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POVERTY AND ITS DETERMINANTS IN NAGAUR DISTRICT OF RAJASTHAN STATE LOGIT MODEL APPROACH

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Abstract: *Multistage random sampling was used to collect primary data from 100 households in the study area. Minimum consumption expenditure per person was used as standard of measurement to categorize households into poor and non-poor. To address principal determinants of household poverty in the study area, the study used, logit model. The poverty headcount was 20 percent in in Nagaur district. The district has poverty gap index of 0.056 and the squared poverty gap index was 0.021. Descriptive analysis results showed majority 53 percent of overall, 56 percent of non-poor and 35 percent of poor sampled households responded they have unemployed family member. 60 percent poor, 41 percent non-poor and 45 percent overall sampled households responded their own production is not enough year round. Agriculture generates nearly 55 percent and non-farm has 45 percent of the total annual income in Nagaur district. Out of monthly total expenditure, 63 percent goes to food, 18 percent to non-food, 17 percent to education and the remaining 3 percept to medical expenditure monthly. In the district, 60 percent of the poor and 8 percent of the non-poor had below poverty line ration card. The logit model result showed, as family size increases by one adult equivalent, citrus paribus, the probability that a household falls into poverty increases by 10.1 percent. As farm size increases by one hectare, the probability that a household falls into poverty decrease by 5.2 percent and a household with better access to irrigation is 8.3 percent more likely to be non-poor in Nagaur district. If income increases by one lakh, the probability of the household falling into poverty will decrease by 0.04 percent. As livestock ownership increases by one TLU, the probability that a household falls into poverty will decrease by 13.7 percent. As decision maker education measured by years of schooling increases by one unit, the probability that a household falls into poverty will decrease by 4.8 percent.*

Key words: *Poverty, determinants of poverty, logit, Poverty gap index, headcount index, Poverty severity index*

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INTRODUCTION

Despite high rates of economic growth that exceeded expectations and led to India being placed in third-largest world economy in terms of PPP (Purchasing Power Parity) and positioned in the category of 'lower middle income countries', the grassroots reality makes it clear that the country still have a long way to go in eradicating poverty and ensuring acceptable minimum standards of living for all citizens (Mehta K. *et al*., 2011).According to the Human Development Index (HDI), India is ranked 134th out of 187 nations with HDI value of 0.586 (UNDP, 2014). The most recent Rangarajan expert group report (2014) indicates India is home to more than 363 million poor. The proportion of the population below the poverty line in India is 29.5 percent. Similar to other developing countries, majority of the poor (72 percent) in India live in rural areas (*ibid*). Furthermore, the Planning Commission (2014) report indicated that, of these 363 million people in the country who did not have incomes to access a consumption basket that defines the poverty line, 260.5 million lives in rural and 102.5 million in urban areas. According to world Bank newly revised official poverty line, 37 percent of India's population (or about 410 million people) falls below the poverty line, making the country home to one-third of the world's poor. Reduction of poverty in India is, therefore, critical for the attainment of national and international goals. In line with the available statistics, the incidence of poverty in India is a rural phenomenon (World Bank, 1990; Fields, 2000; World Bank, 2001).

Rajasthan state is the largest state in India geographically, but the poverty situation in this largest state is not different than Indian condition. Like other sister Indian states, Rajasthan has been home to more than 17 million poor people (UNDP, 2014). In Rajasthan, totally more than 225.7 lakhs people who are unable to meet monthly per capita consumption expenditure of 1035.97 in rural and 1406.15 in urban areas (Rangarajan, 2014). In the state 21.7 percent of people are under poverty line or they are not able to expend minimum amount expenditure to satisfy their monthly consumption needs and deemed as poor in 2011-12 (Rangarajan, 2014). Rajasthan is ranked 17th out of 23 states in India, in the Human Development Index (HDI) with value of 0.434 (UNDP, 2014).Human Development Report 2002 which pointed out salient feature of Rajasthan's poverty profile shows that, there has been a high level of urban poverty (22.5 %), as well as consistently higher rural poverty levels (21.4 %).

