant of human capital that enhances the productivity and prosperity of a nation which is further helpful in enhancing the development of society as a whole. The trends of adult education in Haryana and India from 1992-2016 is presented in table 4.2 as below:

Table: 4.2 Status of Adult Education in Haryana and India from 1992-2016 (in Percent)

Sr. No.	Educational categories		1992-93		1998-99		2005-06		2015-16	
			Male	Female	Male	Female	Male	Female	Male	Female
1	Illiterate	**Haryana**	27.7	54.1	21.2	42.7	14.4	37.6	7.5	23.0
		India	31.2	56.7	25.8	48.6	18	40.6	12	27.6
2	Literate	**Haryana**	18.4	15.1	19.6	17.4	7.1	2.9	2.8	2.8
		India	20.2	15.1	21.1	17.1	10.2	8	6.0	5.8
	Primary	**Haryana**	18.6	14.5	17.8	16.5	20.6	17.5	13.5	13.9
		India	16.8	12.1	18.4	14.5	16.5	15.1	14.2	14.2
4	Middle	**Haryana**	12.0	6.2	13.1	8.4	14.3	12.4	15.3	14.5
		India	11.9	6.9	13.0	8.1	20.6	14	20.7	16.7
5	High school	**Haryana**	17.6	7.6	16.0	7.8	23.7	15.3	22.0	17.2
		India	13.6	6.6	10.7	6	14.9	10.4	17.4	14.2
6	Above high	**Haryana**	5.7	2.5	12.3	7.2	20.0	14.3	39.1	28.7
		India	6.1	2.6	11.2	5.6	19.7	12	29.6	21.5
7	Missing	**Haryana**	0.1	0	0	0	0	0	0	0
		India	0.1	0.1	0	0	0	0	0	0
8	Total	**Haryana**	100	100	100	100	100	100	100	100
		India	100	100	100	100	100	100	100	100

Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

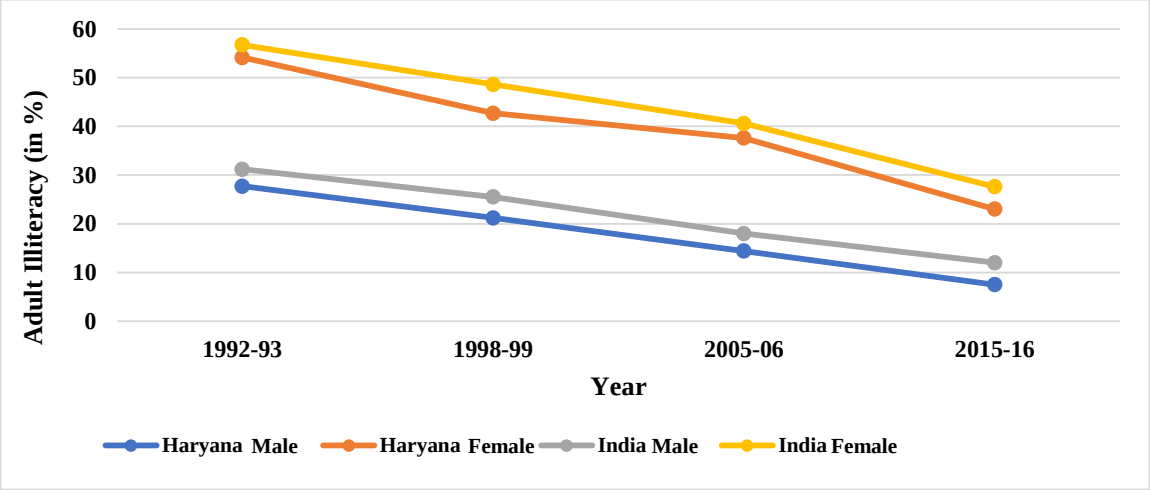
Note: 1) In 1992-93 and 1998-99 people with age 6 years and above included in adult education.

2) In 2005-06 and 2015-16 people between 15-49 years included in adult education.

Table- 4.2 shows the level of education among adult males and females of Haryana and India for the period 1992-2016. **In 1992-93** male illiteracy rate in Haryana was 27.7 percent, literate males were 18.4 percent, 18.6 percent males were completed their primary education, 12 percent of males completed eight years of schooling, 17.6 percent were completed their high school education, and only 5.7 were completed above high school education. Now, the level of male education has improved because the level of illiteracy has come down to 7.5 percent and 61.1 percent of males have completed their high school or more than high school education in 2015-16. In Haryana Female illiteracy rate was 54.1 percent in 1992-93 that was double of male illiteracy, the female literacy rate was 15.1 percent, 14.5 percent of females were completed their primary education, 6.2 percent were completed eight years of schooling, 7.6 percent were completed high schooling and only 2.5 percent of female were completed more than high school education.

Like male education, the level of female education has also improved but still, the illiteracy rate among females is three times higher than male illiteracy, and the level of higher education is also very low among females as compared to males in Haryana in 2015-16. Whereas at national level the male illiteracy rate is 31.2 percent, literate males were 31.2 percent, 16.8 percent of males were completed primary education, and 19.7 percent of males were completed high school or more than high schooling in 2015-16. Female education level is low as compared to male education in India also where the female illiteracy rate is 56.7 percent and only 9.2 percent of females were completed ten or more than ten years of schooling. In the case of India, the level of education among males and females has increased and the status of females in education is lower than males but education disparities among males and females in Haryana is higher (where the female illiteracy rate is more than three times of males illiteracy) as compared to India (females illiteracy rate is more than two times of male illiteracy) in 2015-16.

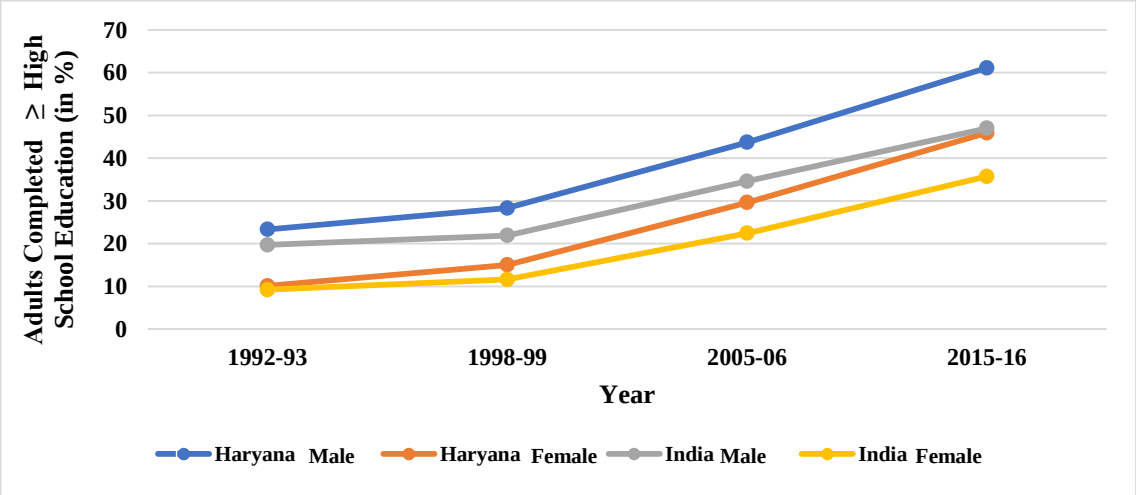
Figure: 4.1 Trends of Adult Illiteracy among Male and Female in Haryana and India 1992-2016



Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

Figure- 4.1 shows the trends of illiteracy among males and females in Haryana and India from 1992-2016. The illiteracy rate has continuously declined among males and females over the period and the female illiteracy rate is higher than the male illiteracy rate in Haryana as well as in India. The figure presents female average illiteracy in India is higher followed by female illiteracy in Haryana, male illiteracy in India, and male illiteracy in Haryana.

Figure: 4.2 Trends of Adult Higher Education Among Male and Female in Haryana and India 1992-2016



Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

Figure- 4.2 present the trends of adult higher education from 1992-2016 in Haryana and India. The level of adults higher education among males and females in Haryana as well as in India has increased over the period where the level of higher education among males in Haryana is higher than females in Haryana and males and females in India also.

In short, the status of education among males and females has improved at the state as well as the national level where the illiteracy rate has continuously declined and the level of higher education (high school and more than high school completed) has improved during 1992-2016. There are huge gender disparities among males and females at both levels but the education inequality in Haryana is higher than India.

4.2.2 Health Dimension

Infant mortality rate, child mortality rate, nutrition level of children, and other health indicators are the basic indicators of human development. This section presents the level of health deprivation in Haryana and India. The level of infant and child mortality rate (per 1000 live births) in Haryana and India is shown in following table:

Table: 4.3 Infant and Child Mortality Rate (per 1000 live births) in Haryana and India

Sr. No.	Year	Infant Mortality		Child Mortality	
		Haryana	India	Haryana	India
1.	1992-93	73.3	78.5	27.4	33.3
2.	1998-99	56.8	67.6	21.2	29.3
3.	2005-06	41.7	57	11.1	18.4
4.	2015-16	32.8	40.7	8.6	9.4

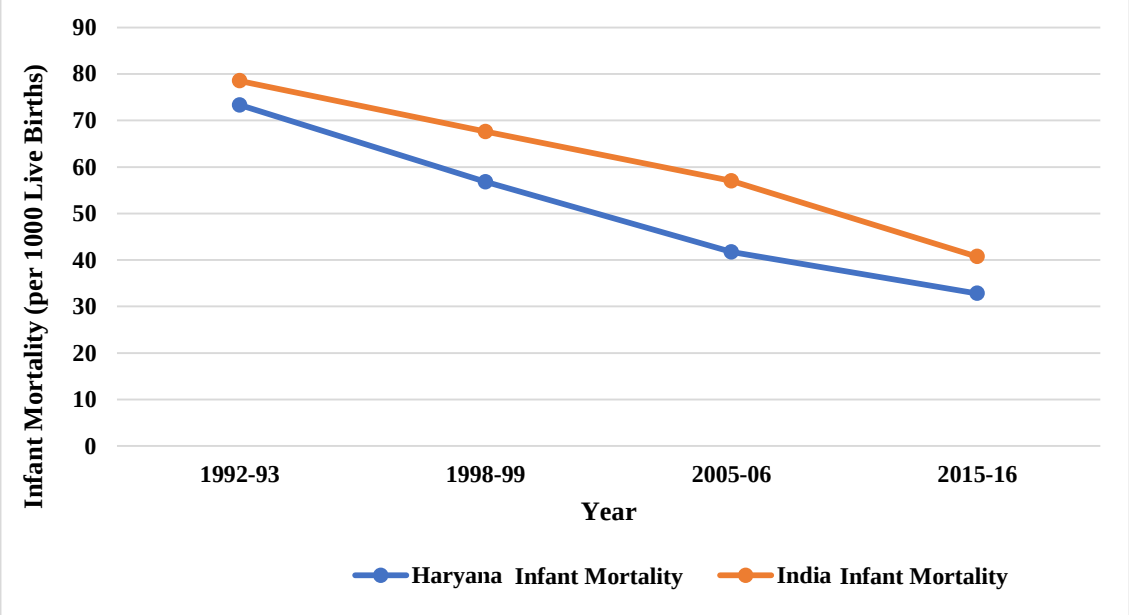
Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

Note: 1) children between 0-1 years are included in infant mortality.

2) children between age 1 years to 5 years are included in Child mortality.

Table- 4.3 divulges infant mortality and child mortality (per 1000 live births) in Haryana and India. In Haryana, infant mortality has declined from 73.3 in 1992-93 to 32.8 in 2015-16 and child mortality has declined from 27.4 in 1992-93 to 8.6 in 2015-16. In India also infant mortality and child mortality both has declined in the whole period where the infant mortality rate has declined 78.9 in 1992-93 to 40.7 in 2015-16 and child mortality has declined from 33.3 in 1992-93 to 9.4 in 2015-16. Infant mortality and child mortality show declining trends in Haryana as well as in India but the Infant mortality rate is still high at state as well as national level. Delivery at home and traditional birth practices are the major cause of infant mortality rate in India **(Haq, 2008)**. Delivery in hospitals is strongly associated with the education level of mothers so that female literacy is significantly related to infant mortality rate (**Gokhale et al., 2002)**.

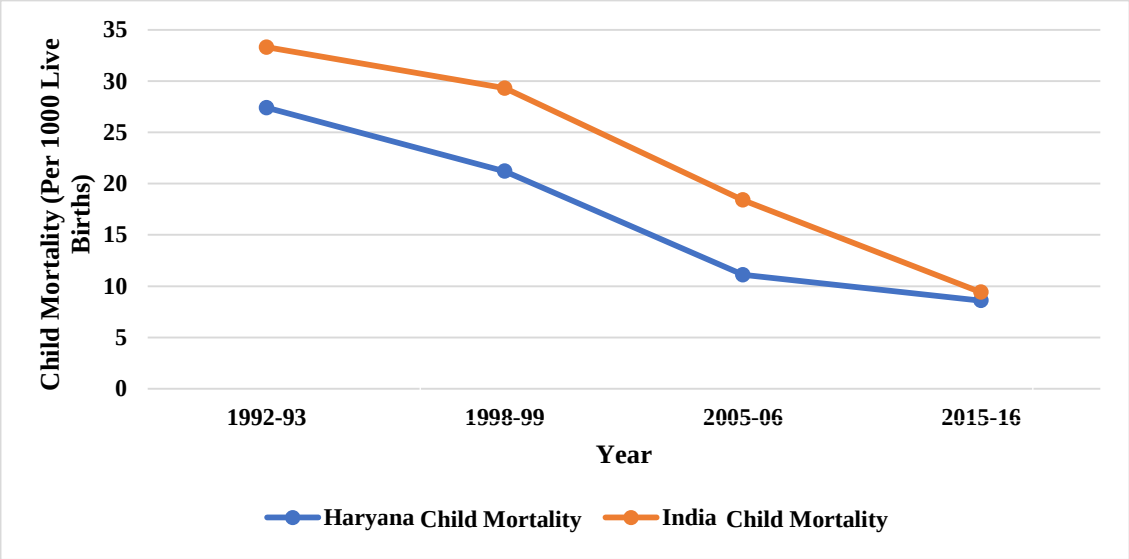
Figure: 4.3 Trends of Infant Mortality (per 1000 live births) in Haryana and India



Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

Figure-4.3 shows the declining trends of infant mortality in Haryana and India from 1992-2016 where infant mortality in India is higher than infant mortality in Haryana however level of infant mortality is still high at both level in 2015-16.

Figure: 4.4 Trends of Child Mortality (per 1000 live births) in Haryana and India



Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

Figure- 4.4 represents the trends of child mortality (per 1000 live births) in Haryana and India from 1992-2016. Like Infant mortality, child mortality also shows a declining trend in the whole period where child mortality rate at India level is more than at Haryana level but it is less than 10 (per 1000 live births) at both state as well at national level.

The status of child malnutrition (underweight, stunted and wasted) in Haryana and India during 1992-2016 shown in following table:

Table: 4.4 Child Malnutrition in Haryana and India 1992-2016 (in Percent)

Sr. No.	Year	Underweight		Stunted		Wasted	
		Haryana	India	Haryana	India	Haryana	India
1.	1992-93	37.9	53.4	46.7	52.0	5.9	17.5
2.	1998-99	34.6	47.0	50.0	45.5	5.3	15.5
3.	2005-06	39.6	42.5	45.7	48.0	19.1	19.8
4.	2015-16	29.4	35.7	34.0	38.4	21.2	21.0

Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

Note: 1) Children with -2 S.D. considered deprived in nutrition and children with -3 S.D. also included in it.

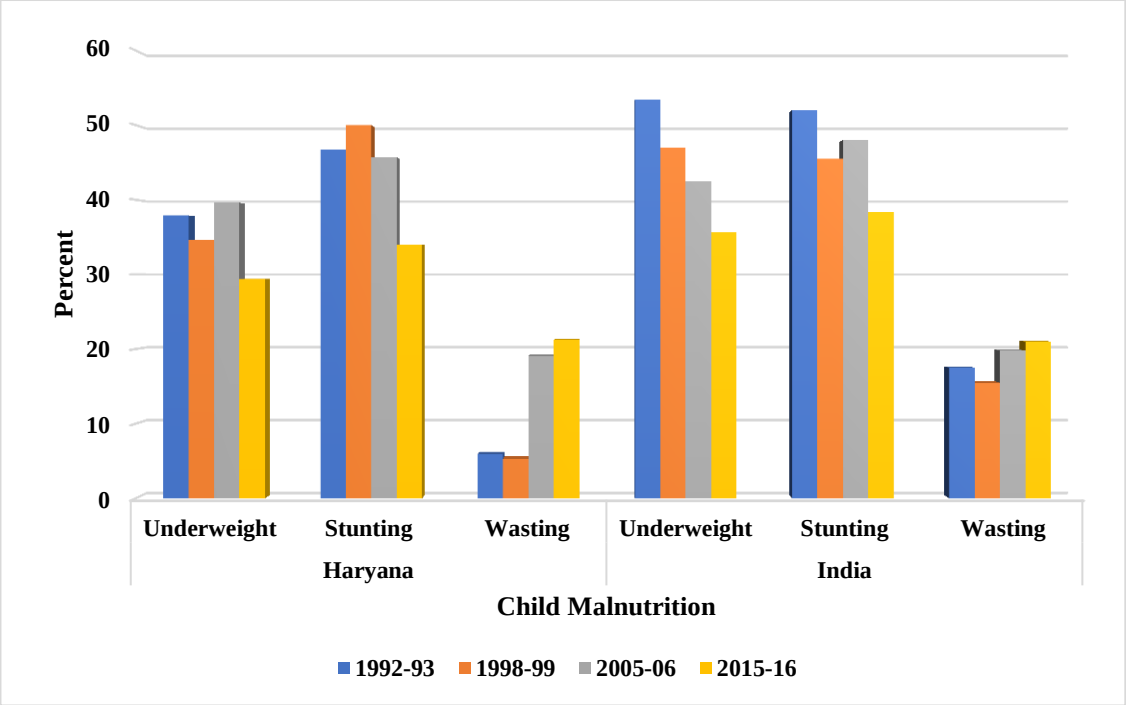
2) Underweight- weight for age, Stunted- height for age, and wasted- weight for height.

3) In 1992-93 children under age 4 years classify as malnourished.

4) In 1998-99 children under age 3 years classify as malnourished.

5) In 2005-06 and 2015-16 children under 5 years classify as malnourished.

Figure: 4.5 Child Malnutrition in Haryana and India



Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4

Table- 4.4 and Figure- 4.5 reveal the children health status based on their nutrition level during 1992-2016. **In Haryana** 37.9 percent of children were underweight, 46.7 percent were stunted, and wasted children were only 5.9 percent in 1992-93. The percentage of stunted children has declined over the period but is still significantly high, where children with underweight have also declined to 29.4 percent in 2015-16 but it shows fluctuations over the period. The percentage of wasted children has declined from 1992-93 to 1998-99 in Haryana but since then it has increased continuously which has increased to 21.2 percent in 2015-16.

In India, 53.4 percent of children were underweight, 52 percent were stunted and 17.5 percent were wasted in 1992-93 where the percentage of underweight children continuously decline over the period but the percentage of stunted children shows fluctuations over the period. In India, the percentage of wasted children has declined from 1992-93 to 1998-99 but since then it has grown steadily. In Haryana as well as in India percentage of underweight and stunted children has declined from 1992-2016 but is still high in 2015-16 where the percentage of wasted children performance has been the worst as it has increased instead of decreasing at both levels. Haryana's child health deprivation in the case of underweight and stunted children is low as compared to India and almost similar in the case of the percentage of wasted children at the national level. These results are similar to the results of a study conducted by **Aguayo et al. (2014)** that revealed that the level of undernutrition is high in Haryana and the state is one among the top four states with rank four in India which has a high value of Child Underweight Index (CUI). Further child malnutrition is highly associated with the mother's chronic energy deficiency **(Radhakrishna and Ravi, 2004)**.

It is summarised that infant mortality and the child mortality rate have declined at state as well as at the national level from 1992-2016 but the infant mortality rate is still high at both levels. On the other hand, the child malnutrition rate is slightly lower in the state as compared to the national level but still, it is a matter of concern in the state where nearly 30 percent of children (0-5 age group) are underweight, 34 percent of children are stunted, and 21.2 percent of children are wasted in 2015-16. Hence, there is a need to be more focused on children health at both levels.

4.2.3 Standard of living Dimension

Standard of living is one of the important determinants of human wellbeing. This section presents the level of deprivation in the standard of living dimension on the basis of electricity, drinking water, toilet facilities, cooking fuel, and pucca house indicators. The level of deprivation in the standard of living dimension at state as well as national level during 1992-2016 is shown by the following table:

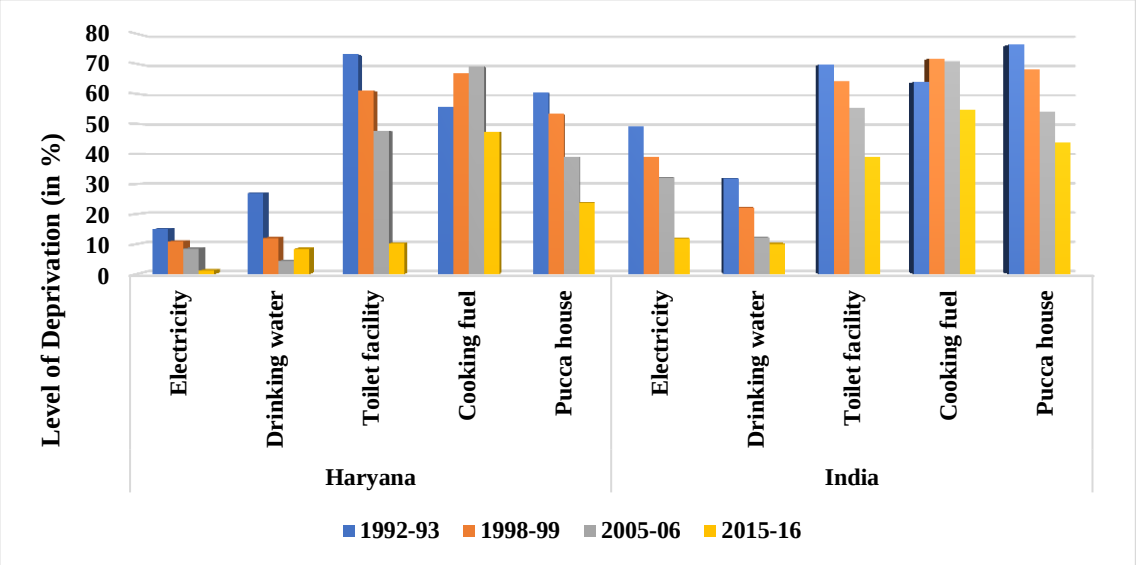
Table: 4.5 Households Deprivation in Standard of living Indicators in Haryana and India 1992-2016 (in Percent)

Sr. no.	Indicators	1992-93		1998-99		2005-06		2015-16	
		Haryana	India	Haryana	India	Haryana	India	Haryana	India
1.	Electricity	15.0	49.1	10.9	39.1	8.5	32.1	1.2	11.8
2.	Drinking water	27.0	31.8	12.0	22.1	4.4	12.1	8.4	10.1
3.	Toilet facility	73.1	69.7	61.0	64.1	47.6	55.4	10.2	38.9
4.	Cooking fuel	55.6	63.9	66.9	71.7	69.1	70.8	47.4	54.7
5.	Pucca house	60.4	76.3	53.3	68.0	38.9	54.1	23.7	43.7

Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4.

Note: Table- 4.5 is derived from A-2 in appendix.

Figure: 4.6 Households Deprivation in Standard of living Indicators in Haryana and India



Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4.

The standard of living dimensions shows a better position of Haryana as compared to India which is in lives with its economic growth in the last three decades. **Table- 4.5, and Figure- 4.6** present the level of deprivation in the standard of living indicators as electricity, drinking water, toilet facilities, cooking fuel, pucca houses in Haryana and India from 1992-2018. **However in Haryana** toilet facility (73.1 percent) is the less accessible indicator among all the standard of living indicators followed by the pucca

house (60.4 percent), cooking fuel (55.6 percent), drinking water (27 percent), and electricity (15 percent) in 1992-93. Level of deprivation (from 1992-93 to 2015-2016) in all the indicators has declined and cooking fuel indicator is most deprived among all the standard of living indicators (where about half of the population used dung cake, agriculture crop waste, straw/shrubs/grass, coal/lignite, and charcoal for cooking purposes), followed by pucca houses (23.7 percent households living in Kuccha or semi pucca houses), toilet facility (10.2 percent households are without any kind of toilet facilities), and drinking water (8.4 percent households used drinking water without improved sources), and electricity is a less deprived indicator (1.2 percent) in 2015-16 in Haryana. **In India** pucca house is the most deprived indicator (76.3 percent), followed by toilet facility (69.7 percent), cooking fuel (63.9 percent), electricity (49.1 percent), and drinking water (31.8 percent) in 1992-93. The level of deprivation in India also declined like Haryana from 1992-93 to 2015-16 but the level of deprivation among all the indicators at the national level is higher as compared to Haryana in 2015-16 and deprivation in cooking fuel, pucca houses, and toilet facility are serious problem among households at both levels.

In short, the level of deprivation in all the standard of living indicators (electricity, drinking water, toilet facilities, cooking fuel, and pucca houses) has continuously declined at state as well as national level during 1992-2016 but the deprivation rate in cooking fuel, pucca houses, and drinking water has less degree of decline and still have a high rate in 2015-16.

4.2.4 Income Poverty

The official poverty line in India has changed from time to time as per various expert group's recommendations. The result of poverty estimates at the state as well as at the national level from 1973-74 to 2011-12 are presented in the table- 4.7 are based on various poverty thresholds which are shown in table- 4.6. The poverty results from 1973-74 to 1993-94 are based on the poverty line recommended by the Lakdawala committee, poverty estimates for the year 2004-05 and 2009-10 are based on Tendulkar committee recommended poverty line, and income poverty result for the year 2011-12 are based on Rangarajan committee poverty line. As per recommendations of various committees, the poverty line from 1973-74 to 2011-12 is shown in the following table:

Table- 4.6 Income Poverty Line in terms of Per Month Per Capita Income (in Rs.)

Sr. No.	Name of expert group	Year	Haryana		India	
			Rural	**Urban**	**Rural**	**Urban**
1	**Lakdawala Committee**	1973-74	49.95	52.42	49.63	56.76
		1977-78	59.37	66.94	56.84	70.33
		1983-84	88.57	103.48	89.50	115.65
		1987-88	122.90	143.22	115.20	162.16
		1993-94	233.79	258.23	205.84	281.35
2	**Tendulkar Committee**	2004-05	529	625	447	579
		2009-10	792	975	673	860
3	**Rangarajan Committee**	2011-12	1127.82	1528.31	972	1407

Source: Planning Commission, Government of India

The results of income poverty estimates at state as well as at national level during 1973-74 to 2011-12 are based on above nutritional criterion definitions presented in table-4.7

Table: 4.7 Population with Income Poverty (Below Poverty Line) in Haryana and India 1973-2012 (in Percent)

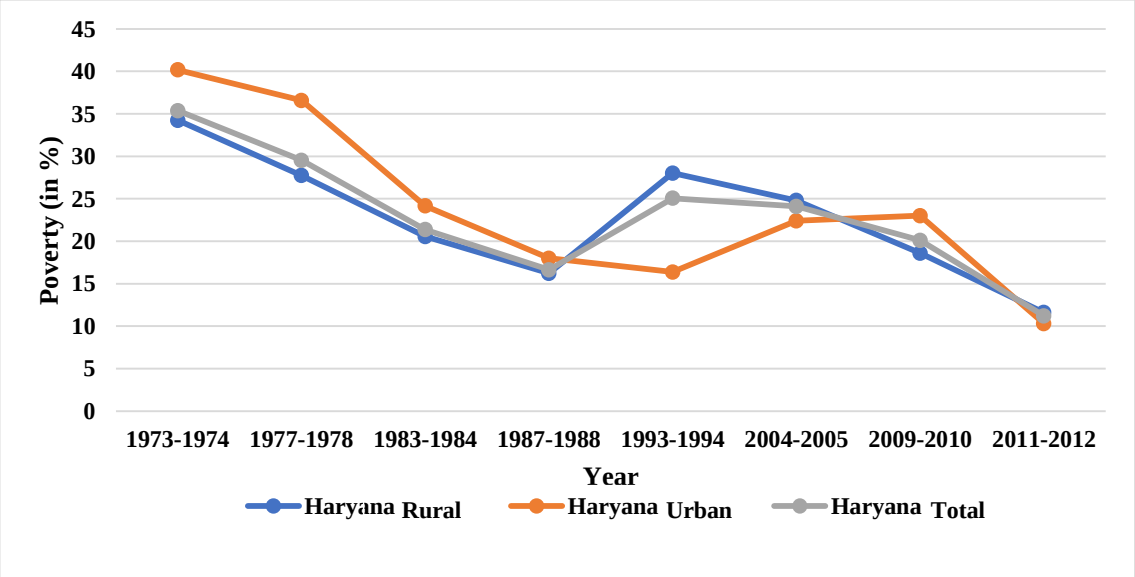
Sr. no.	Year	Rural		Urban		Total	
		Haryana	**India**	**Haryana**	**India**	**Haryana**	**India**
1.	1973-1974	34.23	56.44	40.18	49.01	35.36	54.88
2.	1977-1978	27.73	53.07	36.57	45.24	29.52	51.32
3.	1983-1984	20.56	45.65	24.15	40.79	21.37	44.48
4.	1987-1988	16.22	39.09	17.99	38.20	16.64	38.86
5.	1993-1994	28.02	37.27	16.38	32.36	25.05	35.97
6.	2004-2005	24.8	41.8	22.4	25.7	24.1	37.2
7.	2009-2010	18.6	33.8	23.0	20.9	20.1	29.9
8.	2011-2012	11.6	25.7	10.3	13.7	11.2	21.9

Source: Planning commission, Government of India

Table- 4.7 shows the proportion of below the poverty line population in Haryana and India during the 1973-2012 period. **In Haryana**, income poverty is 35.36 percent in 1973-74 which comprised 34.23 percent of rural poverty and 40.18 percent of urban poor. Poverty shows declining trends at state as well as at the national level during 1973-2012. Initially, the level of poverty is declined in Haryana from 1973-74 to 1987-

88 but it increased from 16.64 percent in 1987-88 to 25.05 percent in 1993-94 but since then it has been decreasing continuously till 2011-12 where the same pattern has been observed in the rural area whereas urban poverty rate has continuously decreased from 1973-74 to 1993-94 but increased from 1993-94 to 2005-06 and again from 2005-06 to 2009-10 which again decreased to 11.3 percent in 2011-12. **At India** level of income poverty is 54.88 percent that comprised 56.44 percent of rural poverty and 49.01 percent of urban poverty in 1973-74 where the poverty ratio is declined from 1973-74 to 1993-94 but it increased from 35.97 percent in 1993-94 to 37.2 percent in 2004-05 because of methodological change but from 2004-05 to 2011-12 it has been decreasing continuously where rural poverty follows the same pattern as total but urban poverty has steadily decreased over the period. In Haryana, the rural poverty rate is less than the urban poverty ratio in most of the years and the state also shows less poverty ratio in terms of income as compared to India. The level of income poverty in Haryana in 2011-12 is only 11.2 percent that comprised 11.6 percent of rural poverty and 10.3 percent of urban poverty whereas the Indian poverty rate is more than double of Haryana poverty in rural as well as urban areas. Similar results are reported by **Khan et al. (2014)** and the study presented that Haryana is one of the states which has a low incidence of income poverty.

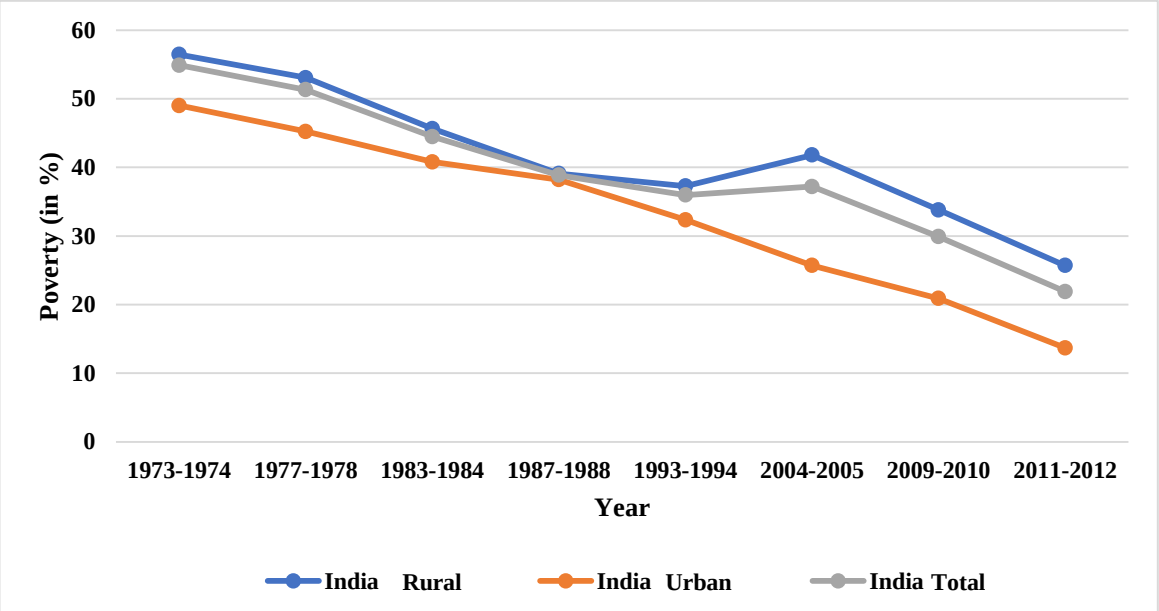
Figure: 4.7 Trends of Income Poverty in Haryana 1973-2012



Source: Planning commission, Government of India

Figure-4.7 shows the trends of income poverty in Haryana 1973-2012. Urban poverty in Haryana is more than rural poverty from 1973-74 to 87-88 but in 1987-88 this comes down to rural poverty which remained less till 2004-05. But then again increase in 2004-05, more than rural poverty and remained more till 2009-10 and after that, in 2011 it decreased slightly.

Figure: 4.8 Trends of Income Poverty in India 1973-2012



Source: Planning commission, Government of India

Figure- 4.8 present the trends of income poverty in India where the rural poverty rate has always been more than the urban poverty rate from 1973-74 to 2011-12. In both Haryana and India, from 1973-74 to 2011-12, there has been a fluctuation in the poverty rate but over the years the poverty rate has declined considerably.

In short, the level of poverty shows declining trends at state as well as at national level during 1973-2012. Initially the poverty rate is declined in Haryana from 1973-74 to 1987-88 but increased from 1987-88 to 1993-94 but since then it has been decreasing continuously till 2011-12. At the national level, the poverty rate has declined from 1973-74 to 1993-94 but it has increased from 1993-94 to 2004-05 due to methodological changes in 2004-05 but after 2004-05 to till 2011-12 the poverty rate has continuously declined.

4.3 Socio-Economic Conditions and Income Poverty at District Level in Haryana

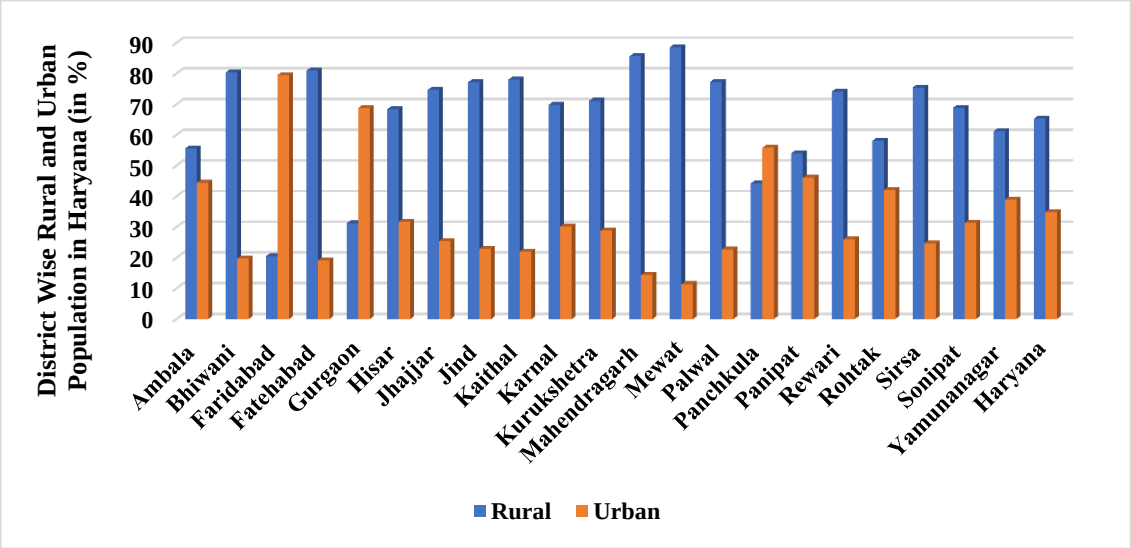
This section presents the socio-economic conditions of Haryana at the district level where this section has been divided into four sub sections. First, sub- sections presents the level of deprivation in education, second section shows health deprivation, third section present the level of deprivation in standard of living dimension, and fourth section shows the level of income poverty in various districts of Haryana. The percentage of rural urban population in various districts of Haryana is shown in following table:

Table- 4.8 Rural and Urban Population in Various Districts of Haryana in 2011 (in percent)

Sr. no.	Districts	Rural	Urban
1.	Ambala	55.6	44.4
2.	Bhiwani	80.3	19.7
3.	Faridabad	20.5	79.5
4.	Fatehabad	80.9	19.1
5.	Gurgaon	31.2	68.8
6.	Hisar	68.3	31.7
7.	Jhajjar	74.6	25.4
8.	Jind	77.1	22.9
9.	Kaithal	78	22
10.	Karnal	69.8	30.2
11.	Kurukshetra	71.1	28.9
12.	Mahendragarh	85.6	14.4
13.	Mewat	88.6	11.4
14.	Palwal	77.3	22.7
15.	Panchkula	44.2	55.8
16.	Panipat	54	46
17.	Rewari	74.1	25.9
18.	Rohtak	58	42
19.	Sirsa	75.4	24.6
20.	Sonipat	68.8	31.3
21.	Yamuna Nagar	61.1	38.9
22.	Haryana	65.2	34.8

Source: Director of census operation, Haryana

Figure- 4.9 District Wise Rural and Urban Population in Haryana in 2011

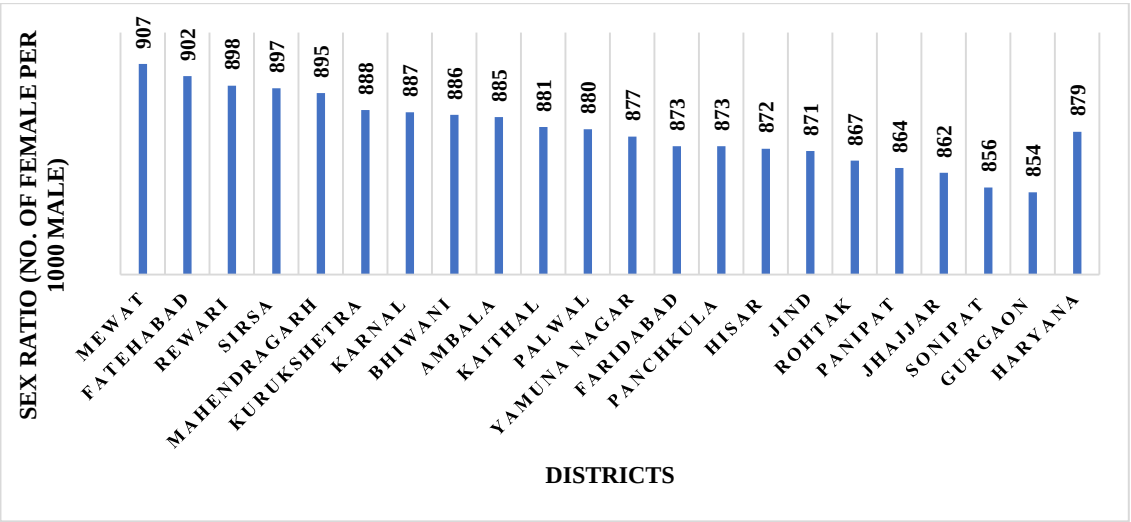


Source: Director of census operation, Haryana

Table- 4.8 and Figure- 4.9 represent the percentage of the population in rural and urban areas in Haryana in 2011. The result reveals that in all the districts of Haryana majority of the population living in rural areas except the Faridabad, Gurugram, and Panchkula districts where the urban population is greater than the rural population. In Mewat, Mahendragarh, Fatehabad, and Bhiwani districts more than 80 percent population is living in rural areas.

The value of sex ratio among various districts of Haryana is shown in following figure:

Figure- 4.10 District Wise Sex Ratio in Haryana in 2011 (no. of female per 1000 male)



Source: Census of India, 2011.

Figure- 4.10 shows the district-wise sex ratio in Haryana in 2011. The result shows that the sex ratio in the state is 879 in which Mewat District has a high sex ratio among all the districts that is 907 followed by Fatehabad (902), Rewari (898), Sirsa (897), Mahendragarh (895), Kurukshetra (888), Karnal (887), Bhiwani (886), Ambala (885), Kaithal (881), Palwal (880), Yamuna Nagar (877), Faridabad (873), Panchkula (873), Hisar (872), Jind (871), Rohtak (867), Panipat (864), Jhajjar (862), Sonipat (856), and Gurugram (854). Gurugram and Sonipat districts have lowest sex ratio among all the districts. In majority of districts sex ratio is less than 900 that presents gender disparities and male child performance in the state.

