

# Is Migration an Adaptive Strategy for Livelihood in Changing Climate Scenario? A Micro Level Analysis of Sikar District of Rajasthan

**Anshuman Upadhyaya**  
Assistant Regional Director,  
IGNOU Regional Center,  
Lucknow

**Subhakanta Mohapatra**  
Associate Professor,  
School of Science,  
IGNOU, New Delhi

## Abstract

Livelihoods based upon climatic sensitive natural resources are facing a new type of challenge in a scenario where the Climate is changing and the extreme events are at rise. The communities of rural areas have been adapting to climate variability and its related risks from centuries by adopting various mechanisms and Migration is one of the important adaptation strategies. In this study, the socio-economic parameters which can be considered as determinants for migration has been studied in district Sikar, Rajasthan. A high percentage of population (76.32%) of the district resides in rural areas with a larger dependency upon agriculture and related activities and the agriculture is mainly rain fed. The district lies in a climatic sensitive zone with a probability of drought once in five years. The study relies upon Primary survey in 369 rural households, conducted to assess the natural capital of the study area, which prompts to adopt migration for making their livelihood sustainable. It even high lights the migration pattern in different strata of society analyzing the reasons for it. The study indicates that migration has been adaptive strategy in communities vulnerable to climate change, the views from the communities have been analyzed and suggestions have been given for policy implications.

**Keywords:** Livelihood, Climate Sensitivity, Migration, Adaptation, Natural Capital, Sustainable Livelihood.

## Introduction

Climate change is now being perceived as a new type of challenge especially amongst rural communities as it has an adverse effect on livelihoods, which mainly depend upon agriculture and allied activities. As reported by Government of India in its second communication to UNFCCC, 70% of population is dependent upon agriculture and allied activities. The role of Climate is significant as most of agriculture in India is dependent upon monsoon rainfall and occurrence of frequent disastrous events like floods and droughts are detrimental to agriculture (Government of India). The IPCC Fifth Assessment report noted the sensitivity of rural areas in developing countries, due to their large dependency upon natural resources for livelihood along with factors like poverty, isolation and marginality (Dasgupta, Partha; Morton).

## Review of Literature

Adaptation is process which is fundamental for individuals, households, communities and countries for preparing them to face the consequences of climate change. The process of adaptation involves adjustments to increase the capability of socio-economic activities thus reducing their vulnerability to climate and its extreme (Smit). Adaptation described by Fourth Assessment Report as "adjustment in natural or human system in response to actual or expected climatic stimuli or their effects" (IPCC). The Fifth Assessment report of IPCC, states that adaptations are options which leads to reduction of "risks" and "vulnerability" by providing opportunities for capacity building of individuals so that they may cope-up with consequences of climate change (Noble et al.). Migration was viewed as one of the conventional coping strategy for countering climatic stresses (Ober). Of late, it has been begun to be considered as an adaptation, beyond coping by various authors (Adger et

al, Barnett et al, McLeman and Smit, Tacoli). The three foremost strategies available to rural households may include "agriculture intensification", "livelihood diversification" and "migration", the migration can be considered as one of the important strategy, which may combine with others leading to "sustainable livelihood" (Mcdowell and Haan). Mclleman and Hunter considered "Migration" as one of adaptation resorted by individuals and households as and when they are exposed to variability or stressful conditions of climate .The authors further stated that the spatial and temporal basis of migration having relationship with climate can be understood on the basis of "vulnerability" of communities (Mcleman and Hunter). The Third Assessment Report of IPCC, defined vulnerability as "The degree to which a system is susceptible to or unable to cope with adverse effects of Climate Change including Climate variability and extremes. Vulnerability is a function of the Character, magnitude, and rate of Climate Variation to which a system is expand, its severability, and its adaptive capacity" (IPCC). Increased Migration, its associated risks due to climate change and enhancement of adaptive capacity of communities through migration have been discussed by Barnett et.al.(2010).Decisions to migrate may be "forced" or "voluntary" depending upon situations (Barnett, Jon; Webber et al.). Range of Migration may vary; it can be "temporary" or "definite" at individual and at community level, depending upon the adaptive strategies of people (Benoit Mayer). Migration also have an impact on social resilience of communities, individuals and on "sustainability" of resources (Adger et al.). Piguat et al have given an overview about migration and climate change nexus based upon certain empirical findings, highlighting key issues at stake in social ,and political context (Piguat, Pécoud, and de Guchteneire). Natural disasters and climatic extreme events have increased due to variability in climate, which can be considered as causation for "forced migration" (Black, Kniveton, and Schmidt-Verkerk). The Study carried out amongst people of Zambia in Sub Saharan Africa depicted a complex relationship between climate extremes and migration (Simatele and Simatele).