To address the problem of rural poverty, the Indian government is committed to a reduction of poverty to the barest minimum and even eradicate if possible hence rural poverty alleviation has remained the declared goal for Central, State and district level governments. In order to reduce or eradicate poverty, since independence successive governments have launched several poverty alleviation programmes to curtail problem of poverty in the country and certain areas of the country such as northern part of Rajasthan. These programmes have ensured reduction in poverty; however, the pace of poverty reduction over the past decade has been slow. This phenomenon calls for assessment of poverty and its determinants in Nagaur district of Rajasthan State.

METHODOLOGY

Sampling Technique

Multistage stratified random sampling procedure was adopted for the selection of 100 sampled respondents from Nagaur district. Nagaur district was purposively selected for this study because of limitation of district level poverty study. In the second stage, two *tehsils* were selected randomly. Namely, Merta and Khinwsar *tehsils* were selected randomly. In the third stage, three villages from each selected *tehsil* were selected randomly. Thus, totally six villages from two selected *tehsils* were selected for further selection of households. In the fourth stage, list of all households residing in each selected village from village *Patwari and* voters list available in the village *Sarpanch* were applied to pick out targeted households' using systematic sampling technique. Hundred households were selected based on size proportional to household size from six randomly selected villages of a *tehsil* by using systematic sampling technique. Thus, totally hundred household's primary data collected with the aid of interview using schedules administered by the researchers were however found useful for this study.

Analytical Techniques

In this study minimum consumption expenditure per person or preferably per household was used as standard of measurement to measure poverty. In measure of extent of poverty, the choice of income or consumption expenditure as best indicator for living standard measurement of households is another point of debate. Government of India and most analysts prefer to use current consumption as an indicator of living standard measurement because income of the poor often varies over time. Rural households in developing

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

To address dimension of poverty in the study area, the FGT poverty measure that was introduced by (Foster, Greer, and Thorbecke, 1984) was used. The first step was by distinguishing between the poor and non-poor using poverty line. Poverty line is a monthly per capita consumption expenditure per person or a cut of living standard level below which an individual is considered to be poor (Rangarajan, 2014, MoFED ,2013; Doyle, 2003; Ravallion, 1992). Following expert group of India (Rangarajan, 2014) monthly per capita consumption expenditure of Rs.1035.97 in rural areas and Rs.1406.15 in urban areas is treated as the poverty line at the Rajasthan state level. Any household failing to meet this level of consumption expenditure can be treated as a poor household.

Based on data from households, this study used three poverty dimension instruments that were identified by (Foster, Greer, and Thorbecke, 1984) to achieve the objective related to the extent of poverty in Northern Rajasthan. These included headcount index; the poverty gap index; and severity index or Foster-Greer- Thorbecke (FGT) index of poverty. Using these three poverty dimension instruments we identified the percentage of the poor (headcount index), the aggregate poverty gap (poverty gap index), and the distribution of income among the poor (poverty severity index).

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

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

Where

Z = *is* poverty line

n = *is* the total population

q = the number of poor

Then, P_α is given by

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

Where:

P_α= Poverty measure

Z = Poverty line

N = Population number

q = Number of persons/households below the poverty line

Y_i = real per capita consumption expenditure, in the equation, $Z - Y_i = 0$ if $Y_i > Z$.

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

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

$$P_0 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{Z - Y_i}{Z}\right)^0 \quad ----------(3)$$

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

$$P_1 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{Z - Y_i}{Z}\right)^1 \quad ----------(4)$$

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

$$P_2 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{Z - Y_i}{Z}\right)^2 \quad ----------(5)$$

After identification of percentage of the poor (headcount index), aggregate poverty gap (poverty gap index), and distribution of income among the poor (poverty severity index), an examination of the determinants of poverty was done using logit regression analysis.

Logit regression can be defined as:

$$log\left[\frac{pi}{1-pi}\right] = logit\ of\ being\ poor\ or\ non\ poor \quad ----------(6)$$

Logit (pi) scale ranges from negative infinity to positive infinity and is symmetrical around the logit of 0.5 (which is zero). The formula below shows the relationship between the usual regression equation (a + bx … etc.), which is a straight line formula in the logistic regression equation. The form of the logistic regression equation is:

$$logit[Pi] = log\left[\frac{pi}{1-pi}\right] = a + b_1x_1 + b_1x_2 + b_3x_3 \ldots\ldots + b_kx_k + U_t \quad ---(7)$$