4.3.1 Education Deprivation

This section presents the status of education among males and females in rural as well as urban areas in various districts of Haryana. The literacy rate among males and females in various districts of Haryana is presented in following table- 4.9

Table: 4.9 Literacy Rate Among Male and Female in Various Districts of Haryana in 2015-16

Sr. no.	District	Literacy Rates (in percent)					
		Male			Female		
		Rural	Urban	Total	Rural	Urban	Total
1.	Ambala	96.0	97.3	96.5	85.5	94.9	90.0
2.	Bhiwani	86.0	NA	87.3	75.1	NA	76.2
3.	Faridabad	NA	96.4	96.3	NA	76.6	74.2
4.	Fatehabad	90.9	NA	87.3	69.2	NA	71.8
5.	Gurgaon	97.1	88.8	90.9	79.2	73.1	74.6
6.	Hisar	83.6	100	89.4	67.7	84.9	73.3
7.	Jhajjar	96.3	NA	94.8	81.9	NA	82.5
8.	Jind	87.5	NA	89.5	74.9	NA	77.2
9.	Kaithal	82.4	NA	84.9	70.6	NA	73.1
10.	Karnal	84.0	93.8	86.5	74.4	87.3	78.4
11.	Kurukshetra	92.4	NA	92.0	79.0	NA	80.4
12.	Mahendragarh	96.2	NA	93.3	77.1	NA	79.0
13.	Mewat	78.3	NA	78.0	33.3	NA	35.6
14.	Palwal	89.6	NA	92.2	54.1	NA	59.8
15.	Panchkula	98.8	93.7	95.9	79.0	89.8	85.7
16.	Panipat	95.1	90.3	93.0	79.5	77.8	78.6
17.	Rewari	97.8	NA	97.9	77.9	NA	77.6
18.	Rohtak	89.7	88.1	89.0	76.5	80.2	78.0
19.	Sirsa	75.0	NA	79.0	65.2	NA	70.3
20.	Sonipat	90.4	96.7	92.5	80.8	84.5	82.1
21.	Yamuna Nagar	91.6	100	94.7	80.9	89.4	84.3
22.	Haryana	88.9	93	90.6	72.1	80.3	75.4

Source: National Family Health Survey -4

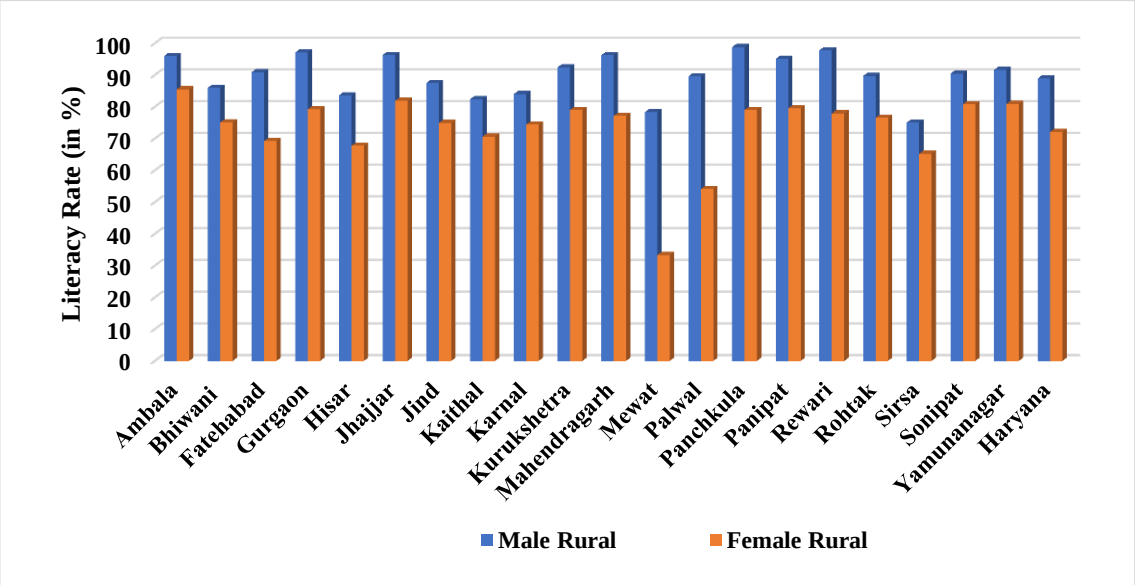
Table- 4.9 present the district-wise literacy among males and females in Haryana in 2015-16. **In rural Haryana**, the male literacy rate is 88.9 in which male literacy in rural Panchkula is the highest (98.8 percent) among all the districts followed by Rewari (97.8 percent), Gurgaon (97.1 percent), Jhajjar (96.3 percent), Mahendragarh (96.2 percent), Panipat (95.1 percent), Kurukshetra (92.4 percent), Ambala (92 percent), Yamuna Nagar (91.6 percent), Fatehabad (90.9 percent), Sonipat (90.4 percent), Rohtak (89.7 percent), Palwal (89.6 percent), Jind (87.5 percent), Bhiwani (86 percent), Karnal (84 percent), Hisar (83.6 percent), Kaithal (82.4 percent), Mewat (78.3 percent), Sirsa (75 percent). The female literacy rate in rural Haryana is 72.1 percent where Ambala district has the highest female literacy in rural areas that is 85,5 percent followed by Jhajjar (81.9 percent), Yamuna Nagar (80.9 percent), Sonipat (80.8 percent), Panipat (79.5 percent), Gurgaon (79.2 percent), Panchkula (79 percent), Kurukshetra (79 percent), Rewari (77.9 percent), Mahendragarh (77.1 percent), Rohtak (76.5 percent), Bhiwani (75.1 percent), Jind (74.9 percent), Karnal (74.4 percent), Kaithal (70.6 percent), Fatehabad (69.2 percent), Hisar (67.7 percent), Sirsa (65.2 percent), Palwal (54.1 percent), and Mewat (33.3 percent).

In the case of Urban literacy, 93 percent of the male are literate in Haryana in which Hisar and Yamuna Nagar have the highest male literacy rate that is 100 percent followed by Ambala (97.3 percent), Sonipat (96.7 percent), Faridabad (96.4 percent), Karnal (93.8 percent), Panchkula (93.7 percent), Panipat (90.3 percent), Gurgaon (88.8 percent), Rohtak (88.1 percent). The female literacy rate in urban Haryana is 80.3 percent wherein female literacy in Ambala district is highest among all the districts followed by Panchkula (89.8 percent), Yamuna Nagar (89.4 percent), Sonipat (84.5 percent), Karnal (87.3 percent), Hisar (84.9 percent), Rohtak (80.2 percent), Panipat (77.8 percent), Faridabad (76.6 percent), and Gurgaon (73.1 percent).

In total, the Male literacy rate in Haryana is 90.6 percent and the female literacy rate is 75.4 percent in which male literacy rate is highest in Rewari (97.9 percent) and lowest in Mewat (78 percent) district whereas the female literacy rate is the highest in Ambala (90 percent) and lowest in Mewat that is only 35.6 percent. Table- 3.7 shows huge gender and regional disparities within the state (disparities based on rural and urban areas, and differences between districts) based on education. The level of deprivation based on adult literacy is highest in females as compared to male deprivation in rural as

well as urban areas in which rural population is more deprived than urban population and some districts are highly deprived whereas others are less deprived in Haryana.

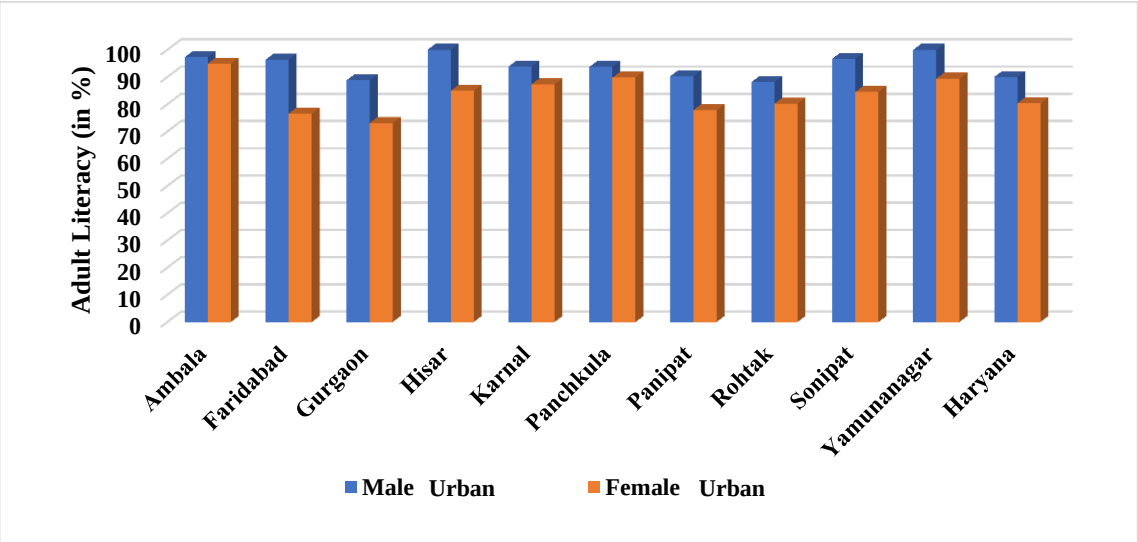
Figure: 4.11 District Wise Adult Literacy in Rural Haryana in 2015-16



Source: National Family Health Survey -4

Figure-4.11 shows the literacy rate among males and females in rural Haryana where male literacy is highest in Panchkula and lowest in Sirsa whereas the female literacy rate is highest in Ambala and lowest in Mewat that is only 33.3 percent. The level of literacy rate among females is less than male literacy in all the districts of Haryana.

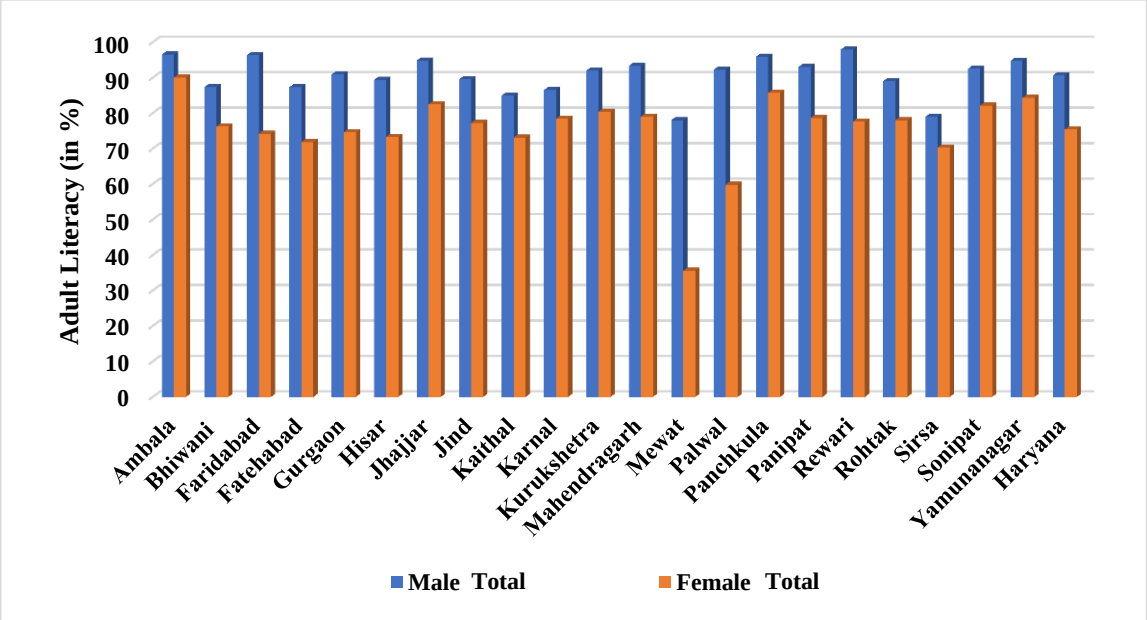
Figure: 4.12 District Wise Adult Literacy in Urban Haryana in 2015-16



Source: National Family Health Survey -4

Figure- 4.12 present the literacy rate among males and females in urban Haryana in which male literacy is highest in Yamuna Nagar and Hisar districts that are 100 percent, male literacy in Rohtak district is low compared to other districts whereas in case of female, Ambala district has the highest literacy and Gurgaon district has lowest literacy rates.

Figure: 4.13 District Wise Adult Literacy in Haryana (Rural + Urban) in 2015-16



Source: National Family Health Survey -4

Figure- 4.13 reveal male and female literacy rate as total (rural + urban) in Haryana where the male literacy rate is highest in Rewari and lowest in Mewat, and the female literacy rate is low as compared to the male literacy rate.

In short, Mewat is the most deprived district in case of adult education attainment indicator where literacy rate among males as well as females is very low as compared to other districts of Haryana whereas male literacy rate is highest in Rewari (97.9 percent) and female literacy rate is highest in Ambala (90 percent).

4.3.2 Health Deprivation

This section shows the status of children health in Haryana in 2015-16. The percentage of underweight, stunted, and wasted children (0-5 age group) in various districts of Haryana is shown in the following table:

Table: 4.10 District Wise Child Malnutrition in Haryana (in Percent) in 2015-16

Sr. no.	Districts	Child Health								
		Rural			Urban			Total		
		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
1.	Ambala	29.9	24.5	26.2	37.4	13.1	54.8	32.9	19.8	37.9
2.	Bhiwani	27.3	36.8	16.1	NA	NA	NA	26.9	35.1	15.7
3.	Faridabad	NA	NA	NA	20.9	28.0	19.5	20.5	29.7	19.7
4.	Fatehabad	32.2	30.1	18.2	NA	NA	NA	30.0	28.5	20.7
5.	Gurgaon	27.1	28.5	24.0	31.5	44.3	16.3	30.6	41.2	17.9
6.	Hisar	22.9	25.5	24.5	25.6	25.9	20.5	23.5	25.6	23.5
7.	Jhajjar	17.0	19.0	12.0	NA	NA	NA	21.0	22.3	15.5
8.	Jind	30.2	27.2	29.5	NA	NA	NA	29.3	26.0	26.7
9.	Kaithal	39.3	35.8	23.9	NA	NA	NA	37.5	33.6	23.8
10.	Karnal	35.3	43.5	22.2	25.1	34.6	13.5	32.5	41.0	19.8
11.	Kurukshetra	25.4	32.4	22.0	NA	NA	NA	27.1	31.9	24.1
12.	Mahendragarh	25.8	24.7	18.9	NA	NA	NA	26.1	23.5	19.2
13.	Mewat	40.8	52.9	17.1	NA	NA	NA	40.2	52.2	17.2
14.	Palwal	28.1	37.6	21.2	NA	NA	NA	27.5	34.0	21.4
15.	Panchkula	29.7	26.1	35.5	23.7	18.2	29.1	26.2	21.5	31.8
16.	Panipat	39.3	40.1	31.9	42.3	48.7	18.6	40.8	44.6	25.1
17.	Rewari	21.5	28.3	17.4	NA	NA	NA	23.0	27.8	18.3
18.	Rohtak	25.9	35.5	12.9	24.1	38.4	14.9	25.2	36.6	13.6
19.	Sirsa	30.9	34.5	24.4	NA	NA	NA	30.1	34.2	22.5
20.	Sonipat	29.1	34.6	22.1	33.2	52.5	20.6	30.4	40.2	21.6
21.	Yamuna Nagar	30.0	27.4	21.7	34.9	34.4	35.4	31.8	30.0	26.8
22.	Haryana	29.9	28.5	24.4	34.3	33.4	34	29.4	34	21.2

Source: National Family Health Survey -4

Note: (1)- Underweight, (2)- Stunted, (3)- Wasted.

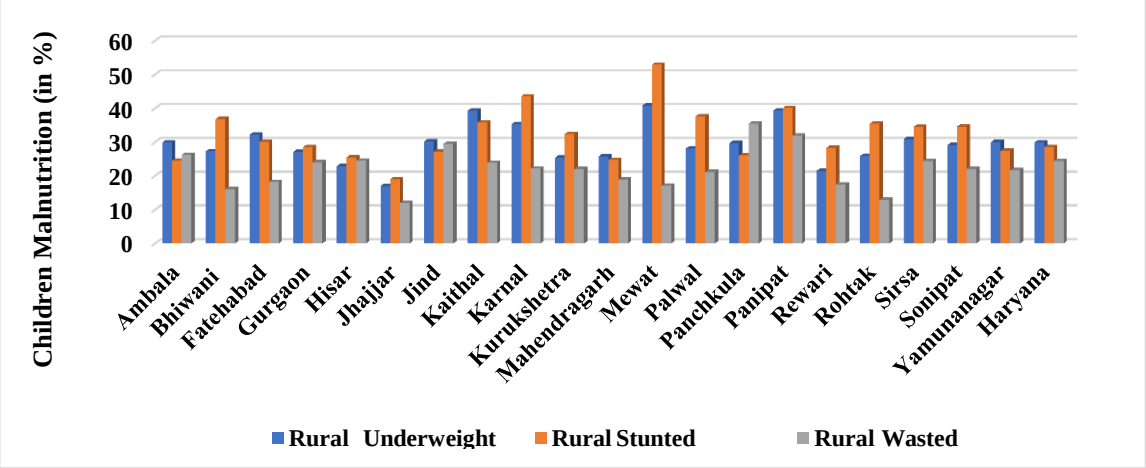
Table- 4.10 shows the district-wise child health status in Haryana in 2015-16. **In rural Haryana**, 29.9 percent of children are underweight where Mewat has a high percentage of underweight children (40.8 percent), and Jhajjar district has a lowest percentage of underweight children. In rural Haryana percentage of children with underweight are higher than the percentage of stunted and wasted children but about in 60 percent of districts (Bhiwani, Gurgaon, Hisar, Jhajjar, Karnal, Mewat, Palwal, Panipat, Rewari, Rohtak, Sirsa, Sonipat, and Yamuna Nagar), stunted children are more than

underweight and wasted children whereas in remaining 40 percent of districts percentage of underweight children are high. **In the case of urban Haryana**, 34.3 percent of children were underweight, 33.4 percent are stunted, and 34 percent were wasted in which Panipat district has highest number of underweight children and Faridabad district has the lowest percentage of underweight children among all the districts, where the percentage of stunted children are highest in Sonipat district and lowest in Ambala district, further the percentage of wasted children are highest in Ambala and lowest in Karnal district.

In total, Underweight children are highest in Panipat district (40.8 percent) followed by Mewat (40.2 percent), Kaithal (37.5 percent), Ambala (32.9 percent), Karnal (32.5 percent), Yamuna Nagar (31.8 percent), Gurugram (30.6 percent), Sonipat (30.4 percent), Sirsa (30.1 percent), Fatehabad (30 percent), Jind (29.3 percent), Palwal (27.5 percent), Kurukshetra (27.1 percent), Bhiwani (26.9 percent), Panchkula (26.2 percent), Mahendragarh (26.1 percent), Rohtak (25.2 percent), Hisar (23.5 percent), Rewari (23 percent), Jhajjar (21 percent), and Faridabad (20.5 percent). Ambala district has a high percentage of wasted children (37.9 percent), followed by Panchkula (31.8 percent), Yamuna Nagar (26.8 percent), Jind (26.7 percent), Panipat (25.1 percent), Kurukshetra (24.1 percent), Kaithal (23.8 percent), Hisar (23.5 percent), Sirsa (22.5 percent), Sonipat (21.6 percent), Palwal (21.4 percent), Fatehabad (20.7 percent), Karnal (19.8 percent), Faridabad (19.7 percent), Mahendragarh (19.2 percent), Rewari (18.3 percent), Gurugram (17.9 percent), Mewat (17.2 percent), Bhiwani (15.7 percent), Jhajjar (15.5 percent), and Rohtak (13.6 percent). In case of stunted, Ambala district shows a poor performance where nearly 38 percent of children are wasted and Rohtak district shows best performance among all the districts.

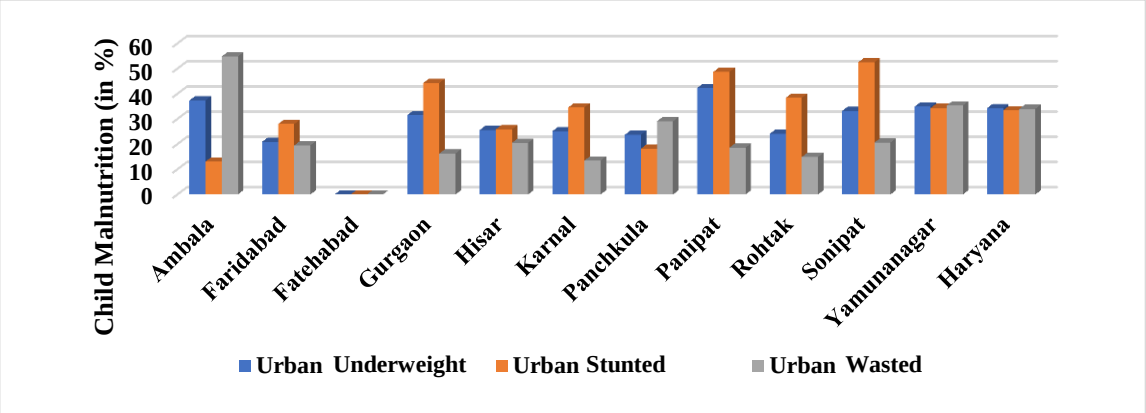
This table present the weak performance of child health in terms of nutrition wherein urban deprivation is more than rural deprivation among children and percentage of underweight children are slightly higher than the percentage of stunted children, and the percentage of stunted children are slightly higher than the percentage of wasted children in rural as well in urban Haryana. These results are in lines with the results of **Bhalla (1995)** that Haryana shows poor performance in the quality of life indicators such as health and sex ratio.

Figure: 4.14 District Wise Child Malnutrition in Rural Haryana in 2015-16



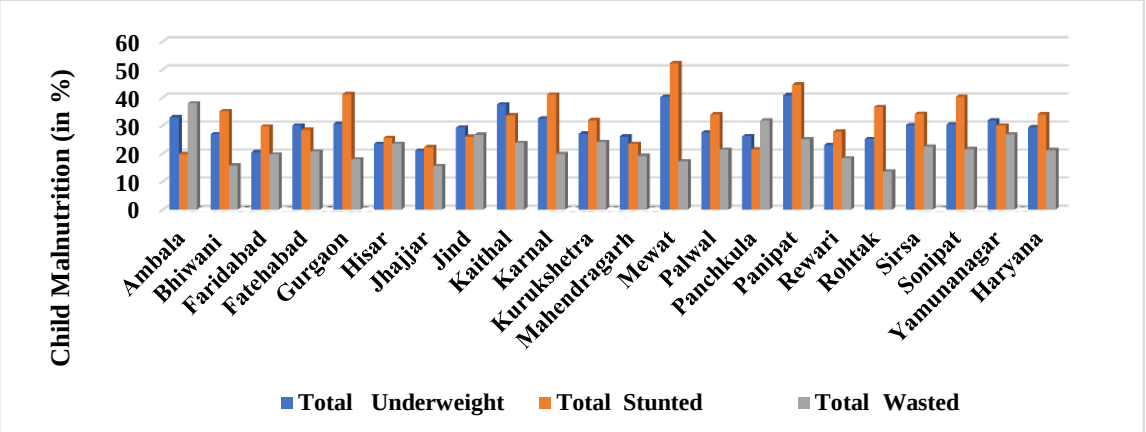
Source: National Family Health Survey -4

Figure: 4.15 District Wise Child Malnutrition in Urban Haryana in 2015-16



Source: National Family Health Survey -4

Figure: 4.16 District Wise Child Malnutrition in Haryana (Rural + Urban) in 2015-16



Source: National Family Health Survey -4

Figure- 4.14, figure- 4.15, and figure- 4.16 present the district-wise child health in rural Haryana, urban Haryana, and total (rural + urban) respectively. The level of malnutrition in rural as well as in Haryana is high which indicates that the level of health deprivation among children in Haryana is high.

Table: 4.11 District wise Adults Malnutrition in Haryana (in Percent) in 2015-16

Sr. no.	Districts	Malnutrition among Adults					
		Male			Female		
		Rural	Urban	Total	Rural	Urban	Total
1.	Ambala	16.7	4.0	11.4	13.5	8.3	11.1
2.	Bhiwani	21.0	NA	19.8	23.4	NA	21.4
3.	Faridabad	NA	10.8	10.7	NA	13.2	14.4
4.	Fatehabad	14.6	NA	13.2	23.5	NA	22.2
5.	Gurgaon	11.1	5.8	7.1	17.1	11.0	12.5
6.	Hisar	11.1	7.6	9.9	17.2	10.4	14.9
7.	Jhajjar	11.0	NA	12.1	12.2	NA	12.4
8.	Jind	12.1	NA	11.0	17.3	NA	17.0
9.	Kaithal	17.7	NA	16.1	16.4	NA	15.3
10.	Karnal	7.3	3.7	6.4	15.1	7.9	12.9
11.	Kurukshetra	4.5	NA	3.9	10.7	NA	9.2
12.	Mahendragarh	18.0	NA	14.7	20.1	NA	19.2
13.	Mewat	30.2	NA	30.4	26.9	NA	27.1
14.	Palwal	13.8	NA	12.2	17.8	NA	16.9
15.	Panchkula	10.6	4.6	7.2	11.7	3.9	6.8
16.	Panipat	1.3	10.6	5.5	11.8	9.1	10.4
17.	Rewari	17.6	NA	14.4	22.6	NA	21.4
18.	Rohtak	8.7	13.3	10.7	17.9	13.6	16.1
19.	Sirsa	15.2	NA	10.9	23.2	NA	20.6
20.	Sonipat	4.3	4.4	4.3	13.7	15.1	14.1
21.	Yamuna Nagar	9.0	1.2	6.1	19.3	11.3	16.2
22.	Haryana	12.9	9.0	11.3	18.2	12.2	15.8

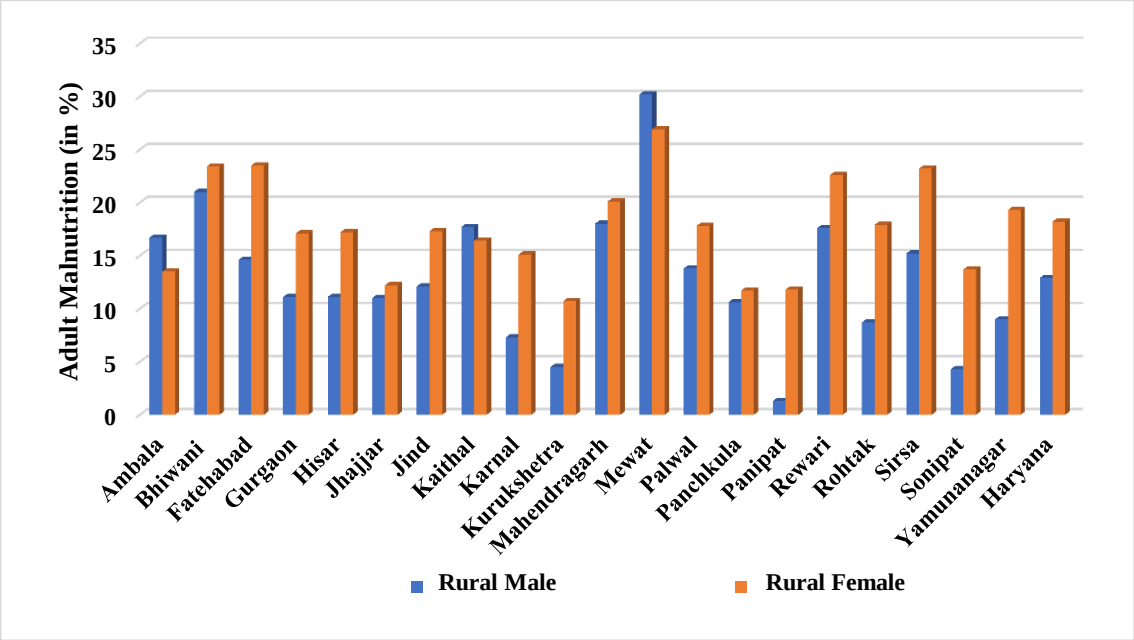
Source: National Family Health Survey -4

Table- 4.11 reveals that 11.3 percent of the adult male are malnourished in Haryana that comprised 12.9 percent of rural males and 9 percent of urban males where Mewat district has the highest percentage of adult malnutrition followed by Bhiwani (19.8 percent), Kaithal (16.1 percent), Mahendragarh (14.7 percent), Rewari (14.4 percent),

Fatehabad (13.2 percent), Palwal (12.2 percent), Jhajjar (12.1 percent), Ambala (11.4 percent), Jind (11 percent), Sirsa (10.9 percent), Faridabad (10.7 percent), Rohtak (10.7 percent), Hisar (9.9 percent), Panchkula (7.2 percent), Gurgaon (7.1 percent), Karnal (6.4 percent), Yamuna Nagar (6.1 percent), Panipat (5.5 percent), Sonipat (4.3 percent), and Kurukshetra (3.9 percent).

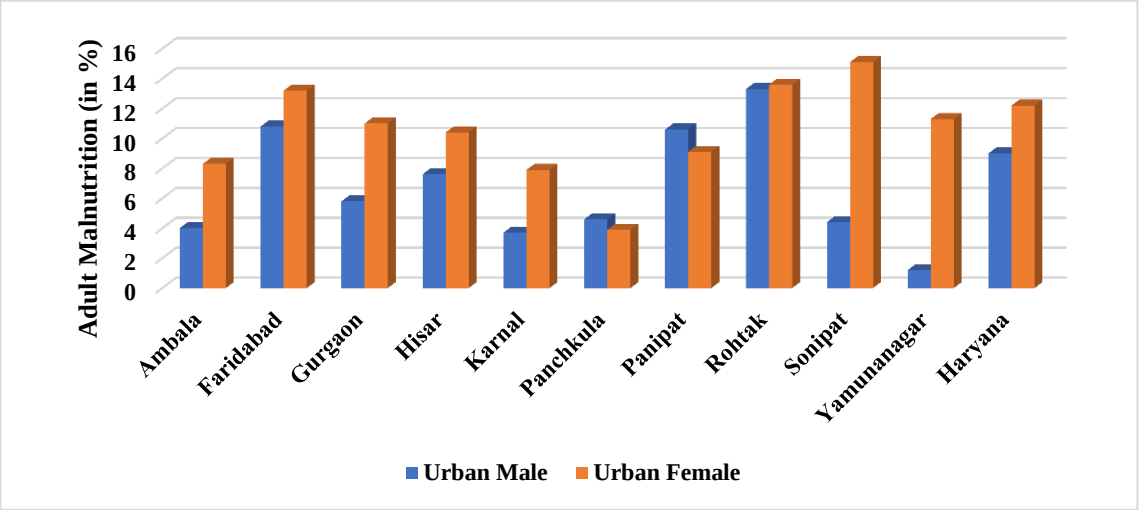
In the case of females, malnutrition rate is 15.8 percent in Haryana which includes 18.2 percent of rural malnutrition and 12.2 percent of urban female malnutrition in which Mewat district show high level of malnutrition, followed by Fatehabad (22.2 percent), Bhiwani (21.4 percent), Rewari (21.4 percent), Sirsa (20.6 percent), Mahendragarh (19.2 percent), Jind (17 percent), Palwal (16.9 percent), Rohtak (16.1 percent), Kaithal (15.3 percent), Hisar (14.9 percent), Faridabad (14.4 percent), Sonipat (14.1 percent), Karnal (12.9 percent), Gurgaon (12.5 percent), Jhajjar (12.4 percent), Ambala (11.1 percent), Panipat (10.4 percent), Kurukshetra (9.2 percent), and Panchkula (6.8 percent). The result also shows that the level of female malnutrition in rural as well as urban areas is higher than male malnutrition, and rural adults are more malnourished than urban adults in both male and female.

Figure: 4.17 District Wise Adult Malnutrition in Rural Haryana in 2015-16



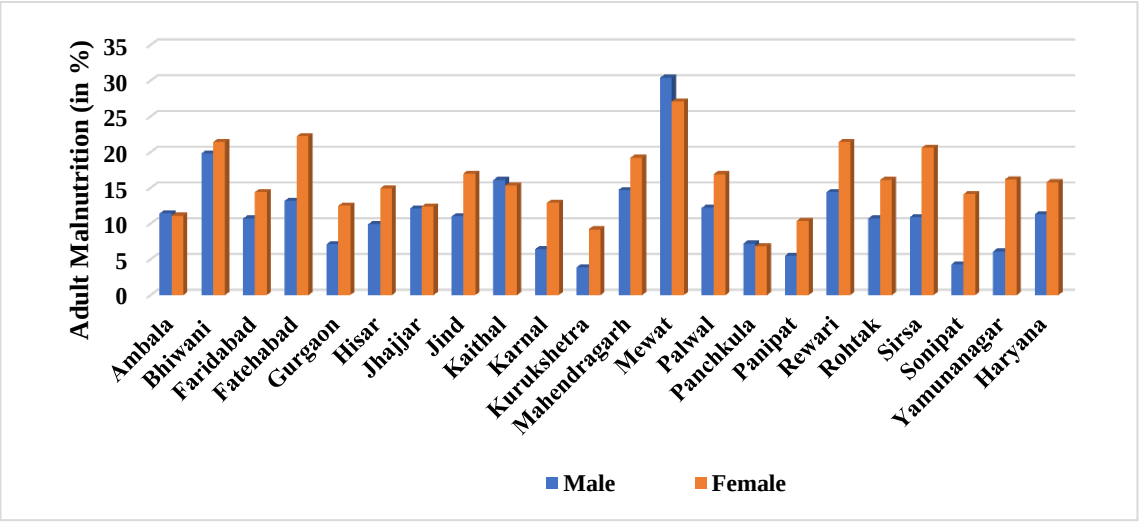
Source: National Family Health Survey -4

Figure: 4.18 District Wise Adult Malnutrition in Urban Haryana in 2015-16



Source: National Family Health Survey -4

Figure: 4.19 District Wise Adult Malnutrition in Haryana (Rural+ Urban) in 2015-16



Source: National Family Health Survey -4

Figure- 4.17, figure-4.18, and figure- 4.19 divulge the adult malnutrition among males and females in rural Haryana, urban Haryana and combined respectively and the figures disclose that females are more malnourished than males and rural adults are more malnourished than urban adults in Haryana.

In summarize, child health shows a weak performance where urban malnutrition is more than rural malnutrition among children and percentage of underweight children are slightly higher than the percentage of stunted children, whereas the percentage of

stunted children are slightly higher than the percentage of wasted children in rural as well in urban Haryana. In case of adult malnutrition, females shows worse performance as compared to males in rural as well as urban Haryana where Mewat is highly deprived district in case of both males as well as females malnutrition.

4.3.3 Standard of Living Deprivation

This section presents the level of deprivation in terms of electricity, improved drinking water, improved sanitation, and clean cooking fuel in various districts of Haryana in 2015-16.

Table: 4.12 District Wise Households Deprivation in Standard of Living Indicators in Haryana (in Percent) in 2015-16

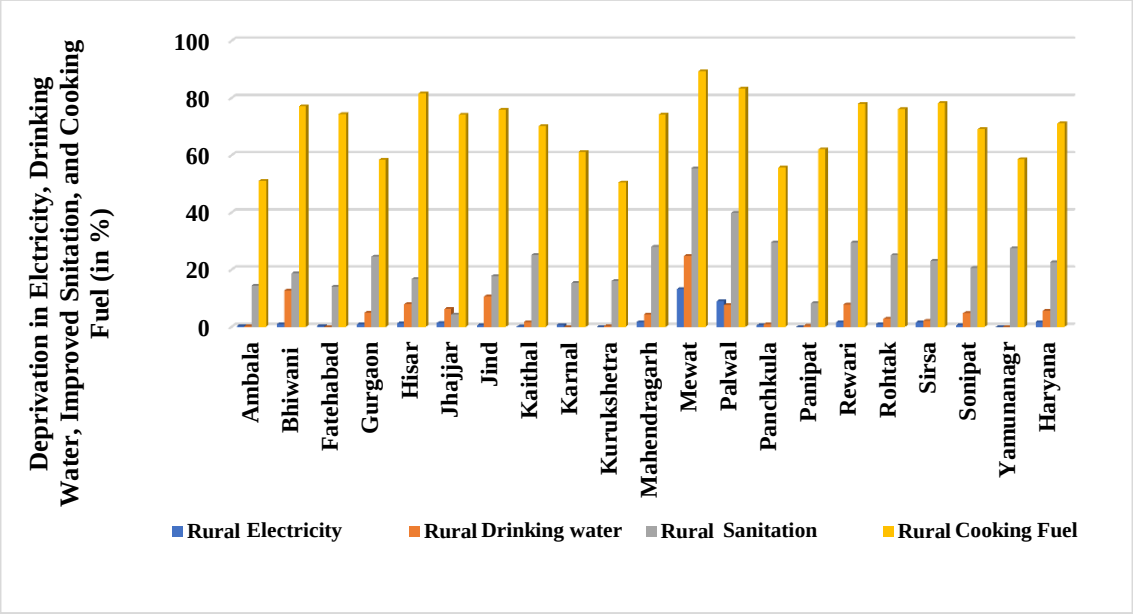
Sr. no.	Districts	Rural				Urban				Total			
		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1.	Ambala	0.3	0.2	14.4	51.1	0	0.4	5.1	10.1	0.2	0.3	10.1	32.2
2.	Bhiwani	1.0	12.7	18.7	77.1	NA	NA	NA	NA	0.8	10.2	17.4	66.6
3.	Faridabad	NA	NA	NA	NA	0.6	54.0	21.0	10.9	0.8	48.9	22.0	17.4
4.	Fatehabad	0.3	0	14.1	74.4	NA	NA	NA	NA	0.2	0.2	12.5	60.9
5.	Gurgaon	0.9	4.9	24.6	58.4	0	1.4	36.1	7.7	0.2	2.1	33.7	18.0
6.	Hisar	1.2	7.9	16.7	81.7	0.6	2.4	13.1	20.2	1.0	6.1	15.5	61.2
7.	Jhajjar	1.4	6.2	4.4	74.1	NA	NA	NA	NA	1.0	7.0	13.6	56.1
8.	Jind	0.5	10.6	17.8	75.9	NA	NA	NA	NA	0.5	8.6	15.4	63.2
9.	Kaithal	0.1	1.7	25.1	70.2	NA	NA	NA	NA	0.1	1.2	22.0	58.9
10.	Karnal	0.7	0	15.3	61.2	0.2	0	6.7	13.1	0.5	0	12.5	45.3
11.	Kurukshetra	0	0.3	16.0	50.5	NA	NA	NA	NA	0.1	0.2	14.0	40.9
12.	Mahendragarh	1.7	4.4	28.0	74.2	NA	NA	NA	NA	1.4	4.0	25.7	67.1
13.	Mewat	13.2	24.8	55.4	89.4	NA	NA	NA	NA	11.5	21.1	53.3	82.8
14.	Palwal	8.9	7.6	39.8	83.3	NA	NA	NA	NA	6.8	6.4	33.6	69.4
15.	Panchkula	0.5	0.9	29.5	55.7	0.3	0.2	4.3	4.8	0.4	0.5	13.1	22.7
16.	Panipat	0	0.4	8.2	62.0	0	0.2	9.8	11.1	0	0.3	9.0	36.4
17.	Rewari	1.7	7.8	29.5	78.0	NA	NA	NA	NA	1.4	6.5	30.3	60.9
18.	Rohtak	1.0	2.8	25.0	76.1	0.7	0.2	20.4	25.6	0.9	1.7	23.0	54.2
19.	Sirsa	1.6	2.1	23.1	78.2	NA	NA	NA	NA	1.1	1.8	20.5	58.2
20.	Sonipat	0.5	4.8	20.6	69.1	0	6.3	19.2	19.4	0.3	5.3	20.1	51.6
21.	Yamuna Nagar	0	0	27.6	58.6	0.3	0.7	8.5	8.8	0.1	0.3	19.8	38.4
22.	Haryana	1.7	5.7	22.6	71.1	0.4	12	18.3	15.1	1.2	8.3	20.8	47.8

Source: National Family Health Survey -4

Note: 1- Electricity, 2- Improved drinking water, 3- Improved sanitation, 4- Clean cooking fuel, and NA – Not Available, table - 4.12 derived from A- 3 in appendix.

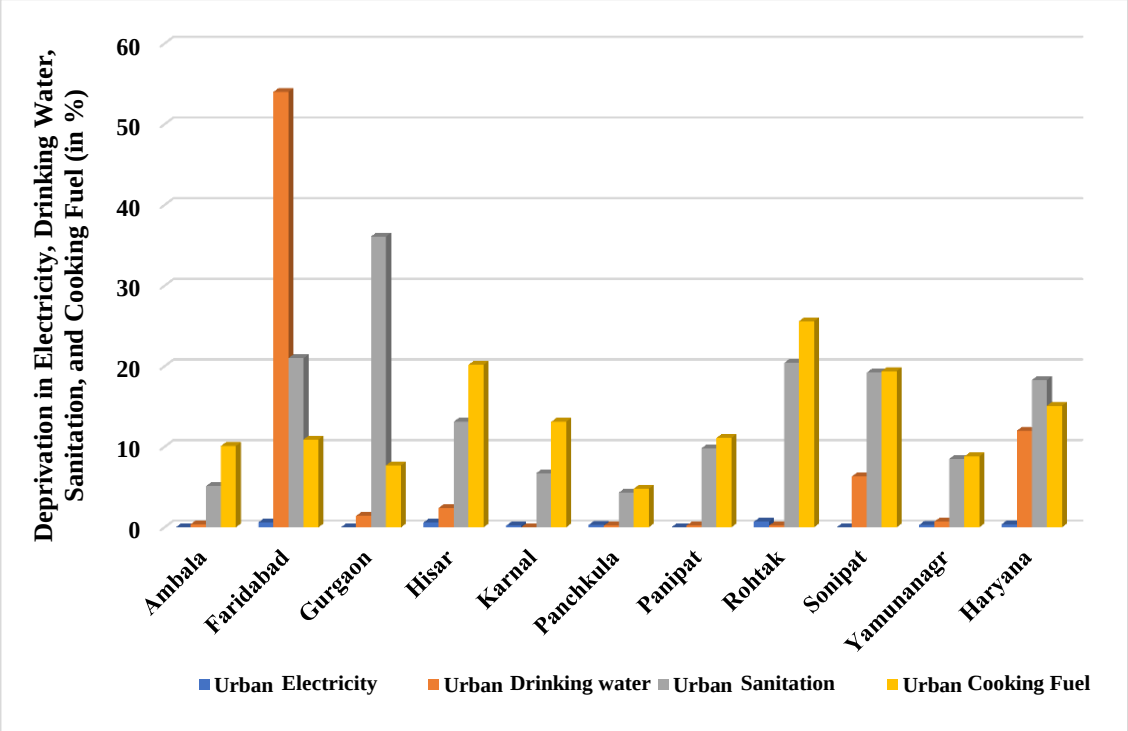
Table- 4.12 present the district-wise households deprivation in the standard of living indicators in Haryana. In rural Haryana 71.1 percent of households are deprived of clean drinking water in which Mewat, Palwal, and Hisar districts are more deprived, 22.6 percent of households are deprived in improved sanitation, 5.7 percent of households are deprived in improved drinking water where Mewat district is more deprived and Jhajjar district is less deprived, and only 1.7 percent households are deprived in electricity in rural Haryana. In the case of urban households, improved sanitation is highly deprived indicator where 18.3 percent of households are deprived in the state wherein Gurgaon is highly deprived district (36.1 percent), and Panchkula district is least deprived (4.3 percent). In the state, 15.1 percent of households are deprived of clean cooking fuel in urban areas in which Rohtak district shows higher deprivation (25.6 percent), and Panchkula district is less deprived (4.3 percent). In case of drinking water indicator, 12 percent of urban households are deprived in improved drinking water in the state where Faridabad district is highly deprived district among all the districts. In the state at aggregated level (rural + urban), majority of households are highly deprived in clean cooking fuel (47.8 percent) followed by improved sanitation (20.8 percent), improved drinking water (8.3 percent), and electricity (1.2 percent) where Faridabad district is highly deprived in improved drinking water (48.9 percent) and Gurugram is highly deprived in improved sanitation (33.7 percent) among all the districts.