### Aim of the Study

The present study attempts to answer the question whether migration from rural areas for employment can be an adaptive strategy for livelihood, in district Sikar, Rajasthan especially when the traditional occupation of agriculture may not be much economically viable in context of changing climate and existing drought like situations.

### Area & Method of Study

Geographically, the district lies between the longitude 74.44 Degree to 75.25 Degree and Latitude in the East 27.21 Degree to 28.12 Degree in the North, having an area of 7742.44 Sq.Km. (Census of India-2011). The district have three natural divisions, which includes the desert topography in north western part, the semi desert with hillocks in central part whereas in north as well as in north eastern portion ,it has the undulating and hilly areas

(B.D.Agrawal). The probability of occurrence of drought in the district is high; having a frequency of once in five years (GoR) and the percentage of years of drought occurred between the time period of 1901 to 2002 is 49.5% (M. S. Rathore). The situation of water availability is grim in the district as it has no perennial river, and the dependence upon groundwater is high for water requirements. The ground water resources of all blocks of the district has been declared as "over exploited" category except for Fatehpur (Central Ground Water Board).

The present study has been carried out in eighteen villages, two villages sampled from 09 tehsils of the district, using simple random sampling technique. The sampling frame has been devised on the basis of number of households in each selected village and 369 households have been sampled, giving appropriate representation to social, economical and gender dimensions of the households by using multistage random sampling. A semi structured questionnaire was canvassed amongst the sampled households. Various social, economical and agricultural parameters of the households were obtained through questionnaire.The Cropping intensity has been calculated by using primary data of households, which has been taken as ratio of gross sown area to net sown area, the method adopted from the report "State of Indian Agriculture 2015-16" (India), whereas the crop diversification index has been calculated following the method given by Jasbeer Singh (Singh & Dhillon). The Coefficient of Rainfall for 40 years (1973-2013) has been calculated by using standard deviation and mean of rainfall data btained from India Metrological Department (IMD), Pune and from the Rajasthan Government website of Water Resources department (Annual Rainfall). The percentages of income of households from sources influenced by climatic conditions i.e. agriculture and allied activities have also been calculated from the primary data and it has been tabulated for comparisons.

### Results & Analysis

The average land holding of the sampled households is 2.24 hectare.The Natural capital of land and its productivity plays a significant role in livelihoods of rural people. It has been represented through the indicator Cropping Intensity and Crop Diversification Index. The options for migration both internal and external adopted by household members have been depicted in form of percentage. The data obtained has been tabulated in Table 01.

**Table 01**  
**Mean values of various Natural Capital, Income and Migration at household level**

Village	Cropping Intensity	Crop Diversification Index	Percent of Income from Agriculture and other allied activities	Percentage of Households adopting Migration
Dhandhan	100.0	29.31	32.42	52.94
Rookansar	102.9	27.37	41.42	50.00
Udansari	100.0	32.29	21.97	75.00

Harsava				
Bada	109.6	31.69	38.91	52.94
Singodara	105.3	40.96	29.97	69.23
Magloona	121.2	42.88	39.53	63.64
Piprali	143.8	28.15	45.03	25.00
Harsh	143.4	33.56	37.66	56.52
Mandoli	141.9	29.93	60.39	17.65
Kasli	121.6	30.65	37.06	34.62
Dhalyavas	167.8	34.01	40.37	52.38
Nimera	116.4	29.87	33.68	47.83
Raiwasa	100.0	41.67	25.64	57.14
Mandha	121.1	34.46	48.00	45.83
Nangal	119.9	37.00	26.81	38.10
Mau	125.3	41.02	36.47	35.71
Dareeba	133.9	45.31	22.34	50.00
Chala	113.5	44.17	18.63	80.00