Pi = Probability one is poor

1-Pi = Probability of one is not poor

Where P_i = (poor respondent) if $P_i \geq 0$

P_i = (respondent is not poor) if $P_i < 0$

The probability of one becoming poor or non-poor based on the explanatory variables can be calculated with the formula below, which is simply another rearrangement of formula above:

$$p = \frac{exp^{a+b_1x_1+b_1x_2+b_3x_3\ldots\ldots+b_kx_k}}{1+exp^{a+b_1x_1+b_1x_2+b_3x_3\ldots\ldots+b_kx_k}} \quad ----------(8)$$

Result and Discussion

Descriptive analysis:- Descriptive statistics are numbers that describe our data. We can see the sex distribution among sampled householdes and the sex ratio in the district is calculated and presented on table 1.

Table 1:- Sex ratio distributions among sampled households in Nagaur district

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

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

Table 1 indicates male and female sex ratio distribution among households in Nagaur district. The result shows almost the district has equal number of male and female. There are 268 female and 276 male as family member among sampled households. This ratio (1:97) is better than Rajasthan state sex ratio report of 1: 93 (Gov.Raj, 2012). Both poor and non-poor have equal number of sex ratio, which indicates gender is not cause for household poverty. Salary earners presence in the family among sampled households in Nagaur district was assessed and the result is depicted on table 2.

Table 2:- Salary earners presence in the family among sampled households in Nagaur district

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

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

Above half sampled households in Nagaur district responded that they have salary earner in their family. Similarly, 55 percent non-poor and 35 percent poor also had salary earner family member. But, majority 65 percent poor, 45 percent non-poor and 49 percent overall had no salary earner family member among sampled households. Sampled households were also assessed about unemployment distribution and the result is presented on table 3.

Table 3:- Unemployment distribution among sampled households in Nagaur district

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

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

In this study unemployed, refers to people who have attained standard 12 and above education only. Accordingly, table 3 result illustrates that majority 53 percent of overall, 56 percent of non-poor and 35 percent of poor sampled households responded they have unemployed family member. Majority 65 percent poor, 44 percent non-poor and 47 percent overall also responded they had no member attained standard 12 and above education and jobless.

The job and wage difference factors appear to be a major determinant of rural-to-urban migration. Accordingly, sampled households were asked whether any family member migrated to other palace for job or not. Table 4 presents respondents response about family member migration in the study area.

Table 4:- Family member migration among sampled households in Nagaur district

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

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

Majority, 94 percent of overall 90 percent of poor and 95 percent of non-poor sampled households respond no one has migrated from their family. Households who had migrants for job were 5 percent from non-poor, 10 percent from poor and 6 percent from overall sampled households. This might be the result of implementation of several poverty-alleviation and employment-generation programmes by government in the district. They reduced distress migration and improved the bargaining power of agriculture labour leading to higher wages and reduced migration. Similarly, own production sufficiency among sampled households in Nagaur district was assessed and the result is depicted on table 5.

Table 5:- Own production sufficiency among sampled households in Nagaur district

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

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

The results on table 5 shows sampled households response on whether their normal year own production is enough years round or not. Accordingly, 60 percent poor,41 percent non-poor and 45 percent overall sampled households responded their own production is not enough year round. However,40percent poor households, 59 percent non-poor and 55 percent overall sampled households responded their own production would last them through the year. This self-sufficiency is particularly important, because in Nagaur district, where food expenditure reaches to 62percent (see table 11), a family that can feed itself has

high survival value and low probability to be poor regardless of other difficulties confronting it. It is believed that to bring national food self-sufficiency family food self-sufficiency is vital. In the district, households were asked whether they have taken loan or not and the result is presented on table 6.

Table 6:- Households classification whether they taken loan or not in Nagaur district

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

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

Majority of sampled household responded that they did not take any loan from formal financial institutions. Of overall 85 percent, 80 percent of poor and 85 percent of non-poor had no loan. But, 16 percent of overall, 20 percent of poor and 15 percent of non-poor had loan from financial institutions.

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

Table 7:- Households saving practice in Nagaur district

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

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

Table 7 illustrates households saving habit in Nagaur district and the results show that 28 percent of overall, 31percent of non-poor and 15percent of poor sampled households were responded they have good tradition of putting cash or kind aside for future use. In contrast majority, 85 percent of poor, 69percent of non-poor and 72percent of overall sampled households replied that they had no saving habit.