Figure: 4.20 District Wise Deprivation in Standard of Living Indicators in Rural Haryana



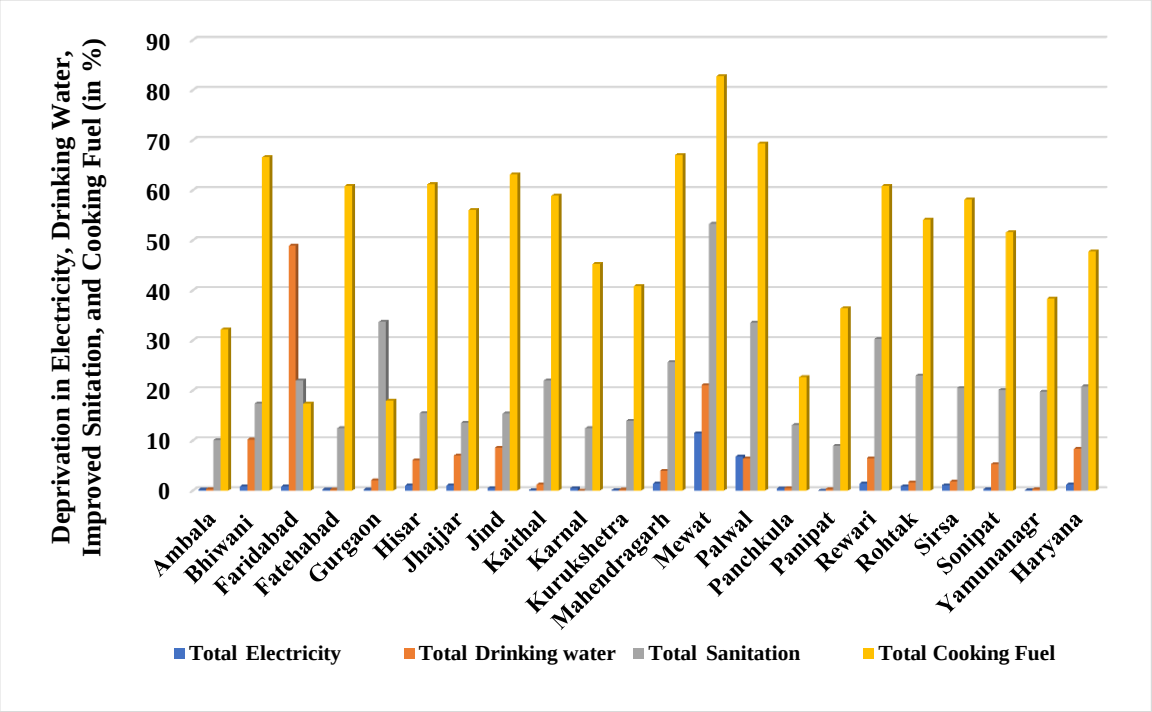
Source: National Family Health Survey -4

Figure: 4.21 District Wise Deprivation in Standard of Living Indicators in Urban Haryana



Source: National Family Health Survey -4

Figure: 4.22 District Wise Deprivation in Standard of Living Indicators in Haryana (Rural+ Urban)



Source: National Family Health Survey -4

Figure- 4.20, figure-4.21, and figure- 4.22 presents district-wise deprivation in the standard of living indicators in rural Haryana, urban Haryana, and in total respectively. Dirty cooking fuel and improved sanitation are the highly deprived indicators in rural Haryana and deprivation in improved sanitation indicators is a major problem among urban households in Haryana.

In short, non-availability of safe cooking fuel and non-availability and non-accessibility of improved sanitation facilities are the serious problem in rural Haryana whereas deprivation in toilet facilities is a matter of concern in urban Haryana.

4.3.4 Income Poverty

Rural development department, Haryana measured the poverty level in rural Haryana during 1981-2008. The level of poverty was based on poverty line annual family income up to Rs. 3500 in 1981-84, annual income per month Rs. 11000 in 1991-92, per month per capita income Rs. 289.31 in 1997-98, but in 2007-08 below poverty line households were measured by using socio-economic indicators such as land, housing

conditions, household goods, means of living, and education status. The level of poverty in various districts of rural Haryana is shown in following table:

Table- 4.13 District Wise BPL in Rural Haryana 1981-2008 (in Percent)

District	1981-84	1991-92	1997-98	2007-08
Ambala	44.32	26.72	28.99	30.28
Bhiwani	25.20	34.26	28.59	26.83
Faridabad	39.10	26.75	25.20	21.71
Fatehabad	NA	NA	31.01	35.51
Gurgaon	43.98	48.84	24.06	23.85
Hisar	41.55	36.38	31.88	24.69
Jhajjar	NA	NA	26.37	22.35
Jind	76.16	37.97	38.69	33.45
Kaithal	NA	36.66	33.17	30.45
Karnal	60.89	48.78	43.46	26.77
Kurukshetra	31.35	44.79	38.99	33.08
Mahendragarh	74.45	29.79	16.73	26.59
Mewat	NA	NA	NA	27.69
Palwal	NA	NA	NA	32.69
Panchkula	NA	NA	30.14	24.57
Panipat	NA	20.51	23.91	25.53
Rewari	NA	29.27	37.85	25.53
Rohtak	35.89	24.36	27.79	18.64
Sirsa	34.47	25.35	34.70	25.80
Sonipat	35.67	26.18	23.17	26.40
Yamuna Nagar	NA	43.19	32.34	28.28
Haryana	42.06	33.40	30.34	27.17

Source: Rural Development Department, Haryana

Table- 4.13 show the district-wise trends of below the poverty line in rural Haryana from 1981 to 2008. The result reveals that poverty in rural Haryana has decreased over the period. At the district level, the poverty rate shows fluctuations in more than fifty percent of districts of Haryana from 1981-2008. In 1981-84 Jind district shows worse picture where 76.16 percent people were living below the poverty line and Bhiwani was less poor (25.20 percent) districts among all districts. In 1991-92 Gurugram district was highly poor and Panipat was a less poor district among all the districts but in 1997-98 Karnal was the poorest district of Haryana. In 2007-08 poverty was highest in

Fatehabad (35.51 percent) followed by Jind (33.45), Kurukshetra (33.08 percent), Palwal (32.69 percent), Kaithal (30.45 percent), Ambala (30.28 percent), Yamuna Nagar (28.28 percent), Nuh (27.69 percent), Bhiwani (26.83 percent), Karnal (26.77 percent), Mahendragarh (26.59 percent), Sonipat (26.40), Sirsa (25.80 percent), Panipat (25.53 percent), Rewari (25.53 percent), Hisar (24.69 percent), Panchkula (24.57 percent), Gurugram (23.85 percent), Jhajjar (22.35 percent), Faridabad (21.71) respectively and Rohtak (18.64 percent) is least poor districts among all districts of Haryana.

In short, the level of income poverty in rural Haryana has declined in rural Haryana from 1981-2008. In 2007-08 Fatehabad, Jind, Kurukshetra, Palwal, Kaithal, and Ambala are the highly poor districts where more than 30 percent of population is living below poverty line.

4.4 Conclusion

The important conclusions has been derived from the above analysis are presented as follows:

- The level of education has improved among males and females in Haryana and India from 1992-2016 where the female literacy rate is less than the male literacy rate over the years in both (Haryana and India) that shows gender inequality in education. In Haryana, a huge regional disparity is also presented based on education in Haryana where literacy among rural adults is less than literacy in urban adults.
- Infant mortality and child mortality rates (per 1000 live births) have also shown declining trends in Haryana and India but the infant mortality rate is still high in Haryana (32.8) and India (40.7) in 2015-16. Delivery at home, traditional birth practices and poor health of mothers are the significant causes of infant mortality in most of the Indian states including Haryana.
- The level of child health deprivation in Haryana is very high where 21.3 percent of children are underweight that includes 29.9 percent of rural underweight and 34.3 percent of urban underweight, 21 percent of stunted children, and 21.2 percent of wasted children.

- The level of deprivation in the standard of living indicators has declined from 1993-2016 in Haryana and India but deprivation in cooking fuel, pucca houses, and toilet facility are still a serious problem among Haryanvi households. In Haryana 71.1 percent of rural households are using dung cake, agriculture crop waste, straw/shrubs/grass, coal/lignite, and charcoal for cooking purposes in 2015-16.
- There has been a slight fluctuation in the poverty ratio in Haryana between 1973-74 to 2011-12 but over the years the level of poverty has come down considerably where the poverty ratio in the state is low which is only 11.2 percent and it comprised 11.2 percent of rural poverty and 10.3 percent of urban poverty.
- There is a huge gender and regional disparities within the state (disparities based on rural and urban areas, and differences between various districts) based on education. The level of deprivation based on adult literacy is highest in females as compared to male deprivation in rural as well as urban areas in which rural population is more deprived than urban population and some districts are highly deprived whereas others are less deprived in Haryana.
- The level of female malnutrition in rural as well as urban areas is higher than male malnutrition, where rural adults are more malnourished than urban adults. In case of child nutrition, children shows poor performance where the urban deprivation is more than rural deprivation among children and percentage of underweight children are slightly higher than the percentage of stunted children. Further the percentage of stunted children are slightly higher than the percentage of wasted children in rural as well in urban Haryana.
- In Haryana majority of households are highly deprived in clean cooking fuel (47.8 percent) followed by improved sanitation (20.8 percent), improved drinking water (8.3 percent), and electricity (1.2 percent) where Faridabad district is highly deprived in improved drinking water (48.9 percent) and Gurugram is highly deprived in improved sanitation (33.7 percent) among all the districts in respected indicators.

- The poverty shows declining trend in Haryana during 1981-2008 where almost all the districts shows the level of poverty has declined.

It is clear from the above discussion that the deprivation in socio-economic deprivation is high whereas income poverty is comparably low in Haryana where the rural population is more deprived than the urban population and female deprivation is higher than male deprivation. In the case of the education dimension, the female deprivation rate is very high (24.6 percent of the female are not able to read and write) whereas the male illiteracy rate is only 9.4 percent. In the case of health dimension, child health deprivation is a serious problem where 21.3 percent of children are underweight, 21 percent of children are stunted and 21.2 percent of children are wasted where rural deprivation is slightly lower than urban deprivation but in the case of adult malnutrition, rural people is more deprived than urban people in which females are more deprived than males in rural as well as urban areas. In the case of the standard of living dimension, about 50 percent of households are using dirty cooking fuel, and more than 20 percent of households don't have toilet facilities. It is pertinent to examine that what is the level of poverty in multiple dimensions as education, health, and standard of living, and what is the contribution of these dimensions in multidimensional poverty and which is analysed in detail in the next chapter of this study.

CHAPTER- 5
ESTIMATES OF RURAL POVERTY IN HARYANA: RESULTS AND INTERPRETATIONS

5.1 Introduction

The previous chapter analysed the trends of income poverty and socio-economic conditions in Haryana based on secondary data and it has been found that the level of malnutrition among children and adults as well as the illiteracy rate among females are very high, and deprivation in cooking fuel and sanitation is a matter of concern in the state. This chapter is based on primary data, collected from 1040 rural households from six districts (Faridabad, Gurugram, Jind, Karnal, Rohtak, and Yamuna Nagar) of Haryana. The present chapter elaborates the empirical finding related to income and multidimensional poverty by including important dimensions of living. The three dimensions are education, health, and standard of living which further includes total ten indicators (school attainment, school attendance, nutrition, child mortality, assets, cooking fuel, drinking water, electricity, flooring, and sanitation) for analysis of multidimensional poverty.

This chapter also discusses income poverty, estimates of MPI, the contribution of each dimension in MPI, and sensitivity analysis of the extent and intensity of poverty in rural Haryana. Where the contribution of dimensions in MPI shows that which dimension is mainly responsible for multidimensional poverty, further sensitivity analysis helps to identify the poor households at different poverty cut-off (from K=1 to K=10, where K=1 identifies the households which are deprived in at least one dimension, and K=2 identifies the households which are at least deprived in two dimensions and so on). The last section of this chapter is devoted to determinants of poverty at the household level in Haryana where these determinants are analysed by using a logit regression model according to binary or dichotomous nature of dependent variable with sixteen independent variables (head of the family, social category, type of family, dependent population in house, ration card, arable land, main occupation, annual income, adult female education, adult male education, adult female health, adult male health, a health facility at the village level, cooking fuel, toilet facility, and drinking water).

The chapter has been divided into six sections, where the second section of the study elucidates the general profile of selected households in six districts, the third section explains the deprivation in three dimensions as education, health, and standard of living dimension, the fourth section explains the poverty estimates, the fifth section presents the results about determinants of poverty in rural Haryana, and the last section of this study is concluding one.

5.2 General Profile of the Households

This section presents the general profile of respondent households in Haryana. The general profile provided some basic information of households such as their economic category (APL or BPL card holder), level of households annual income, and occupation of currently working population at district level in Haryana. The distribution of households according to type of ration card is shown by following table:

Table: 5.1 Distribution of Households by Type of their Ration Card

District	**Social Category**	**APL**		**BPL**		**Total**	
		Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Faridabad	General	17	100	0	0	17	100
	OBC	66	88	9	12	75	100
	SC	6	50	6	50	12	100
	Total	**89**	**85.6**	**15**	**14.4**	**104**	**100**
Gurugram	General	110	95.7	5	4.3	115	100
	OBC	59	89.4	7	10.6	66	100
	SC	30	55.6	24	44.4	54	100
	Total	**199**	**84.7**	**36**	**15.3**	**235**	**100**
Jind	General	108	96.4	4	3.6	112	100
	OBC	20	76.9	6	23.1	26	100
	SC	10	43.5	13	56.5	23	100
	Total	**138**	**85.7**	**23**	**14.3**	**161**	**100**
Karnal	General	158	100	0	0	158	100
	OBC	21	75	7	25	28	100
	SC	72	66.1	37	33.9	109	100
	Total	**251**	**85.1**	**44**	**14.9**	**295**	**100**
Rohtak	General	89	97.8	2	2.2	91	100
	OBC	26	61.9	16	38.1	42	100
	SC	24	46.2	28	53.8	52	100
	Total	**139**	**75.1**	**46**	**24.9**	**185**	**100**
Yamunanagar	General	13	100	0	0	13	100
	OBC	31	83.8	6	16.2	37	100
	SC	10	100	0	0	10	100
	Total	**54**	**90**	**6**	**10**	**60**	**100**
Haryana	General	495	97.8	11	2.2	506	100
	OBC	223	81.4	51	18.6	274	100
	SC	152	58.5	108	41.5	260	100
	Total	**870**	**83.7**	**170**	**16.3**	**1040**	**100**

Source: Author's calculation based on primary data

Table- 5.1 demonstrates the households by their ration card where 83.7 percent of households have above the poverty line ration card and only 16.3 percent of households have below the poverty line ration card where SC category has highest and General category has the lowest contribution in total BPL households in Haryana as per their ration card. At district level majority of households are APL and a few of households are BPL and SC category has highest contribution in total BPL (by taking all the categories combined at their respective district level) except Yamuna Nagar district where all the BPL household belongs to OBC category). This indicates that nearly 80 percent respondents have above poverty line ration card.

The distribution of households by their annual income is presented in the following table- 5.2 where the income of these households is categories into six income categories such as less than Rs. 50 thousand, Rs. 50 thousand - Rs. 1 lakh, Rs. 1 lakh one - Rs 2 lakh, Rs 2 lakh one – Rs. 3 lakh, Rs 3 lakh one – Rs. 4 lakh, and more than Rs. 4 lakh.

Table: 5.2 Distribution of Households by Annual Income (in Rs.) in Percent

District	**Social Category**	**Less than 50,000**	**50,000-100000**	**100001-200000**	**200001-300000**	**300001-400000**	**More than 4,00000**
Faridabad	General	0	13.3	20	20	13.3	33.3
	OBC	2.5	31.6	27.8	19	8.9	10.1
	SC	10	30	30	10	20	0
	Total	**2.9**	**28.8**	**26.9**	**17.3**	**10.6**	**13.5**
Gurugram	General	7.8	16.5	29.6	15.7	8.7	21.7
	OBC	1.5	12.1	30.3	18.2	9.1	28.8
	SC	5.6	38.9	29.6	9.3	5.6	11.1
	Total	**5.5**	**20.4**	**29.8**	**14.9**	**8.1**	**21.3**
Jind	General	15.2	23.2	26.8	7.1	7.1	20.5
	OBC	7.7	19.2	38.5	7.7	7.7	19.2
	SC	21.7	47.8	26.2	0	0	4.3
	Total	**14.9**	**26.1**	**28.6**	**6.2**	**6.2**	**18**
Karnal	General	2.5	13.9	31.6	15.2	14.6	22.2
	OBC	3.6	32.1	32.1	25.0	3.6	3.6
	SC	6.4	39.4	43.1	4.6	5.5	0.9
	Total	**4.1**	**25.1**	**35.9**	**12.2**	**10.2**	**12.5**

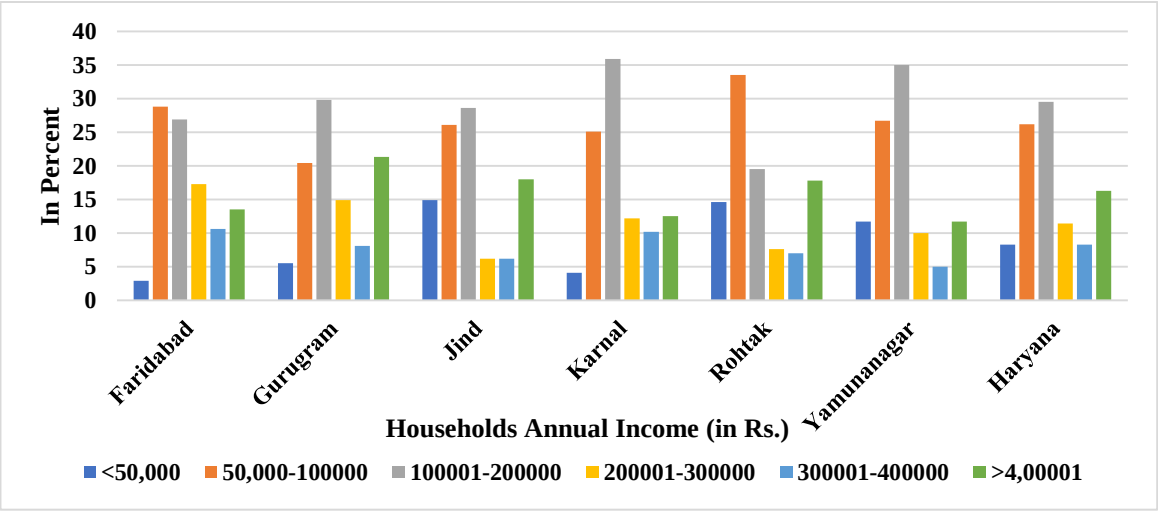
Cont……..

District	Social Category	Less than 50,000	50,000-100000	100001-200000	200001-300000	300001-400000	More than 4,00000
Rohtak	General	14.3	24.2	16.5	13.2	6.6	25.3
	OBC	16.7	35.7	26.2	0	9.5	11.9
	SC	13.5	48.1	19.2	3.8	5.8	9.6
	Total	**14.6**	**33.5**	**19.5**	**7.6**	**7**	**17.8**
Yamuna Nagar	General	7.7	23.1	46.2	0	7.7	15.4
	OBC	16.2	21.6	29.7	16.2	2.7	13.5
	SC	0	50	40	0	10	0
	Total	**11.7**	**26.7**	**35**	**10**	**5**	**11.7**
Haryana	General	8.7	18.6	27.5	12.8	9.9	22.5
	OBC	6.9	25.2	29.6	15	7.7	15.7
	SC	8.8	41.9	33.5	5	5.8	5
	Total	**8.3**	**26.2**	**29.5**	**11.4**	**8.3**	**16.3**

Source: Author's calculation based on primary data

Note: Absolute values related to this table are presented in A- 4 in Appendix.

Figure: 5.1 Distribution of Households by Annual Income in Selected Districts

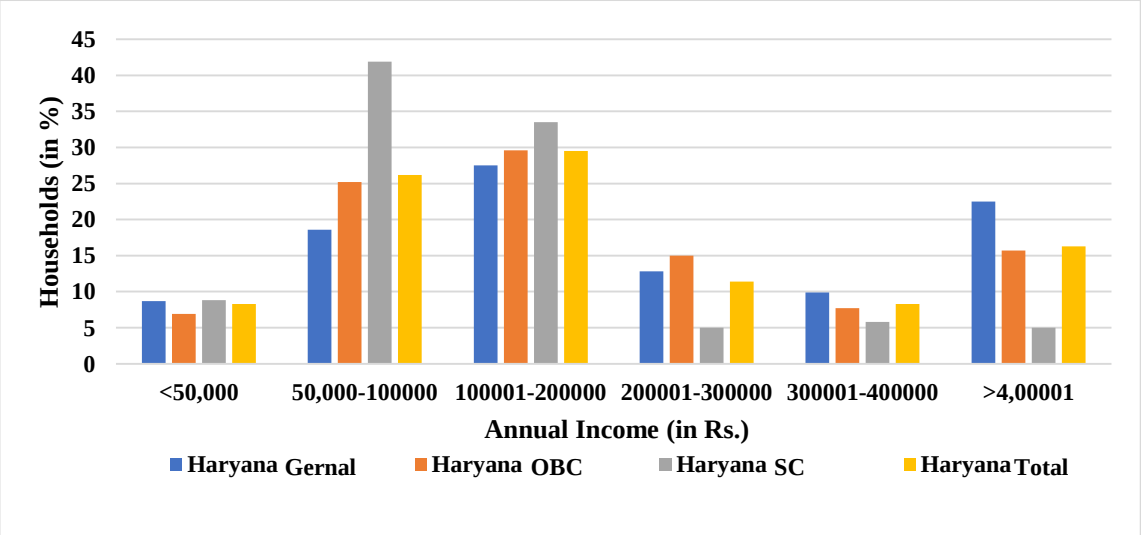


Source: Author's calculation based on primary data

Table 5.2 and figure- 5.1 present the households by their annual income where households are distributed in six income categories. In Haryana as a total, the majority of households (29.5 percent) earn Rs. 100001 to Rs. 200000 income annually (35.9 percent of households in Karnal, 35 percent in Yamuna Nagar, 29.8 percent in Gurugram, 28.6 percent in Jind, 26.9 percent in Faridabad, and 19.5 percent in Rohtak earn Rs. 100001 to Rs. 200000), and the households earn Rs. Less than 50000 (8.3 percent) and Rs. 300000 to Rs. 400000 (8.3 percent) annually in Haryana are less in

percentage. At the district level, fewer percentages of households in Faridabad (2.9 percent), Karnal (4.1 percent), and Gurugram (5.5 percent) districts earn Rs. less than 50,000 whereas the fewer percentage of households in Jind (6.2 percent), Rohtak (7 percent), and Yamuna Nagar (5 percent) districts has earning between Rs.300001 to Rs. 400000 as compared to other categories.

Figure: 5.2 Distribution of Households by Annual Income in different Social Category in Haryana



Source: Author's calculation based on primary data

The results are shown in **Table- 5.2 and figure- 5.2** depict that majority of households in the General category (72.7 percent) and the OBC category (68 percent) earn more than Rs. 100000 annually, whereas the majority of households (50.7 percent) in the SC category earn less than Rs. 100000 annually. The results show high variation and differences based on income among social categories in Haryana where the earnings of the SC category households are comparatively less than General as well as OBC category households in all the selected households.

According to the work, the working-age respondents are distributed into eight categories such as daily wage labourers, agriculture labourers, farmers, government employees, working in the private sector (e.g. factories and companies, etc.), small shopkeepers, businessman, and other (include truck driver, auto driver, private bus driver, and conductor). The **occupational distribution** of working-age group respondents is shown as follows.

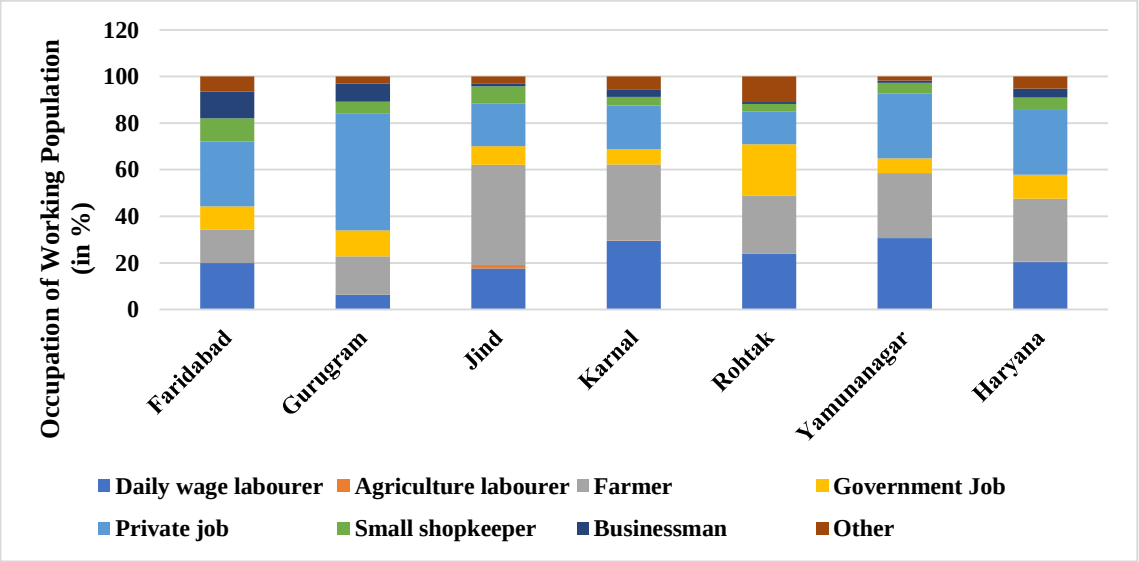
Table: 5.3 Occupational Distribution of Working Age-Group Respondents (in Percent)

Districts	Social Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Total
Faridabad	Gen	8.7	0	4.4	34.8	47.8	0	4.3	0	100
	OBC	22	0	19	6	19	11	14	9	100
	SC	23.5	0	0	0	53	17.6	5.9	0	100
	Total	**20**	**0**	**14.3**	**10**	**27.8**	**10**	**11.5**	**6.4**	**100**
Gurugram	Gen	1.3	0	28.1	11.8	41.8	5.2	8.5	3.3	100
	OBC	3.6	0	4.8	8.4	59	6.0	13.2	4.8	100
	SC	20.9	0	4.5	13.4	58.2	3.0	0	0	100
	Total	**6.3**	**0**	**16.5**	**11.2**	**50.2**	**5.0**	**7.8**	**3.0**	**100**
Jind	Gen	2.3	0	59.3	9.7	19.2	5.6	1.1	2.8	100
	OBC	10.2	10.3	17.9	5.1	30.8	15.4	2.6	7.7	100
	SC	84.4	0	0	4.4	4.5	6.7	0	0	100
	Total	**17.6**	**1.5**	**43**	**8**	**18.4**	**7.3**	**1.1**	**3.1**	**100**
Karnal	Gen	2.1	0	58.1	8.7	18.7	4.6	4.5	3.3	100
	OBC	51.1	0	8.9	4.4	22.2	4.5	2.2	6.7	100
	SC	63.8	0.6	1.8	3.7	17.8	2.5	0.6	9.2	100
	Total	**29.4**	**0.20**	**32.7**	**6.5**	**18.7**	**3.8**	**2.9**	**5.8**	**100**
Rohtak	Gen	1.6	0	47.5	27.1	9.8	3.3	1.6	9.1	100
	OBC	34.5	0	8.6	15.5	12.1	5.2	0	24.1	100
	SC	52.7	0	0	18.9	22.9	1.4	0	4.1	100
	Total	**24**	**0**	**24.8**	**22.1**	**14.2**	**3.1**	**0.8**	**11**	**100**
Yamuna Nagar	Gen	21.4	0	28.6	3.6	35.7	7.1	3.6	0	100
	OBC	16.9	0	35.4	7.7	32.3	4.6	0	3.1	100
	SC	94.4	0	0	5.6	0	0	0	0	100
	Total	**30.6**	**0**	**28**	**6.3**	**27.9**	**4.5**	**0.9**	**1.8**	**100**
Haryana	Gen	2.6	0	44.5	12.3	28.7	4.4	3.8	3.7	100
	OBC	21.3	1.0	15.9	8	30.3	7.7	6.9	8.9	100
	SC	56.2	0.3	1.6	8.3	25	3.4	0.5	4.7	100
	Total	**20.4**	**0.3**	**26.9**	**10.2**	**28.2**	**5**	**3.8**	**5.2**	**100**

Source: Author's calculation based on primary data

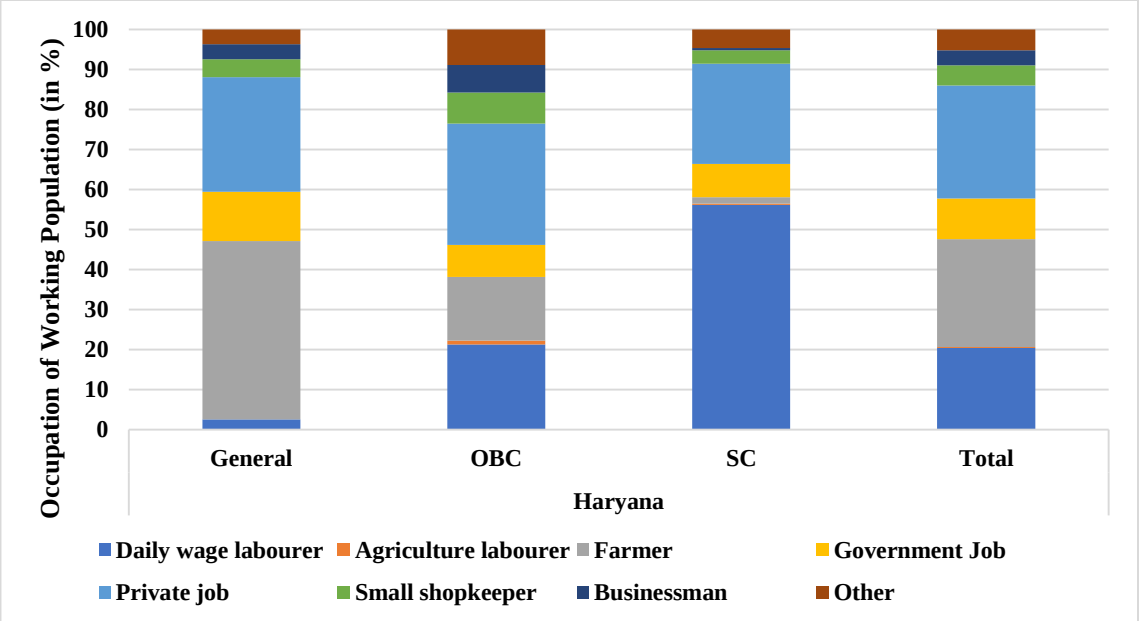
Note: 1- Daily wage labourers, 2- Agriculture labourers, 3- Farmers, 4- Government job, 5- Private job, 6- Small shopkeepers, 7- Businessman, 8- Other (include truck driver, auto driver, private bus driver and conductor).

Figure: 5.3 Occupational Distribution of working people in Selected Districts



Source: Author's calculation based on primary data

Figure: 5.4 Occupational Distribution of Working People in Social Categories in Haryana



Source: Author's calculation based on primary data

At the district level, the result presents in **table- 5.3 and figure- 5.3 shows that** in Gurugram district, 61.4 percent of respondents are working in the organized sector in which 50 percent of these people are working in the private sector (companies), and 38.6 percent of total working respondents in this district are engaged in the unorganized

sector. In Faridabad, 38.7 percent of respondents are working in the organized sector (27.8 percent in private jobs and 10 percent in government jobs), and the remaining 61.3 percent are engaged in the unorganized sector (daily wage labourer, agricultural labourer, farmer, small shopkeeper, businessmen, and other). In the Jind and Karnal district majority of people are engaged in agricultural activities where the agricultural sector employs 43 percent and 32.7 percent population. The Yamuna Nagar district also shows the same pattern as other districts where the majority of persons are working in the unorganized sector. But the analysis based on different social categories presents a different picture where the majority of General category people are engaged in agricultural activities whereas most of the SC category (56.2 percent) people are working as a daily wage labourer, and the majority of OBC category persons are engaged in private job and as a daily wage labourer in Haryana at an aggregated level **(see table-5.3 and figure- 5.4)**.

To sum up, the sampled households shows a mixed picture where on the one hand majority of households are APL card holders which shows that as per government definition poverty is not a problem among these households and it presents a better picture but on the other hand there is huge job insecurity among the households because 61.6 percent of working people are working in the unorganized sector for their living in Haryana at aggregated level hence the majority of households annual earning is low (64 percent of households earn less than 2 lakh annually). The next section of this chapter presents the level of education deprivation.

5.3 Deprivation in Three Dimensions

This section shows the level of deprivation in education, health, and standard of living dimensions and according to these dimensions, this section has been divided into three sub-sections. Section 5.3.1 presents the deprivation in the education dimension, section 5.3.2 shows the level of deprivation in health dimensions, and section 5.3.3 shows the level of deprivation in the standard of living dimension.

5.3.1 Education Deprivation

Education is an important determinant of quality of life. This study measures multidimensional poverty by using three important dimensions of living where education is one among them.

This section has divided into two parts where first part introduce the level of deprivation at the household level and the second part of this section shows the education performance of children and adults at the individual level. For measurement of deprivation in education dimension at households level, the study uses two indicators for adults and children apparently, first is **school attainment** (at least one adult household member has not completed six years of schooling), and the second one is **school attendance** (at least one school-going age child between 6-14 years has not attended the school). The level of deprivation in the education dimension based on these two indicators is shown by the following table:

Table: 5.4 Level of Deprivation in Education Dimension Among Households (in Percent)

District	Indicator	General	OBC	SC	Total
Faridabad	School Attainment	33.3	63.3	80	60.6
	School Attendance	0	0	0	0
Gurugram	School Attainment	42.6	24.2	44.4	37.9
	School Attendance	0	0	0	0
Jind	School Attainment	72.3	69.2	87.0	74.0
	School Attendance	0	0	0	0
Karnal	School Attainment	52.2	62.1	55.04	54.2
	School Attendance	0	0	0	0
Rohtak	School Attainment	57.6	41.5	65.4	56.2
	School Attendance	0	0	0	0
Yamuna Nagar	School Attainment	61.5	54.1	90	61.7
	School Attendance	0	0	10	1.7
Haryana	School Attainment	55.2	50	60.1	55
	School Attendance	0	0	0.4	0.1

Source: Author's calculation based on primary data

Note: Absolute values related to this table are presented in A- 5 in Appendix.

Table- 5.4 delineates the level of deprivation in two indicators of the education dimension of MPI in Haryana. In the sample at the aggregated level, deprivation in school attendance indicator is negligible but school attainment indicator is most deprived indicator among households where 55 percent of households are deprived in school attainment (at least one of the adults in a household is not completed six years of schooling) in which SC households are 60.1 percent, General households are 55.2 percent, and OBC households are 50 percent deprived. At the district level, the

percentage of deprivation in school attainment among households is highest in Jind (74 percent), followed by Yamuna Nagar (61.7 percent), Faridabad (60.6 percent), Rohtak (56.2 percent), Karnal (54.2 percent), Gurugram (37.9 percent) where SC category is a most deprived category in all the districts of Haryana except Karnal.

In short, school attainment indicator shows that more than half of the households are deprived according to this indicator in all the districts of Haryana except Gurugram district but it is very interesting to analyse that almost none of the households are deprived in school attendance indicator which indicates that all the school going age children (6-14 years) in each household are going to school.

Table: 5.5 Enrolment of Children (6-14 years) in Schools (in Percent)

District	**Social category**	**Enrolment of children in schools**			**Type of school**	
		Attending school	**Not attending school**	**Total**	**Government school**	**Private school**
Faridabad	General	100	0	100	46.2	53.8
	OBC	100	0	100	37.7	62.3
	SC	100	0	100	71.4	28.6
	Total	**100**	**0**	**100**	**41.6**	**58.4**
Gurugram	General	100	0	100	13.8	86.2
	OBC	100	0	100	40.5	59.5
	SC	100	0	100	73.5	26.5
	Total	**100**	**0**	**100**	**35.6**	**64.4**
Jind	General	100	0	100	41.5	58.5
	OBC	100	0	100	67.9	32.1
	SC	100	0	100	75	25
	Total	**100**	**0**	**100**	**54.6**	**45.4**
Karnal	General	100	0	100	13.8	86.2
	OBC	100	0	100	44.4	55.6
	SC	100	0	100	63.6	36.4
	Total	**100**	**0**	**100**	**37.9**	**62.1**
Rohtak	General	100	0	100	2.4	97.6
	OBC	100	0	100	33.3	66.7
	SC	100	0	100	83.3	16.7
	Total	**100**	**0**	**100**	**35.9**	**64.1**
Yamuna Nagar	General	100	0	100	25	75
	OBC	100	0	100	42.9	57.1
	SC	94.5	5.5	100	100	0
	Total	**98.1**	**1.9**	**100**	**59.3**	**40.7**
Haryana	General	100	0	100	18.9	81.1
	OBC	100	0	100	43.3	56.7
	SC	99.5	0.5	100	73.6	26.4
	Total	**99.86**	**0.14**	**100**	**41.5**	**58.5**

Source: Author's calculation based on primary data

The performance of children based on their educational attainment at the individual level is shown in **table- 5.5** which describes the enrolment of school-going age children in Haryana. All the 6-14 years age children are attending school in all the selected districts except Yamuna Nagar (0.5 percent of children are not attending school) and the majority of children (58.5 percent) are going to private school and 41.5 percent of school-going children are going to a government school whereas the majority of SC category children are going to a government school (because of low earning of this category households) but the majority of General category (81.1 percent) and OBC category (56.7 percent) children are going to private school. At the districts level, results are almost the same as in Haryana where the majority of children attend private school except Jind. In Jind district, about 55 percent of the children go to a government school, and 45 percent of these children are going to private school because the level of households income in this district is very low (41 percent of households annual earning is less than Rs 1 lakh and about 70 percent of household income is less than Rs. 200000 annually) and the most of households in Jind district are working in the unorganized sector this is the reason that people are unable to bear the high fees of private schools and they prefer to send their children in government schools.

The level of adult education among respondents has presented in following table:

Table: 5.6 Level of Adult Education Among Respondents (in Percent)

District	**Adults Education**	**General**			**OBC**			**SC**			**Total**		
		M	**F**	**T**	**M**	**F**	**T**	**M**	**F**	**T**	**M**	**F**	**T**
Faridabad	**Illiterate**	**3.4**	**25**	**14**	**3.8**	**38.5**	**20.1**	**15**	**41.2**	**27**	**5**	**36.4**	**19.8**
	Literate	0	0	0	1.5	0	0.8	0	0	0	1.1	0	0.6
	Primary	0	0	0	8.3	8.5	8.4	20	0	10.8	8.3	6.2	7.3
	Middle	17.2	14.3	15.8	22	13.7	18.1	20	35.3	27	21	16	18.7
	Matriculate	24.1	25	24.6	30.3	21.4	26.1	25	23.5	24.3	28.7	22.2	25.7
	Senior secondary	24.1	7.1	15.8	20.5	11.1	16.2	10	0	5.4	19.9	9.3	14.9
	Graduation	27.6	21.4	24.6	11.4	5.1	8.4	10	0	5.4	13.8	7.4	10.8
	Above graduation	3.4	7.1	5.3	2.3	1.7	2	0	0	0	2.2	2.5	2.3

Cont……

District	Adults Education	General			OBC			SC			Total		
		M	F	T	M	F	T	M	F	T	M	F	T
Gurugram	**Illiterate**	**4.3**	**14.4**	**9**	**3.4**	**7.4**	**5.2**	**3.9**	**9.2**	**6.5**	**3.9**	**11.3**	**7.4**
	Literate	0	1.8	0.8	0	0	0	0	1.3	0.7	0	1.2	0.6
	Primary	4.8	13.8	9	1.7	8.5	4.7	24.7	19.7	22.2	7.9	13.6	10.6
	Middle	10.2	13.8	11.9	9.3	13.8	11.3	7.8	19.7	13.7	9.5	15.1	12.1
	Matriculate	28.3	24	26.3	42.4	42.6	42.5	33.8	31.6	32.7	33.8	30.9	32.4
	Senior secondary	34.2	20.4	27.7	25.4	16	21.2	19.5	17.1	18.3	28.5	18.4	23.8
	Graduation	17.6	10.8	24.4	16.1	11.7	14.2	9.1	1.3	5.2	15.4	8.9	12.4
	Above graduation	0.5	1.2	0.8	1.7	0	0.9	1.3	0	0.7	1	0.6	0.8
Jind	**Illiterate**	**10.8**	**46.3**	**27.1**	**19.6**	**38**	**28.3**	**21.3**	**44.7**	**31.8**	**13.8**	**44.6**	**28**
	Literate	0.9	0	0.5	0	0	0	4.3	2.6	3.5	1.2	0.4	8
	Primary	9.9	8.5	9.3	3.6	10	6.6	19.1	5.3	12.9	10.2	8.3	9.3
	Middle	7.2	7.4	7.3	12.5	8	10.4	21.3	13.2	17.6	10.2	8.3	9.3
	Matriculate	22.5	17	20	30.4	30	30.2	14.9	23.7	18.8	22.8	20.3	21.6
	Senior secondary	33.3	10.1	22.7	16.1	12	14.2	14.9	5.3	10.6	27.7	9.8	19.5
	Graduation	13.1	7.4	10.5	14.3	2	8.5	0	5.3	2.4	11.4	6.2	9
	Above graduation	2.3	3.2	2.7	3.6	0	1.9	4.3	0	2.4	2.8	2.2	2.5
Karnal	**Illiterate**	**5.6**	**19.1**	**12**	**8.1**	**18.8**	**12.7**	**13.7**	**22**	**17.6**	**8.8**	**20.1**	**14.1**
	Literate	0.3	1.1	0.7	0	4.2	1.8	1.5	4.4	2.8	0.7	2.6	1.6
	Primary	4.9	6.5	5.7	16.1	18.8	17.3	14.7	15.4	15	9.6	10.8	10.2
	Middle	11.8	14	12.9	12.9	16.7	14.5	22.5	19.2	21	15.8	16.1	16
	Matriculate	29.9	23	26.6	33.9	29.2	31.8	29.9	23.6	26.9	30.4	23.8	27.3
	Senior secondary	32.6	18.3	25.8	19.4	10.4	15.5	14.7	13.7	14.2	24.7	15.9	20.6
	Graduation	14.1	15.5	14.8	9.7	2.1	6.4	2.9	1.6	2.3	9.6	9.3	9.5
	Above graduation	0.7	2.5	1.5	0	0	0	0	0	0	0.4	1.4	0.8
Rohtak	**Illiterate**	**9.7**	**32.6**	**19.9**	**6.3**	**22.6**	**13.5**	**20.7**	**32.9**	**26.2**	**11.9**	**30.4**	**20.1**
	Literate	0.6	0	0.3	1.3	0	0.7	2.2	1.3	1.8	1.2	0.4	0.8
	Primary	5.5	8.3	6.7	12.7	8.1	10.6	12	7.9	10.1	8.9	8.1	8.5
	Middle	9.1	7.6	8.4	10.1	17.7	13.5	9.8	13.2	11.3	9.5	11.5	10.4
	Matriculate	31.5	20.5	26.6	29.1	24.2	27	15.2	21.1	17.9	26.5	21.5	24.3
	Senior secondary	21.8	15.2	18.9	32.9	21	27.7	26.1	13.2	20.2	25.6	15.9	21.3
	Graduation	20	11.4	16.2	7.6	4.8	6.4	14.1	10.5	12.5	15.5	9.6	12.9
	Above graduation	1.8	4.5	3	0	1.6	0.7	0	0	0	0.9	2.6	1.7

Cont……

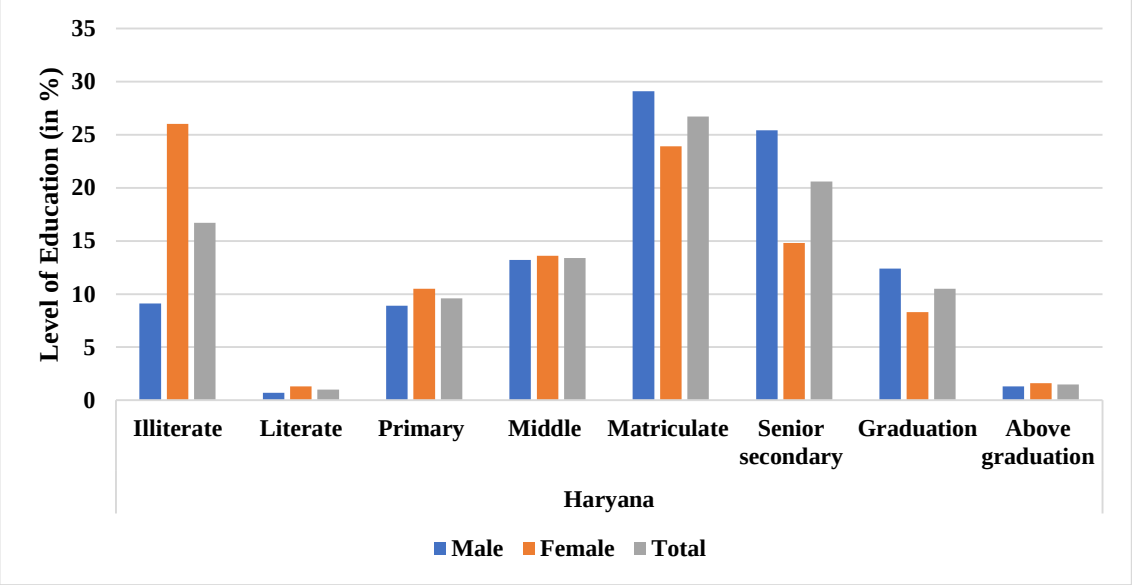
District	Adults Education	General			OBC			SC			Total		
		M	F	T	M	F	T	M	F	T	M	F	T
Yamuna Nagar	**Illiterate**	**12.9**	**20.8**	**16.4**	**7**	**20.7**	**16**	**31.6**	**28.6**	**30**	**12.4**	**21.7**	**17.9**
	Literate	0	0	0	0	0.7	0.5	0	4.8	2.5	0	1.1	0.7
	Primary	0	20.8	9.1	8.5	9.6	9.2	5.3	33.3	20	5.8	13.9	10.6
	Middle	12.9	8.3	10.9	19.7	18.5	18.9	26.3	14.3	20	19	16.7	17.6
	Matriculate	35.5	16.7	27.3	32.4	19.3	23.8	31.6	14.3	22.5	33.1	18.3	24.3
	Senior secondary	32.3	29.2	30.9	19.7	20	19.9	5.3	4.8	5	20.7	19.4	19.9
	Graduation	6.5	4.2	5.5	9.9	9.6	9.7	0	0	0	7.4	7.8	7.6
	Above graduation	0	0	0	2.8	1.5	1.9	0	0	0	1.7	1.1	1.3
Haryana	**Illiterate**	**7.5**	**26.8**	**16.4**	**6.8**	**25.3**	**14.5**	**15**	**24.9**	**19.7**	**9.1**	**26**	**16.7**
	Literate	0.4	0.7	0.6	0.6	0.5	0.6	1.5	2.9	2.2	0.7	1.3	1
	Primary	5.9	8.9	7.3	7.9	10	8.8	16.1	14.1	15.2	8.9	10.5	9.6
	Middle	10.1	11.3	10.6	14.9	14	14.5	17.4	18	17.7	13.2	13.6	13.4
	Matriculate	28.1	21.3	25	33.6	29.4	31.8	25.9	24.1	25.1	29.1	23.9	26.7
	Senior secondary	30.9	16.3	24.1	22.8	14	19.2	17.2	12.4	15	25.4	14.8	20.6
	Graduation	15.8	11.9	14	11.8	5.9	9.3	6.1	3.4	4.8	12.4	8.3	10.5
	Above graduation	1.3	2.8	2	1.7	0.8	1.3	0.7	0	0.3	1.3	1.6	1.5

Source: Author's calculation based on primary data

Note: 1) More than 14 years old people are considered adults.