### (Based Upon Primary Survey)

The figures from the above table depicts that the cropping intensity in north and north western part of the district comprising of first six villages in the table from tehsil Ramgarh Shekhawati, Fatehpur and Lachhmangarh is low because of high variance in rainfall(CV=53.04) and lower irrigation facilities. The agriculture is mainly rain fed and crops are grown only in "Kharif" season. The crop diversification index calculated by using Jasbeer's method explains an inverse relationship with the diversification. Higher the index, lesser diverse crops are grown by the farming community. Analysis of six villages from north and north western part shows that the crop diversification index is quite high ranging from 27.37 in Rookansar to 42.88 in Magloona village, indicating lesser number of crops is grown due to water scarcity, drought like conditions and land degradation. The contribution of income from agriculture and allied activities in total household income in these six villages is also low ranging from 27.97 % in Singodara to 41.42% in Rookansar. Such high variance in rainfall and low productivity of land, initiate the process for exploring livelihood activities outside the original place. Migration in Rajasthan is common phenomena, which includes human migration and at times it happens along with livestock. Migration takes place even in non drought years on certain definite routes (Rathore). The decision to migrate for work, at times of scarcity becomes a significant adaptive strategy for the household in the district as there are losses in agriculture and fewer opportunities in the village, despite of various interventional employment generation schemes functioning in the village. All three types of migration including seasonal, long term and permanent migration is prevalent in the district but at household level the data collected mainly focus upon on seasonal migration where few members of the household do seek intra-district inter-district as well as interstate migration for employment. Through migration, the households diversify their livelihood portfolio; can generate extra income by utilizing their surplus time as well augmentation of income through remittances. The migration of household takes place either from rural to urban or rural to rural for labour and other form of employment. The period of such migrations varies between few days up to 8 to 10

months in a year. In north and north – western part of the district, the percentage of households adopting migration as adaptive strategy is high ranging between 50 to 75%.In Udansari village in Fatehpur tehsil, seasonal migration is highest (75%), because of prevailing drought like conditions, almost no irrigation facilities and the variance in rainfall is also high (CV=57.86). Similarly, in Singodara (69.23%) and Mangloona (63.64%) villages of Lachhmangarh tehsil, the percentage of migration is high due to similar reason of water scarcity and lesser output from agricultural activities. The members of the household from these villages either go to district headquarter, Sikar or State Capital Jaipur for labour and other employment. Even they migrate to State of Punjab and Haryana for working as agricultural labours in post monsoon season. The situation is slightly different in the central portion of the district, where the irrigation facilities are better and it can be visualized through higher cropping intensity as compared to north western part of the district.

The villages Piprali and Harsh in Sikar tehsil, Mandoli and Kasli in Dhond Tehsil and Dhalyavas in Khandela tehsil, the income from agriculture is high as cropping is practiced in both "Kharif" and "Rabi" besides in some places the "zaid" cucurbitaceous crops are also grown due to availability of irrigation. The migration is least in Mandoli (17.65) followed by Piprali (25%) and Kasli (34.6%) villages; the household in these villages adopt water conservation techniques like drip irrigation .The variance of rainfall in these tehsils is also less (CV=45.26) .The level of migration from Harsh village is high due to its proximity to the district headquarter, hence the household members of small land holders or landless do go to Sikar district Headquarters for various employment including labour. In south central part of district, the Raiwasa Village of Danta Ramgarh tehsil, there is no irrigation facility in the village and the crop diversification index(41.67%) is quite high, depicting lesser diversification of grown crops , thus indicating low profitability from agriculture. During the Focus Group Discussion, members of village community informed that earlier there was stone quarrying at Raiwasa hill which use to employ a large number of villagers, but after being stopped by some judicial orders, the people have no other options than to migrate to district head quarter or to Jaipur for labour or other form of Job. Salt making activities at nearby Raiwasa Lake was not also generating employment for local people, because it is being drying up due to lesser precipitation and the only option left with them was to explore possibilities of work outside the village. The percentage of migration is high in the village as agriculture is not much economical viable because of high risk involved due to much dependency on rains, with a contribution of only 25.64% in Household income. In the eastern part of the district, the villages Dareeba and Chala from Neem Ka Thana Tehsil, have higher rates of migration as the village Dareeba is located in hilly terrain, the land holdings are small and the crops grown are less diversified. The village communities have lesser options of livelihood due to