Accessibility to communication plays a significant role in getting information about technology, market information, weather, government policy and others in shortest time

possible over large area of coverage. Sampled households were asked whether they have enough communication ways or not. Table 8 illustrates results of respondents on their accessibility to communication.

Table 8:-Accessibility of households to communication ways in Nagaur district

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

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

Mobile communication is popular in both poor and non-poor sampled households, everyone had mobile. It is encouraging to note that 100 percent of sampled households had mobile communication. Out of sampled households 35percent of poor, 82percent of non-poor and 73 percent of overall sampled households have television communication accessibility in their home. Similarly, 40percent of poor, 49percent of non-poor and 47percent of overall sampled households had Radio communication accessibility. Like mobile, post office is used widely in Nagaur district, 75percent of poor, 90percent of non-poor and 87percent of overall sampled households had post office service around their village.

This study assumes that expenditures and income were accurately reported by households during data collection. Both household income and spending size matter to personal well-being. If an income-expenditure gap is positive, household has probability of saving and if it is negative, that household has probability of de-saving from past saving. Accordingly, income expenditure gap is calculated for sampled households and the result presented on table 9.

Table 9:- Income-expenditure gap among sampled households in Nagaur district

Income-expenditure gap	Non-Poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Positive	74	92	16	80	90	90
Negative	6	8	4	20	10	10
Total	80	100	20	100	100	100

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

Table 9result shows 80 percent of poor, 92 percent of non-poor and 90 percent of overall sampled household expenditure was less than their income and their annual balance is

positive whereas, for 8 percent of non-poor, 20 percent of poor and 10percent of overall sampled household expenditure was more than their income and their annual balance is negative. They filled their gap using their past saving or other source.

Income is the sum of all the wages, salaries, profits, interest payments, rents, and other forms of earnings received in a given period of time, this study focused on yearly income. To understand sources of income and their share in Nagaur district, data collected from sampled household is depicted on table 10.

Table 10:- Income source among sampled households in Nagaur district

Sources of income	Share from total income in (%)
Farm Income(Annual)	55
Non-farm income(Annual)	45

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

Table 10 depicts sources of household income in Nagaur district. Sources of income of rural households are diverse. but agriculture is still the main source of income. In Nagaur district, farm income and non-farm income are the two dominant sources of household income. The share of non-farm income differently from other sister districts is almost near to agriculture income. Agriculture generates nearly 55 percent of the total income in the study area. The non-farm incomes, with a share of 45 percent in the total income, comprise the second largest income source after agriculture. In the district, sampled households were assessed about monthly expenditure budget share and the result is presented on table 11.

Table 11:- Expenditure budget share among sampled households in Nagaur district

Expenditure budget share	Share from total expenditure in (%)
Food expenditure (monthly)	63
Non-food expenditure (monthly)	18
Education expenditure (monthly)	17
Medical Expenditure (monthly)	2

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

Table 11 depicts share of some important household monthly expenditure variables. Food expenditure takes the lion share. Out of monthly total expenditure for sampled households in Nagaur district, 63 percent goes to food purchase, 18 percent to non-food expenditure, 17 percent to education expenditure and the remaining 3 percept to medical expenditure monthly.

Accesses to safe drinking water supply facilities to rural dwellers constitute essential ingredient of good and healthy living. Sources of drinking water supply available to households were assessed and the results are presented in table 12.

Table 12:- Sources of drinking water among sampled households in Nagaur district

Sources of drinking water	Non-Poor		Poor		Total	
	N = 80	Percent	N=20	Percent	N=100	Percent
Public water system outside hose	49	61	11	55	60	60
Pond	31	39	9	45	40	40

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

Table 12 shows**,** 60 percent overall sampled households getting drinking water by public water system outside the house and 40 percent from pond. The results also show that,55 percent poor and 61 percent non-poor sampled household's also getting drinking water by public water system outside the house. In the district, 45 percent poor and 39 percent non-poor are getting drinking water from pond.

Data was also gathered about the sources of domestic energy in the study area. The sampled household response is calculated by poverty status and given in table 12.