2) Absolute values related to this table are presented in A- 6 in Appendix

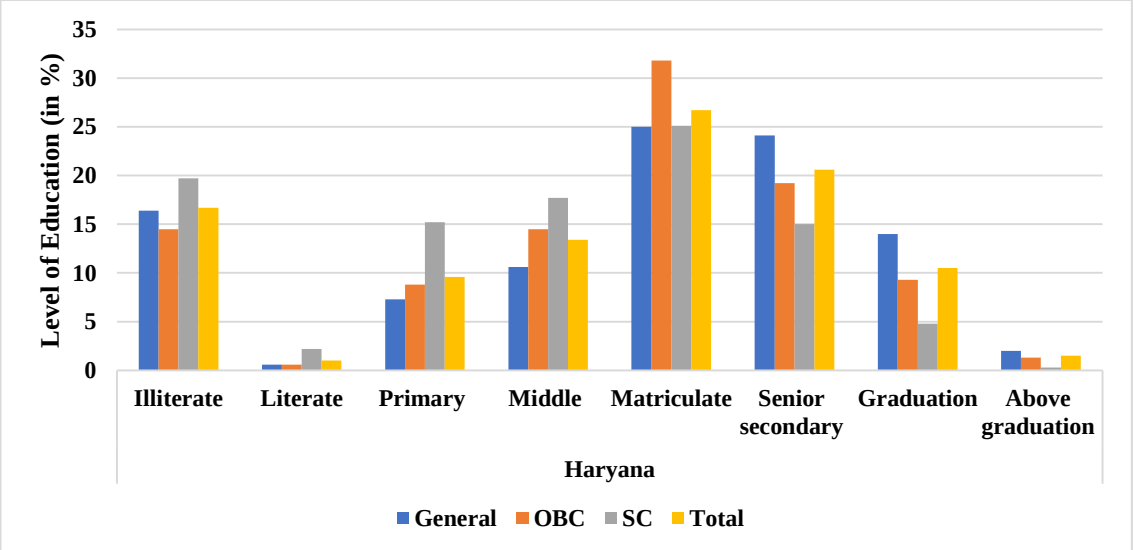
Figure: 5.5 Level of Adult Education Among Respondents



Source: Author's calculation based on primary data

Table- 5.6, and figure- 5.5 presents the level of adult education among respondents in rural Haryana. In Haryana, the total illiteracy rate is 16.7 percent where male illiteracy is 9.1 percent and female illiteracy is 26 percent (about three times more than male illiteracy). Education level in the state is very low where 40.7 percent of adults have not completed their matriculation (out of these low educated people more than 50 percent are female and about 32 percent are male) and only 12 percent of adults completed their higher education (graduation and above graduation) consisting 13.7 percent males and 9.9 percent females. The illiteracy rate in Jind is the highest among respondents (28 percent) among all the districts followed by Rohtak (20.1 percent), Faridabad (19.8 percent), Yamuna Nagar (17.9 percent), Yamuna Nagar (16.7 percent), and Gurugram (7.4 percent). These results are very similar to the results based on secondary data of the study that shows the level of education is low in Haryana (see table- 4.1, chapter- 4) and females are more deprived than males in education in almost all the districts of Haryana (presented in the table- 4.8, chapter- 4).

Figure: 5.6 Level of Adult Education Among Various Social Categories Respondents



Source: Author's calculation based on primary data

Figure- 5.6 presents that the SC category shows weak performance where the illiteracy rate is highest in this category as compared to the General and OBC category whereas highly educated adults are lowest among all the social categories.

The table-5.6 shows the weak performance of adults as per their education status.

Hence the present study is an attempt to measure the reasons or causes of low education

(less than matriculation) among adult males and females which are shown in the following table:

Table: 5.7 Reason of Low Level of Adult Education Among Respondents (in Percent)

District	Reason	Male	Female	Total
Faridabad	Family not allowed	6.8	**53.3**	**34.9**
	Absence of school in village	1.7	12.2	8.1
	Household responsibilities	18.6	5.6	10.7
	Poor infrastructure in school	5.1	5.6	5.4
	Safety reasons	0	2.2	1.3
	Couldn't afford school fees	10.2	2.2	5.4
	Lack of interest in Studies	**57.6**	16.7	**32.9**
	Physical disability	0	2.2	1.3
Gurugram	Family not allowed	4.1	**47**	**33.8**
	Absence of school in village	0	19.4	15.5
	Household responsibilities	2.7	0	0.7
	Poor infrastructure in school	17.8	9.7	11.2
	Safety reasons	0	2.2	1.4
	Couldn't afford school fees	17.8	3.7	7.6
	Lack of interest in Studies	**56.2**	17.9	29.5
	Physical disability	1.4	0	0.4
Jind	Family not allowed	7.1	**73.2**	**46.6**
	Absence of school in village	6.2	12.5	10
	Household responsibilities	16.8	1.2	7.5
	Poor infrastructure in school	1.8	0.6	1.1
	Safety reasons	0	3	1.8
	Couldn't afford school fees	18.6	1.8	8.5
	Lack of interest in Studies	**49.6**	7.7	24.6
	Physical disability	0	0	0
Karnal	Family not allowed	5.8	**56.1**	**34.2**
	Absence of school in village	3.7	11.5	8.1
	Households responsibilities	10.6	7.8	9
	Poor infrastructure in school	3.7	2.9	3.2
	Safety reasons	0	1.2	0.7
	Couldn't afford school fees	9.5	2.5	5.5
	Lack of interest in Studies	**66.7**	17.6	**39**
	Physical disability	0	0.4	0.2

Cont……..

District	Reason	Male	Female	Total
Rohtak	**Reason**	**Male**	**Female**	**Total**
	Family not allowed	15.7	**48.9**	**34.6**
	Absence of school in village	3.9	23	14.8
	Household responsibilities	13.7	4.4	8.4
	Poor infrastructure in school	3.9	1.5	2.5
	Safety reasons	0	0	0
	Couldn't afford school fees	9.8	5.2	7.2
	Lack of interest in Studies	**52**	17	**32.1**
	Physical disability	1	0	0.4
Yamuna Nagar	Family not allowed	7.1	**46.2**	31.2
	Absence of school in village	6.2	20	20.2
	Household responsibilities	16.8	16.9	12.8
	Poor infrastructure in school	1.8	0	0
	Safety reasons	0	3.1	1.8
	Couldn't afford school fees	18.6	0	0.9
	Lack of interest in Studies	**49.6**	13.8	33
	Physical disability	0	0	0
Haryana	Family not allowed	11.4	**55.9**	**40.7**
	Absence of school in village	6.9	15.6	12
	Household responsibilities	10.6	5.1	7.3
	Poor infrastructure in school	5.2	3.3	4
	Safety reasons	0.2	1.8	1.3
	Couldn't afford school fees	11.1	2.8	5.7
	Lack of interest in Studies	**54.4**	15.2	28.5
	Physical disability	0.3	0.4	0.4

Source: Authors own calculations based on primary data

Table- 5.7 presents the reason or causes of low education (less than matriculation) among males and females. In Haryana at the aggregate level the primary cause of low education among males is lack of interest in studies because 54.4 percent of adult males have not completed their matriculation because of their low interest in education. Apart from this variable poor economic condition (couldn't afford school fees), household responsibilities, non-availability of school in the village and poor infrastructure in school (specially non-availability of staff) are also responsible for low education in males. Whereas significant reason behind low education among females is family and social restrictions where about 56 percent of females are less educated because their family doesn't allow them to pursue their studies and along with this non-availability of

school in the village, lack of interest in studies, household responsibilities, poor infrastructure facilities in school, non-availability of school fees, and safety reasons has also caused low education among females respectively.

To summarize that the level of education shows a huge inequality in Haryana where the level of illiteracy in the SC category is higher than in other categories. Further females are more illiterate as compared to males among all the social categories in Haryana which shows gender disparity based on education and a root cause of this disparity is family and social restrictions for females. But the good thing is that almost all the school-going age children are attending schools at the district level as well as at aggregate level in Haryana which shows that the education situation is going to improve.

5.3.2 Deprivation in Health Dimension

The present section has divided into two parts where the first part shows health deprivation at the household level and the second part presents health deprivation among children and adults at the individual level in Haryana.

The level of deprivation at the household level in the health dimension is presented in this part. For measurement of the level of deprivation in the health dimension, the study uses two indicators (nutrition and child mortality) of the health dimension. Where a household is considered deprived in nutrition indicator if at least one household member is malnourished and if at least one 0-5 age group child has died in households five years before the survey then the household was considered as deprived in child mortality indicator. The level of deprivation in health indicators is presented in the following table:

Table: 5.8 Level of Deprivation in Health Dimension of MPI Among Households (in Percent)

District	Indicator	General	OBC	SC	Total
Faridabad	Nutrition	53.3	46.8	40	47.1
	Child Mortality	0	0	0	0
Gurugram	Nutrition	38.3	49.9	42.6	40
	Child Mortality	0	1.5	0	0.42
Jind	Nutrition	47.3	50	78.3	52.2
	Child Mortality	2.7	15.4	13	6.2
Karnal	Nutrition	52.2	34.5	59.6	53.2
	Child Mortality	0.6	3.4	2.8	1.7
Rohtak	Nutrition	29.3	34.1	30.8	30.8
	Child Mortality	1.9	0	1.9	1.08
Yamuna Nagar	Nutrition	53.8	51.3	80	56.6
	Child Mortality	7.7	2.7	0	3.3
Haryana	Nutrition	43.8	43.2	51.9	45.7
	Child Mortality	1.2	2.5	2.7	1.9

Source: Author's calculation based on primary data

Note: Absolute values related to this table are presented in A- 7 in Appendix.

Table- 5.8 presents the level of deprivation in health indicators of MPI at the households level in selected districts of Haryana. In Haryana, 45.7 percent of households are deprived of nutrition (at least one household member is malnourished) and only 1.5 percent of households are deprived due to child mortality indicators (at least one child has died in a household five years before the survey). In case of deprivation in nutrition, Yamuna Nagar (56.6 percent) is the most deprived district, followed by Karnal (53.2 percent), Jind (52.2 percent), Faridabad (47.1 percent), Gurugram (40 percent), and Rohtak (30.8 percent). In Yamuna Nagar, Jind, and Karnal district SC households are more deprived than other categories, whereas OBC households are more deprived in Gurugram and Rohtak, and in Faridabad General households are more deprived in nutrition indicators. In the child mortality indicator, Jind is the most deprived district where 6.2 percent of households are deprived that comprised 15.4 percent of OBC households, 13 percent of SC households, and 2.7 percent of General whereas in Faridabad no single household is deprived in child nutrition indicator.

Further, the level of health deprivation among children (0-5 age group) and adults (more than 5 years) based on their nutrition at the individual level is presented below. The empirical results based on children health are analysed through WHO anthro software and this software measured the malnutrition in case of weight for age (underweight), height for age (stunting), and weight for height (wasting) whereas adult health is measured through Body Mass Index (BMI). BMI has been calculated by individual weight (Kg) divided by height $(m)^2$ and an individual is considered underweight if their BMI value is less than 18.5 (Alkire and Santos, 2010).

$$\text{BMI} = \frac{weight\ (Kg)}{height\ \ (m)^2}$$

The level of child malnutrition (0-5 years age group) at individual level is shown as follows:

Table: 5.9 Child Malnutrition in Haryana (in Percent)

District	Social category	**Underweight**			**Stunted**			**Wasted**		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Faridabad	General	14.3	60	33.3	28.6	40	33.3	0	25	9.1
	OBC	24	23.8	23.9	25	23.8	24.4	13	15	14
	SC	0	0	0	33.3	0	25	0	0	0
	Total	**20**	**29.6**	**24.2**	**26.5**	**25.9**	**26.2**	**9.1**	**16**	**12.1**
Gurugram	General	12.5	18.2	15.2	4.2	31.8	17.4	8.7	13.6	11.1
	OBC	14.3	11.1	12.5	28.6	22.2	25	14.3	11.1	12.5
	SC	22.2	30.8	25.1	22.2	25	23.3	22.2	8.3	16.7
	Total	**16.3**	**20.5**	**18.3**	**14.3**	**27.9**	**20.7**	**14.6**	**11.6**	**13.2**
Jind	General	5.3	15	10.3	5	40	22.5	5.3	10	7.7
	OBC	20	20	20	60	40	50	0	0	0
	SC	30	40	33.3	20	20	20	25	20	23.1
	Total	**14.7**	**20**	**17.2**	**17.1**	**36.7**	**26.2**	**9.4**	**10**	**9.7**
Karnal	General	7.4	14.8	11.1	3.8	18.5	11.3	0	7.4	3.8
	OBC	0	0	0	0	0	0	0	0	0
	SC	16	27.8	20.9	12	16.7	14	12	11.1	11.6
	Total	**10.7**	**18.4**	**14.3**	**7.3**	**16.3**	**11.5**	**5.5**	**8.2**	**6.7**
Rohtak	General	10.5	13.6	12.2	11.1	13.6	12.5	5.3	18.2	12.2
	OBC	0	28.6	14.3	0	28.6	14.3	0	0	0
	SC	10	0	4.5	11.1	33.3	23.8	0	8.3	4.8
	Total	**8.3**	**12.2**	**10.4**	**8.8**	**22**	**16**	**2.9**	**12.2**	**7.9**

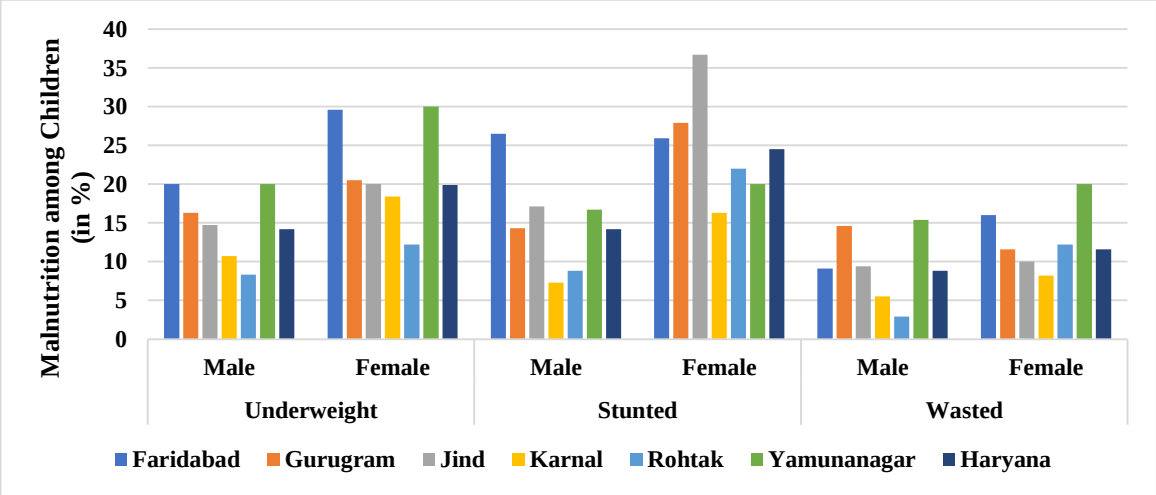
Cont……

District	Social category	Underweight			Stunted			Wasted		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Yamuna Nagar	General	0	33.3	20	0	33.3	20	0	33.3	20
	OBC	28.6	20	25	16.7	0	9.1	28.6	20	26
	SC	20	50	28.6	25	50	33.3	0	0	0
	Total	**20**	**30**	**24**	**16.7**	**20**	**18.2**	**15.4**	**20**	**17.4**
Haryana	General	9.1	18.2	13.2	7.2	26.3	16.8	4.2	13.3	8.8
	OBC	18.5	19.6	19	23.1	21.6	22.3	11.5	10	10.8
	SC	18.3	23.5	20.5	17.4	24	20.2	13.4	10	12
	Total	**14.2**	**19.9**	**16.9**	**14.2**	**24.5**	**19.1**	**8.8**	**11.6**	**10.1**

Source: Author's calculation based on primary data

Note: Children between 0-5 years age group are included in the table weight for age (underweight), height for age (stunted), and weight for height (wasted).

Figure: 5.7 Child Malnutrition Among Males and Females in Selected Districts

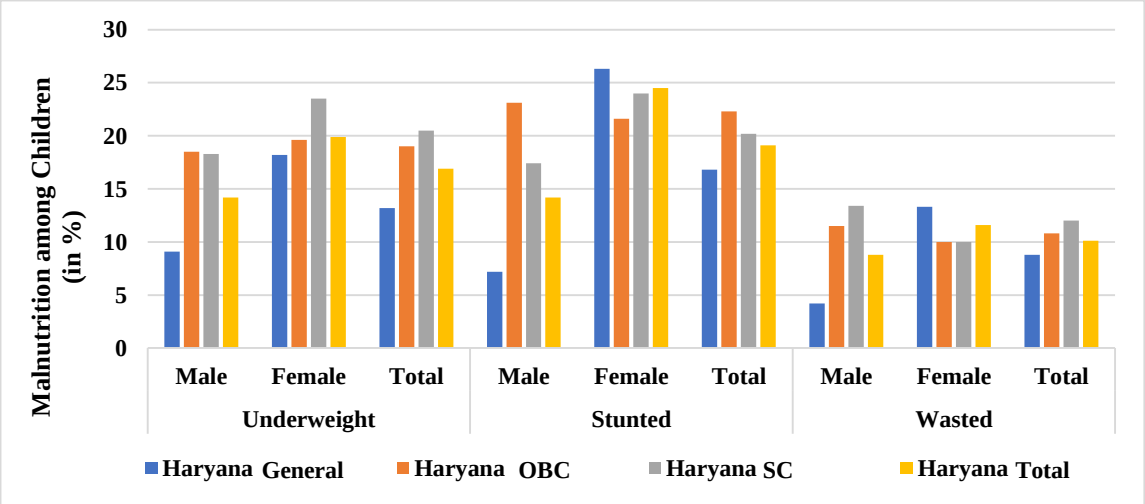


Source: Author's calculation based on primary data

Table- **5.9 and figure- 5.7** show the child health deprivation among males and females based on nutrition in selected districts. The percentage of stunted children under age five (19.1 percent) is higher in Haryana that contains 14.2 percent of males and 24.5 percent of females followed by underweight children (16.9 percent) comprised 19.9 percent of female and 14.2 percent of male, and wasted children (10.1 percent) includes 8.8 percent of male and 11.6 percent of female children. In the case of underweight children, Faridabad is the highly deprived district where 24.2 percent of children are underweight that consists 20 percent of males and 29.6 percent of females, and Rohtak is a less deprived district where child malnutrition rate is 10.4 percent that comprised

8.3 percent of male and 12.2 percent of female. In the case of stunted children, Faridabad and Jind districts are more deprived where both of these districts have equal stunted children that are 26.2 percent and both of the districts have more percentage of female stunted children, on the other hand, Karnal is less deprived in which 11.5 percent of children are stunted that consist 7.3 percent of males and 16.3 percent of females. Yamuna Nagar district has a high percentage of wasted children that involved 15.4 percent of males and 20 percent of female whereas Karnal has less percentage of wasted children involved 5.5 percent of male and 8.2 percent of female.

Figure: 5.8 Child Malnutrition Among Various Social Categories in Haryana



Source: Author's calculation based on primary data

Table- 5.9 and figure- 5.8 presents that taking all the districts together result shows that the SC category has a highest percentage of underweight children, whereas the OBC category has the highest stunted children among all the categories, but at the district level the result presents a mixed picture for example in Gurugram district SC category has more underweight and wasted children whereas General categories children have a high percentage of stunting. There is a high variation on the basis of social categories, gender, and regions. The results of this study are different from a study conducted by **Yadav et al. (2016)** who collected the data in 2012 in Ambala where the authors concluded that 41.3 percent of under-five age children are underweight in Haryana which is about double of our study results.

The level of adult malnutrition is shown in following table- 5.10.

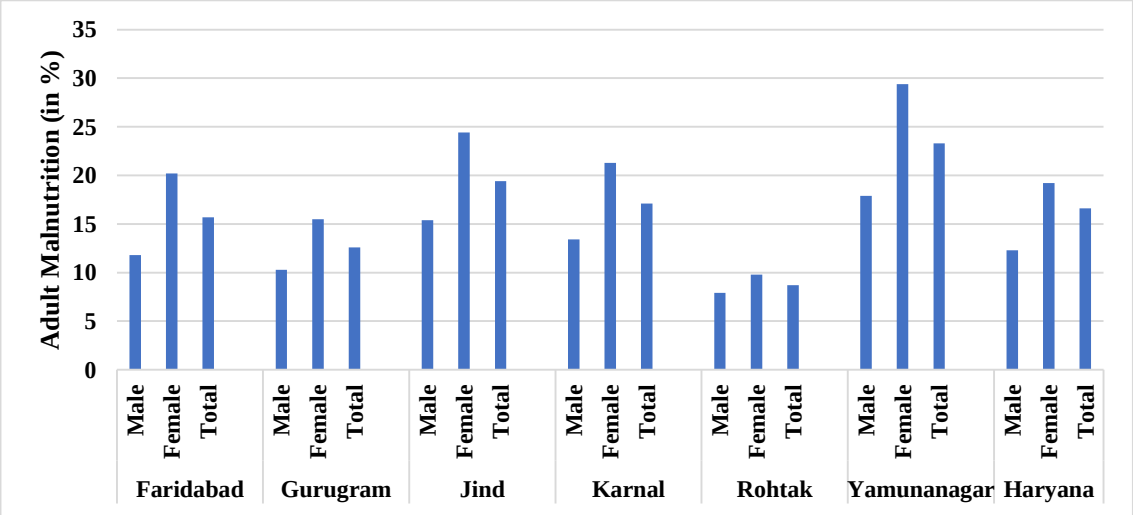
Table: 5.10 Adult Malnutrition (Underweight) Among Respondents (In Percent)

District	Gender	General	OBC	SC	Total
Faridabad	Male	5.6	12.7	14.8	11.8
	Female	32.4	18.7	10.5	20.2
	Total	**18.6**	**15.5**	**13**	**15.7**
Gurugram	Male	8.9	12.1	11.2	10.3
	Female	16	14.7	15.3	15.5
	Total	**12.1**	**13.2**	**13.2**	**12.6**
Jind	Male	10.9	24	25	15.4
	Female	22	14	47.8	24.4
	Total	**15.8**	**19.7**	**35.3**	**19.4**
Karnal	Male	11.7	17.4	14.6	13.4
	Female	15.5	27.6	28.4	21.3
	Total	**13.6**	**22**	**20.8**	**17.1**
Rohtak	Male	8.2	8.7	6.6	7.9
	Female	9	8.6	11.8	9.8
	Total	**8.6**	**8.6**	**9**	**8.7**
Yamuna Nagar	Male	14.3	12	41.4	17.9
	Female	15.4	27.5	46.7	29.4
	Total	**14.8**	**19.2**	**44.1**	**23.3**
Haryana	Male	10.2	13.7	14.9	12.3
	Female	16.7	18.3	24.9	19.2
	Total	**15.9**	**15.8**	**19.5**	**16.6**

Source: Author's calculation based on primary data

Note: More than 5 years age group persons are considered as adults for measuring adult malnutrition.

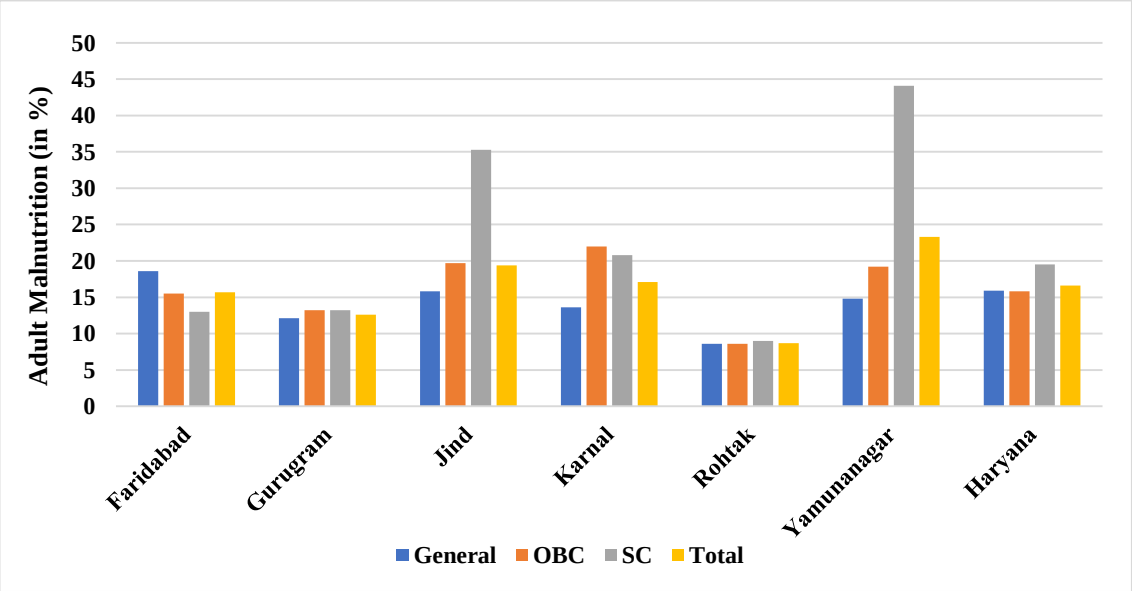
Figure: 5.9 Adult Malnutrition Among Males and Females at District Level in Haryana



Source: Author's calculation based on primary data

Table- 5.10 and figure- 5.9 shows the adult malnutrition among males and females in selected districts. The result presents that the adult malnutrition rate is 16.6 percent in Haryana in which male malnutrition is 12.3 percent and female malnutrition is 19.2 percent. Yamuna Nagar district is highly malnourished (23.3 percent) among all the districts, followed by Jind (19.4 percent), Karnal (17.1 percent), Faridabad (15.7 percent), Gurugram (12.6 percent), and Rohtak (8.7 percent). The level of female malnutrition is greater than males malnutrition in all the districts.

Figure: 5.10 Adult Malnutrition among Social Categories in Selected Districts in Haryana



Source: Author's calculation based on primary data

Table- 5.10 and figure- 5.10 reveal that percentage of malnutrition in the SC category is greater than other social categories whereas the General category and OBC category shows the almost same percentage of malnutrition in Haryana. At the district level, in Jind and Yamuna Nagar SC categories are more malnourished than General and OBC categories, malnutrition in Gurugram and Rohtak is almost equal in all the three categories, whereas OBC category is more malnourished in Karnal, and General category is more malnourished in Faridabad districts as compared to other categories.

In short, results on malnutrition among children and adults are almost similar where malnutrition in females is higher than in males that showing the gender inequality in the health dimension. It is considered as one of the serious problems

which affect the overall health of individuals. Where undernutrition in children has been responsible for the weak immune system, poor mental health, and school performance whereas malnutrition among adults also has been responsible for many health-related problems i.e. weak immunity, risk of getting infections, etc.

5.3.3 Standard of Living Deprivation

This section represents the results of measurement of households deprivation in the standard of living dimension which includes the housing conditions, deprivation in durable goods, and level of deprivation in standard of living indicators (assets, cooking fuel, drinking water, electricity, flooring, and improved sanitation) of Multidimensional Poverty Index (MPI). The level of deprivation in the standard of living indicators of MPI is based on the following deprivation criterion which is shown in **table- 5.11.**

Table: 5.11 Deprivation Criterion for Standard of Living Indicators of MPI

Indicators	**A household is deprived if**
Electricity	Electricity is not available in the house.
Drinking Water	Clean drinking water is not available in the household or it is available more than 30 minutes away by walking.
Sanitation	Improved toilet is not available in the household or the toilet is shared with other households.
Flooring	The house has dirt, dung, or sand floor.
Cooking Fuel	The household is using dirty cooking fuel (Dung cake, charcoal, wood).
Assets	If a minimum of one asset related to information gathering source (TV, Radio, Mobile, and Telephone) is not available with the household, a minimum of one asset related to mobility (truck, tractor, car, bike, motorbike, animal cart, and motorboat) is not available with household, and a minimum of one asset related to livelihood (refrigerator, arable land, and livestock) is not available with household.

Source: Alkire and Santos (2010)

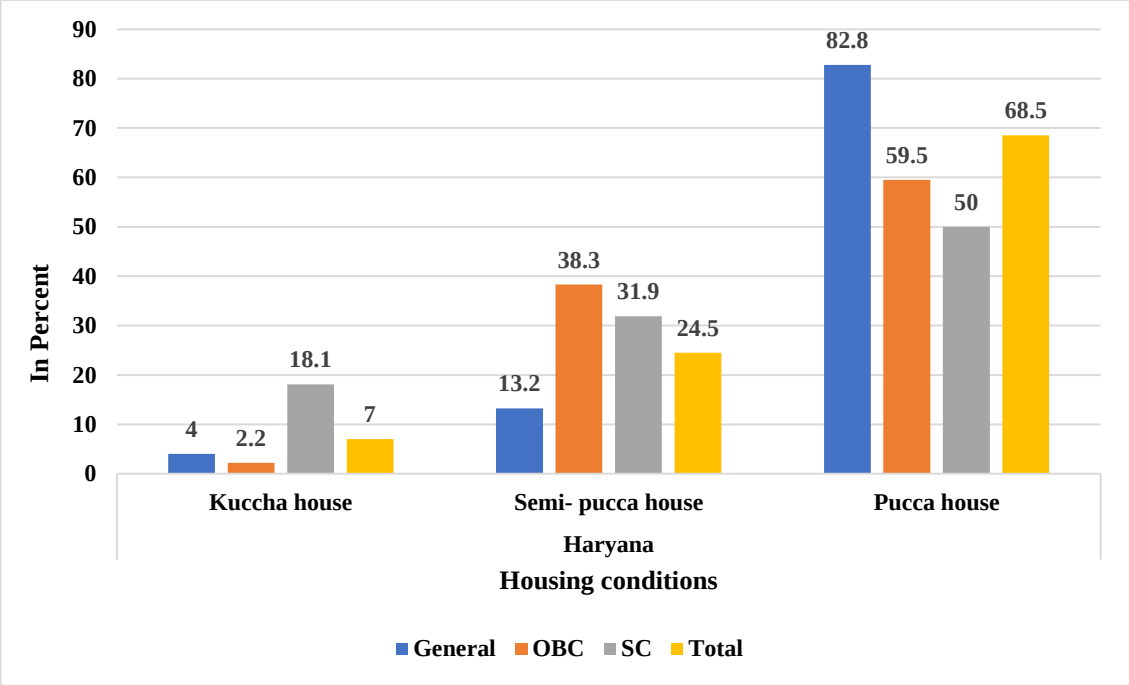
Distribution of households as per their housing conditions (kuccha house, semi- pucca house, and pucca house) is presented as follows.

Table: 5.12 Distribution of Households by Housing Conditions in Haryana (in Percent)

District	Housing conditions	General	OBC	SC	Total
Faridabad	Kuccha house	0	1.3	0	1
	Semi- pucca house	47.1	58.7	66.7	57.7
	Pucca house	52.9	40	33.3	41.3
Gurugram	Kuccha house	1.7	0	1.9	1.3
	Semi- pucca house	4.3	19.7	22.2	12.7
	Pucca house	93.9	80.3	75.9	86
Jind	Kuccha house	8.9	0	13	8.1
	Semi- pucca house	20.5	50	34.8	27.3
	Pucca house	70.6	50	52.2	64.6
Karnal	Kuccha house	2.5	3.6	18.4	8.5
	Semi- pucca house	3.2	14.3	27.5	13.2
	Pucca house	94.3	82.1	54.1	78.3
Rohtak	Kuccha house	3.3	0	36.5	11.9
	Semi- pucca house	24	57.1	42.3	37.8
	Pucca house	64	42.9	21.2	50.3
Yamuna Nagar	Kuccha house	7.7	10.8	40	15
	Semi- pucca house	0	18.9	30	20
	Pucca house	92.3	70.3	30	65
Haryana	Kuccha house	4	2.2	18.1	7
	Semi- pucca house	13.2	38.3	31.9	24.5
	Pucca house	82.8	59.5	50	68.5

Source: Author's calculation based on primary data

Figure: 5.11 Distribution of Households by Housing Conditions Among Various Social Categories in Haryana



Source: Author's calculation based on primary data

Table- 5.12, and figure- 5.11 depict the distribution of households by their housing conditions in selected districts of Haryana. In Haryana, 31.5 percent of households are living in kuccha or semi-pucca houses. Faridabad shows worse performance among all the districts where 58.7 percent of households are living in kuccha or semi-pucca houses and followed by Rohtak (49.7 percent), Jind (35.4 percent), Yamuna Nagar (35 percent), Karnal (21.7 percent), and Gurugram (14 percent). In the case of social categories, 50 percent of households in the SC category, 40.5 percent of households in OBC, and 17.2 percent of General category households are living in kuccha or semi-pucca houses in Haryana where most of the districts also show the same pattern where the performance of SC category by their housing condition is worse than other categories where 78.8 percent of SC households in Rohtak district, 70 percent of households in Yamuna Nagar, 66.7 percent in Faridabad, 47.8 percent in Jind, 45.9 percent in Karnal, and 24.1 percent are living in kuccha or semi-pucca houses in Gurugram.

Table: 5.13 Distribution of Households by Availability of Separate Kitchen and Bathroom Facilities (in Percent)

District	Social Category	Availability of Separate Kitchen		Availability of Bathroom	
		Yes	**No**	**Yes**	**No**
Faridabad	General	100	0	100	0
	OBC	77.3	22.7	97.3	2.7
	SC	66.7	33.3	100	0
	Total	**79.8**	**20.2**	**91.1**	**8.9**
Gurugram	General	100	0	100	0
	OBC	100	0	100	0
	SC	96.3	3.7	100	0
	Total	**99.1**	**0.9**	**100**	**0**
Jind	General	79.5	20.5	89.3	10.7
	OBC	73.1	26.9	80.8	19.2
	SC	34.8	65.2	43.5	56.5
	Total	**72**	**28**	**72.7**	**27.3**
Karnal	General	96.2	3.8	98.7	1.3
	OBC	78.6	21.4	89.3	10.7
	SC	71.6	28.4	84.4	15.6
	Total	**85.4**	**14.6**	**92.5**	**7.5**
Rohtak	General	**95.6**	4.4	100	0
	OBC	**85.7**	14.3	97.6	2.4
	SC	**63.5**	36.5	92.3	7.7
	Total	**84.3**	**15.7**	**97.3**	**2.7**
Yamuna Nagar	General	100	0	100	0
	OBC	91.9	8.1	94.6	5.4
	SC	20	80	90	10
	Total	**81.7**	**18.3**	**95**	**5**
Haryana	General	93.5	6.5	97.2	2.8
	OBC	85.8	14.2	97.4	2.6
	SC	53.8	46.2	86.5	13.5
	Total	**85.5**	**14.5**	**94**	**6**

Source: Author's calculation based on primary data

Table- 5.13 explains the distribution of households by the availability of kitchen, and bathroom facilities in selected districts. In the case of kitchen 14.5 percent don't have separate kitchen facilities including 46.2 percent of SC households, 14.2 percent of

OBC, and 6.5 percent of General households, and cook the food either in the living room or in open. In Jind district separate kitchen is not available in 28 percent of households, 20.2 percent of households in Faridabad, 18.3 percent in Yamuna Nagar, 15.2 percent in Rohtak, 14.6 percent in Karnal and only 0.9 percent in Gurugram are without a kitchen. in case of non-availability of the bathroom, 6 percent of households in Haryana are without a bathroom in Haryana that comprised 13.5 percent of SC households, 2.8 percent of General households, and 2.6 percent of OBC households, where Jind is the most deprived, and Gurugram is the less deprived district in the availability of bathroom facilities among all the districts. The results also reveal that SC is the most deprived category among all the districts in the availability of kitchen and bathroom facilities.

The level of households deprivation in durable goods based on television/radio, mobile/phone, refrigerator, cooler/fan, washing machine, tractor/car, motorcycle/ scooter/Scotty, computer, and air conditioner is shown as follows in the table- 5.14.

Table: 5.14 Deprived Households in Durable Goods in Haryana (in Percent)

District	**Social Category**	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Faridabad	General	0	0	11.8	0	11.8	58.8	5.9	94.1	100
	OBC	12	12	33.3	0	45.3	76	29.3	89.3	88
	SC	33.3	0	50	0	50	91.7	50	100	100
	Total	**12.5**	**8.7**	**31.7**	**0**	**40.4**	**75**	**27.9**	**91.3**	**91.3**
Gurugram	General	0	0	1.7	0.9	8.7	50.4	7	89.6	82.6
	OBC	0	1.5	3	0	15.2	48.5	9.1	86.4	87.9
	SC	3.7	0	13	0	44.4	85.2	27.8	96.3	94.4
	Total	**0.9**	**0.4**	**4.7**	**0.4**	**18.7**	**57.9**	**12.3**	**90.2**	**86.8**
Jind	General	12.5	1.8	18.8	0	30.4	79.5	47.3	94.6	91.1
	OBC	19.2	0	38.5	0	53.8	84.6	57.7	100	100
	SC	52.2	4.3	82.6	0	87	100	78.3	100	100
	Total	**19.3**	**1.9**	**31.1**	**0**	**42.2**	**83.2**	**53.4**	**96.3**	**93.8**
Karnal	General	0	0	0.6	0	4.4	46.8	8.2	89.9	70.9
	OBC	14.3	0	32.1	7.1	57.1	85.7	46.4	100	96.4
	SC	9.2	1.8	37.6	4.6	42.2	98.2	44	100	100
	Total	**4.7**	**0.7**	**17.3**	**2.4**	**23.4**	**69.5**	**25.1**	**94.6**	**84.1**

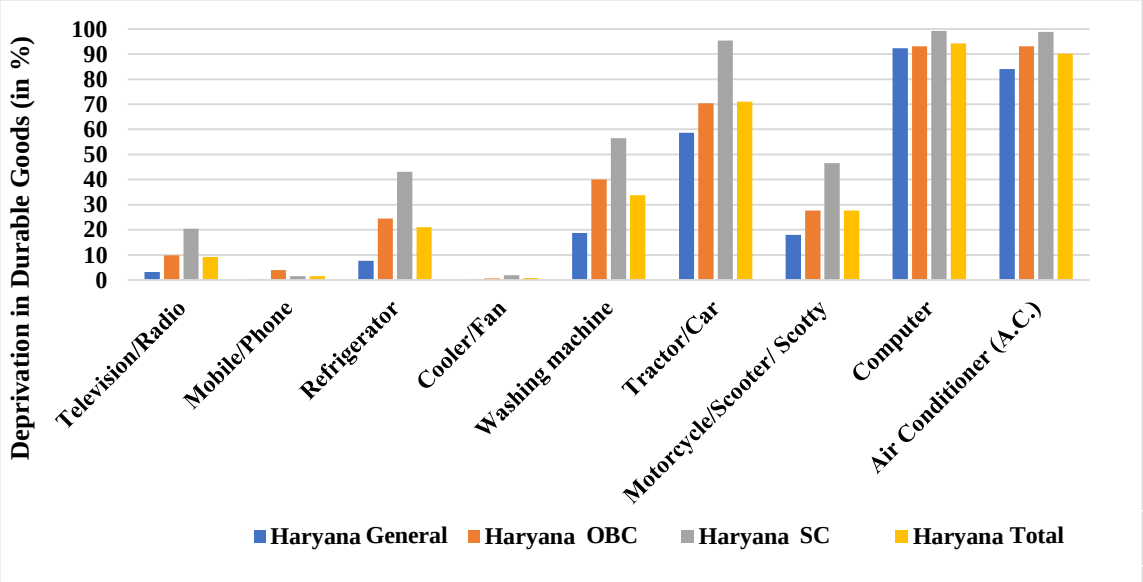
Cont…….