hilly terrain of the village; hence they migrate to National Capital Region for employment. In Chala, the contribution of income from agriculture is least due to prevailing drought like conditions from many years, so it has highest rate of migration. During interviews, the members of the community informed that most of the people work as labour in brick kilns or at "Krishi Upaj Mandi" in Shri Madhopur.

The migration option being practiced amongst the sampled households, on the basis of economical, social and gender of household head, has been tabulated in Table 02.

**Table 02**

**Household under categories opting for Migration as Adaptive Strategy**

Category	Households	Percentage of Households migrating for work
Economical	APL	47.42
	BPL	53.85
Gender	Male Headed	51.90
	Female Headed	30.19
Social	General	50
	Schedule Caste	45.2
	Schedule Tribe	48.1

Except for female headed households, other categories reported migration from 45% to 53% which can be considered as fairly high in rural economy. In economical category; Households under Below Poverty Line (BPL) do have higher migration rates for employment than the households under Above Poverty Line (APL), because such households are landless or have small landholdings. Similarly the migration sought for employment is in male headed households is more as compared to female headed households, as the female headed households do have more responsibilities of carrying out various work both at house and farm level. In social category the migration varies from 45.2% to 50% and members of General Category household do opt for seasonal migration more as compared to the SC/ST household due to better opportunities.

The households were also analyzed for the contribution of remittances in total household income especially from members who have migrated to Middle East for employment from the villages and the data has been tabulated in Table 03.

**Table: 03**

**Income of households as Remittances from International Migrants**

Village	Percentage of Household Income as Remittances from International Migrants
Dhandhan	5.3
Rookansar	19.0
Udansari	14.4
Harsava Bada	2.8
Magloona	15.5

Piprali	1.8
Kasli	15.1
Dhalyavas	0.0
Raiwasa	3.4
Mandha	1.9

**(Based Upon Primary Survey)**

Some of the members of community in villages of north and north western part have migrated to Middle East countries for employment and they send financial assistance to the household as remittances, which contribute substantially in meeting various requirements both for purchasing assets as well as for meeting other contingencies. The contribution of remittances constitute from 1.8% to 19.0% of total household income. However the international migration is not prevalent in eastern and southern part of the district.

**Conclusions**

Thus from the above study it can be concluded that migration is a very significant adaptive strategy which is being adopted by the households residing in rural areas of Sikar District. It gives them opportunities for diversifying their livelihoods especially during the extreme conditions of drought and drought like conditions which are being faced by rural communities in era of climate change. Migration is a "key" element in climate change adaptation options (Tacoli) but there are certain issues related to migration as it disturbs the demographical ratio and other health issues related to migrants living in unhygienic conditions. There is need to develop capacities of the community for enriching the natural capital which can make their livelihood sustainable at their own places. Capacity building of local communities in rainwater harvesting, organic farming, poultry farming and other skills for on-farm diversification, can be another facet which can rejuvenate livelihoods based upon natural resources and can help in mitigating the climate adversaries. The World Bank Report 2010 has mentioned that degradation of environment has enhanced rural-urban migration (Bierbaum and Zoellick). The community participation in adaptation process needs to be enhanced integrating it with policy interventions of various participatory and development schemes, that should be implemented at grass root level effectively for restoration of agricultural as well as common grazing lands which may not enforce "forced" migration of communities but the process of migration may be utilized as an voluntary "response" to climate change.

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