Table 13:- Sources of domestic fuel among sampled households in Nagaur district

Sources of domestic fuel	Non-Poor		Poor		Total	
	N = 80	Percent	N=20	Percent	N=100	Percent
LPG-03	68	85	7	35	75	75
Woods and Dung cakes	80	100	20	100	100	100
Kerosene oil	19	24	4	20	23	23

Source: Authors' computations, based on household survey data, 2015.*Note:-Totals sum to more than 100%, because of multiple responses were permitted.*

Table 13 result shows all sampled households use woods and dung cakes but, 75 percent of overall, 85 percent of non-poor and 35 percent of poor use LPG-03 as sources of domestic fuel. In the district, 24 percent of non-poor, 20 percent of poor and 23 percent of overall uses kerosene oil as sources of domestic fuel.

Economic status of the family can be forecasted by the type of ration card they owned. Antyodaya (extreme poverty level), below poverty line (BPL) and above poverty line (Normal) are currently used ration card by Indian government. Sampled households were assessed by the type of ration card they owned and the result is shown on table 14.

Table 14:- Ration card owned among sampled households in Nagaur district

Type of ration card you have?	Non-Poor		Poor		Total	
	N = 80	Percent	N = 20	Percent	N=100	Percent
Normal	74	92	8	40	82	82
BPL	6	8	12	60	18	18
Total	80	100	20	100	100	100

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

The distribution of sampled households by the ration card they owned indicates that a considerable proportion of the sampled households (60 percent of the poor and 8 percent of the non-poor) had below poverty line (BPL) ration card. Yet, most of the sampled households (92 percent of the non-poor and 40 percent of the poor) owned normal ration card. Similarly, out of 100 overall sampled households, 82 percent owned normal ration card and 18 percent owned below poverty line ration card.

Extent of poverty in Nagaur district

The descriptive analysis explains how we construct summary measures for the socio-economic characteristics of poverty in the study area. Extent of poverty can be easily summarized using povertyheadcount index (P_0), poverty gap index (P_1) and Poverty severity index (squared poverty gap) (P_2). These indexes were computed and the results presented on table 15.

Table 15:- Extent of poverty in Nagaur district

District	Headcount Index (Poverty Incidence)	Poverty gap index (Poverty depth)	Poverty severity index
Nagaur	0.2	0.056	0.021

Source:-Survey Data, 2015

Table 15 shows situations of absolute poverty as measured by different poverty scales. With a poverty line of Rs.1036 per person per month for rural Rajasthan, the poverty headcount (incidence of poverty) was 0.2 in Nagaur district. It shows the proportion of the population for which consumption expenditure is less than Rs.1036 per person per month is 20 percent in the district among sampled households. This means the proportion of poor people who have not yet attained a minimum level of expenditure to meet basic needs in Nagaur district was 20 percent.

Poverty gap index in table 15 indicates the extent to which the per-capita expenditure of the poor falls below the poverty line. It is often considered as representing the depth of poverty. It is the mean distance separating the population from the poverty line. The poverty gap is a

useful statistic to assess how many resources would be needed to eradicate poverty through cash transfers perfectly targeted to the poor. The greater the gap the deeper poverty they are in. The poverty gap index was 0.056 for Nagaur district. In Nagaur district on average 5.6 percent of the poverty line monthly cash transfer is needed to lift each poor person out of poverty.

Squared poverty gap index (Poverty severity index)is not easy to interpret as compared to headcount index and poverty gap index. Hence, by squaring the poverty gap index, the measure implicitly puts more weight on observations that fall well below the poverty line, in other words the poorest among the poor. The result on table 15 shows, the squared poverty gap index was (0.021) for Nagaur district, this shows the degree of inequality among the poor in Nagaur district is lesser. There is no clear monthly per person expenditure difference among poor in the district.

Determinants of poverty

Availability of differences in infrastructure, geography, demography and culture among districts in Rajasthan, we believe that the determinants of poverty differ from one district to the next. The application of logit model at district level enabled us to look at how particular variables affect the extent of household poverty. Thus, explanations for each significant independent variable for Nagaur district are given consecutively as follows:

Table 16 - The maximum likelihood estimates of the logit model for Nagaur District