District	Social Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rohtak	General	2.2	0	9.9	0	40.7	60.4	15.4	95.6	94.5
	OBC	9.5	2.4	31	0	66.7	83.3	31	97.6	100
	SC	36.5	1.9	55.8	0	78.8	98.1	50	100	100
	Total	**13.5**	**1.1**	**27.6**	**0**	**57.3**	**76.2**	**28.6**	**97.3**	**97.3**
Yamuna Nagar	General	0	0	30.8	0	38.5	84.6	15.4	100	100
	OBC	13.5	0	21.6	0	21.6	62.2	18.9	97.3	97.3
	SC	60	0	100	0	100	100	80	100	100
	Total	**18.3**	**0**	**36.7**	**0**	**38.3**	**73.3**	**28.3**	**98.3**	**98.3**
Haryana	General	3.2	0.4	7.7	0.2	18.8	58.7	18	92.3	84
	OBC	9.9	4	24.5	0.7	40.1	70.4	27.7	93.1	93.1
	SC	20.4	1.5	43.1	1.9	56.5	95.4	46.5	99.2	98.8
	Total	**9.2**	**1.6**	**21**	**0.8**	**33.8**	**71**	**27.7**	**94.2**	**90.1**

Source: Author's calculation based on primary data

Note: 1- Television/radio, 2- Mobile/phone, 3- Refrigerator, 4- Cooler/fan, 5- Washing machine, 6- Tractor/Car, 7- Motorcycle/ scooter/Scotty, 8-Computer, 9-Air Conditioner.

Figure: 5.12 Households Deprivation in Durable Goods Among Various Social Categories in Haryana



Source: Author's calculation based on primary data

Table- 5.14 and figure 5.12 show the distribution of households by deprivation in durable goods in selected districts of Haryana. Computer (94.2 percent) and A.C. (90.1 percent) are the assets where deprivation level is high in Haryana followed by four-vehicles (tractor/ car), washing machine (33.8 percent), two- vehicles i.e. motorcycle/ scoter / Scotty (27.7 percent), refrigerator (21 percent), television/ radio (9.2 percent), and a very few households are deprived in phone and fan/ cooler. All the districts also have an almost same pattern where computer and A.C. are the most deprived assets (about more than 90 percent of households are deprived), and fan/ cooler and mobile/ phone are the less deprived assets among all the districts.

In the case of television/ radio, Jind (19.3 percent of households) is the most deprived district and Gurugram is the least deprived district among all the districts. In the refrigerator, Yamuna Nagar (36.7 percent of households) district is highly deprived and Gurugram (4.7 percent of households) district is the least deprived district. In the case of four vehicles and two vehicles, Jind and Yamuna Nagar are highly deprived districts in respected goods and Gurugram is the least deprived district in comparison to other districts. Table- 5.14 and figure 5.12 also divulges that SC is a most deprived category in all the durable asset as compared to other social categories in most of the districts.

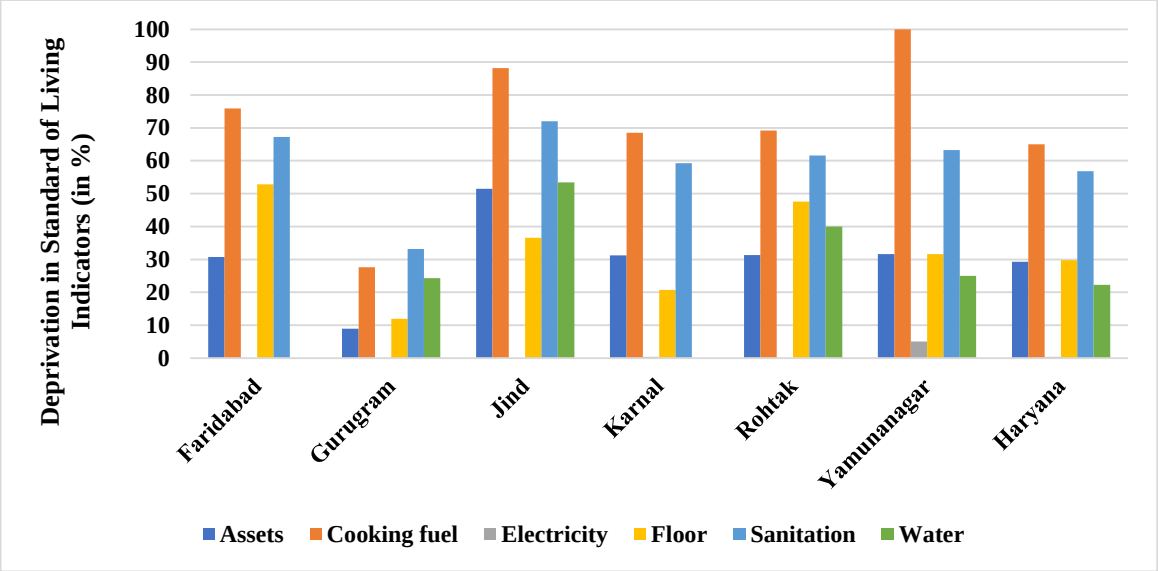
The level of deprivation among households in six standard of living indicators (assets, cooking fuel, electricity, floor, sanitation, and water) of MPI has shown as follows:

Table: 5.15 Level of Deprivation in Standard of Living Indicators of MPI (in Percent)

District	Social Category	Assets	Cooking fuel	Electricity	Floor	Sanitation	Water
Faridabad	General	6.6	73.3	0	20	46.6	0
	OBC	34.2	78.48	0	58.2	67.1	0
	SC	40	60	0	60	100	0
	Total	**30.7**	**75.9**	**0**	**52.8**	**67.3**	**0**
Gurugram	General	5.2	37.4	0	3.5	28.7	17.4
	OBC	4.5	16.6	0	18.2	31.8	30.3
	SC	22.2	22.2	0	22.2	44.4	31.5
	Total	**8.9**	**27.6**	**0**	**11.9**	**33.2**	**24.3**
Jind	General	42.8	86.6	0	31.2	64.3	58.9
	OBC	57.7	88.4	0	50	88.5	34.6
	SC	86.9	95.6	0	47.8	91.3	47.8
	Total	**51.5**	**88.2**	**0**	**36.6**	**72**	**53.4**
Karnal	General	8.9	73.8	0	6.4	45.2	0
	OBC	51.7	58.6	3.4	17.2	65.5	0
	SC	57.8	63.3	0	42.2	78	0
	Total	**31.2**	**68.5**	**0.34**	**20.7**	**59.3**	**0**
Rohtak	General	11.9	71.7	0	25	49	44.5
	OBC	39.0	65.8	0	61	70.7	19.5
	SC	59.6	67.3	0	76.9	76.9	48
	Total	**31.3**	**69.2**	**0**	**47.6**	**61.6**	**40**
Yamuna Nagar	General	23.1	100	0	23.1	61.5	61.5
	OBC	18.9	100	5.4	27.0	56.7	13.5
	SC	90	100	10	60	90	20
	Total	**31.6**	**100**	**5**	**31.6**	**63.3**	**25**
Haryana	General	16.5	68.6	0	15.5	46.8	26.7
	OBC	29.8	63.6	1.07	39.9	59.7	15.1
	SC	53.9	59.7	0.38	46.9	73.2	21.3
	Total	**29.3**	**65**	**0.38**	**29.8**	**56.8**	**22.3**

Source: Author's calculation based on primary data

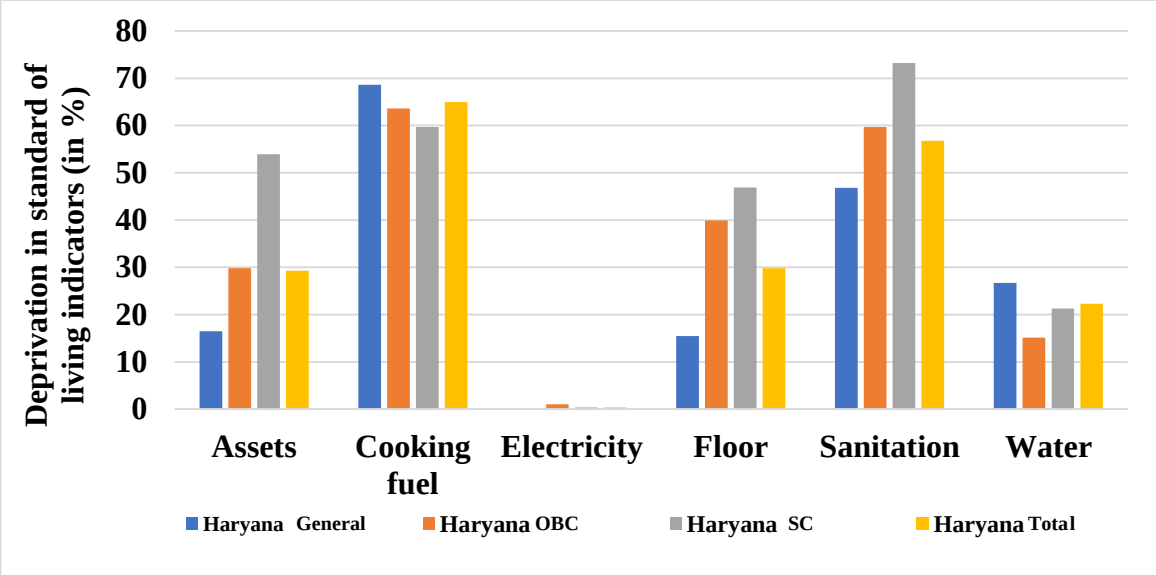
Figure: 5.13 Level of Deprivation in Standard of Living Indicators of MPI in Selected Districts



Source: **Source:** Author's calculation based on primary data

Table- 5.15 and figure- 5.13 presents the distribution of households by the level of deprivation in the standard of living indicators of MPI in selected districts of Haryana. In Haryana, cooking fuel is an indicator (where 65 percent of households are using dung cake, agriculture crop waste, straw/shrubs/grass, coal/lignite, and charcoal for cooking purposes) where high level of deprivation presents, followed by improved sanitation (56.8 percent of households), flooring (29.8 percent of households), assets (29.3 percent of households not having at least one asset related to information gathering source, at least one asset related to moving assets, and at least one assets related to livelihood), drinking water (22.3 percent of households drink unsafe drinking water), and electricity (0.38 percent of households don't have electricity connection in their houses). Cooking fuel is the most deprived (Yamuna Nagar is the most deprived and Gurugram is the less deprived district in cooking fuel indicator among all the districts) and electricity is the less deprived indicator in most of the districts. In case of deprivation in sanitation and water Rohtak is a highly deprived district whereas Gurugram is less deprived in sanitation but Karnal is less deprived in the water among all the districts.

Figure: 5.14 Level of Deprivation in Standard of Living Indicators of MPI in Social Categories in Haryana



Source: **Source:** Author's calculation based on primary data

Table- 5.15 and figure- 5.14 show that the General category is more deprived in cooking fuel and water indicators, the OBC category is somewhat more deprived in electricity, and the SC category is more deprived in assets, flooring, and sanitation indicators in Haryana.

To sum up, the standard of living of rural households in Haryana is poor where 65 percent of households use coal/wood/cow dung cake for cooking purposes, nearly 60 percent of households don't have improved toilet facilities, more than 30 percent households either living in kuccha or semi-pucca houses, about 30 percent of households living with a dirty floor, and more than 20 percent of households drinking unsafe water, whereas electricity is the single indicator which is available to the majority of the households of Haryana.

5.4 Poverty Estimates

This section has divided into three sub-sections where the first section presents the income and multidimensional poverty estimates based on primary data, the second section shows the sensitivity analysis of multidimensional poverty, and the third section analyses the determinants of multidimensional poverty in Haryana at the households level.

5.4.1 Income and Multidimensional Poverty Measures

This section represents the estimation results of the level of income and multidimensional poverty, deprivation status of households by the number of indicators they are deprived, the extent (slabs) of multidimensional poverty, the contribution of different dimensions (education, health, and standard of living) and their indicators in MPI.

As mentioned in earlier chapter-3, the income poverty measures are derived by using the following formulas.

(i) Income Poverty Measures

- **Income head count ratio (H_Y)** = $\frac{q}{n}$

Where q= number of poor households whose income fell below the income threshold, n= total population, and per month per capita income Rs. 1610.52 is poverty threshold which is revised (at 2018-19 prices) version of Rangarajan committee poverty line (per month per capita Rs. 1127.82 for rural Haryana at 2011-12 prices).

- **Income poverty gap index (P_1)** = $\frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-yi}{z}\right)$

Where n= total population, q= number of poor households whose income fell below the income threshold, z= income poverty line, and yi= income of the poor household.

- **Square poverty gap index (P_2)** = $\frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-yi}{z}\right)^2$

Where n= total population, q= number of poor households whose income fell below the income threshold, z= income poverty line, and yi= income of the poor household.

Following table shows the results of income based poverty measures in Haryana which are calculated by using the above formulae.

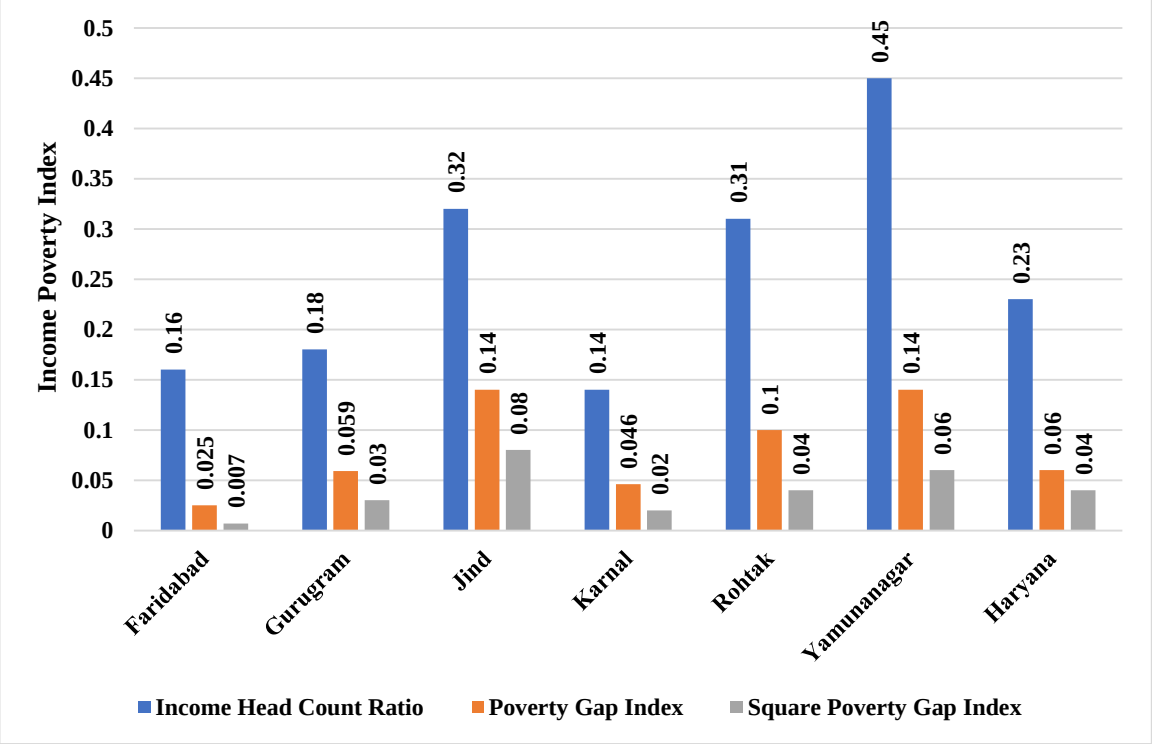
Table: 5.16 Income Poverty Estimates for Haryana

District	Category	Income Poverty Measures		
		H_Y	P_1	P_2
Faridabad	General	0	0	0
	OBC	0.19	0.03	0.008
	SC	0.20	0.026	0.006
	Total	**0.16**	**0.025**	**0.007**
Gurugram	General	0.16	0.06	0.030
	OBC	0.18	0.058	0.033
	SC	0.24	0.057	0.027
	Total	**0.18**	**0.059**	**0.030**
Jind	General	0.28	0.11	0.06
	OBC	0.23	0.12	0.10
	SC	0.61	0,29	0.17
	Total	**0.32**	**0.14**	**0.08**
Karnal	General	0.06	0.020	0.007
	OBC	0.17	0.049	0.036
	SC	0.25	0.094	0.034
	Total	**0.14**	**0.046**	**0.02**
Rohtak	General	0.25	0.08	0.03
	OBC	0.27	0.10	0.05
	SC	0.44	0.14	0.06
	Total	**0.31**	**0.10**	**0.04**
Yamunanagar	General	0.23	0.048	0.011
	OBC	0.43	0.13	0.059
	SC	0.80	0.28	0.12
	Total	**0.45**	**0.14**	**0.06**
Haryana	General	0.17	0.07	0.03
	OBC	0.23	0.11	0.04
	SC	0.34	0.07	0.05
	Total	**0.23**	**0.06**	**0.04**

Source: Author's calculation based on primary data

Note: H_Y = Income Head Count Ratio, P_1= Poverty Gap Index, P_2 = Square Poverty Gap Index,

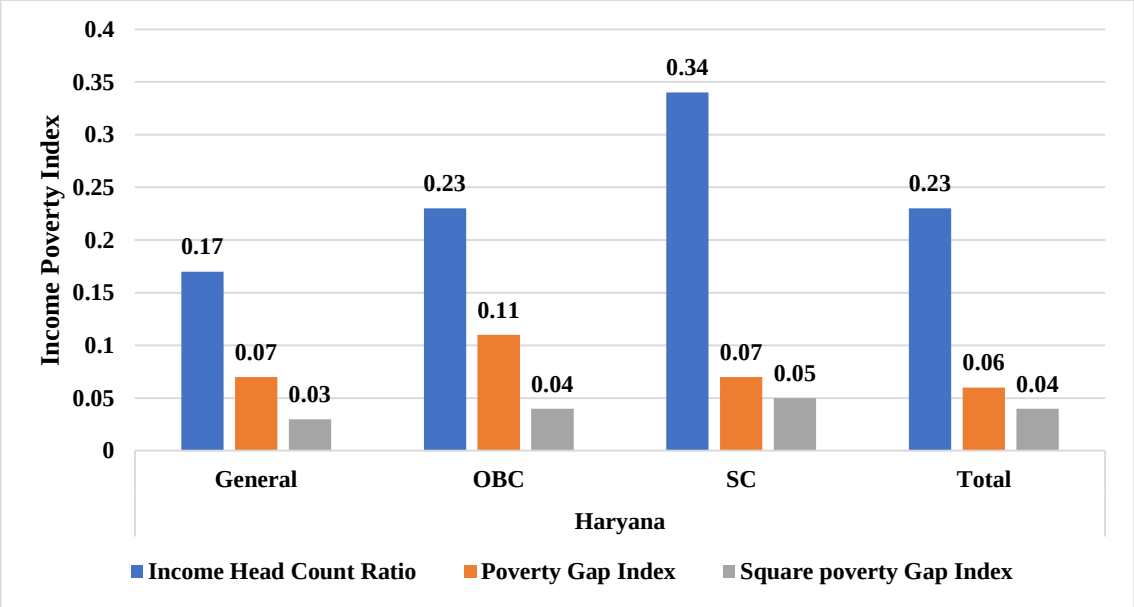
Figure: 5.15 Income Based Poverty Measurement in Selected Districts of Haryana



Source: Author's calculation based on primary data

Table- 5.16 and figure- 5.15 delineate the distribution of households by income head-count ratio, income gap poverty gap index, and square income poverty gap index. In Haryana, the income head-count ratio is 0.22 that shows 22 percent of households are below the poverty line whose monthly per capita income is less than the poverty threshold Rs. 1610.52 that comprised 80 percent of SC households, 43 percent of OBC households, and 23 percent of General households, poverty gap index ratio is 0.06 that means an average income of a poor household is 6 percent below from poverty threshold, and square poverty gap index ratio is 0.04 which presents that level of income inequality is 4 percent between income-poor households. At the district level, the percentage of income poor households are highest in Yamuna Nagar (45 percent) and lowest in Karnal (14 percent) whereas the income poverty gap ratio is high in Yamuna Nagar (0.14) and Jind (0.14), and low in Faridabad (0.025) but in the case of the square of income poverty index is highest in Karnal (0.08) and lowest in Faridabad (0.007).

Figure: 5.16 Income Based Poverty Measurement Among Various Social Categories in Haryana



Source: Author's calculation based on primary data

Table- 5.16 and figure- 5.16 shows that the income head-count ratio and square poverty gap index value is high in the SC category whereas the value of the income poverty gap index is high in the OBC category that shows the level of income poverty and income inequality among the poor is higher in SC households but the gap between an average poor household income and the poverty line is more in OBC category households. Income poverty among SC category is highest in Yamuna Nagar (80 percent) but the income poverty gap and square of income poverty gap index value is higher in Jind (0.14 and 0.08 respectively). In the OBC category, the income head-count ratio and poverty gap index value is highest in Yamuna Nagar but a square of poverty gap index ratio is highest in Jind. The General category shows better performance among all the categories but high variation between the districts has presented where Jind district shows higher value in all three income poverty measures.

(ii) Multidimensional Poverty Measures

As it is mentioned in chapter-3, Multidimensional Poverty measures use three important dimensions (education, health, and standard of living) for poverty estimation and these dimensions include total ten indicators in which two indicators (nutrition and child mortality) are taken for health dimension, two indicators (school attendance and school attainment) are taken for education dimension, and six indicators (cooking fuel,

drinking water, assets, flooring, sanitation, and electricity) are taken for the standard of living dimension. Where the multidimensional poverty measures such as head-count ratio, the intensity of poverty, and multidimensional poverty index are derived by using the following formula's:

Multidimensional head count ratio (H_M) = $\frac{q}{n}$

Where H= head-count ratio, q = number of multidimensionally poor households, and n = total households.

- **Intensity of Poverty (A)** = $\frac{1}{q}\sum_{i=1}^{q} C(K)$

Where q= number of multidimensionally poor households, C(K)= deprivation score of poor household.

- **Multidimensional Poverty Index (M_0)**= H_M × A

Where H_M is multidimensional head count ratio, and A is intensity of poverty.

Here, deprivation status of households by number of indicators they are deprived (of out of 10 indicators) is shown in table- 5.17.

Table: 5.17 Deprivation Status of Households by Number of Indicators (in Percent)

District	Social Categories	Number of Indicators a Household Deprived of											
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Faridabad	**General**	20	13.3	20	20	20	6.7	0	0	0	0	0	100
	OBC	5.1	15.2	15.2	3.8	21.5	26.6	12.6	0	0	0	0	100
	SC	0	10	20	30	0	10	30	0	0	0	0	100
	Total	**6.7**	**14.4**	**16.4**	**8.7**	**19.2**	**22.1**	**12.5**	**0**	**0**	**0**	**0**	**100**
Gurugram	**General**	20.9	27.8	29.6	6.9	12.2	0	1.7	0.9	0	0	0	100
	OBC	28.8	27.3	18.2	12.1	10.6	1.5	1.5	0	0	0	0	100
	SC	16.7	22.2	22.2	14.8	7.4	13	3.7	0	0	0	0	100
	Total	**22.1**	**26.4**	**24.8**	**10.2**	**10.6**	**3.4**	**2.1**	**0.4**	**0**	**0**	**0**	**100**
Jind	**General**	2.7	9.8	9.8	17	12.5	25	14.3	8.9	0	0	0	100
	OBC	3.9	3.9	0	11.5	26.9	19.2	30.8	3.8	0	0	0	100
	SC	0	4.3	0	4.3	8.7	8.7	65.2	8.8	0	0	0	100
	Total	**2.5**	**8.1**	**6.8**	**14.3**	**14.3**	**21.7**	**24.2**	**8.1**	**0**	**0**	**0**	**100**
Karnal	**General**	4.5	24.2	31.2	27.4	10.8	1.9	0	0	0	0	0	100
	OBC	3.5	17.2	10.3	24.1	20.7	17.2	3.5	3.5	0	0	0	100
	SC	0	3.6	25.7	20.2	20.2	21.1	9.2	0	0	0	0	100
	Total	**2.7**	**15.9**	**27.1**	**24.4**	**15.3**	**10.5**	**3.7**	**0.4**	**0**	**0**	**0**	**100**

Cont……

District	Social Categories	Number of Indicators a Household Deprived of											
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Rohtak	**General**	8.7	15.2	19.6	18.5	17.4	14.1	4.3	2.2	0	0	0	100
	OBC	4.9	19.5	12.2	12.2	14.6	26.8	9.8	0	0	0	0	100
	SC	11.6	1.9	9.6	7.7	15.4	9.6	36.5	7.7	0	0	0	100
	Total	**8.7**	**12.4**	**15.1**	**14.1**	**16.2**	**15.7**	**14.6**	**3.2**	**0**	**0**	**0**	**100**
Yamuna Nagar	**General**	0	23.1	15.3	0	7.7	23.1	23.1	7.7	0	0	0	100
	OBC	0	21.7	16.2	24.3	16.2	5.4	10.8	0	2.7	2.7	0	100
	SC	0	0	10	10	20	20	20	20	0	0	0	100
	Total	**0**	**18.3**	**15**	**16.7**	**15**	**11.7**	**15**	**5**	**1.7**	**1.7**	**0**	**100**
Haryana	**General**	8.9	19.8	23.2	17.9	12.9	9.5	5	2.8	0	0	0	100
	OBC	9.7	18.7	13.6	12.6	17.6	16.2	10.1	0.7	0.4	0.4	0	100
	SC	5.8	7.4	18.6	15.1	14.7	15.5	19.8	3.1	0	0	0	100
	Total	**8.4**	**16.4**	**19.5**	**15.8**	**14.6**	**12.8**	**10**	**2.3**	**0.1**	**0.1**	**0**	**100**

Source: Author's calculation based on primary data

Note: Absolute values related to this table are given in A-8 in appendix.

Table- 5.17 presents the deprivation status of households by the number of indicators in which they are deprived. The deprivation in '0' indicator shows the household is not deprived in any indicators, deprivation in 1 indicator shows that the household is deprived only in one indicator (out of 10 indicators), deprivation in 2 indicators shows that the household is deprived in two indicators (out of total 10 indicators) and so on. The result shows that in Haryana 8.4 percent of households are not deprived in any indicators, 16.4 percent of households are deprived in one indicator (out of 10 indicators), 19.5 percent of households are deprived in two indicators, 15.8 percent of households are deprived in three indicators, 14.6 percent of households are deprived in four indicators, 12.8 percent of households are deprived in five indicators, 10 percent of households are deprived in six indicators, 2.3 percent of households are deprived in seven indicators, 0.1 percent of households are deprived in eight and 0.1 percent of households are deprived in nine indicators, and no-one is deprived in all 10 indicators. At district level also shows almost similar results where a very few households are those who are not deprived in any dimension but in Gurugram, 22.1 percent of households are not deprived in any dimension which is highest among all the districts whereas Yamuna Nagar district shows worse picture because there is not even one household which is not deprived in any indicator (all households are deprived in one or the other indicators). The maximum number of indicators a household is deprived is 9

in Yamuna Nagar, 6 in Faridabad, and in remaining districts, the households are deprived of maximum 7 indicators.

The estimates of multidimensional heads count ratio, the intensity of poverty, and multidimensional poverty index has presented in table- 5.18.

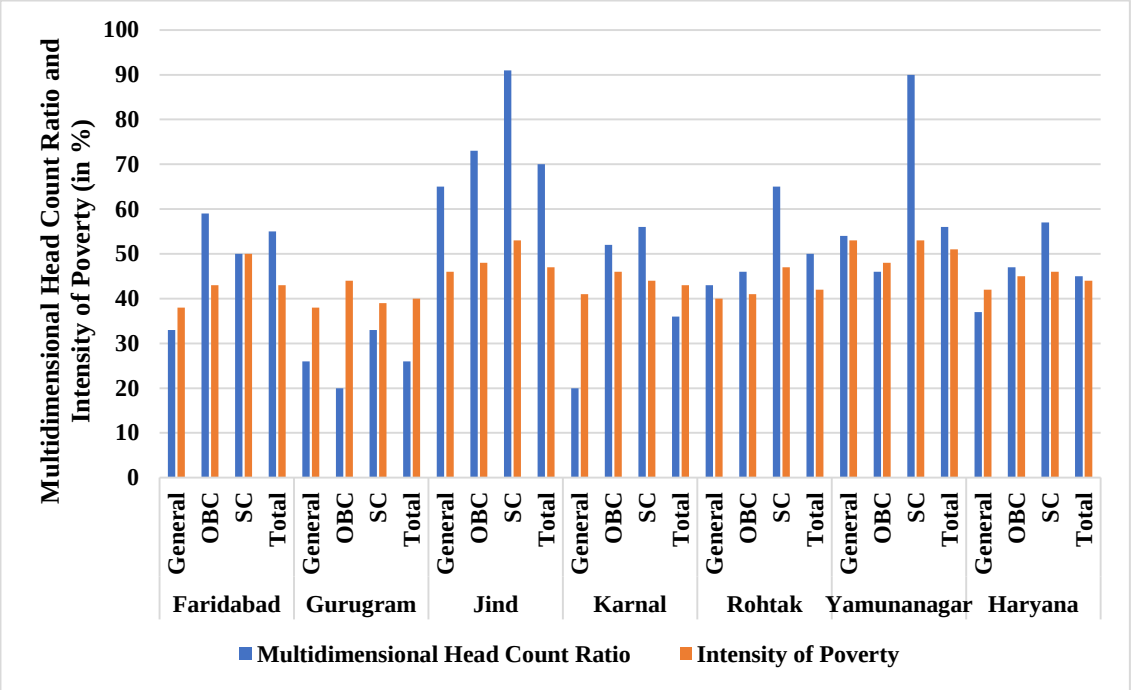
Table: 5.18 Multidimensional Poverty Estimates in Haryana

District	**Social Category**	**Multidimensional Poverty Measures**		
		H_M	**A**	M_0
Faridabad	General	0.33	0.38	0.13
	OBC	0.59	0.43	0.25
	SC	0.50	0.50	0.25
	Total	**0.55**	**0.43**	**0.24**
Gurugram	General	0.26	0.38	0.10
	OBC	0.20	0.42	0.08
	SC	0.33	0.39	0.13
	Total	**0.26**	**0.39**	**0.10**
Jind	General	0.65	0.46	0.30
	OBC	0.73	0.48	0.35
	SC	0.91	0.53	0.48
	Total	**0.70**	**0.47**	**0.33**
Karnal	General	0.20	0.41	0.08
	OBC	0.52	0.46	0.24
	SC	0.56	0.44	0.25
	Total	**0.36**	**0.43**	**0.15**
Rohtak	General	0.43	0.40	0.17
	OBC	0.46	0.41	0.19
	SC	0.65	0.47	0.31
	Total	**0.50**	**0.42**	**0.21**
Yamuna Nagar	General	0.54	0.53	0.29
	OBC	0.46	0.48	0.22
	SC	0.90	0.53	0.48
	Total	**0.56**	**0.51**	**0.29**
Haryana	General	0.37	0.42	0.16
	OBC	0.47	0.45	0.21
	SC	0.57	0.46	0.26
	Total	**0.45**	**0.44**	**0.20**

Source: Author's calculation based on primary data

Note: H_M = Multidimensional Head Count Ratio, A = Multidimensional Intensity of Poverty, and M_0 = Multidimensional Poverty Index or Adjusted Head Count Ratio.

Figure: 5.17 Multidimensional Head Count Ratio and Intensity of Poverty Among Various Social Categories



Source: Author's calculation based on primary data

Table- 5.18 and figure- 5.17 explain the distribution of households by multidimensional headcount ratio, the multidimensional intensity of poverty, and multidimensional poverty index in selected districts. In Haryana, 45 percent of households are multidimensionally poor and an average MPI poor person is 44 percent deprived in total dimensions and a multidimensional poverty index is the product of multidimensional head-count ratio (H_M) and intensity of poverty (A) that is 0.20 where MPI adjust the poverty figures into a single number. Jind district has the highest multidimensional as well as income-based poverty (70 percent of households are multidimensionally poor) whereas Yamuna Nagar is the most deprived district where an average MPI poor household is more than 50 percent deprived in total dimensions (d) among all the districts of Haryana but Gurugram district has low poverty (26 percent) as well as low deprivation (an average poor person is 39 percent deprived) among all the districts. The result also reveals that SC households are more multidimensionally poor as well as deprived than other categories where almost all the

districts follow the same pattern. The results of this study are similar to a study by (Sharma, 2014) which shows that multidimensional poverty in Haryana is much higher than income poverty.

Table: 5.19 Income Poverty and Multidimensional Poverty in Haryana

District	Income Criterion	Multidimensional Criterion		
		Non-Poor	Poor	Total
Faridabad	**Non-Poor**	42.3	**41.3**	83.7
	Poor	2.9	13.5	16.3
	Total	45.2	54.8	100
Gurugram	**Non-Poor**	63.8	**17.9**	81.7
	Poor	10.2	8.1	18.3
	Total	74	26	100
Jind	**Non-Poor**	25.5	**42.9**	68.3
	Poor	4.3	27.3	31.7
	Total	29.8	70.2	100
Karnal	**Non-Poor**	60.7	**25.1**	85.8
	Poor	3.0	11.2	14.2
	Total	63.7	36.3	100
Rohtak	**Non-Poor**	42.7	**26.5**	69.2
	Poor	7	23.8	30.8
	Total	49.7	50.3	100
Yamuna Nagar	**Non-Poor**	35	**20**	55
	Poor	10	35	45
	Total	45	55	100
Haryana	**Non-Poor**	49.4	**27.8**	77.2
	Poor	6	16.8	22.8
	Total	55.4	44.6	100

Source: Author's calculation based on primary data

Table- 5.19 presents the classification of households by income and multidimensional poverty. The result shows that the under coverage rate (percentage of those multidimensionally poor households whose non-poor by income perspective) is 27.8 percent in Haryana at the aggregated level where all the social categories show almost equal percentage. At the district level, Jind shows the highest under coverage rate where 42.9 percent of households are those who are multidimensionally poor but at the same time, these households are non-poor by income criterion whereas lowest in Gurugram district (17.9 percent) among all the districts of Haryana. The under coverage rate is 41.3 percent in Faridabad, 25.1 percent in Karnal, 26.5 percent in Rohtak, and 20 percent in Yamuna Nagar. The huge gap in poverty by analysing from two different perspectives where multidimensional poverty is much higher than income poverty shows that there are many such households that have sufficient level of income but even than unable to have a minimum level of education, better health, and appropriate standard of living so that there is a need of shift the focus from income poverty to multidimensional poverty by including important dimensions of living.

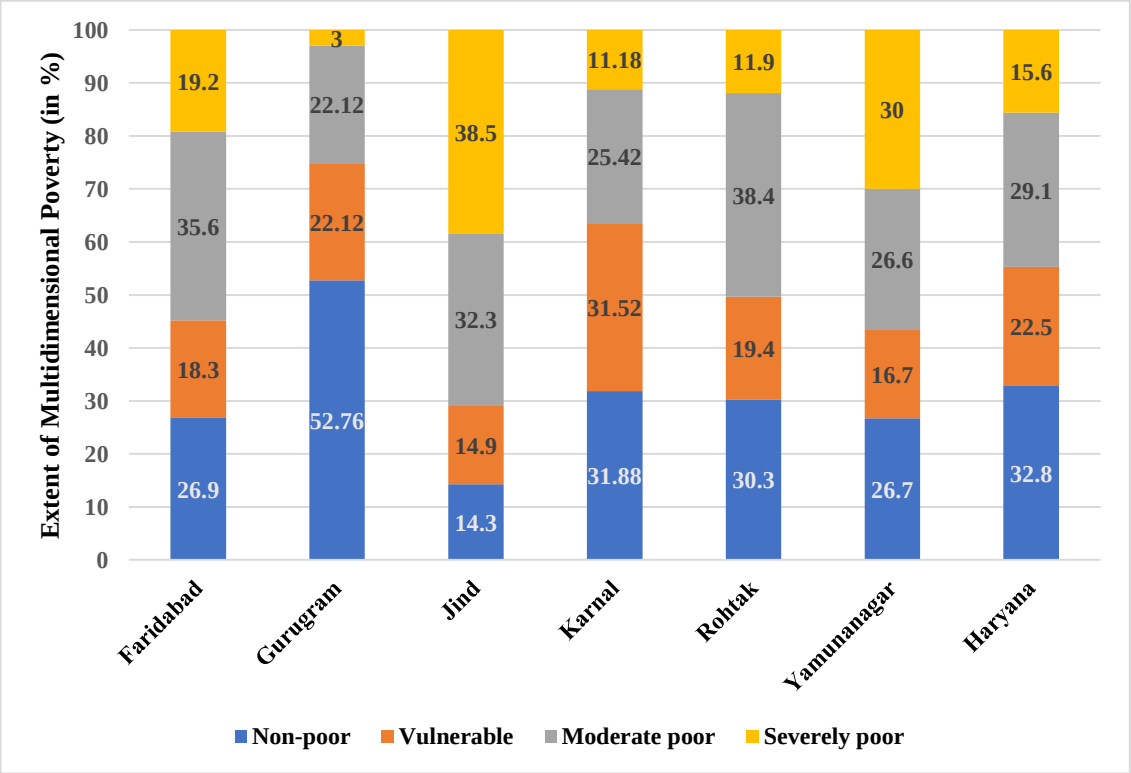
Based on the percentage of household deprivation in MPI indicators, households are divided into four categories**. 1) Non-poor:** If the deprivation score of a household is 0-0.20 in total MPI indicators. **2) Near to poverty (Vulnerable)**: If the deprivation score of a household is 0.21-0.33 in total MPI indicators. **3) Moderate Poor:** If the deprivation score of a household is 0.34-0.50 in total MPI indicators. **4) Severely poor:** If the deprivation score of a household is 0.51-1 in total MPI indicators. On the basis of the above deprivation categories extent or slabs of multidimensional poverty has presented in the following table- 5.20.

Table: 5.20 Extent/ Slabs of Multidimensional Poverty in Rural Households (in Percent)

District	Level of multidimensional poverty	Deprivation Score	Gen	OBC	SC	Total
Faridabad	Non-poor	0 - 0.200	33.3	26.6	20	26.9
	Near to poverty (vulnerable)	0.201 - 0.332	33.3	13.9	30	18.3
	Moderate poor	0.333 - 0.499	33.4	38	20	35.6
	Severely poor	**0.500 - 1**	**0**	**21.5**	**30**	**19.2**
Gurugram	Non-poor	0 - 0.200	52.17	62.14	42.6	52.76
	Near to poverty (vulnerable)	0.201 - 0.332	21.80	21.21	24.1	22.12
	Moderate poor	0.333 - 0.499	24.33	12.15	29.6	22.12
	Severely poor	**0.500 - 1**	**1.70**	**4.50**	**3.7**	**3.00**
Jind	Non-poor	0 - 0.200	17.8	7.7	4.4	14.3
	Near to poverty (vulnerable)	0.201 - 0.332	16.1	19.2	4.3	14.9
	Moderate poor	0.333- 0.499	34.8	30.8	21.7	32.3
	Severely poor	**0.500 - 1**	**31.3**	**42.3**	**69.6**	**38.5**
Karnal	Non-poor	0 - 0.200	40.12	31.03	20.18	31.88
	Near to poverty (vulnerable)	0.201 - 0.332	40.12	17.24	22.95	31.52
	Moderate poor	0.333 - 0.499	18.47	27.60	34.86	25.42
	Severely poor	**0.500 - 1**	**1.29**	**24.13**	**22.01**	**11.18**
Rohtak	Non-poor	0 - 0.200	31.5	36.6	23.1	30.3
	Near to poverty (vulnerable)	0.201 - 0.332	25	17.1	11.5	19.4
	Moderate poor	0.333 - 0.499	37	36.6	42.3	38.4
	Severely poor	**0.500 - 1**	**6.5**	**9.7**	**23.1**	**11.9**
Yamunanagar	Non-poor	0 - 0.200	30.78	32.43	0	26.7
	Near to poverty (vulnerable)	0.201 - 0.332	7.69	21.62	10	16.7
	Moderate poor	0.333 - 0.499	15.38	29.72	30	26.6
	Severely poor	**0.500 – 1**	**46.15**	**16.23**	**60**	**30.0**
Haryana	Non-poor	0 - 0.200	35.9	36	23.3	32.8
	Near to poverty (vulnerable)	0.201 - 0.332	26.8	18	19	22.5
	Moderate poor	0.333 - 0.499	27.2	29	33.3	29.1
	Severely poor	**0.500 – 1**	**10.1**	**17**	**24.4**	**15.6**

Source: Author's calculation based on primary data

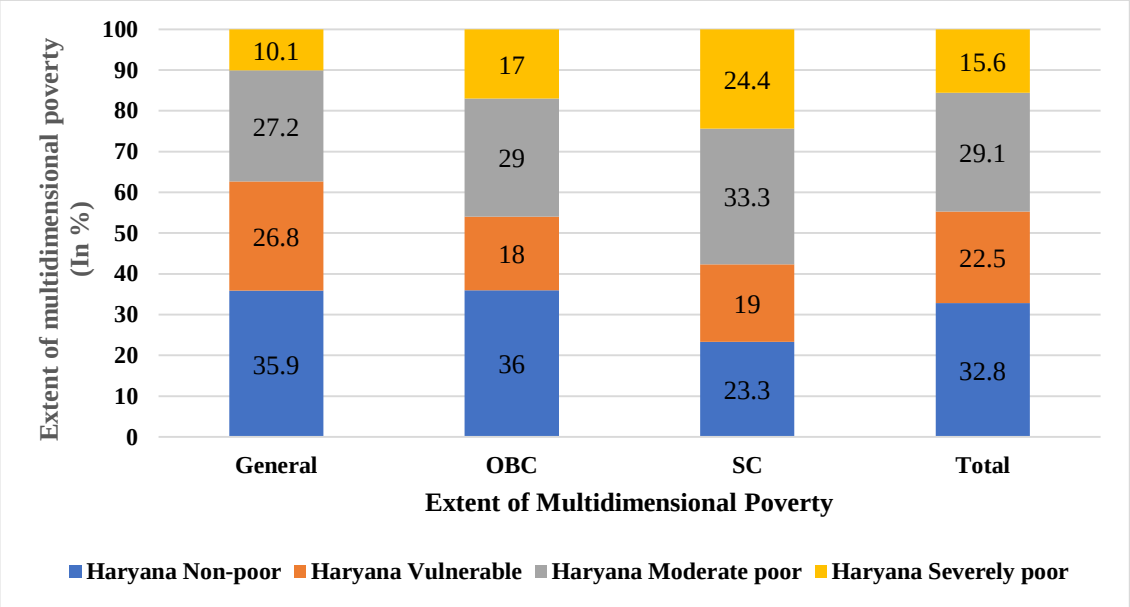
Figure: 5.18 Extent of Multidimensional Poverty in Selected Districts



Source: Author's calculation based on primary data

Table- 5.20 and figure- 5.18 represent the distribution of households by the extent of poverty in selected districts. In Haryana, 32.8 percent of households are non-poor, 22.5 percent of households are vulnerable, and 44.7 percent of households are multidimensionally poor in which 29.1 percent are moderately poor and 15.6 percent are severely poor. The level of severely poor and vulnerable households is high in all the districts. The Jind district has a high percentage of severely poor (38.5 percent) households followed by Yamuna Nagar (30 percent), Faridabad (19.2 percent), Rohtak (11.9 percent), Karnal (11.18 percent), and Gurugram (3 percent) whereas the percentage of vulnerable households are higher in Karnal (31.52 percent) and lower in Jind (14.9 percent), and these vulnerable households **and having chances to enter in the trap of poverty in future.**

Figure: 5.19 Extent of Multidimensional Poverty Among Various Social Categories in Haryana



Source: Author's calculation based on primary data

Figure- 5.19 presents that SC category households are more severely poor in Faridabad, Jind, Rohtak, and Gurugram districts among all the categories whereas in Gurugram and Karnal district OBC households are more severely poor. In the case of vulnerability, the General category is more vulnerable as compared to other categories.

One of the properties of the Multidimensional Poverty Index (MPI) is decomposability that means this methodology decomposes the deprivation by dimensions and indicators which shows what is the contribution of different dimensions of deprivation (and indicators of these dimensions) in MPI. So, this study decomposes the MPI by dimensions and indicators which shows that what dimensions and indicators are more responsible for MPI. The contribution of dimensions and indicators in MPI is calculated by using the following formula's:

⇨ **Contribution of Dimension j in MPI**

- $Contribution_j = \frac{\frac{1}{n}\sum_{i=1}^{q} C_j(K)}{M_0}$

Where, $Contribution_j$= contribution of dimension j (either education, health, or standard of living) in MPI, and $C_j(K)$ = poor's deprivation score in dimension j, q

= number of multidimensional poor households, n = total households, and M_0 = MPI.

⇨ **Contribution of Indicator I in MPI**

- $\boldsymbol{Contribution_I}$= $\frac{\frac{1}{n}\sum_{i=1}^{q} C_I(K)}{M_0}$

Where, $Contribution_I$= contribution of dimension I in M_0, and $C_I(K)$ = poor's deprivation score in dimension I, q = number of multidimensional poor households, n = total households, and M_0 = MPI

The contribution of dimensions (education, health and standard of living), and all the indicators in MPI has presented in the following table- 5.21

Table: 5.21 Contribution of Education, Health, and Standard of Living Dimension in Multidimensional Poverty Index (in Percent)

District	Dimensions and Indicators	General	OBC	SC	Total
Faridabad	**Education Dimensions**	**35.2**	**33.5**	**33.3**	**33.6**
	a) School attainment	35.2	33.5	33.3	33.6
	b) School Attendance	0	0	0	0
	Health Dimension	**26.4**	**24.5**	**26.6**	**24.9**
	a) Child Mortality	0	0	0	0
	b) Nutrition	26.4	24.5	26.6	24.9
	Standard of Living	**38.4**	**42**	**40.1**	**41.5**
	a) Assets	3	6.6	8.9	6.3
	b) Cooking fuel	14.8	11.8	8.9	12
	c) Drinking water	0	0	0	0
	d) Electricity	0	0	0	0
	e) Flooring	8.8	11.5	11.1	11.2
	f) Sanitation	11.8	12.1	11.1	12
Gurugram	**Education Dimension**	**42.2**	**34.4**	**30.6**	**37.1**
	a) School attainment	42.2	34.4	30.6	37.1
	b) School Attendance	0	0	0	0
	Health Dimension	**30.5**	**37.9**	**33**	**32.8**
	a) Child Mortality	0	0	0	0
	b) Nutrition	30.5	37.9	33	32.8
	Standard of Living	**27.3**	**27.7**	**36.4**	**30.1**
	a) Assets	2.9	3.5	5.5	3.8
	b) Cooking fuel	6.8	5.8	5.5	6.2
	c) Drinking water	7.3	6.9	9.5	7.9
	d) Electricity	0	0	0	0
	e) Flooring	1.5	4.6	6.3	3.6
	f) Sanitation	8.8	6.9	9.6	8.6

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District	Dimensions and Indicators	General	OBC	SC	Total
Jind	**Education Dimension**	**31.5**	**29.2**	**28.4**	**30.6**
	a) School attainment	31.5	29.2	28.4	30.6
	b) School Attendance	0	0	0	0
	Health Dimension	**25.2**	**29.2**	**30.0**	**26.9**
	a) Child Mortality	1.0	7.3	4.5	2.8
	b) Nutrition	24.2	21.9	25.5	24.1
	Standard of Living	**43.3**	**41.6**	**41.6**	**42.7**
	a) Assets	6.3	7.4	10	7.3
	b) Cooking fuel	11.8	11.6	10.5	11.5
	c) Drinking water	9.4	4.3	5.5	7.7
	d) Electricity	0	0	0	0
	e) Flooring	5.3	6.7	5.5	5.6
	f) Sanitation	10.5	11.6	10.1	10.6
Karnal	**Education Dimension**	**35.5**	**36.0**	**30.1**	**32.5**
	a) School attainment	35.5	36.0	30.1	32.5
	b) School Attendance	0	0	0	0
	Health Dimension	**40.7**	**33.5**	**33.2**	**35.3**
	a) Child Mortality	1.3	2.4	1.8	1.8
	b) Nutrition	39.4	31.1	31.4	33.5
	Standard of Living	**23.8**	**30.5**	**36.7**	**32.2**
	a) Assets	2.2	8.0	9.7	7.4
	b) Cooking fuel	12.4	8.0	9.7	10.2
	c) Drinking water	0	0	0	0
	d) Electricity	0	0.80	0	0.1
	e) Flooring	2.2	3.2	6.0	4.5
	f) Sanitation	7.0	10.5	11.3	10.0
Rohtak	**Education Dimension**	**36.5**	**27.8**	**32.6**	**33.2**
	a) School attainment	36.5	27.8	32.6	33.2
	b) School Attendance	0	0	0	0
	Health Dimension	**19.8**	**21.4**	**16.8**	**18.9**
	a) Child Mortality	0	0	1.0	0.4
	b) Nutrition	19.8	21.4	15.8	18.5
	Standard of Living	**43.7**	**50.8**	**50.5**	**47.9**
	a) Assets	3.8	9.3	9.9	7.3
	b) Cooking fuel	13	11.4	10.2	11.6
	c) Drinking water	9.1	3.6	7.8	7.5
	d) Electricity	0	0	0	0
	e) Flooring	6.6	13.6	11.3	9.9
	f) Sanitation	11.2	12.9	11.3	11.6
Yamuna Nagar	**Education Dimension**	**31.3**	**32.4**	**34.8**	**32.8**
	a) School attainment	31.3	32.4	31.3	31.8
	b) School Attendance	0	0	3.5	1.0
	Health Dimension	**31.3**	**32.3**	**24.4**	**29.8**
	a) Child Mortality	4.5	2.0	0	2.0
	b) Nutrition	26.8	30.3	24.4	27.8

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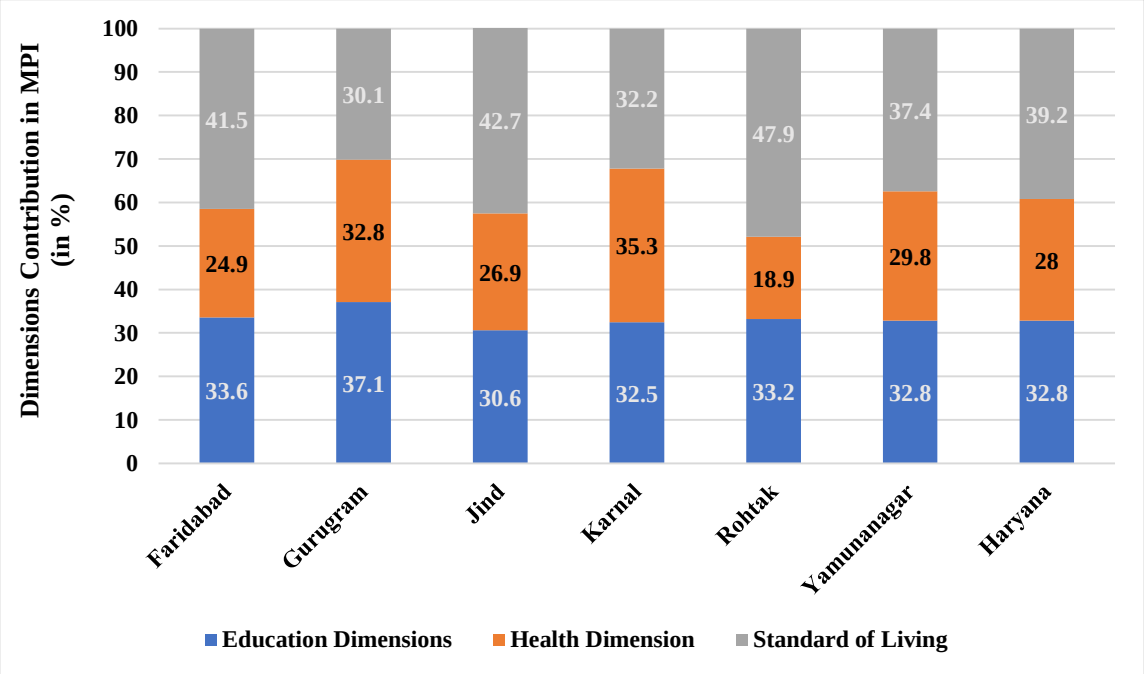
District	Dimensions and Indicators	General	OBC	SC	Total
	Standard of Living	**37.4**	**35.3**	**40.8**	**37.4**
	a) Assets	3.0	4.8	10.5	6.0
	b) Cooking fuel	10.4	11.5	10.5	11.0
	c) Drinking water	9.0	3.4	2.3	4.3
	d) Electricity	0	1.4	1.2	1.0
	e) Flooring	4.5	5.4	7.0	5.7
	f) Sanitation	10.5	8.8	9.3	9.3
Haryana	**Education Dimension**	**34.8**	**32.2**	**31.0**	**32.8**
	a) School Attainment	34.8	32.2	30.7	32.7
	b) School Attendance	0	0	0.3	0.1
	Health Dimension	**27.7**	**28.2**	**28.0**	**28.0**
	a) Child Mortality	0.8	1.8	1.7	1.4
	b) Nutrition	26.9	26.4	26.3	26.6
	Standard of Living	**37.5**	**39.6**	**41.0**	**39.2**
	a) Assets	4.4	6.7	9.4	6.7
	b) Cooking fuel	11.4	10.7	9.5	10.6
	c) Drinking water	7.3	2.3	3.8	4.7
	d) Electricity	0	0.3	0.1	0.1
	e) Flooring	4.6	8.6	7.4	6.6
	f) Sanitation	9.8	11.0	10.8	10.5

Source: Author's calculation based on primary data

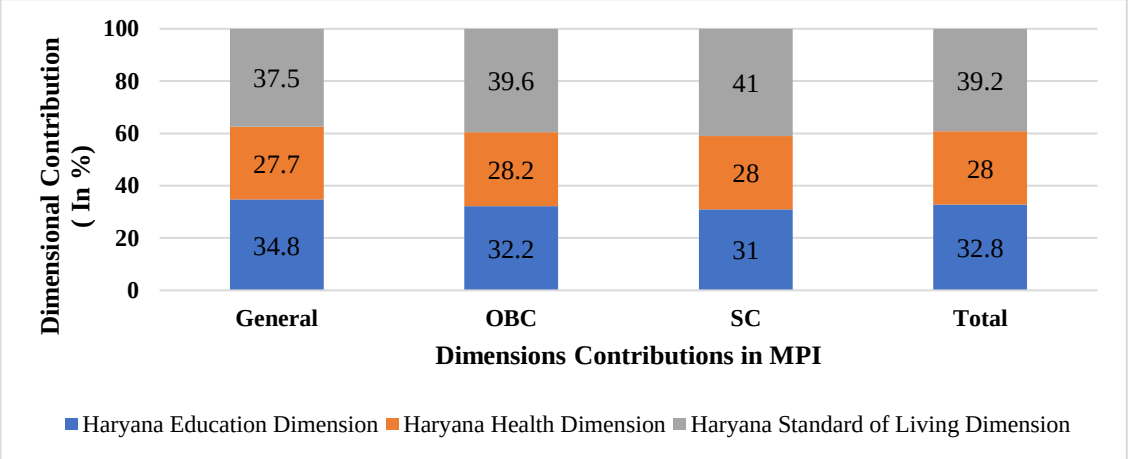
Figure: 5.20 Contribution of Education, Health, and Standard of Living Dimension in Multidimensional Poverty Index in Selected Districts



Source: Author's calculation based on primary data

Table- 5.21 and figure- 5.20 show the contribution of education, health, and standard of living dimension and their respective indicators in the Multidimensional Poverty Index in selected districts of Haryana. In Haryana standard of living dimension has the highest contribution (39.2 percent), followed by education (32.8 percent), and health dimension (28 percent) in MPI, and the contribution of each indicator in their respective dimension is presented in the table. At the district level, Faridabad, Jind, Rohtak, and Yamuna Nagar districts follow the same pattern as Haryana where the standard of living dimension has the highest contribution, and health dimension has the lowest contribution in MPI whereas in Karnal health dimension has the highest contribution in MPI followed by education and standard of living dimension. In Gurugram contribution of the education dimension is greater than, health and standard of living dimension in MPI. In Faridabad, Rohtak, and Yamuna Nagar districts all the categories follow the same pattern as their respective contribution in total but in Gurugram, Jind, and Karnal all the categories have different contributions in MPI that show variation by social category and by the district. In the case of indicators, school attainment indicator (32.7 percent) has the highest contribution in MPI followed by nutrition (26.6 percent), cooking fuel (10.6 percent), sanitation (10.5 percent), assets (6.7 percent), flooring (6.6 percent), drinking water (4.7 percent) whereas the contribution of deprivation in electricity and school attendance indicator is negligible at the aggregated level where almost all the districts also follow the same pattern.

Figure: 5.21 Contribution of Each Dimension in Multidimensional Poverty Index by Various Social Categories in Haryana



Source: Author's calculation based on primary data

Figure-5.21 shows that all the social category presents similar results where the standard of living dimension has the highest contribution in MPI followed by education and health dimensions.

In short, the level of multidimensional poverty is more than double of income poverty in Haryana where the standard of living dimension has the highest contribution (39.2 percent) in MPI followed by the education dimension (32.8 percent), and health dimension (28 percent). The level of multidimensional poverty is highest in Jind district but Yamuna Nagar district is a high-income poor district. The under-coverage rate (percentage of households are non-poor by income criterion but poor by multidimensional perspective) is very high in Haryana at aggregate as well as at district level. The level of poverty (income as well as multidimensional) is high in the SC category as compared to OBC and General category in all the districts except the Faridabad district.

5.4.2 Sensitivity Analysis of Multidimensional Poverty

Sensitivity analysis identify the percentage of "exactly poor" households at different poverty cut-offs (K) where poverty cut-off is a benchmark that is used to measure the multidimensionally poor households. Here, the multidimensional poverty at K=1 identifies the households which are deprived in at least one indicator (out of 10 indicators), and K=2 identifies the households who are poor in at least 2 indicators and so on. This section shows the sensitivity analysis of multidimensional poverty which shows the values of head-count ratio (H_M), intensity of poverty (A), and multidimensional poverty index (M_0) at different cut-off (K).

How change in poverty cut-off changes the value of head count ratio, intensity of poverty and MPI is shown in following table:

Table: 5.22 Sensitivity Analysis of Multidimensional Poverty Measures at Different Poverty Cut-off (K)

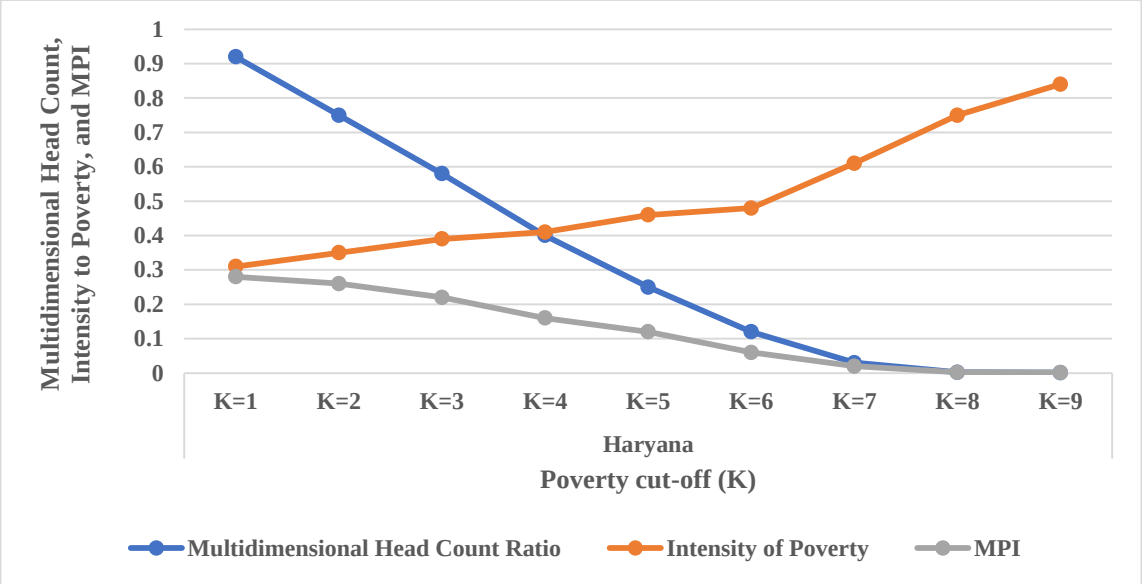
Districts	Poverty Cut-off	General			OBC			SC			Total		
		H_M	A	M_0	H_M	A	M_0	H_M	A	M_0	H_M	A	M_0
Faridabad	K=1	0.80	0.28	**0.22**	0.96	0.33	**0.32**	1	0.36	**0.36**	0.94	0.33	**0.31**
	K=2	0.67	0.31	**0.21**	0.80	0.37	**0.30**	1	0.36	**0.36**	0.80	0.36	**0.29**
	K=3	0.40	0.36	**0.14**	0.64	0.42	**0.27**	0.8	0.42	**0.34**	0.63	0.41	**0.26**
	K=4	0.27	0.38	**0.10**	0.59	0.43	**0.25**	0.5	0.50	**0.25**	0.54	0.43	**0.23**
	K=5	0.07	0.39	**0.03**	0.38	0.47	**0.18**	0.4	0.52	**0.21**	0.34	0.48	**0.16**
	K=6	0	0	**0**	0.13	0.56	**0.07**	0.3	0.56	**0.17**	0.13	0.56	**0.07**
	K=7	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=8	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=9	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=10	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Gurugram	K=1	0.79	0.24	**0.19**	0.71	0.24	**0.17**	0.83	0.27	**0.22**	0.78	0.24	**0.19**
	K=2	0.51	0.30	**0.15**	0.47	0.30	**0.14**	0.59	0.33	**0.19**	0.52	0.31	**0.16**
	K=3	0.29	0.37	**0.11**	0.29	0.37	**0.11**	0.44	0.37	**0.16**	0.32	0.37	**0.12**
	K=4	0.15	0.40	**0.06**	0.15	0.44	**0.07**	0.24	0.40	**0.10**	0.14	0.48	**0.07**
	K=5	0.03	0.54	**0.02**	0.06	0.49	**0.03**	0.13	0.44	**0.06**	0.06	0.47	**0.03**
	K=6	0.03	0.54	**0.02**	0	0	**0**	0.04	0.50	**0.02**	0.02	0.52	**0.01**
	K=7	0.01	0.61	**0.01**	0	0	**0**	0	0	**0**	0.004	0.61	**0.003**
	K=8	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=9	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=10	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Jind	K=1	0.97	0.38	**0.37**	0.96	0.42	**0.40**	1	0.50	**0.50**	0.98	0.40	**0.36**
	K=2	0.87	0.41	**0.36**	0.92	0.43	**0.40**	0.96	0.52	**0.50**	0.89	0.42	**0.38**
	K=3	0.80	0.42	**0.34**	0.92	0.43	**0.40**	0.96	0.52	**0.50**	0.84	0.44	**0.33**
	K=4	0.62	0.47	**0.29**	0.81	0.46	**0.37**	0.91	0.53	**0.48**	0.69	0.48	**0.25**
	K=5	0.49	0.50	**0.24**	0.50	0.56	**0.28**	0.83	0.55	**0.46**	0.54	0.52	**0.20**
	K=6	0.23	0.55	**0.13**	0.35	0.56	**0.19**	0.74	0.56	**0.41**	0.32	0.55	**0.18**
	K=7	0.11	0.61	**0.07**	0.04	0.61	**0.02**	0.09	0.61	**0.05**	0.09	0.61	**0.05**
	K=8	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=9	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=10	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**

Cont……

Districts	Poverty Cut-off	General			OBC			SC			Total		
		H_M	A	M_0	H_M	A	M_0	H_M	A	M_0	H_M	A	M_0
Karnal	K=1	0.95	0.23	**0.22**	0.97	0.33	**0.32**	1	0.33	**0.33**	0.97	0.29	**0.28**
	K=2	0.71	0.27	**0.19**	0.79	0.38	**0.30**	0.96	0.34	**0.33**	0.81	0.31	**0.25**
	K=3	0.41	0.34	**0.14**	0.69	0.40	**0.28**	0.72	0.40	**0.29**	0.55	0.38	**0.21**
	K=4	0.12	0.42	**0.05**	0.48	0.43	**0.21**	0.50	0.45	**0.23**	0.29	0.44	**0.13**
	K=5	0.02	0.47	**0.01**	0.24	0.53	**0.13**	0.31	0.49	**0.15**	0.15	0.49	**0.07**
	K=6	0	0	**0**	0.07	0.59	**0.04**	0.09	0.57	**0.05**	0.04	0.58	**0.02**
	K=7	0	0	**0**	0.03	0.61	**0.02**	0.01	0.73	**0.01**	0.01	0.61	**0.01**
	K=8	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=9	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=10	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Rohtak	K=1	0.91	0.29	**0.26**	0.95	0.28	**0.27**	0.88	0.39	**0.34**	0.91	0.31	**0.28**
	K=2	0.76	0.32	**0.24**	0.76	0.33	**0.25**	0.86	0.40	**0.34**	0.79	0.35	**0.28**
	K=3	0.59	0.36	**0.21**	0.63	0.37	**0.23**	0.77	0.43	**0.33**	0.65	0.39	**0.25**
	K=4	0.38	0.40	**0.15**	0.51	0.40	**0.20**	0.69	0.45	**0.31**	0.50	0.42	**0.21**
	K=5	0.21	0.45	**0.09**	0.37	0.43	**0.16**	0.54	0.49	**0.26**	0.34	0.46	**0.16**
	K=6	0.07	0.52	**0.04**	0.10	0.50	**0.05**	0.44	0.51	**0.22**	0.18	0.51	**0.10**
	K=7	0.02	0.61	**0.01**	0	0	**0**	0.08	0.61	**0.05**	0.03	0.61	**0.02**
	K=8	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=9	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
	K=10	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Yamuna Nagar	K=1	1	0.35	**0.35**	1	0.39	**0.39**	1	0.51	**0.51**	1	0.35	**0.35**
	K=2	0.69	0.48	**0.33**	0.78	0.37	**0.29**	1	0.51	**0.51**	0.80	0.42	**0.34**
	K=3	0.61	0.52	**0.32**	0.62	0.58	**0.36**	1	0.51	**0.51**	0.68	0.46	**0.32**
	K=4	0.61	0.52	**0.32**	0.38	0.51	**0.19**	0.9	0.53	**0.48**	0.52	0.52	**0.27**
	K=5	0.54	0.54	**0.29**	0.22	0.75	**0.16**	0.8	0.54	**0.44**	0.38	0.55	**0.21**
	K=6	0.31	0.60	**0.19**	0.16	0.60	**0.10**	0.4	0.64	**0.26**	0.23	0.61	**0.14**
	K=7	0.08	0.73	**0.06**	0.05	0.75	**0.04**	0.3	0.67	**0.20**	0.10	0.71	**0.07**
	K=8	0	0	**0**	0.03	0.84	**0.03**	0.1	0.67	**0.07**	0.03	0.75	**0.02**
	K=9	0	0	**0**	0.03	0.84	**0.03**	0	0	**0**	0.02	0.84	**0.02**
	K=10	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
Haryana	K=1	0.90	0.28	**0.25**	0.90	0.31	**0.28**	0.94	0.36	**0.34**	0.92	0.31	**0.28**
	K=2	0.71	0.33	**0.23**	0.72	0.36	**0.26**	0.87	0.38	**0.33**	0.75	0.35	**0.26**
	K=3	0.51	0.38	**0.19**	0.59	0.39	**0.23**	0.71	0.41	**0.29**	0.58	0.39	**0.22**
	K=4	0.30	0.42	**0.13**	0.46	0.43	**0.20**	0.53	0.44	**0.23**	0.40	0.41	**0.16**
	K=5	0.17	0.48	**0.08**	0.28	0.49	**0.14**	0.39	0.48	**0.19**	0.25	0.46	**0.12**
	K=6	0.08	0.52	**0.04**	0.11	0.56	**0.06**	0.23	0.53	**0.12**	0.12	0.48	**0.06**
	K=7	0.03	0.58	**0.02**	0.01	0.68	**0.01**	0.04	0.63	**0.03**	0.03	0.61	**0.02**
	K=8	0	0	**0**	0.004	0.84	**0.003**	0.004	0.67	**0.003**	0.002	0.75	**0.002**
	K=9	0	0	**0**	0.004	0.84	**0.003**	0	0	**0**	0.001	0.84	**0.001**
	K=10	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**

Source: Author's calculation based on primary data

Figure: 5.22 The Values of Multidimensional Head Count Ratio, Intensity of Poverty, and MPI at different Poverty Cut-off



Source: Author's calculation based on primary data

Table- 5.22 and figure- 5.22 presents the sensitivity analysis of poverty measures and the result divulges that how values of these poverty measures are changed as we change the poverty cut-off. In Haryana at K=1, 92 percent of households are multidimensionally poor where an average poor person is 31 percent deprived and value of MPI is 0.28, at K=2 multidimensional head-count ratio is 75 percent, the intensity of poverty is 35 percent and MPI is 0.26. At the district level, Yamuna Nagar is the most deprived district where all the households (100 percent) are poor by K=1 which means there is not even one household that is not deprived in any indicator (all households are deprived in one or the other indicators), at K=2 (at least deprived in 2 indicators) headcount ratio is 80 percent, intensity of poverty is 42 percent and the value of multidimensional poverty index is 0.34 and a household with a maximum number of the deprived indicator is nine that is highest among all the district. In Gurugram, Jind, Karnal, and Rohtak district a household is deprived in maximum seven indicators which mean no single household is deprived in eight or more indicators whereas in Faridabad maximum number of deprived indicators is six. The result also finds that the value of multidimensional head-count ratio and multidimensional poverty index has decreased and the value of the intensity of poverty has increased as the poverty cut-off (K) increases. Based on social indicators, the SC category shows a high

poverty ratio (head-count ratio) at all the cut-off (K) in most of the districts this means that the SC category households have the highest share in total poverty at each poverty cut-off (K) so there is a need of more focus on the welfare of SC category by government.

The above table presents the percentage of exactly poor households but which indicators are responsible for their poverty at different poverty Cut-off (K) presented in the following table- 5.23.

Table: 5.23 Indicator Wise Deprivation of Poor Households at Different Poverty Cut-off (K) (in Percent)

District	Indicators	Poverty cut-off (K)									
		K=1	K=2	K=3	K=4	K=5	K=6	K=7	K=8	K=9	K=10
Faridabad	School attainment	63.3	21.7	80	83.9	97.1	100	0	0	0	0
	School Attendance	0	0	0	0	0	0	0	0	0	0
	Child Mortality	0	0	0	0	0	0	0	0	0	0
	Nutrition	51	55.4	60	64.3	62.9	100	0	0	0	0
	Assets	31.6	37.3	46.2	35.7	80	100	0	0	0	0
	Cooking fuel	81.6	92.8	92.3	96.4	100	100	0	0	0	0
	Drinking water	0	0	0	0	0	0	0	0	0	0
	Electricity	0	0	0	0	0	0	0	0	0	0
	Flooring	56.1	67.5	78.5	91.1	100	100	0	0	0	0
	Sanitation	72.4	83.1	90.8	98.2	100	100	0	0	0	0
Gurugram	School attainment	49.2	61.5	60.5	91.2	71.4	80	100	0	0	0
	School Attendance	0	0	0	0	0	0	0	0	0	0
	Child Mortality	0.5	0.8	1.3	0	0	0	0	0	0	0
	Nutrition	51.4	63.1	55.3	73.5	85.7	80	100	0	0	0
	Assets	11.5	17.2	26.3	47.1	92.9	100	100	0	0	0
	Cooking fuel	36.1	47.5	44.7	67.6	71.4	80	100	0	0	0
	Drinking water	31.1	36.1	63.2	100	92.9	100	100	0	0	0
	Electricity	0	0	0	0	0	0	0	0	0	0
	Flooring	14.2	20.5	31.6	47.1	85.7	80	100	0	0	0
	Sanitation	42.6	48.4	57.9	100	92.9	100	100	0	0	0

Cont……

District	Indicators	Poverty cut-off (K)									
		K=1	K=2	K=3	K=4	K=5	K=6	K=7	K=8	K=9	K=10
Jind	School attainment	76.4	82.6	80.1	85.6	88.5	92.3	100	0	0	0
	School Attendance	0	0	0	0	0	0	0	0	0	0
	Child Mortality	6.4	4.9	6.6	7.2	6.9	11.5	0	0	0	0
	Nutrition	49	56.3	58.1	64.9	73.6	92.3	100	0	0	0
	Assets	52.9	56.3	60.3	66.7	71.3	80.8	100	0	0	0
	Cooking fuel	90.4	95.8	97.1	100	100	100	100	0	0	0
	Drinking water	54.8	59	62.5	70.3	73.6	75	100	0	0	0
	Electricity	0	0	0	0	0	0	0	0	0	0
	Flooring	37.6	41	43.4	48.6	62.1	69.2	100	0	0	0
	Sanitation	73.2	79.1	82.4	91.9	94.3	98.1	100	0	0	0
Karnal	School attainment	49.7	56.3	69.1	80.5	90.9	91.7	100	0	0	0
	School Attendance	0	0	0	0	0	0	0	0	0	0
	Child Mortality	1.4	1.7	1.9	3.4	2.3	8.3	50	0	0	0
	Nutrition	52.8	57.9	67.9	80.5	79.5	100	100	0	0	0
	Assets	32.5	58.8	49.4	73.6	90.9	100	100	0	0	0
	Cooking fuel	70.6	75.8	79.6	81.6	88.6	100	100	0	0	0
	Drinking water	0	0	0	0	0	0	0	0	0	0
	Electricity	0.35	0.41	0.62	1.1	2.3	8.3	50	0	0	0
	Flooring	21	23.8	28.4	41.4	61.4	91.7	100	0	0	0
	Sanitation	66.8	71.7	82.7	90.8	95.5	100	100	0	0	0
Rohtak	School attainment	60.9	66.4	72.5	77.2	80.6	90.9	100	0	0	0
	School Attendance	0	0	0	0	0	0	0	0	0	0
	Child Mortality	1.2	1.4	0.8	1.1	1.6	3	0	0	0	0
	Nutrition	33.7	35.6	37.5	39.1	46.8	54.5	100	0	0	0
	Assets	33.7	39	46.7	59.8	77.4	97	100	0	0	0
	Cooking fuel	74.6	80.8	86.7	88	93.5	94	100	0	0	0
	Drinking water	43.8	49.3	59.2	69.6	80.6	93.9	100	0	0	0
	Electricity	0	0	0	0	0	0	0	0	0	0
	Flooring	52.7	56.8	63.3	76.1	83.9	81.8	100	0	0	0
	Sanitation	67.5	82.9	75.8	92.4	93.5	93.9	100	0	0	0

Cont……

District	Indicators	Poverty cut-off (K)									
		K=1	K=2	K=3	K=4	K=5	K=6	K=7	K=8	K=9	K=10
Yamuna Nagar	School attainment	61.7	77.1	90.2	96.8	95.7	100	100	100	100	0
	School Attendance	1.7	2.1	2.4	3.2	4.3	7.1	16.7	0	0	0
	Child Mortality	3.3	4.2	4.9	6.5	8.7	14.3	33.3	50	100	0
	Nutrition	55	68.8	75.6	83.9	87	92.9	100	100	100	0
	Assets	31.7	39.6	46.3	61.3	73.9	71.4	100	100	100	0
	Cooking fuel	100	97.9	100	100	95.7	100	100	100	100	0
	Drinking water	25	31.3	34.1	45.2	56.5	71.4	83.3	100	100	0
	Electricity	3.3	4.2	4.9	6.5	8.7	14.3	33.3	100	100	0
	Flooring	31.7	39.6	46.3	54.8	65.2	85.7	83.3	100	100	0
	Sanitation	46.7	58.3	68.3	83.9	95.7	100	100	100	100	0
Haryana	School attainment	58.1	61.4	73.8	83.7	87.9	93	100	100	100	0
	School Attendance	0.1	0.1	0.2	0.2	0.4	0.8	33.3	0	0	0
	Child Mortality	2	2	2.7	3.4	3.8	7.8	10	50	100	0
	Nutrition	48.5	54.7	57.7	64.5	68.7	83.7	100	100	100	0
	Assets	31.9	44.7	47.8	60.3	78.5	88.4	100	100	100	0
	Cooking fuel	70.9	79.2	83.3	82	94.7	97.7	100	100	100	0
	Drinking water	24.3	27.6	36.3	46.2	52.8	65.9	90	100	100	0
	Electricity	0.3	0.4	0.5	0.7	1.1	2.3	10	100	100	0
	Flooring	32.3	38.2	45.8	59.4	73.6	79.8	96.7	100	100	0
	Sanitation	62.6	71.9	78	92.7	95.1	97.7	100	100	100	0

Source: Author's calculation based on primary data

Table- 5.23 presented the percentage of poor household's deprivation in MPI indicator at different poverty cut-offs (K) when all social categories were combined. In Haryana, at K=1 more than 70 percent of households are deprived in cooking fuel indicator, 62.6 percent of households don't have toilet facilities, 58.1 percent of households are deprived in school attainment indicator, 48.5 percent are deprived in nutrition, 32.3 percent have the dirty floor, and 31.9 percent of households are deprived in assets, and it means that these indicators are the significant causes of poverty at poverty cut-off one (K=1). From K=1 to K= 6 cooking fuel, sanitation, school attainment, nutrition, assets, flooring, and drinking water indicators are the most deprived indicators and these indicators are most responsible indicators of poverty but households deprivation

in school attendance, electricity, and child mortality indicator is very few (almost non-existent). At k=7 all the poor households (100 percent) are deprived in school attainment, nutrition, assets, cooking fuel, and sanitation indicators respectively, 33.3 percent of households are deprived in school attendance (at least one child from 6-14 years age is not going to school), 10 percent of households are deprived in child mortality (at least one child from 0-5 years has died from 5 years before the survey), and 10 percent of households don't have electricity in their houses. At K=8 all the poor households (100 percent) are deprived in school attainment, nutrition, assets, cooking fuel, drinking water, electricity, flooring, and sanitation but 50 percent of households are deprived in child mortality. At K=9 all the poor households are deprived in nine indicators (out of total 10 indicators) as school attainment, child mortality, nutrition, assets, cooking fuel, drinking water, electricity, flooring, and sanitation whereas no one is deprived in school attainment indicators at K=8 and K=9.

In Yamuna Nagar district, cooking fuel is the highly deprived indicator in which almost all the households are deprived at every poverty cut-off from K=1 to K=9 other than this school attainment, nutrition, assets, drinking water, flooring, and sanitation are also highly deprived indicators from K=1 to K=6. At K=7 apart from these variables which are highly deprived from K=1 to K=6, child mortality is also responsible for poverty in which 33.3 percent of households are deprived. In the Rohtak district, school attainment, nutrition, assets, cooking fuel, drinking water, flooring, and sanitation are the most deprived indicators whereas no one is deprived in school indicator and electricity, and a very few poor households are deprived in child mortality indicator from K=1 to K=7. In Karnal district, School attainment, nutrition, assets, cooking fuel, flooring, and sanitation are highly responsible indicators of poverty from K=1 to K=7 and it is very interesting to analyse that no one is deprived in school attendance and drinking water variables whereas a very few households are deprived in child mortality and electricity indicators from K=1 to K=6 but 50 percent of households are deprived at K=7 in respected indicators. The Jind and Gurugram district shows an almost the same pattern where school attainment, nutrition, assets, cooking fuel, drinking water, flooring, and sanitation indicators are the significant cause of poverty among households from K=1 to K=7. In Faridabad, a poor household is deprived in maximum six indicators and all the six indicators (school attainment, nutrition, nutrition, assets,

cooking fuel, flooring, and sanitation) are highly deprived whereas the percentage of deprivation in the remaining four indicators (school attendance, child mortality, drinking water and electricity) is zero.

It is summarized that sensitivity analysis shows the exactly poor households at different poverty cut-off (K) and it is found that the value of head-count ratio and MPI has declined and the value of intensity to deprivation has increased as we increase the poverty cut-off where SC category has the highest contribution in total poverty at each K among all the districts. In Haryana at the aggregate level school attainment, nutrition, assets, cooking fuel, drinking water, flooring, and sanitation indicators are the common responsible indicators of poverty at each K in all the districts hence, for reduction of the value of the head-count ratio, the intensity of poverty and MPI the more emphasis should be given to increase the accessibility of these indicators at village level.

5.5 Determinants of Poverty in Rural Haryana

This section presents the determinants of multidimensional poverty at the households level in Haryana where a binary logistic regression model is applied for the analysis. This section has been divided into two sub-sections where 5.5.1 section presents the estimates of binary logistic regression at Haryana at aggregate level whereas section 5.5.2 shows the estimates of binary logistic regression at the district level. The logit regression model is used to predict the relationship between independent variables and outcome variables where the nature of the outcome variable is binary. So, in this study, the nature of the dependent variable is binary/ dichotomous (multidimensional poor and non-poor) so that in this case binary logistic regression has been used. Here, total of sixteen variables are used as independent variables for estimation of poverty determinants by using the following equation:

$$\mathbf{P(y) = \frac{1}{1+e^{-(\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots\cdots\cdots + \beta_{16} X_{16} + e_i}}} \quad \textbf{……. (Eq. 5.1)}$$

In equation (5.1) P(y) is probability of happening y, e is base of natural logarithmic, α is intercept term, β's are coefficient of their respective independent variable, e_i is random term, and X's are independent variables.

The odd ratio (Exp (B)) is also an important term used in logistic regression analysis for analysing the constant effect of an independent variable on the probability

of an outcome will happen. Where the odd of an event happening is the probability of an event happening divided by the probability of event not happening is presented as below:

$$\textbf{Exp (B)} = \frac{P}{1-P} \text{ ……..} \quad \textbf{(Eq. 5.2)}$$

Where P is probability of happening and 1-P is probability of not happening. The value of odd lies between 0 to infinity. In the case, when the value of odd ratio is greater than one it shows that increase in independent variable also increase the odd ratio but if the value of odd ratio is below the one it means that increase in independent variable decline the odd ratio.

Here, natural logarithmic has been applied on (eq. 5.2) after which equation (5.3) has been received as follows:

$$\textbf{In } \left(\frac{P}{1-P}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \ldots\ldots + \beta_n X_n \quad \textbf{…….(Eq. 5.3)}$$

Where the value of In $(\frac{P}{1-P})$ or logit (which is presented as B in SPSS) lies between – infinity to + infinity. The positive value of logit indicates that as the value of independent variable increase the odd of the outcome happening (being multidimensionally poor) also increases and value of odd is greater than one whereas negative value of logit shows that as the value of independent variable increase the odd of the outcome happening (being multidimensionally poor) decreases and value of odd is less than one.

The complete detail of dependent and independent variables on the basis of their nature and category is presented in the table-5.24.

Table: 5.24 Model Specification for Binary Logistic Regression

Code	Variable	Nature	Category
Dependent Variable			
Yi	Multidimensionally poor or non-poor	Binary	Poor-1, non-poor-0
Independent Variables			
X_1	Head of family	Binary	Male-1, female-0
X_2	Social category	Binary	Unreserved-1, reserved-0
X_3	Type of family	Binary	Nuclear-1, Joint-0
X_4	Dependent population in house (children below age 15 and old age person)	Binary	Absent-1, present-0
X_5	Ration card	Binary	APL-1, BPL-0
X_6	Arable land	Binary	Yes-1, no-0
X_7	Main occupation	Categorical	Labourer-1, agriculture and allied activities-2, government job-3, private job-4, self-employed-5
X_8	Annual income	Categorical	Less than 1 lakh-1; 1 lakh to 2 lakh-2; 2.1 lakh to 3 lakh-3; more than 3 lakh-4
X_9	Adult female education	Binary	Matric or more-1, Less than matric-0
X_{10}	Adult male education	Binary	Matric or more-1, Less than matric-0
X_{11}	Adult female health	Binary	Healthy-1, malnutrished-0
X_{12}	Adult male health	Binary	Healthy-1, malnutrished-0
X_{13}	Health facility at village level	Binary	Yes-1, no-0
X_{14}	Cooking fuel	Binary	Clean-1, dirty-0
X_{15}	Toilet facilities	Binary	Improved-1, Not-improved-0
X_{16}	Drinking water	Binary	Safe-1, Unsafe-0

Source: Author's calculation based on primary data

5.5.1 Estimation of Binary Logistic Regression at Haryana Level

This section has been used to find out the determinants of poverty in Haryana at aggregate level where sixteen variables (head of family, social category, type of family, dependent population in household, ration card, arable land, main occupation, annual income, adult female education, adult male education, adult female health, adult male health, health facility at village level, cooking fuel, sanitation, and drinking water) are taken as independent variables. The results of binary logistic regression at Haryana level are presenting in the following table- 5.25.