Variables	Coefficient	Std. Err	Z	P>|Z|	Wald	Marginal Effect
FAMS	0.971867	0.212	8.12	0.000***	21.02	0.101
FARS	-0.5276	0.132	-7.89	0.000***	16.04	-0.052
IRRLS	-0.56766	0.274	-2.12	0.034**	4.29	-0.083
INCM	-0.000071	0.000026	-5.05	0.000***	7.55	0.0000004
SAVG	-0.000073	0.0000505	-1.46	0.145	2.10	-
CRDT	-0.000442	0.001	-0.40	0.689	0.16	-
TLU	-1.051627	0.289	-4.69	0.000***	13.19	-0.137
DEMED	-0.445335	0.109	-7.32	0.000***	16.63	-0.048
WIFE	0.06565	0.062	1.08	0.279	1.14	-
DR	2.42056	0.515	7.41	0.000***	22.12	0.215
NFAP	-0.39987	0.171	-2.51	0.012**	5.47	-0.060
FAMEX	-0.14897	0.04	-4.88	0.000***	13.86	-0.020
ROAD	0.131873	0.041	3.83	0.000***	10.48	0.020
MOFG	0.69495	0.1511	10.86	0.000***	21.15	0.050

Source: Model output****Significant at less than 1% probability level*

*** Significant at less than 5% probability level*

**Significant at less than 10 % probability level*

The results of the maximum likelihood estimates presented in Table 16 depict that the signs of most of the estimated parameters conform to our prior expectations. In general, eleven among fourteen variables were found to be statistically significant in the logit model at less than 10 percent probability level. Among eleven statistically significant explanatory variables, we found cultivated land size, income, irrigated land owned, livestock holding, decision maker education and farming experience to be negatively related to extent of household poverty. Whereas family size, dependency ratio, number of farm participant , main road distance and months of food deficit are variables that are positively correlated with the probability of being non-poor.

Family size reflects the number of units among which household resources need to be allocated according to the weights of each unit. Family size may have an ambiguous role in poverty status of rural households depending on the relative strength of size economies in consumption as against the diminishing return to scale. In our result, family size is positively associated with household poverty. As family size increases by one adult equivalent, *citrus paribus,* the probability that a household falls into poverty increases by 10.1 percent.This result coincide with, Melkamu andBannor(2015) result, they found that an addition of one member to the family size will result 9.7 percent probability of the household becoming poor in Chencha, Ethiopia.Likewise, the coefficient of dependency ratio is statistically significant and positively related with poverty status of a household. As dependency ratio increases by one unit, *citrus paribus,* the probability that a household falls into poverty increases by 21.5percent. This implies that the larger the dependency ratio, the higher the incidence and intensity of poverty in the household. This could be as a result of much pressure exerted on the limited resources at the household level. Expectedly, the result indicates that the size of land cultivated, as a basic input in farming, is negatively associated and significant at less than 1percent probability level with poverty status of a household. Asfarm size increases by one hectare, *citrus paribus,* the probability that a household falls into poverty decrease by 5.2 percent in Nagaur district. This means households with large cultivated land produce more for household consumption and for sale and have better chance to get additional income than those having relatively small size of cultivated land. Similarly, access to irrigated land is essential for household welfare. The coefficient irrigated land owned is significant at less than 5percent probability level in determining the

probability of being non-poor. The marginal effects indicate that a household with better access to irrigation is 8.3 percent more likely to be non-poor in Nagaur district. Income is negatively and significantly associated with household poverty in the area, but as income increases by one rupee, *citrus paribus,* the probability of the household falling into poverty is almost zero. However if income increases by one lakh, *citrus paribus,* the probability of the household falling into poverty decrease by 0.04 percent. Furthermore, livestock holding is another variable which was found to have a negative and significant impact on household poverty in the district (at p< 1%). As livestock ownership increases by one TLU, *citrus paribus,* the probability that a household falls into poverty decrease by 13.7percent. In India, most households in the rural communities accumulate their wealth in terms of livestock. Results here support such a practice where households with relatively large livestock size were found to be less vulnerable to poverty. Similarly,Melkamu and Mesfin (2015) in their study in Kamba, Ethiopia also found that, farm size and livestock number, supposed as wealth indicator variables in the study area and a hectare increase in farm size will decrease the probability of off-farm participation by 0.135 and one unit increase in animal wealth of the household measured in TLU, will decrease the probability of off-farm participation by 0.037.According to human capital theories (Muller 2002), household earnings are largely explained by the education attainment. Our result coincides with this idea and decision maker education was negatively associated and significant at less than 1percent probability level with poverty status of a household. As decision maker education measured by years of schooling increases by one unit, *citrus paribus,* the probability that a household falls into poverty decrease by 4.8percent.Implying that, households with less-educated head are poorer than those with more educated head when other things are constant. In addition, farming experience is expected to be associated with skills enhancement, accumulation of resources, extensive social capital and others that ought to contribute positively to well-being (Bashaasha et al., 2006). Our outcome also coincides with this idea. Farming experience of household head is found to be negative and significant at less than 1percent probability level, implying that as farming experience of household increases by one year, *citrus paribus,* the probability that a household falls into poverty decrease by 2 percent. Moreover, number of farm participant was significant at less than 5percent probability level and associated negatively with poverty status of a household. As