Table: 5.25 Parameter Estimates for Binary Logistic Regression in Haryana

Variable	Description	B	S. E.	Wald	Sig. level	Exp(B)
$X_1(1)$	Head of family (Female)	.293	.320	.840	.359	1.340
X_2 (1)	Social category (Reserved)	-.431	.271	2.449	.118	.654
X_3 (1)	Type of family (Joint)	.287	.238	1.451	.228	1.332
$X_4(1)$	Dependent population in house (presented)	.736	.224	10.845	**.001***	2.088
$X_5(1)$	Ration card (BPL)	.204	.296	.474	.491	1.226
$X_6(1)$	Arable land (not-available)	.696	.275	6.356	**.012****	2.001
$X_7(1)$	Main occupation (Labour)	.707	.344	4.219	**.040****	2.027
$X_7(2)$	Main occupation (Agriculture and allied activities)	-.265	.323	.675	.411	.767
$X_7(3)$	Main occupation (Government Job)	-.632	.450	1.974	.160	.532
$X_7(4)$	Main occupation (Private Job)	-.376	.332	1.283	.257	.687
$X_8(1)$	Annual Income (<1 Lakh)	.310	.326	.902	.342	1.363
$X_8(2)$	Annual Income (1lakh-2 Lakh)	-.015	.306	.003	.960	.985
$X_8(3)$	Annual Income (2.1 lakh-3 lakh)	-.316	.383	.680	.409	.729
$X_9(1)$	Adult female education (<matric)	1.790	.263	46.234	**.000***	5.994
$X_{10}(1)$	Adult male education(<matric)	1.108	.211	27.699	**.000***	3.030
$X_{11}(1)$	Adult female health (malnourished)	1.996	.258	59.690	**.000***	7.358
$X_{12}(1)$	Adult male health (malnourished)	1.585	.313	25.673	**.000***	4.877
$X_{13}(1)$	Health facility at village level (not-available)	.747	.241	9.598	**.002***	2.110
$X_{14}(1)$	Cooking fuel (dirty)	1.221	.234	27.317	**.000***	3.392
$X_{15}(1)$	Sanitation (Not-improved)	1.275	.227	31.654	**.000***	3.579
$X_{16}(1)$	Drinking water (unsafe)	2.025	.258	61.807	**.000***	7.576
Constant		-5.652	.529	114.218	.000	.004
-2 Log Likelihood (-2LL)			698.352			
Nagelkerke R Square (R^2N)			.676			

Source: Author's calculation based on primary data

Note: (1) * means significant at 1 percent, ** means significant at 5 percent.

(2) S.E.- Standard Error, Sig. level- Significance level.

(3) Base categories- male head, unreserved social category, availability of land, APL ration card, nuclear family, more than 3 lakh annual income, health facility available at village level, self-employed, dependent population is absent, matric or more educated adult females, matric or more educated adult males, healthy female, healthy male, using clean cooking fuel, improved sanitation facilities, safe drinking water is available.

Table- 5.25 presents the factors responsible for multidimensional poverty at the households level in Haryana. Here total sixteen independent variables are taken which includes the head of the family, social category of household, type of family, whether dependant population presents or not in the house, type of ration card, whether arable land available or not to household, the main occupation of household, annual income, education of adult males in the household, education of adult females in the household, the health status of adult males, the health status of adult females, whether health facilities available or not at the village level, sanitation facility, type of cooking fuel used by household, and type of drinking water used by the household. The value of Nagelkerke pseudo R square (R^2N) is .676 that shows the specified model defines 67 percent variations in explaining the causes of poverty.

Dependent population in house, non-availability of arable land, labour as the main occupation, low adult females education, low adult males education, adult female malnutrition, adult male malnutrition, non-availability of the health facility at the village level, use of dirty cooking fuel, lack of improved sanitation facility, and use of unsafe drinking water are the significant causes of poverty at household level in Haryana. Every household where the dependent population is presented has 2.088 times higher chances of getting poor as compared to the households where the dependent population is not present. Those households who don't have arable land have 2.001 times more chances of being poor in comparison to those households that have arable land. In the case of the main occupation variable, labourers have 2.027 times higher possibilities of getting poor as compared to self-employed households. The households with at least one adult female with low education (whose level of education is less than matric) have 5.994 times and the household with at least one adult male whose level of education is less than matric has 3.030 times higher probabilities respectively to

become poor as compared to those households where all the adult females and males are with matric or more education. A household in which at least one malnourished adult female is available has 7.358 times and a household with at least one malnourished adult male has 4.877 times more likelihood of getting poor respectively as compared to a household where all the adult females and males are healthy. The possibility of being poor is 2.110 times more in those households whose villages don't have health facilities. Every household where dirty cooking fuel (using wood, cow dung cake, and charcoal) is using for cooking purposes has 3.392 times higher possibilities to become poor in comparison to those households who are using safe fuel (LPG and electricity). The households who don't have improved sanitation or improved toilet facilities have 3.579 times more chances of being poor. Non-availability of safe drinking water in the household is another significant cause of poverty which has 7.576 times higher odds of getting poor.

5.5.2 Estimates of Binary Logistic Regression at District Level

This section explains the causes of multidimensional poverty at household level in selected districts (Faridabad, Gurugram, Jind, Karnal, Rohtak, and Yamuna Nagar) that shows what are the variables that increase and decrease the probability of poverty for a household. The results of binary logistic regression in Faridabad are presented in the following table and there are total 104 rural households have been selected from the Faridabad district. In the case of the **Faridabad district**, SPSS does not take the values for drinking water variable (X_{16}), because safe drinking water is available in every household.

Table: 5.26 Parameter Estimates for Binary Logistic Regression for Faridabad District

Variable	Description	B	S. E.	Wald	Sig. level	Exp(B)
$X_1(1)$	Head of family (Female)	1.144	2.296	.248	.618	3.140
X_2 (1)	Social category (Reserved)	1.120	1.332	.708	.400	3.066
X_3 (1)	Type of family (Joint)	.417	1.257	.110	.740	1.517
$X_4(1)$	Dependent population in house (presented)	1.170	1.123	1.087	.297	3.223
$X_5(1)$	Ration card (BPL)	-1.193	1.331	.803	.370	.303
$X_6(1)$	Arable land (not-available)	.421	1.281	.108	.742	1.524
$X_7(1)$	Main occupation (Labour)	1.227	1.463	.704	.402	3.411
$X_7(2)$	Main occupation (Agriculture and allied activities)	2.841	1.652	2.956	**.086*** **	17.126
$X_7(3)$	Main occupation (Government Job)	-.954	2.206	.187	.665	.385
$X_7(4)$	Main occupation (Private Job)	1.747	1.286	1.847	.174	5.739
$X_8(1)$	Annual Income (<1 Lakh)	2.485	1.938	1.644	.200	11.997
$X_8(2)$	Annual Income (1lakh-2 Lakh)	3.101	1.683	3.396	**.065*** **	22.217
$X_8(3)$	Annual Income (2.1 lakh-3 lakh)	1.723	1.555	1.228	.268	5.601
$X_9(1)$	Adult female education (<matric)	2.263	1.577	2.061	.151	9.614
$X_{10}(1)$	Adult male education(<matric)	2.019	1.022	3.899	**.048** **	7.528
$X_{11}(1)$	Adult female health (malnourished)	2.463	1.529	2.594	.107	11.742
$X_{12}(1)$	Adult male health (malnourished)	2.693	3.473	.601	.438	14.783
$X_{13}(1)$	Health facility at village level (not-available)	1.258	1.181	1.133	.287	3.517
$X_{14}(1)$	Cooking fuel (dirty)	.550	1.385	.158	.691	1.733
$X_{15}(1)$	Sanitation (Not-improved)	3.338	1.577	4.480	**.034** **	28.165
Constant		-12.036	3.582	11.289	.001	.000
-2 Log Likelihood (-2LL)			48.393			
Nagelkerke R Square (R^2N)			.800			

Source: Author's calculation based on primary data

Note: (1) * means significant at 1 percent, ** means significant at 5 percent, *** means significant at 10 percent.

(2) S.E.- Standard Error, Sig. level- Significance level.

(3) Base categories- male head, unreserved social category, availability of land, APL ration card, nuclear family, more than 3 lakh annual income, health facility available at village level, self-employed, dependent population is absent, matric or more educated adult females, matric or more educated adult males, healthy female, healthy male, using clean cooking fuel, improved sanitation facilities, safe drinking water is available.

Table 5.26 shows the determinants of multidimensional poverty at households level in rural Faridabad. There are total sixteen variables such as head of family, social category, type of family, dependent population in house, ration card, arable land, main occupation, annual income, adult female education, adult male education, adult female health, adult male health, health facility at village level, cooking fuel, sanitation, and drinking water are selected as independent variables. Where agriculture and allied activities as a main occupation, adult female with less education, adult male with less education, adult female malnutrition, non-availability of health facility at village level, lack of improved sanitation, and use of unsafe drinking water increases the probability of being poor for a household. A household who is mainly depends on agriculture sector has 17.126 times more chances of being poor as compared to the self-employed household. A household with at least one less educated adult female has 10.351 times and a household with at least one less educated adult male has 9.655 times more possibilities of getting poor. The chances of being poor is 5.980 times more in those households where health facilities are not available at their village level. In those households where improved toilet facilities are not available has 5.743 times more probability of getting poor as compared to those households where improved toilet facilities are available whereas non-availability of safe drinking water has 10.192 times more possibilities to being a household poor.

The determinants of poverty at households level based on binary logistic regression of **Gurugram district** are presented in below table based on a sample of total 235 rural households.

Table: 5.27 Parameter Estimates for Binary Logistic Regression for Gurugram District

Variable	Description	B	S. E.	Wald	Sig. level	Exp(B)
$X_1(1)$	Head of family (Female)	2.987	1.163	6.596	**.010***	19.817
X_2 (1)	Social category (Reserved)	-.717	.643	1.244	.265	.488
X_3 (1)	Type of family (Joint)	1.615	.671	5.792	**.016****	5.029
$X_4(1)$	Dependent population in house (presented)	.846	.638	1.759	.185	2.330
$X_5(1)$	Ration card (BPL)	.067	.779	.007	.931	1.070
$X_6(1)$	Arable land (not-available)	.935	.692	1.824	.177	2.547
$X_7(1)$	Main occupation (Labour)	-1.886	1.167	2.612	.106	.152
$X_7(2)$	Main occupation (Agriculture and allied activities)	-2.761	1.062	6.765	**.009***	.063
$X_7(3)$	Main occupation (Government Job)	-2.396	1.188	4.065	**.044****	.091
$X_7(4)$	Main occupation (Private Job)	-1.877	.960	3.826	**.050****	.153
$X_8(1)$	Annual Income (<1 Lakh)	-.139	1.034	.018	.893	.870
$X_8(2)$	Annual Income (1lakh-2 Lakh)	-.630	.922	.466	.495	.533
$X_8(3)$	Annual Income (2.1 lakh-3 lakh)	-1.011	1.082	.873	.350	.364
$X_9(1)$	Adult female education (<matric)	2.337	.641	13.291	**.000***	10.351
$X_{10}(1)$	Adult male education(<matric)	2.267	.608	13.888	**.000***	9.655
$X_{11}(1)$	Adult female health (malnourished)	2.071	.697	8.827	**.003***	7.935
$X_{12}(1)$	Adult male health (malnourished)	.517	.778	.442	.506	1.677
$X_{13}(1)$	Health facility at village level (not-available)	1.788	.672	7.073	**.008***	5.980
$X_{14}(1)$	Cooking fuel (dirty)	.616	.602	1.048	.306	1.851
$X_{15}(1)$	Sanitation (Not-improved)	1.748	.702	6.206	**.013****	5.743
$X_{16}(1)$	Drinking water (unsafe)	2.322	.7717	10.482	**.001***	10.192
Constant		-5.223	1.053	24.626	.000	.005
-2 Log Likelihood (-2LL)			116.903			
Nagelkerke R Square (R^2N)			.699			

Source: Author's calculation based on primary data

Note: (1) * means significant at 1 percent, ** means significant at 5 percent, *** means significant at 10 percent.

(2) S.E.- Standard Error, Sig. level- Significance level.

(3) Base categories- male head, unreserved social category, availability of land, APL ration card, nuclear family, more than 3 lakh annual income, health facility available at village level, self-employed, dependent population is absent, matric or more educated adult females, matric or more educated adult males, healthy female, healthy male, using clean cooking fuel, improved sanitation facilities, safe drinking water is available.

Table- 5.27 shows the determinants of poverty at household level in Gurugram district. The result finds that female headed households, joint family, low adult female education (less than matric), low adult male education (less than matric), adult female malnutrition, non-availability of health facility at village level, lack of improved sanitation, and non-availability of drinking water has increase the chances of poverty among households whereas the households who are mainly working in agriculture sector, and work as a government and private employees has decrease the probability of getting poor as compared to self-employed households.

The female headed households has 19.817 times more chances of being poor as compared to male headed households and a household living in joint family has 5.029 times more likelihood of getting poor as compared to a households living in nuclear family. Those households where at least one adult female is less educated (less than matric) has 10.351 times and the households with at least one adult male is less educated (less than matric) has 9.655 times more possibilities of being poor. A household in which improved sanitation facility is not available has 5.743 times and a households using unsafe drinking water has 10.192 percent more chances of getting poor. Whereas those households who are mainly depends on agriculture sector has .063 times, who depends on government job has .091 times, and those who are mainly depends on private job has .153 times low probability of being poor as compared to self-employed households.

The determinants of poverty at households level based on binary logistic regression in **Jind district** are presented in below table where this district selected a sample of total 161 rural households.

Table: 5.28 Parameter Estimates for Binary Logistic Regression for Jind District

Variable	Description	B	S. E.	Wald	Sig. level	Exp(B)
$X_1(1)$	Head of family (Female)	.275	.888	.096	.757	1.317
X_2 (1)	Social category (Reserved)	.482	.977	.244	.622	1.620
X_3 (1)	Type of family (Joint)	-1.015	.761	1.779	.182	.363
$X_4(1)$	Dependent population in house (presented)	1.395	.782	3.187	**.074*** **	4.036
$X_5(1)$	Ration card (BPL)	-.332	1.161	.082	.775	.718
$X_6(1)$	Arable land (not-available)	-.019	1.028	.000	.985	.981
$X_7(1)$	Main occupation (Labour)	1.523	1.366	1.244	.265	4.588
$X_7(2)$	Main occupation (Agriculture and allied activities)	1.373	1.073	1.636	.201	3.947
$X_7(3)$	Main occupation (Government Job)	-.956	1.287	.551	.458	.384
$X_7(4)$	Main occupation (Private Job)	.593	1.101	.290	.590	1.809
$X_8(1)$	Annual Income (<1 Lakh)	-.566	.987	.329	.566	.568
$X_8(2)$	Annual Income (1lakh-2 Lakh)	-.70	.880	.006	.937	.933
$X_8(3)$	Annual Income (2.1 lakh-3 lakh)	.215	1.149	.035	.852	1.240
$X_9(1)$	Adult female education (<matric)	2.006	.843	5.659	**.017****	7.436
$X_{10}(1)$	Adult male education(<matric)	.747	.636	1.378	.241	2.110
$X_{11}(1)$	Adult female health (malnourished)	3.144	1.158	7.374	**.007***	23.203
$X_{12}(1)$	Adult male health (malnourished)	2.238	1.138	3.871	**.049****	9.376
$X_{13}(1)$	Health facility at village level (not-available)	-.483	1.008	.230	.632	.617
$X_{14}(1)$	Cooking fuel (dirty)	1.738	1.061	2.686	.101	5.688
$X_{15}(1)$	Sanitation (Not-improved)	.999	.704	2.010	.156	2.715
$X_{16}(1)$	Drinking water (unsafe)	.740	1.054	.493	.483	2.097
Constant		-5.454	1.834	8.846	.003	.004
-2 Log Likelihood (-2LL)			94.136			
Nagelkerke R Square (R^2N)			.661			

Source: Author's calculation based on primary data

Note: (1) * means significant at 1 percent, ** means significant at 5 percent, *** means significant at 10 percent.

(2) S.E.- Standard Error, Sig. level- Significance level.

(3) Base categories- male head, unreserved social category, availability of land, APL ration card, nuclear family, more than 3 lakh annual income, health facility available at village level, self-employed, dependent population is absent, matric or more educated adult females, matric or more educated adult males, healthy female, healthy male, using clean cooking fuel, improved sanitation facilities, safe drinking water is available.

Table- 5.28 examines the determinants of poverty at the household level in the Jind district. The result finds that the availability of dependent population in the household, low adult female education, malnourished adult female, and a malnourished adult male are the main determinates of poverty among rural households in Jind district. A household where a dependent population is present has 4.036 times more probability of becoming poor as compared to those households where a dependent population is not available. A household with at least one less-educated adult female has 7.436 times more chances of getting poor as compared to those households where all the adult females are at least completed their matriculation. In the case of health, those households where at least one adult female is malnourished have 23.203 times more likelihood of being poor as compared to those households where all the adult females are healthy as per their nutrition. A household where at least one adult male is malnourished has 9.376 times more possibilities of being poor as compared to those households where all the households have proper nutrition. So, for declining the poverty rate in the Jind district more focus should be on adult's health.

The determinants of poverty at households level based on binary logistic regression in **Karnal district** are presented in below table- 5.29 where this district selected a sample of total 295 rural households. In case of Karnal district, SPSS does not take the values for two variables health facility at village level (X_{13}) and drinking water (X_{16}) because safe drinking water is available in every households and health facilities are also available in both the village (Gagsina and Nigdhu) which are included in sample of Karnal district.

Table: 5.29 Parameter Estimates for Binary Logistic Regression for Karnal District

Variable	Description	B	S. E.	Wald	Sig. level	Exp(B)
$X_1(1)$	Head of family (Female)	.114	.606	.035	.851	1.121
X_2 (1)	Social category (Reserved)	-.606	.800	.574	.449	.546
X_3 (1)	Type of family (Joint)	.298	.461	.419	.518	1.347
$X_4(1)$	Dependent population in house (presented)	.501	.441	1.295	.255	1.651
$X_5(1)$	Ration card (BPL)	1.009	.628	2.579	.108	2.742
$X_6(1)$	Arable land (not-available)	.964	.653	2.182	.140	2.623
$X_7(1)$	Main occupation (Labour)	1.717	.726	5.596	**.018****	5.566
$X_7(2)$	Main occupation (Agriculture and allied activities)	-.043	.758	.003	.954	.958
$X_7(3)$	Main occupation (Government Job)	.080	1.088	.005	.942	1.083
$X_7(4)$	Main occupation (Private Job)	-.195	.859	.052	.820	.823
$X_8(1)$	Annual Income (<1 Lakh)	-.234	.665	.124	.725	.791
$X_8(2)$	Annual Income (1lakh-2 Lakh)	-.777	.553	1.977	.160	.460
$X_8(3)$	Annual Income (2.1 lakh-3 lakh)	-.654	.753	.754	.385	.520
$X_9(1)$	Adult female education (<matric)	2.227	.614	13.148	**.000***	9.272
$X_{10}(1)$	Adult male education(<matric)	.942	.432	4.760	**.029****	2.564
$X_{11}(1)$	Adult female health (malnourished)	2.401	.457	27.545	**.000***	11.035
$X_{12}(1)$	Adult male health (malnourished)	2.292	.512	20.049	**.000***	9.890
$X_{14}(1)$	Cooking fuel (dirty)	1.694	.486	12.161	**.000***	5.442
$X_{15}(1)$	Sanitation (Not-improved)	.634	.443	2.049	.152	1.885
Constant		-6.544	1.203	29.597	.000	.001
-2 Log Likelihood (-2LL)			184.521			
Nagelkerke R Square (R^2N)			.679			

Source: Author's calculation based on primary data

Note: (1) * means significant at 1 percent, ** means significant at 5 percent, *** means significant at 10 percent.

(2) S.E.- Standard Error, Sig. level- Significance level.

(3) Base categories- male head, unreserved social category, availability of land, APL ration card, nuclear family, more than 3 lakh annual income, health facility available at village level, self-employed, dependent population is absent, matric or more educated adult females, matric or more educated adult males, healthy female, healthy male, using clean cooking fuel, improved sanitation facilities, safe drinking water is available.

Table- 5.29 presents the causes of multidimensional poverty in the Karnal district. The result shows that out of total sixteen variables only six variables are found significant which means these six variables (labour as the main occupation, low adult female education, low adult male education, adult female malnutrition, adult male malnutrition, and use of dirty cooking fuel) are the significant causes of multidimensional poverty at household level in Karnal district. Those households where labour is the main occupation have 5.566 times more chances of getting poor as compared to self-employed households. A household with at least one less-educated adult female has 9.272 times and a household with at least one less-educated adult male has 2.564 times more possibilities of getting poor. A household in which at least one malnourished adult female is available has 11.035 times and a household with at least one malnourished adult male has 9.890 times more likelihood to getting poor respectively as compared to a household where all the adult females and males are healthy. Those households who use dirty cooking fuel have 5.442 times more probability of getting poor as compared to those households where safe cooking fuel is used. So that to overcome the problem of poverty in Karnal district government should be more focused on employment generation, adult education, adults nutrition, and accessibility of safe cooking fuel.

The results of binary logistic regression in **Rohtak district** are shown in below table- 5.30, where this district selected a sample of total 185 rural households. For Rohtak district, SPSS does not take the values for the variable health facility at village level (X_{13}) because health facilities are available at village level in those villages which are included (Kiloi Khas and Nidana village) in sample of Rohtak district for this study.

Table: 5.30 Parameter Estimates for Binary Logistic Regression in Rohtak.

Variable	Description	B	S. E.	Wald	Sig. level	Exp(B)
$X_1(1)$	Head of family (Female)	-.881	.878	1.008	.315	.414
X_2 (1)	Social category (Reserved)	-7.152	3.641	3.858	**.049****	.001
X_3 (1)	Type of family (Joint)	1.350	1.000	1.824	.177	3.857
$X_4(1)$	Dependent population in house (presented)	2.097	.893	5.514	**.019****	8.139
$X_5(1)$	Ration card (BPL)	.816	.933	.764	.382	2.261
$X_6(1)$	Arable land (not-available)	7.952	3.841	4.288	**.038****	2842.560
$X_7(1)$	Main occupation (Labour)	-.699	1.029	.462	.497	.497
$X_7(2)$	Main occupation (Agriculture and allied activities)	-.086	1.107	.006	.938	.918
$X_7(3)$	Main occupation (Government Job)	-1.229	1.493	.677	.411	.293
$X_7(4)$	Main occupation (Private Job)	-3.148	1.350	5.435	**.020****	.043
$X_8(1)$	Annual Income (<1 Lakh)	.790	1.236	.408	.523	2.203
$X_8(2)$	Annual Income (1lakh-2 Lakh)	1.855	1.545	1.441	.230	6.389
$X_8(3)$	Annual Income (2.1 lakh-3 lakh)	-.177	1.534	.013	.908	.838
$X_9(1)$	Adult female education (<matric)	2.669	.840	10.095	**.001***	14.421
$X_{10}(1)$	Adult male education(<matric)	2.327	.746	9.739	**.002***	10.242
$X_{11}(1)$	Adult female health (malnourished)	2.458	1.127	4.757	**.029****	11.683
$X_{12}(1)$	Adult male health (malnourished)	4.198	2.876	2.130	.144	66.551
$X_{14}(1)$	Cooking fuel (dirty)	1.344	.731	3.382	**.066****	3.833
$X_{15}(1)$	Sanitation (Not-improved)	3.256	1.011	10.374	**.001***	25.935
$X_{16}(1)$	Drinking water (unsafe)	1.165	.735	2.511	.113	3.206
Constant		-9.160	2.312	15.701	.000	.000
-2 Log Likelihood (-2LL)			85.399			
Nagelkerke R Square (R^2N)			.804			

Source: Author's calculation based on primary data

Note: (1) * means significant at 1 percent, ** means significant at 5 percent, *** means significant at 10 percent.

(2) S.E.- Standard Error, Sig. level- Significance level.

(3) Base categories- male head, unreserved social category, availability of land, APL ration card, nuclear family, more than 3 lakh annual income, health facility available at village level, self-employed, dependent population is absent, matric or more educated adult females, matric or more educated adult males, healthy female, healthy male, using clean cooking fuel, improved sanitation facilities, safe drinking water is available.

Table- 5.30 presents the factors responsible for multidimensional poverty at the households level in Rohtak district. The result shows that social category, dependent population in house, arable land, main occupation, adult female education, adult male education, cooking fuel, and sanitation variables are found significant. It is surprising to find that the reserved category has .001 times fewer chances of getting poor as compared to the unreserved category. Every household where the dependent population is presented has 8.139 times higher chances of being poor as compared to the households where the dependent population is not presented. A household without arable land has 2842.560 times more chances of getting poor as compared to a household to whom the arable land is available. Those households who are mainly dependent on the private sector for the job have .043 times fewer chances of getting poor as compared to self-employed households. The households with at least one adult female with low education (whose level of education is less than matric) have 14.421 times and the household with at least one adult male whose level of education is less than matric has 10.242 times higher probabilities respectively to become poor as compared to those households where all the adult females and males are with matric or more education. A household in which at least one malnourished adult female is available has 11.683 times more likelihood of getting poor respectively as compared to a household where all the adult females are healthy. The possibility of being poor is 3.833 times more in those households where dirty cooking fuel is used by households and the likelihood of getting poor is 25.935 times higher in those households where improved toilet facilities are not available.

The determinants of poverty at households level based on binary logistic regression in **Yamuna Nagar district** are presented in below table where this district selected a sample of total 60 rural households. For Yamuna Nagar district, all the households using dirty cooking fuel for cooking purposes, and health facilities are also not available at village level in both the villages (Rampur Khadar and Kanjnon) which are selected for study that's why SPSS does not provide the result for these two variables.

Table: 5.31 Parameter Estimates for Binary Logistic Regression for Yamuna Nagar District.

Variable	Description	B	S. E.	Wald	Sig. level	Exp(B)
$X_1(1)$	Head of family (Female)	79.217	9974.999	.000	.994	2.533E+34
X_2 (1)	Social category (Reserved)	-7.494	10138.434	.000	.999	.001
X_3 (1)	Type of family (Joint)	40.294	13685.910	.000	.999	3.160E+17
$X_4(1)$	Dependent population in house (presented)	-16.771	4324.732	.000	**.997**	.000
$X_5(1)$	Ration card (BPL)	.227	16644.618	.000	1.000	1.255
$X_6(1)$	Arable land (not-available)	37.025	17238.148	.000	**.998**	120E+16
$X_7(1)$	Main occupation (Labour)	89.383	20399.520	.000	**.997**	6.587E+38
$X_7(2)$	Main occupation (Agriculture and allied activities)	53.155	17763.535	.000	.998	1.216E+23
$X_7(3)$	Main occupation (Government Job)	-22.430	54409.362	.000	1.000	.000
$X_7(4)$	Main occupation (Private Job)	5.646	19527.433	.000	1.000	283.273
$X_8(1)$	Annual Income (<1 Lakh)	12.513	49540.328	.000	1.000	271890.534
$X_8(2)$	Annual Income (1lakh-2 Lakh)	9.850	45496.898	.000	1.000	18966.552
$X_8(3)$	Annual Income (2.1 lakh-3 lakh)	30.649	53873.171	.000	1.000	2.044E+13
$X_9(1)$	Adult female education (<matric)	6.670	9167.738	.000	**.999**	788.555
$X_{10}(1)$	Adult male education(<matric)	48.883	8392.583	.000	**.995**	1.698E+21
$X_{11}(1)$	Adult female health (malnourished)	34.729	10426.943	.000	**.997**	1.210E+15
$X_{12}(1)$	Adult male health (malnourished)	51.448	9773.580	.000	**.996**	2.205E+22
$X_{15}(1)$	Sanitation (Not-improved)	-6.348	7296.135	.000	**.999**	.002
$X_{16}(1)$	Drinking water (unsafe)	64.430	13123.597	.000	**.996**	9.584E+27
Constant		-107.380	42461.208	.000	.998	.000
-2 Log Likelihood (-2LL)			2.773			
Nagelkerke R Square (R^2N)			.984			

Source: Author's calculation based on primary data

Note: (1) * means significant at 1 percent, ** means significant at 5 percent, *** means significant at 5 percent.

(2) S.E.- Standard Error, Sig. level- Significance level.

(3) Base categories- male head, unreserved social category, availability of land, APL ration card, nuclear family, more than 3 lakh annual income, health facility available at

village level, self-employed, dependent population is absent, matric or more educated adult females, matric or more educated adult males, healthy female, healthy male, using clean cooking fuel, improved sanitation facilities, safe drinking water is available.

Table- 5.31 shows the causes of multidimensional poverty at the households level in Yamuna Nagar district at the household level. There are total sixteen variables are taken as independent variables which include head of the family, social category of household, type of family, whether dependant population presents or not in the house, type of ration card, whether arable land available or not to household, the main occupation of household, annual income, education of adult males in the household, education of adult females in the household, the health status of adult males, the health status of adult females, whether health facilities available or not at the village level, sanitation facility, type of cooking fuel used by household, and type of drinking water used by the household. In the case of Yamuna Nagar district, the model could not be fit because of complete separation (It is a situation where dependent variable can be perfectly predicted by one or a group of variables) by the model and this situation occurs because of the small sample size. So that none of the variables is found significant in the case of Yamuna Nagar district.

To summarize, the dependent population in the household, labour as the main occupation, non-availability of arable land, low adult female education, low adult male education, adult malnourished female, adult malnourished male, lack of health facilities at the village level, use of dirty cooking fuel, unsafe drinking water and non-availability of improved toilets are the important cause of poverty among households in rural Haryana at the aggregated level.

5.6 Conclusion

This chapter measures the poverty in rural Haryana by income criterion and multidimensional criterion and according to income criterion the study measures income head-count ratio, income poverty gap, and square income poverty gap whereas multidimensional measures the poverty by important functions of living education, health, and standard of living. The main finding of this chapter is presented as follows:

- More than 80 percent of respondents have the Above Poverty Line (APL) ration card and the remaining nearly 20 percent of respondent households have the Below Poverty Line (BPL) ration card.
- The majority of households are working in an unorganized sector which includes farmers, daily wage labourers, agricultural labourers, small shopkeepers, truck drivers, auto drivers, private bus drivers, and conductors.
- The majority of the household's annual income is less than Rs. 200000 annually and there is a high variation among social categories and districts based on income. Where SC category household earnings are less than General and OBC households. The income of Yamuna Nagar district's households is less compared to Gurugram and Faridabad district's households.
- The level of education is low among rural respondents where 16.7 percent of the adult population are illiterate in which females illiteracy rate is three times higher than males illiteracy whereas 24 percent of respondents have not completed their matriculation comprised 25.4 percent of females and 22.1 percent of males.
- The major cause of low education among males is low interest in studies where 54.4 percent of adult males do not complete their matriculation because of this reason whereas a significant reason behind low education among females is family and social restrictions.
- Deprivation in health is a matter of concern in the state where adult malnutrition is 16.6 percent and underweight children are 16.9 percent, stunted children are 19.1 percent, and wasted children are 10.1 percent of their respective population. In the case of adults as well as children, females are more malnourished in Haryana.
- In case of deprivation in the standard of living dimension, deprivation in clean cooking fuel among households is highest among all the indicators that are 65 percent (14.5 percent of these rural households don't have a separate kitchen and cook the food either in open or in their living room) and followed by sanitation (56.8 percent), flooring (29.8 percent), assets (29.3 percent), drinking water (22.3 percent), and electricity (only 0.38 percent).
- The level of multidimensional poverty (45 percent) is nearly double of income poverty (23 percent) where an average poor household is 44 percent deprived in

total dimensions and the value of MPI is 0.20. In the study, 15.6 percent of rural respondent households are severely poor and 22.5 percent of households are vulnerable to poverty and have a high chance to enter into the trap of poverty in the future. In the case of income poverty, Yamuna Nagar is highly poor whereas Karnal is the least poor district among all the districts of Haryana. Jind is highly multidimensionally poor but Yamuna Nagar is a highly multidimensionally deprived district whereas Gurugram district is the least multidimensionally poor as well as deprived district among all the districts.

- Standard of living dimension and health are the most responsible dimension for multidimensional poverty which has 39.2 percent and 32.8 percent contribution in MPI respectively whereas the contribution of health dimension is 28 percent.
- The sensitivity analysis of the multidimensional poverty measures shows that the value of multidimensional head-count ratio and multidimensional poverty index has decreased and the value of the intensity of poverty has increased as the poverty cut-off increases and the SC category has the highest contribution in total poverty at each K among all the districts. In Haryana at the aggregate level as well as at district level school attainment, nutrition, assets, cooking fuel, drinking water, flooring, and sanitation indicators are the more responsible indicators for poverty at each K.
- The logistic regression analysis shows that availability of dependent population in the household, non-availability of arable land, labour as the main occupation, low adult females education, low adult males education, adult female malnutrition, adult male malnutrition, non-availability of the health facility at the village level, use of dirty cooking fuel, lack of improved sanitation facility, and use of unsafe drinking water are the significant causes of poverty at household level in Haryana. **In Faridabad district,** agriculture and allied activities as a main occupation, low adult female education, low adult male education, adult female malnutrition, non-availability of the health facility at the village level, lack of improved sanitation, and use of unsafe drinking water increase the probability of poverty for a household. **In Gurugram district**, female-headed households, households living in a joint family, low education among adult females, low education among adult males, adult female malnutrition, non-availability of the

health facility at the village level, non-availability of improved sanitation in house, and non-availability of drinking water has increased the likelihood of poverty for a household. **In Jind district**, availability of dependent population in house, low adult female education, malnourished adult female and a malnourished adult male are the main determinates of poverty among rural households. Whereas, **in Karnal district,** labour as the main occupation, low adult female education, low adult male education, adult female malnutrition, adult male malnutrition, and use of dirty cooking fuel is responsible for poverty. **In Rohtak district**, the dependent population in house, non-availability of arable land, low adult female education, low adult male education, use of dirty cooking fuel, and non-availability of sanitation variables are the main determinants of poverty whereas in **Yamuna Nagar** none of the variables is significant.

The above result presents that multidimensional poverty by including important determinants of wellbeing, education, health, and standard of living shows a non-pleasant picture of Haryana which is one of the economically developed states of India. Multidimensional poverty is much higher than income-based poverty whereas the standard of living and education are the most responsible dimension of multidimensional poverty in Haryana. Females are more deprived than males in terms of education and health deprivation, and SC category households show the worse picture in case of deprivation as well as in poverty. In case of multidimensional poverty determinants dependency burden, non-availability of arable land, labour as the main occupation, low adult females education, low adult males education, adult female malnutrition, adult male malnutrition, non-availability of the health facility at the village level, use of dirty cooking fuel, lack of improved sanitation facility, and use of unsafe drinking water are the significant causes of poverty at household level in Haryana.

CHAPTER- 6

CONCLUSIONS AND POLICY IMPLICATIONS

6.1 Introduction

Many poverty measures have been discussed in the literature, on one hand, poverty is considered as an economic phenomenon, on the other, it is considered as a multidimensional concept. **Orshansky (**1963 and 1965) firstly provides the different income poverty lines for different characteristics of households and peoples. **Sen (1976)** develop a poverty index that was also based on the income poverty threshold. **Foster, Greer, and Thorbecke (1984)** extended Sen's measurement of poverty and propounded a class of decomposable income poverty measures. Whereas some other economists as Martinetti (1994), Ravallion (1996), Anand and Sen (1997), Mowafi and Khawaja (2005), Sumner (2007), Spicker (2007), Alkire and Foster (2007, and 2009), Alkire and Santos (2010) criticise the economic criterion as a poverty measure and suggest an alternative measurement in terms of multidimensional poverty.

This study is an endeavor to analyse the income as well as multidimensional poverty in rural Haryana. The study measures the level of deprivation in education, health, and standard of living dimensions because all these dimensions are important determinants of good living. The present study is also an attempt to analyse who are the poor and deprived households? Which households as well as corresponding indicators are responsible for their poverty and deprivation? What are the determinants of multidimensional poverty among rural households in Haryana?

The level of multidimensional poverty is measured in a total of ten indicators which are related to three dimensions as education, health, and standard of living. For the fulfillment of the objectives, the study collected primary data that was collected through a multistage random sampling method where the complete sample design process was going through many stages and the sample has been obtained in such a way that all the units have equal possibilities of selection. So, data was collected from 1040 rural households from twelve villages which belong to six districts. The study used **Foster, Greer, and Thorbecke (1984)** method of poverty measures for measuring income poverty, and Alkire- Foster (2009) methodology is used for multidimensional

poverty measurement. Further, the MPI method fulfills the decomposability criterion among sub-groups of the study, and among dimensions and indicators of poverty. To identify who is poor among the population, the multidimensional poverty method used the duel cut-off criterion. First is deprivation cut-off: which measures the deprivation in dimension j (or Zj), and second is multidimensional poverty cut-off (K). This chapter explains the major conclusions and policy implications that come out of the study. This chapter includes three sections, section 6.1 is an introductory section, section 6.2 presents the main findings of the study, and section 6.3 is related to policy implications of the study.

6.2 Main Findings of the Study

The major findings which comes out from this study is as follows:

(1) On the basis of secondary data, poverty shows declining trends at the state as well as at the national level during 1973-2012. The study finds that level of income poverty is comparatively low in Haryana where only 11.2 percent of the population is below the poverty line in 2011-12 which is half of the national income poverty (21.9 percent) but the deprivation in socio-economic indicators is high in the state. At the district level, Fatehabad, Jind, Kurukshetra, Palwal, Kaithal, and Ambala shows poor performance where more than 30 percent of the rural population is living below the poverty line in 2007-08.

(2) In the case of the education dimension, the female deprivation rate is very high (24.6 percent of the female are not able to read and write) whereas the male illiteracy rate is only 9.4 percent. At the district level, the male literacy rate is highest in Rewari (97.9 percent) and lowest in Mewat (78 percent) district whereas the female literacy rate is the highest in Ambala (90 percent) and lowest in Mewat that is only 35.6 percent.

(3) In the case of health dimension, child health deprivation is a serious problem where 21.3 percent of children are underweight, 21 percent of children are stunted and 21.2 percent of children are wasted where rural deprivation is slightly lower than urban deprivation in the state. However, in the case of adult malnutrition, rural people are more deprived than urban people in which

females are more deprived than males in rural as well as urban areas of the state.

(4) In the case of the standard of living dimension, cooking fuel and sanitation are the most deprived indicators in all the districts of Haryana where about 50 percent of households are using dirty cooking fuel, and more than 20 percent of households don't have access to toilet facilities. The deprivation in the standard of living indicators also shows that rural households are highly deprived as compared to urban households.

(5) The results based on primary data finds that majority of respondent households are working in unorganized sector (informal sector) that includes farmers, daily wage labourers, agricultural labourers, small shopkeepers, truck drivers, auto drivers, private bus drivers, and conductors where most of the general people are engaged in agricultural activities and the majority of OBC population is doing the private job and daily wage whereas a majority of working people from SC category are (56.2 percent) daily wage labourer in Haryana, and it is the major cause of low earning of rural households. The study also shows that more than 80 percent of respondent households have Above Poverty Line (APL) ration cards whereas remaining (nearly 20 percent) households have Below Poverty Line (BPL) ration cards.

(6) The level of deprivation among households on the basis of school attainment indicator (at least one adult member in the household didn't complete six years of schooling) is very high where SC category has the highest contribution in this deprivation. But it is interesting to find that 99.86 percent of school-going age children (6-14 years) are enrolled in schools. Due to a good response of the school attendance indicator, it is expected that the level of education will improve in the future.

(7) In Haryana, the level of education is low among rural respondents where the total illiteracy rate is 16.7 percent, the male illiteracy rate is 9.1 percent whereas the female illiteracy rate is 26 percent (about three times more than male illiteracy). The level of education in the state is very low where 40.7 percent of adults have not completed their matriculation (it comprised of more than 50 percent females and about 32 percent males) and only 12 percent of adults

completed their higher education (graduation and above graduation) that has mainly three key points:

(i) The level of adult female education is lower than the level of adult male education in Haryana at aggregate as well as district level where family and social restrictions are highly responsible for female low education whereas the significant cause of low education among males is their lack of interest in studies.

(ii) SC category adults have poor performance as compared to other social categories in the case of education in almost all the districts of Haryana.

(iii) As per the illiteracy rate at the district level, Jind shows worse performance where 28 percent of adults never went to school followed by Rohtak (20.1 percent), Faridabad (19.8 percent), Yamuna Nagar (17.9 percent), Karnal (14.1 percent), and Gurugram (7.4 percent).

(8) The health deprivation of respondents at the household level in Haryana is very high in nutrition indicators where 45.7 percent of households are deprived (at least one household member is malnourished). However, it is hopeful to mention that only 1.9 percent of households are deprived in the child mortality indicator. The adult and child health (at the individual level) based on their nutrition also shows low performance and portray three main points:

(i) There is 16.6 percent of adults are malnourished in Haryana in which female malnutrition (19.2 percent) is much higher than male malnutrition (12.3 percent).

(ii) At the same time, child health deprivation also shows a negative picture where 19.1 percent of under five years children's are stunted (whose height is less by their age), 16.9 percent of children's are underweight (whose weight is less by their age), and 10.1 percent of children's are wasted (weight is less by their height) where female child malnutrition (adult as well as children) is higher than male malnutrition in the state.

(iii) The Yamuna Nagar and Jind district shows more deprivation in these health indicators at the adult and children levels.

(9) In Haryana, housing conditions are also poor where 31.5 percent of the households are living in kuccha or semi pucca houses that contained 50 percent

of SC households, 40.5 percent of OBC households, and 17.2 percent of General households. A separate kitchen is not available in more than 14 percent of houses and these households cook the food either in open or in their living room which is very unhygienic and cause many diseases. Non- availability of separate bathroom facilities is a matter of concern in the Jind district where 27.3 percent of households don't have bathroom facilities that comprised more than 55 percent of SC households, 19 percent of OBC households, and 10 percent of General households.

(10) The level of deprivation in the standard of living indicator is also very high where cooking fuel indicator is the most deprived indicator (65 percent of households using dung cake and wood as a primary source of cooking), followed by improved sanitation (more than 55 percent of households don't have improved sanitation facilities), flooring (29.8 percent of households having dirty floor), assets (29.3 percent of households are deprived), and drinking water (more than 20 percent of households drink unsafe drinking water). The main point that comes out from the analysis of the standard of living dimensions are as following:

(i) SC category is highly deprived in asset, floor, and sanitation indicators and one of the significant causes of their deprivation is lack of job security (majority of the working population in this category is work as a daily wage labourers) that's why their annual income is very low hence they are not able to enhance their standard of living.

(ii) The General category is highly deprived in cooking fuel indicator because the majority of these households are mainly depending on the agriculture sector (especially farming and animal keepers) that's why agricultural waste, dung cake, and wood is easily available to them so that these households are primarily using these as cooking fuel.

(iii) In most of these standard of living indicators, Jind and Yamuna Nagar districts are more deprived compared to other districts.

(11) In case of deprivation in some important durable goods, more than 90 percent of households don't having computer and air conditioner, about 30 percent of households are deprived in two vehicles, more than 30 percent of households

don’t having washing machine, 21 percent of households not having refrigerator, about 10 percent of households don’t have television. Again Jind and Yamuna Nagar are the most deprived district among the sample districts.

(12) In Haryana, this analysis has been done keeping in mind the ten indicators of the Multidimensional Poverty Index (MPI) and it is shows that cumulatively 8.4 percent of households are not deprived in any indicators, 16.4 percent of households are deprived in one indicator (out of 10 indicators), 19.5 percent of households are deprived in two indicators, 15.8 percent of households are deprived in three indicators, 14.6 percent of households are deprived in four indicators, 12.8 percent of households are deprived in five indicators, 10 percent of households are deprived in six indicators, 2.3 percent of households are deprived in seven indicators, 0.1 percent of households are deprived in eight and 0.1 percent of households are deprived in nine indicators, and no-one is deprived in all 10 indicators. Whereas at district level the maximum number of indicators a household is deprived is 9 in Yamuna Nagar, 6 in Faridabad, and in 7 indicators in the remaining districts (Gurugram, Jind, Karnal, and Rohtak).

(13) There are 23 percent of households are below the poverty line whose monthly per capita income is less than the poverty threshold Rs. 1610.52 and an average income poor household is 6 percent away from this poverty threshold, and the level of income inequality is 4 percent between income-poor households. According to income, poverty measures followings are the key points:

(i) Yamuna Nagar district shows weak performance where 45 percent of rural households are below the income poverty thresholds whereas Karnal district shows a good picture (where the income poverty rate is only 14 percent) among all the selected districts of Haryana.

(ii) The income poverty gap ratio is high in Yamuna Nagar and Jind district which is 0.14 respectively that means an average income of a poor household is 14 percent below the poverty threshold (where per month average per capita income of a poor household is only Rs. 1385) in Yamuna Nagar and Jind districts whereas income poverty gap is least in Faridabad (0.025) among all the selected districts.

(iii) The value of the square income poverty index is highest in Karnal that is 0.08 (which indicates that the level of income inequality is 8 percent between income poor households in Karnal district) and lowest in Faridabad district which is only 0.007.

(iv) In the case of social categories, the value of income head count ratio and square poverty gap index is highest in SC category whereas income poverty gap is highest in OBC category as compared to other social categories at the aggregated level.

(14) The level of multidimensional poverty is very high in all the districts of Haryana as compared to income poverty. At an aggregated level, the multidimensional head count ratio is 0.45 or 45 percent (which is double than income head count ratio) and an average poor household is 44 percent deprived of MPI indicators, and the value of multidimensional poverty index is 0.20. The following points come out from the analysis of multidimensional poverty measures:

(i) SC category is highly multidimensional poor as well as deprived as compared to other social categories. At an aggregated level, 57 percent of households are multidimensionally poor in the SC category whereas multidimensional poverty in the OBC category is 47 percent and in the General category is 37 percent.

(ii) The intensity of poverty is 46 percent, 45 percent, and 42 percent in SC, OBC, and General category that is almost similar in all the social categories. The value of MPI is also highest in the SC category (0.26) followed by the OBC category (0.21) and General category (0.16).

(iii) Jind and Yamuna Nagar districts are highly poor where 70 percent and 56 percent of households are multidimensionally poor in respected districts whereas urugram is the least poor district and at the same time intensity of poverty is also high in Yamuna Nagar and Jind which is almost equal (51 percent in Yamuna Nagar and 47 percent in Jind district). It indicates that Jind and Yamuna Nagar are the highly poor as well as deprived districts among all the six districts of Haryana.

(15) At the aggregated level the results on slabs of multidimensional poverty show that 32.8 percent of households are non-poor, 22.5 percent of households are vulnerable to poverty, and these vulnerable households **have chances to enter into the trap of poverty in the future**, and 44.7 percent of households are multidimensionally poor in which 29.1 percent are moderate poor, whereas 15.6 percent of households are severely poor and these severely poor households are more than 50 percent deprived in all the MPI indicators. The followings are the main finding in the case of slabs of MPI:

(i) In the case of social categories, SC households are more severely poor whereas General households are highly vulnerable to poverty as compared to other categories of households at the aggregate level.

(ii) Jind and Yamuna Nagar districts have the highest severely poor households among all the districts.

(iii)The percentage of vulnerable households are highest in Karnal district (31.52 percent) and lowest in Jind district (14.9 percent).

(16) The result also shows that the under coverage rate (percentage of households are non-poor by income criterion but poor by multidimensional perspective) is very high where 27.8 percent of households are non-poor by income criterion but poor by multidimensional criterion in Haryana at the aggregate level. The high under coverage rate means that these households have a sufficient level of income as per the income poverty threshold but they are not able to get a better education, health, and standard of living which shows that income is important but not a sufficient measure of poverty in a state like Haryana. In the case of poverty analysis the key points are presented below:

(i) At district level, under coverage rate is highest in Jind district (where 42.9 percent of households are multidimensionally poor but non-poor by income perspective) followed by Faridabad district (41.3 percent), Rohtak (26.5 percent), Karnal (25.1 percent), Yamuna Nagar (20 percent), and Gurugram (17.9 percent).

(ii) At social category level, in Faridabad, Jind, Karnal, and Rohtak under coverage rate is highest in OBC category whereas in Gurugram and Yamuna Nagar districts under coverage rate is high in General category.

(17) As per the contribution of dimensions and their indicators in MPI it has been found that the standard of living is the most deprived dimension which has 39.2 percent contribution in MPI followed by education dimensions (32.8 percent contribution) and health dimension (28 percent contribution) in MPI. In case of standard of living dimension cooking fuel has highest contribution followed by assets, flooring, drinking water, and electricity whereas school attainment is the only responsible indicator for education deprivation in Haryana, and out of total deprivation in health dimension (28 percent) only nutrition indicator has 26.6 percent contribution in their total deprivation. In case of contribution of different dimensions in MPI these are the main findings:

(i) In Faridabad, Jind, Rohtak, and Yamuna Nagar districts, Standard of living dimension has highest contribution in MPI followed by education and health dimension. In Gurugram district education dimension has highest contribution followed by health and standard of living dimensions whereas in Karnal district all the three dimensions has almost similar contribution in MPI.

(ii) At aggregate level, all the social categories follows the similar pattern where standard of living has highest contribution in MPI followed by education and health dimensions.

(18) The results of sensitivity analysis based on poverty measures presents that the value of multidimensional head count ratio, intensity of poverty, and multidimensional poverty index are changes with changes in poverty cut-off (k) and result finds that the value of multidimensional head count ratio and multidimensional poverty index has decreased and the value of the intensity of poverty has increased as we increased the poverty cut-off. A household is maximally deprived in nine indicators K=9 and non-one is deprived in all the MPI indicators (K=10) in Haryana. The important details of sensitivity analysis are discussed as follows:

(i) In Haryana at aggregated level cooking fuel, sanitation, school attainment, nutrition, assets, flooring, and drinking water are the highly deprived indicators which are the major indicators that are more responsible for poverty at each poverty cut-off (K).

(ii) In case of General category, cooking fuel, school attainment, sanitation and nutrition are highly responsible indicators for poverty at K=1, cooking fuel, school attainment, sanitation, nutrition, drinking water, assets and flooring has more contribution in poverty at K=2 to K=7.

(iii) In OBC category, at K=1 and K=2 school attainment, nutrition, assets, cooking fuel, flooring and sanitation are more deprived indicators, from K=3 to K=6 school attainment, nutrition, assets, cooking fuel, flooring, sanitation, and drinking water indicators has high contribution in poverty, and from K=7 to K=9 all the indicators (out of 10 indicators of MPI) except school attendance such as school attainment, child mortality, nutrition, assets, cooking fuel, drinking water, electricity, flooring, and sanitation are responsible for poverty.

(iv) In SC category, school attainment, nutrition, assets, cooking fuel, drinking water, flooring, and sanitation are the significant cause of poverty from K=1 to K=8.

(19) In Haryana at aggregate level, availability of dependent population in household, non-availability of arable land, casual labour as a main occupation, low adult females education, low adult males education, adult female malnutrition, adult male malnutrition, non-availability of health facility at village level, use of dirty cooking fuel, lack of improved sanitation facility, and use of unsafe drinking water are the significant determinants of poverty at household level.

(i) In every household where dependent population is presented has 2.088 times higher chances of getting poor.

(ii) Those households who don't have arable land has 2.001 times more chances of being poor.

(iii) In case of main occupation variable, daily wage labourers has 2.027 times higher possibilities of getting poor as compared to self-employed households.

(iv) The households with at least one adult female with low education has 5.994 times and the household with at least one adult male has 3.030 times higher probabilities of getting poor.

(v) A household in which at least one malnourished adult female is available has 7.358 times and a household with at least one malnourished adult male has 4.877 times more likelihood getting poor respectively.

(vi) The possibility of being poor is 2.110 times more in those households where public health facilities at villages level is not available.

(vii) The household using dirty cooking fuel (using wood, cow dung cake and charcoal) has 3.392 times, households without improved toilet facilities have 3.579 times and households using unsafe drinking water has 7.576 times more possibilities of falling into the trap of poverty.

The findings of the study shows that level of adult education, malnutrition among children's and adults, deprivation in cooking fuel, sanitation, drinking water, and assets are the matter of concern in Haryana (which is considered one of the wealthiest state of India). The result of the study also shows huge disparities among districts, social categories, and males and females where female deprivation in education and health is more than males in most of the districts and categories. The SC category shows high level of poverty (income as well as multidimensional), and high level of deprivation in most of the indicators as compared to other social categories in most of the districts. The results based on our primary data shows that Jind and Yamuna Nagar districts are comparatively more poor and deprived districts of Haryana.

6.3 Policy Implications of the Study

Haryana is always treated as one of the developed state of India, however the multidimensional poverty estimates of the study questions the whole development narrative and find it somewhat unpleasant. Where education, health, and standard of living dimensions are considered very important determinants of better living. According to the study the level of deprivation is very high in all these three dimensions where SC category shows worse performance (which is highly poor as well as deprived category) as compared to other social categories in most of the districts and on the basis of education and health there is a huge inequality among males and females where females presents a poor performance as compared to males in Haryana at aggregated as well as district level.

This section of the study suggests some policy measures for the problems emerged from this study are given as follows:

- Haryana is an economically well-developed state but level of multidimensional poverty is very high which is almost double of income poverty (23 percent). The intensity of poverty is 44 percent that means the multidimensionally poor households are averagely 44 percent deprived of MPI indicators. The significant causes of poverty among these poor households are job insecurity, low adult education, poor health and inadequate standard of living (use of unsafe cooking fuel, non-availability of improved toilet facilities, use of unsafe drinking water). So, as the study of development suggests that there is a need to shift the focus from income measures to capacity enhancement of people through improved facilities of health, education, sanitation and other dimensions of well-being.
- The level of adult education is very low in Haryana in which females performance is very poor in comparison to males . In the case of social categories, the performance of SC category is very poor as compared to General and OBC category. There are some significant reasons of low education such as lack of interest in studies among males, family and social restrictions for females, poor economic condition, household responsibilities, non-availability of school in the village and poor infrastructure in school (specially non-availability of staff). So that to overcome these problem following actions should be taken:
  i) Government and education institutes should introduce programmes that make learning process more interactive and interesting should be more focus on extra curriculum activities in every school and college, that will create the interest of children in education and it will help in increasing the level of education.
  ii) Government should provide infrastructural development in rural areas (at least a high school should be available at the village level, and transportation facilities should be provided that will help the adults to gain the higher education by their near towns and cities.

iii) To increase the female enrolment in schools and colleges a subsidiary education should provide to rural females, and awareness programs about females education should be organized by government and NGOs in rural area of the state.

iv) To improve the adult literacy rate in Haryana some adult literacy programs should be started by state and local government in rural areas where educated youth can voluntarily participate and basic reading, writing and numeric will be taught to illiterate adults.

- Despite presence of some important health betterment schemes by government of India like Integrated Child Development Scheme (ICDS) implemented in 1975, and Poshan Abhiyan implemented in 2018 which are also implemented in all the district of Haryana by government of Haryana to improve the health and nutrition in children's (0-6 years), pregnant women, and nursing mothers the level of deprivation in health (particularly malnutrition among children and adults) is very high in rural Haryana and also has a major contribution in multidimensional poverty in study area. Which shows that it is not enough to create schemes and programs, rather there is a need to implement them strictly so that the efficiency of these schemes can be improved.
- The analysis of sensitivity of poverty shows that school attainment, nutrition, cooking fuel, sanitation, drinking water, assets, and flooring are the most deprived indicators at poverty cut-off K=1 to K=6. So, for the removal of multidimensional poverty from these households government should focus on adult education, nutrition, accessibility and availability of safe drinking water, improved toilet facilities, safe cooking fuel, assets, and flooring. For those households who are found multidimensionally poor at poverty threshold K=7, K=8, and K=9 the equal focus should be provided on declining the child mortality rate.
- At aggregated level 65 percent of rural households uses dirty cooking fuel that affect the women and children health so that to overcome this problem government should more focus on availability of safe cooking fuel for which bio gas plant should be made at village level that will convert the dirty fuel into safe cooking fuel.

- Nearly 60 percent of households are deprived in improved toilet facilities where toilet have been made in most of these houses but in these toilets either water facilities are not available or toilet pits are uncovered and in many houses toilet don't even have a door and a roof over the toilet. So that building a toilet is not enough, but government should make sure that proper water facilities should be available inside the toilet, the toilet pit should be covered, the toilet should have a door, and have a proper roof over the toilet. Further villagers should be make aware of ill-effects of open defecation
- Deprivation in drinking water is also a matter of concern in state at aggregated level where safe drinking water is not available in 22.3 percent of rural houses and these households either drink unsafe drinking water or they bring safe drinking water from far away, due to which they take more than 30 minutes. So that government should be more focus on accessibility and availability of safe drinking water to each and every household in rural areas.
- In Haryana, availability of dependent population in house, non-availability of arable land, labour as a main occupation, low adult females education, low adult males education, adult female malnutrition, adult male malnutrition, non-availability of health facility at village level, use of dirty cooking fuel, lack of improved sanitation facility, and use of unsafe drinking water are the significant determinants of poverty at household level. So, for alleviation of the poverty the more focus should be on these variables.
- The result finds that Jind and Yamuna Nagar districts are highly poor and deprived districts where majority of households are subsistence on agriculture and casual labour. So, there is a need to more focus on these two districts where government should provide more employment opportunities for adults, special training programmes should be organized for self-employment in local areas. Accessibility of safe drinking water, improved sanitation, and safe cooking fuel must be provided at village level.
- At social category level, SC category is more poor and deprived than other category because majority of SC households depends on daily wage labourer for employment and labour as a main occupation is one of the significant determinant of poverty in Haryana so that this category is highly poor and

deprived because of their occupation. So, more focus should be on their employment generation and social welfare.

- The study is the analysis of conditions of rural households whose main occupation and source of living is agriculture sector. The study shows that there are many such rural households which are multidimensionally poor whereas they are not considered poor according to income measure. Hence, it is need that government should focus on agriculture sector, employment generation and rural economy to improve living of rural households.

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APPENDIX

A-1 Questionnaire

A Study of Poverty in Rural Haryana

N.B. :- Information supplied shall be kept strictly confidential and will be used only for research work.

Name of administrative division:-

Name of district:-

Name of block:-

Name of village:-

1. Head of the household. Male ☐ Female ☐	2. Name of the head. ☐
3. Social group of the household. Gen ☐ OBC ☐ SC ☐	4. Land owned by household. Yes ☐ No ☐
5. If yes, number of irrigated land. In acre ☐	6. Does the household possess ration card. Yes ☐ No ☐
7. If yes, type of ration card. APL ☐ BPL ☐	8. Type of family. Joint family ☐ Nuclear family ☐
9. Size of family. No of male ☐ No of female ☐ No of children ☐	

10. General profile of the household members:

Sr. No.	Household member name	Relation with head	Gender	Age	Height	Weight	Marital status	Education*	Occupation	Income
1.										
2.										

3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

*Illitrate-1, Literate- 2, Primary-3, Middle-4, Matriculte-5, Sr. Sec.- 6, Graduate-7, Above-8

11. What is the reason behind unemployment?

Household members sr. no.	**Reasons***

*Lack of Skills - 1, Not allowed to work- 2, Low salary- 3, Family responsibility- 4, Safety issue- 5, Don't found job- 6, Not willing to work-7, Currently studying- 8

12. What are the reason behind low education in adults

Household members sr. no.	**Reasons***

*Family not allowed- 1, Non availability of school in the village- 2, Need at home- 3, Poor infrastructure- 4, Safety reasons- 5, Could not cope school fees-6, Lack of interest in studies- 7, Physical disability- 8.

13. Are your school going age children (6 yrs.- 14 yrs.) going to school? Yes ☐ No ☐	14. If not then why your children are not going to School? i. Girl child ii. Could not afford school fees iii. Weak in studies iv. Safety reasons v. Need at home vi. Child not interested
15. If yes then which type of school they studied? Govt ☐ Private ☐	16. Does school have adequate facilities and staff? Yes ☐ No ☐
17. Have any of your child drop out of school. Yes ☐ No ☐	18. If yes, then what is the gender of children? Boy ☐ Girl ☐ Both ☐
19. Why have they dropped out? i. Girl child ii. Could not afford school fees iii. Weak in Studies iv. Safety reasons v. Need at hone vi. Other	20. Have any health facility in your village? Yes ☐ No ☐
21. If yes, type of health service in your village? PHC ☐ CHC ☐ Govt. hospital ☐ Pvt. Hospital ☐	22. Are you satisfied with health facility at village level? Yes ☐ No ☐
23. Where are you going for treatment? PHC in neighbouring village ii. Nearing CHC iii. Going to quack (Jholachap doctor) in the village iv. Private hospital in city/ village v. Govt. hospital in city/ village vi. Traditional healing at home	24. Any below forty age family member died in the house (5 years prior to survey)? Yes ☐ No ☐
25. If yes, how many persons/children died? Male ☐ Female ☐ Male children ☐ Female children ☐	26. Age of dying children ? ☐

27. What is the reason of children death? i. Delivery at home ii. Carelessness of hospital staff iii. Unhealthy child iv. Illiterate or less educated mother v. Underage mother	28. Do you have house Yes ☐ No ☐
29. Do you have own this house. Yes ☐ No ☐	30. Do you own any other house anywhere? Yes ☐ No ☐
31. If yes, type of house. Kuccha house ☐ Pucca house ☐ Semi pucca house ☐	32. Type of housing floor. Dirty, dung or sand floor ☐ Pucca floor ☐
33. No. of rooms in the house. ☐	34. Ventilations of house. Proper ☐ Improper ☐
35. Do you have kitchen facility? Yes ☐ No ☐	36. Do you have bathroom facility? Yes ☐ No ☐
37. Do you have toilet facility? Yes ☐ No ☐	38. If yes, type of toilet. i. Toilet without water facility ii. Un covered pit latrine iii. Flush or pour flush toilet iv. Cover pit ventilated improved latrine v. VIP latrine
39. If not then, what are the reason behind non availability of toilet facility. i. No need of toilet ii. Could not afford iii. No space for toilet construction	40. Do you share above toilet facility with other households? Yes ☐ No ☐
41. If yes, how many households use this toilet facility? No. of households ☐	42. Drainage system of house. Proper ☐ Improper ☐
43. What is the main method of disposal of your waste and garbage? Proper ☐ Improper ☐	44. Which type of drinking water used by family? Safe ☐ Unsafe ☐

45. Main source of drinking water. . Public tap ii. Hand pump iii. Tube well/ bore well iv. Tanker v. Lake/pond/irrigation channel vi. Bottle water vii. other	46. Excess to drinking water distance from water source. In minutes ☐
47. Do you treat your water in any way to make it safer to drink (in case of water not safe) Yes ☐ No ☐	48. If yes, then what do you usually do to make water safer to drink? i. Boil ii. Use alum iii. Add bleach/ chlorine tablets iv. Strain through cloth v. Use water filter vi. R.O.
49. Do you have electricity. Yes ☐ No ☐	50. If not then what is the reason of non-availability of electricity. Specify it……..
51. Primary source of energy used for cooking. i. Dung cake/coal/wood fire/ agricultural crop waste ii. LPG iii. Kerosene iv. Electricity	52. If you used traditional cooking fuel then what are the reasons behind it. i. Habitual ii. Could not afford LPG iii. Lack of awareness regarding subsidiary govt. policies

53. Assets owned by household.

Sr. No.	Durable Assets	Sr. No.	Agricultural Assets	Sr. No.	Pets
1.	T.V.	13.	Tractor	16.	Cow
2.	Radio	14.	Thresher	17.	Bull
3.	Mobile	15.	Combined harvests	18.	Buffalo
4.	Refrigerator			19.	Horse
5.	Colling fan			20.	Donkey
6.	A.C.			21.	Chickens
7.	Computer			22.	Ducks
8.	Washing machine			23.	Pig
9.	Sewing machine				
10.	Motor cycle				
11.	Scooter				
12.	Car				

A-2 Haryana and India: Availability of Standard of Living Indicators among Households (in percent).

Sr. no.	Indicators	1992-93		1998-99		2005-06		2015-16	
		Haryana	India	Haryana	India	Haryana	India	Haryana	India
1.	Electricity	85	50.9	89.1	60.1	91.5	67.9	98.8	88.2
2.	Drinking water*	73	68.2	88	77.9	95.6	87.9	91.6	89.9
3.	Toilet facility	26.9	30.3	39	35.9	52.4	44.6	89.8	61.1
4.	Cooking fuel**	55.6	63.9	66.9	71.7	69.1	70.8	47.4	54.7
5.	Pucca house	39.6	23.7	46.7	32	61.1	45.9	76.3	56.3

Source: National Family Health Survey-1, National Family Health Survey -2. National Family Health Survey-3, National Family Health Survey -4.

Note: * Improved source of drinking water, ** using solid/ unsafe cooking fuel.

A-3 Haryana: District Wise Availability of Standard of Living Indicators among Households in 2015-16 (in percent).

Sr. no.	Districts	Rural				Urban				Total			
		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1.	Ambala	99.7	99.8	85.6	48.9	100	99.6	94.9	89.9	99.8	99.7	89.9	67.8
2.	Bhiwani	99	87.3	81.3	22.9	NA	NA	NA	NA	99.2	89.8	82.6	33.4
3.	Faridabad	NA	NA	NA	NA	99.4	46	79	89.1	99.2	51.1	78	82.6
4.	Fatehabad	99.7	100	85.9	25.6	NA	NA	NA	NA	99.8	99.8	87.5	39.1
5.	Gurgaon	99.1	95.1	75.4	41.6	100	98.6	63.9	92.3	99.8	97.9	66.3	82
6.	Hisar	98.8	92.1	83.3	18.3	99.4	97.6	86.9	79.8	99	93.9	84.5	38.8
7.	Jhajjar	98.6	93.8	85.6	25.9	NA	NA	NA	NA	99	93	86.4	43.9
8.	Jind	99.5	89.4	82.2	24.1	NA	NA	NA	NA	99.5	91.4	84.6	36.8
9.	Kaithal	99.9	98.3	74.9	29.8	NA	NA	NA	NA	99.9	98.8	78	41.1
10.	Karnal	99.3	100	84.7	38.8	99.8	100	93.3	86.9	99.5	100	87.5	54.7
11.	Kurukshetra	100	99.7	84	49.5	NA	NA	NA	NA	99.9	99.8	86	59.1
12.	Mahendragarh	98.3	95.6	72	25.8	NA	NA	NA	NA	98.6	96	74.3	32.9
13.	Mewat	86.8	75.2	44.6	10.6	NA	NA	NA	NA	88.5	78.9	46.7	17.2
14.	Palwal	91.1	92.4	60.2	16.7	NA	NA	NA	NA	93.2	93.6	66.4	30.6
15.	Panchkula	99.5	99.1	70.5	44.3	99.7	99.8	95.7	95.2	99.6	99.5	86.9	77.3
16.	Panipat	100	99.6	91.8	38	100	99.8	90.2	88.9	100	99.7	91	63.6
17.	Rewari	98.3	92.2	70.5	22	NA	NA	NA	NA	98.6	93.5	69.7	39.1
18.	Rohtak	99	97.2	75	23.9	99.3	99.8	79.6	74.4	99.1	98.3	77	45.8
19.	Sirsa	98.4	97.9	76.9	21.8	NA	NA	NA	NA	98.9	98.2	79.5	41.8
20.	Sonipat	99.5	95.2	79.4	30.9	100	93.7	80.8	80.6	99.7	94.7	79.9	48.4
21.	Yamuna Nagar	100	100	72.4	41.4	99.7	99.3	91.5	91.2	99.9	99.7	80.2	61.6
22.	Haryana	98.3	94.3	77.4	28.9	99.6	88	81.7	84.9	98.8	91.7	79.2	52.2

Source: National Family Health Survey -4.

Note: 1- electricity, 2- improved drinking water, 3- improved sanitation, 4- clean cooking fuel, and NA – Not Available.

A-4 Number of Households With their Annual Income (in Rs.)

District	Social Category	Less than 50,000	50,000-100000	100001-200000	200001-300000	300001-400000	More than 400000	Total
Faridabad	General	0	2	3	3	2	5	15
	OBC	2	25	22	15	7	8	79
	SC	1	3	3	1	2	0	10
	Total	**3**	**30**	**28**	**19**	**11**	**13**	**104**
Gurugram	General	9	19	34	18	10	25	115
	OBC	1	8	20	12	6	19	66
	SC	3	21	16	5	3	6	54
	Total	**13**	**48**	**70**	**35**	**19**	**50**	**235**
Jind	General	17	26	30	8	8	23	112
	OBC	2	5	10	2	2	5	26
	SC	5	11	6	0	0	1	23
	Total	**24**	**42**	**46**	**10**	**10**	**29**	**161**
Karnal	General	4	22	50	24	23	35	158
	OBC	1	9	9	7	1	1	28
	SC	7	43	47	5	6	1	109
	Total	**12**	**74**	**106**	**36**	**30**	**37**	**295**
Rohtak	General	13	22	15	12	6	23	91
	OBC	7	15	11	0	4	5	42
	SC	7	25	10	2	3	5	52
	Total	**27**	**62**	**36**	**14**	**13**	**33**	**185**
Yamuna Nagar	General	1	3	6	0	1	2	13
	OBC	6	8	11	6	1	5	37
	SC	0	5	4	0	1	0	10
	Total	**7**	**16**	**21**	**6**	**3**	**7**	**60**
Haryana	General	44	94	139	65	50	114	506
	OBC	19	69	81	41	21	43	274
	SC	23	109	87	13	15	13	260
	Total	**86**	**272**	**307**	**119**	**86**	**170**	**1040**

Source: Author's calculation based on primary data

A-5 Number of Households Deprived in Education Dimension.

District	Households	Indicator	Number of Deprived Households			
			General	OBC	SC	Total
Faridabad	Deprived Households	School Attainment	5	50	8	63
		School Attendance	0	0	0	0
	Total Households		**15**	**79**	**10**	**104**
Gurugram	Deprived Households	School Attainment	49	16	24	89
		School Attendance	0	0	0	0
	Total Households		**115**	**66**	**54**	**235**
Jind	Deprived Households	School Attainment	81	18	20	119
		School Attendance	0	0	0	0
	Total Households		**112**	**26**	**23**	**161**
Karnal	Deprived Households	School Attainment	82	18	60	160
		School Attendance	0	0	0	0
	Total Households		**157**	**29**	**109**	**295**
Rohtak	Deprived Households	School Attainment	53	17	34	104
		School Attendance	0	0	0	0
	Total Households		**92**	**41**	**52**	**185**
Yamuna Nagar	Deprived Households	School Attainment	8	20	9	37
		School Attendance	0	0	1	1
	Total Households		**13**	**37**	**10**	**60**
Haryana	Deprived Households	School Attainment	278	139	155	572
		School Attendance	0	0	1	1
	Total Households		**504**	**278**	**258**	**1040**

Source: Author's calculation based on primary data

A-6 Level of Adult Education Among Respondents (value in numbers).

District	Adults Education	General			OBC			SC			Total		
		M	F	T	M	F	T	M	F	T	M	F	T
Faridabad	**Illiterate**	**1**	**7**	**8**	**5**	**45**	**50**	**3**	**7**	**10**	**9**	**59**	**68**
	Literate	0	0	0	2	0	2	0	0	0	2	0	2
	Primary	0	0	0	11	10	21	4	0	4	15	10	25
	Middle	5	4	9	29	16	45	4	6	10	38	26	64
	Matriculate	7	7	14	40	25	65	5	4	9	52	36	88
	Senior secondary	7	2	9	27	13	40	2	0	2	36	15	51
	Graduation	8	6	14	15	6	21	2	0	2	25	12	37
	Above graduation	1	2	3	3	2	5	0	0	0	4	4	8
	Total	**29**	**28**	**57**	**132**	**117**	**249**	**20**	**17**	**37**	**181**	**162**	**343**
Gurugram	**Illiterate**	**8**	**24**	**32**	**4**	**7**	**11**	**3**	**7**	**10**	**15**	**38**	**53**
	Literate	0	3	3	0	0	0	0	1	1	0	4	4
	Primary	9	23	32	2	8	10	19	15	34	30	46	76
	Middle	19	23	42	11	13	24	6	15	21	36	51	87
	Matriculate	53	40	93	50	40	90	26	24	50	129	104	233
	Senior secondary	64	34	98	30	15	45	15	13	28	109	62	171
	Graduation	33	18	51	19	11	30	7	1	8	59	30	89
	Above graduation	1	2	3	2	0	2	1	0	1	4	2	6
	Total	**187**	**167**	**354**	**118**	**94**	**212**	**77**	**76**	**153**	**382**	**337**	**719**
Jind	**Illiterate**	**24**	**87**	**111**	**11**	**19**	**30**	**10**	**17**	**27**	**45**	**123**	**168**
	Literate	2	0	2	0	0	0	2	1	3	4	1	5
	Primary	22	16	38	2	5	7	9	2	11	33	23	5
	Middle	16	14	30	7	4	11	10	5	15	33	23	56
	Matriculate	50	32	82	17	15	32	7	9	16	74	56	130
	Senior secondary	74	19	93	9	6	15	7	2	9	90	27	117
	Graduation	29	14	43	8	1	9	0	2	2	37	17	54
	Above graduation	5	6	11	2	0	2	2	0	2	9	6	15
	Total	**222**	**188**	**410**	**56**	**50**	**106**	**47**	**38**	**85**	**325**	**276**	**601**
Karnal	**Illiterate**	**17**	**53**	**70**	**5**	**9**	**14**	**28**	**40**	**68**	**50**	**102**	**152**
	Literate	1	3	4	0	2	2	3	8	11	4	13	17
	Primary	15	18	33	10	9	19	30	28	58	55	55	110
	Middle	36	39	75	8	8	16	46	35	81	90	82	172
	Matriculate	91	64	155	21	14	35	61	43	104	173	121	294

	Senior secondary	99	51	150	12	5	17	30	25	55	141	81	222
	Graduation	43	43	86	6	1	7	6	3	9	55	47	102
	Above graduation	2	7	9	0	0	0	0	0	0	2	7	9
	total	304	278	582	62	48	110	204	132	386	570	508	1078
Rohtak	**Illiterate**	**16**	**43**	**59**	**5**	**14**	**19**	**19**	**25**	**44**	**40**	**82**	**122**
	Literate	1	0	1	1	0	1	2	1	3	4	1	5
	Primary	9	11	20	10	5	15	11	6	17	30	22	52
	Middle	15	10	25	8	11	19	9	10	19	32	31	63
	Matriculate	52	27	79	23	15	38	14	16	30	89	58	147
	Senior secondary	36	20	56	26	13	39	24	10	34	86	43	129
	Graduation	33	15	48	6	3	9	13	8	21	52	26	78
	Above graduation	3	6	9	0	1	1	0	0	0	3	7	10
	Total	**165**	**132**	**294**	**79**	**62**	**141**	**92**	**76**	**113**	**336**	**270**	**606**
Yamuna Nagar	**Illiterate**	**4**	**5**	**9**	**5**	**28**	**33**	**6**	**6**	**12**	**15**	**39**	**54**
	Literate	0	0	0	0	1	1	0	1	1	0	2	2
	Primary	4	5	9	6	13	19	1	7	8	7	25	32
	Middle	0	2	2	14	25	39	5	3	8	23	30	53
	Matriculate	11	4	15	23	26	49	6	3	9	40	33	73
	Senior secondary	10	7	17	14	27	41	1	1	2	25	35	60
	Graduation	2	1	3	7	13	20	0	0	0	9	14	23
	Above graduation	0	0	0	2	2	4	0	0	0	2	2	4
	Total	**31**	**24**	**55**	**71**	**135**	**206**	**19**	**21**	**40**	**121**	**180**	**301**
Haryana	**Illiterate**	**70**	**219**	**289**	**35**	**94**	**129**	**69**	**102**	**171**	**174**	**415**	**589**
	Literate	4	6	10	3	2	5	7	12	19	14	20	34
	Primary	55	73	128	41	37	78	74	58	132	170	168	338
	Middle	95	92	187	77	52	129	80	74	154	252	218	470
	Matriculate	264	174	438	174	109	283	119	99	218	557	382	939
	Senior secondary	290	133	423	118	52	170	79	51	130	487	236	723
	Graduation	148	97	245	61	22	83	28	14	42	237	133	370
	Above graduation	12	23	35	9	3	12	3	0	3	24	26	50
	Total	938	817	1755	518	371	889	459	410	869	1915	1598	3513

Source: Author's calculation based on primary data

A-7 Number of Households Deprived in Health Dimension.

District	Households	Indicator	General	OBC	SC	Total
Faridabad	Deprived Households	Nutrition	8	37	4	49
		Child Mortality	0	0	0	0
	Total Households		**15**	**79**	**10**	**104**
Gurugram	Deprived Households	Nutrition	44	27	23	94
		Child Mortality	0	1	0	1
	Total Households		**115**	**66**	**54**	**235**
Jind	Deprived Households	Nutrition	53	13	18	84
		Child Mortality	3	4	3	10
	Total Households		**112**	**26**	**23**	**161**
Karnal	Deprived Households	Nutrition	82	10	65	157
		Child Mortality	1	1	3	5
	Total Households		**157**	**29**	**109**	**295**
Rohtak	Deprived Households	Nutrition	27	14	16	57
		Child Mortality	1	0	1	0
	Total Households		**92**	**41**	**52**	**185**
Yamuna Nagar	Deprived Households	Nutrition	7	19	8	34
		Child Mortality	1	1	0	2
	Total Households		**13**	**37**	**10**	**60**
Haryana	Deprived Households	Nutrition	221	120	134	475
		Child Mortality	6	7	7	20
	Total Households		**504**	**278**	**258**	**1040**

Source: Author's calculation based on primary data

A-8 Deprivation Status of Households by Number of Indicators (Value in Numbers).

District	Social Categories	Number of Indicators a Household Deprived of											
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Faridabad	**General**	3	2	3	3	3	1	0	0	0	0	0	15
	OBC	4	12	12	3	17	21	10	0	0	0	0	79
	SC	0	1	2	3	0	1	3	0	0	0	0	10
	Total	**7**	**15**	**17**	**9**	**20**	**23**	**13**	**0**	**0**	**0**	**0**	**104**
Gurugram	**General**	24	32	34	8	14	0	2	11	0	0	0	115
	OBC	19	18	12	8	7	1	1	0	0	0	0	66
	SC	9	12	12	8	4	7	2	0	0	0	0	54
	Total	**52**	**62**	**58**	**24**	**25**	**8**	**5**	**1**	**0**	**0**	**0**	**235**
Jind	**General**	3	11	11	19	14	28	16	10	0	0	0	112
	OBC	1	1	0	3	7	5	8	1	0	0	0	26
	SC	0	1	0	1	2	2	15	2	0	0	0	23
	Total	**4**	**13**	**11**	**23**	**23**	**35**	**39**	**13**	**0**	**0**	**0**	**161**
Karnal	**General**	7	38	49	43	17	3	0	0	0	0	0	157
	OBC	1	5	3	7	6	5	1	1	0	0	0	29
	SC	0	4	28	22	22	23	10	0	0	0	0	109
	Total	**8**	**47**	**80**	**72**	**45**	**31**	**11**	**1**	**0**	**0**	**0**	**295**
Rohtak	**General**	8	14	18	17	16	13	4	2	0	0	0	92
	OBC	2	8	5	5	6	11	4	0	0	0	0	41
	SC	6	1	5	4	8	5	19	4	0	0	0	52
	Total	**16**	**23**	**28**	**26**	**30**	**29**	**27**	**6**	**0**	**0**	**0**	**185**
Yamuna Nagar	**General**	0	3	2	0	1	3	3	1	0	0	0	13
	OBC	0	8	6	9	6	2	4	0	1	1	0	37
	SC	0	0	1	1	2	2	2	2	0	0	0	10
	Total	**0**	**11**	**9**	**10**	**9**	**7**	**9**	**3**	**1**	**1**	**0**	**60**
Haryana	**General**	45	100	117	90	65	48	25	14	0	0	0	504
	OBC	27	52	38	35	49	45	28	2	1	1	0	278
	SC	15	19	48	39	38	40	51	8	0	0	0	258
	Total	**87**	**171**	**203**	**164**	**152**	**133**	**104**	**24**	**1**	**1**	**0**	**1040**

Source: Author's calculation based on primary data.

A-9 Haryana: Multicollinearity and Autocorrelation test outcome.

Code	Independent Variable	Tolerance	VIF
X_1	Head of family	.960	1.041
X_2	Social category	.601	1.663
X_3	Type of family	.854	1.171
X_4	Dependent population in house (children below age 15 and old age person)	.948	1.055
X_5	Ration card	.742	1.347
X_6	Arable land	.597	1.674
X_7	Main occupation	.850	1.177
X_8	Annual income	.680	1.470
X_9	Adult female education	.719	1.391
X_{10}	Adult male education	.676	1.478
X_{11}	Adult female health	.888	1.126
X_{12}	Adult male health	.881	1.136
X_{13}	Health facility at village level	.908	1.102
X_{14}	Cooking fuel	.786	1.273
X_{15}	Toilet facilities	.668	1.469
X_{16}	Drinking water	.860	1.162
Durbin- Watson		1.8561	

Dependent variable- Multidimensional poor

A-10 Faridabad District: Multicollinearity and Autocorrelation test outcome.

Code	Independent Variable	Tolerance	VIF
X_1	Head of family	.851	1.175
X_2	Social category	.700	1.429
X_3	Type of family	.876	1.141
X_4	Dependent population in house (children below age 15 and old age person)	.868	1.152
X_5	Ration card	.730	1.371
X_6	Arable land	.612	1.635
X_7	Main occupation	.748	1.338
X_8	Annual income	.428	2.339
X_9	Adult female education	.586	1.705
X_{10}	Adult male education	.617	1.620
X_{11}	Adult female health	.782	1.278
X_{12}	Adult male health	.811	1.234
X_{13}	Health facility at village level	.483	2.072
X_{14}	Cooking fuel	.656	1.524
X_{15}	Toilet facilities	.399	2.505
Durbin- Watson		1.936	

Dependent variable- Multidimensional poor

A-11 Gurugram District: Multicollinearity and Autocorrelation test outcome.

Code	Independent Variable	Tolerance	VIF
X_1	Head of family	.916	1.092
X_2	Social category	.760	1.316
X_3	Type of family	.798	1.253
X_4	Dependent population in house (children below age 15 and old age person)	.869	1.151
X_5	Ration card	.614	1.628
X_6	Arable land	.642	1.558
X_7	Main occupation	.825	1.212
X_8	Annual income	.604	1.656
X_9	Adult female education	.758	1.320
X_{10}	Adult male education	.717	1.395
X_{11}	Adult female health	.911	1.097
X_{12}	Adult male health	.878	1.139
X_{13}	Health facility at village level	.711	1.406
X_{14}	Cooking fuel	.671	1.489
X_{15}	Toilet facilities	.599	1.669
X_{16}	Drinking water	.619	1.615
Durbin- Watson		1.909	

Dependent variable- Multidimensional poor

A-12 Jind District: Multicollinearity and Autocorrelation test outcome.

Code	Independent Variable	Tolerance	VIF
X_1	Head of family	.923	1.083
X_2	Social category	.542	1.845
X_3	Type of family	.855	1.170
X_4	Dependent population in house (children below age 15 and old age person)	.814	1.229
X_5	Ration card	.662	1.510
X_6	Arable land	.500	2.000
X_7	Main occupation	.760	1.315
X_8	Annual income	.623	1.605
X_9	Adult female education	.643	1.554
X_{10}	Adult male education	.608	1.645
X_{11}	Adult female health	.790	1.265
X_{12}	Adult male health	.720	1.389
X_{13}	Health facility at village level	.303	3.299
X_{14}	Cooking fuel	.680	1.470
X_{15}	Toilet facilities	.574	1.741
X_{16}	Drinking water	.261	3.832
Durbin- Watson		2.285	

Dependent variable- Multidimensional poor

A-13 Karnal District: Multicollinearity and Autocorrelation test outcome.

Code	Independent Variable	Tolerance	VIF
X_1	Head of family	.964	1.0
X_2	Social category	.293	3.412
X_3	Type of family	.812	1.232
X_4	Dependent population in house (children below age 15 and old age person)	.903	1.107
X_5	Ration card	.729	1.372
X_6	Arable land	.341	2.930
X_7	Main occupation	.916	1.092
X_8	Annual income	.681	1.468
X_9	Adult female education	.685	1.460
X_{10}	Adult male education	.648	1.543
X_{11}	Adult female health	.874	1.144
X_{12}	Adult male health	.887	1.127
X_{14}	Cooking fuel	.895	1.118
X_{15}	Toilet facilities	.790	1.265
Durbin- Watson		1.861	

Dependent variable- Multidimensional poor

A-14 Rohtak District: Multicollinearity and Autocorrelation test outcome.

Code	Independent Variable	Tolerance	VIF
X_1	Head of family	.807	1.238
X_2	Social category	.169	5.905
X_3	Type of family	.754	1.325
X_4	Dependent population in house (children below age 15 and old age person)	.924	1.082
X_5	Ration card	.612	1.634
X_6	Arable land	.167	6.004
X_7	Main occupation	.821	1.217
X_8	Annual income	.501	1.997
X_9	Adult female education	.534	1.872
X_{10}	Adult male education	.547	1.829
X_{11}	Adult female health	.648	1.544
X_{12}	Adult male health	.690	1.450
X_{14}	Cooking fuel	.752	1.329
X_{15}	Toilet facilities	.488	2.051
X_{16}	Drinking water	.791	1.264
Durbin- Watson		2.037	

Dependent variable- Multidimensional poor

A-15 Yamuna Nagar District: Multicollinearity and Autocorrelation test outcome.

Code	Independent Variable	Tolerance	VIF
X_1	Head of family	.677	1.477
X_2	Social category	.465	2.149
X_3	Type of family	.676	1.480
X_4	Dependent population in house (children below age 15 and old age person)	.843	1.186
X_5	Ration card	.564	1.772
X_6	Arable land	.623	1.606
X_7	Main occupation	.538	1.859
X_8	Annual income	.645	1.552
X_9	Adult female education	.665	1.505
X_{10}	Adult male education	.699	1.431
X_{11}	Adult female health	.460	2.174
X_{12}	Adult male health	.523	1.914
X_{15}	Toilet facilities	.502	1.991
X_{16}	Drinking water	.450	2.220
Durbin- Watson		1.723	

Dependent variable- Multidimensional poor