number of farm participant increases by one adult person, *citrus paribus,* the probability that a household falls into poverty decrease by 6percent.The implication of this finding is that more number of farm participant improves efficiency and diversifies time and sources of agricultural income to reduce the risk associated with income from a single source. In addition, in Nagaur district months of food deficit and main road distance were important variable determining household poverty significantly at less than 1percent probability level. They were associated positively with poverty status of a household. As main road distance increases by one kilometer, *citrus paribus,* the probability that a household falls into poverty increase by 2 percent and as months of food deficit increases by one month, the probability that a household falls into poverty increase by 5 percent. Closeness to main road creates easy access to information on inputs and transportation.

CONCLUSIONS AND RECOMMENDATIONS

A sex ratio distribution among sampled households in Nagaur district is better than the state level average. Above half sampled households in Nagaur district responded that they have salary earner in their family. Majority 53 percent of overall, 56 percent of non-poor and 35 percent of poor sampled households responded they have unemployed family member. 94 percent of overall 90 percent of poor and 95 percent of non-poor sampled households respond no one has migrated from their family.60 percent poor, 41 percent non-poor and 45 percent overall sampled households responded their own production is not enough year round. Of overall 85 percent, 80 percent of poor and 85 percent of non-poor had no loan from formal financial institutions. Majority, 85 percent of poor, 69percent of non-poor and 72percent of overall sampled households replied that they had no saving habit. The share of non-farm income differently from other sister districts is almost near to agriculture income. Agriculture generates nearly 55 percent and non-farm has 45 percent of the total annual income in Nagaur district. Out of monthly total expenditure for sampled households in Nagaur district, 63 percent goes to food purchase, 18 percent to non-food expenditure, 17 percent to education expenditure and the remaining 3 percept to medical expenditure monthly. A considerable proportion of the sampled households (60 percent of the poor and 8 percent of the non-poor) had below poverty line (BPL) ration card.

The poverty headcount (incidence of poverty) was 20 percent in Nagaur district. The district has poverty gap index of 0.056. In Nagaur district on average 5.6 percent of the poverty line

monthly cash transfer is needed to lift each poor person out of poverty. The squared poverty gap index was 0.021 which indicates absence of clear monthly per person expenditure difference among poor in the district.

The results of the logit model indicate that, eleven among fourteen variables were found to be statistically significant at less than 10 percent probability level. As family size increases by one adult equivalent, *citrus paribus,* the probability that a household falls into poverty increases by 10.1 percent. As dependency ratio increases by one unit, *citrus paribus,* the probability that a household falls into poverty increases by 21.5percent.Asfarm size increases by one hectare, *citrus paribus,* the probability that a household falls into poverty decrease by 5.2 percent in Nagaur district. The marginal effects indicate that a household with better access to irrigation is 8.3 percent more likely to be non-poor in Nagaur district. If income increases by one lakh, *citrus paribus,* the probability of the household falling into poverty decrease by 0.04 percent. As live stockownership increases by one TLU, *citrus paribus,* the probability that a household falls into poverty decrease by 13.7percent.As decision maker education measured by years of schooling increases by one unit, *citrus paribus,* the probability that a household falls into poverty decrease by 4.8percent.Asmain road distance increases by one kilometer, *citrus paribus,* the probability that a household falls into poverty increase by 2 percent and as months of food deficit increases by one month, the probability that a household falls into poverty increase by 5 percent. The study findings suggest that in selecting priority intervention areas, any poverty reduction strategy should consider statistically significant variables as the most important areas.

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