

Managing Distress Migration and Enhancing Resilience through Climate Appropriate Interventions under MGNREGS in Western Odisha (India)

Supriya Pattanayak, Smita Mishra Panda*, Bibhunandini Das, Payal Nayak

Centurion University of Technology and Management, Odisha, India

*Corresponding author
Email: smita.mishra@cutm.ac.in

Abstract

Western Odisha has long been prone to distress migration due to the large numbers of landless and marginal farmers living in extreme levels of poverty, skewed land distribution in the face of a degrading natural resource base. Out-migration is a survival strategy adopted by people from the rural areas which is an outcome of erratic monsoons and unstable livelihoods. This paper is based on a study conducted in four Western Odisha districts Bolangir, Bargarh, Kalahandi and Nuapada. The interventions are part of the DFID India's Infrastructure for Climate Resilient Growth (ICRG) programme. The main aim of the study was to understand the extent to which climate change has induced distress migration, despite the presence of social protection programmes like the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) in the area. The study adopted both qualitative and quantitative approaches for the study. PRA, individual migrant household surveys using questionnaires and FGDs were conducted in the selected villages. The authors have taken into consideration, a holistic understanding of the interlinkages between climate change and migration integrating both the vulnerability context of the migrants (including asset vulnerability) and the factors that influence their decision to migrate with a special focus on the role of MGNREGS. Needless to mention, there is a strong association between climate change and distress migration. Some specific recommendations have been made keeping in view the need to strengthen the MGNREGS in the area.

Keywords: Distress Migration, Resilience, Climate Change, MGNREGS, Western Odisha

I INTRODUCTION

Impacts of climate change on population mobility has spurred widespread debate, research and predictions on future implications of climate-induced migration, sometimes described as ‘climatic turn’ (Naverla 2007 cited in Panda 2017) in explaining migration. However, in the context of climate change, despite many numerical predictions about the number of people who might be displaced or have already been displaced (Myers 2002, Stern 2006), the empirical basis of such research remains weak. Typical constraints arise due to lack of data on migration and nature of its complexity in developing countries, where people are highly vulnerable to the impacts of climate change. In India, primary agrarian states like Odisha, often suffer the maximum brunt from climate change induced calamities (Tanner et al. 2007, Panda 2017, Ghosh and Majumdar 2006, 2007) resulting in large scale out-migration.

Odisha, is primarily an agrarian state. Agriculture provided employment directly or indirectly to 62% of the total workforce (Odisha Economic Survey 2017–2018). While many studies have attempted to show the impact of environmental hazards on few areas (Velan and Mohanty, 2015 and CSIR, 2017), there is a need to study the impact of climate change especially on migration. An analysis on variation in monthly, seasonal and annual rainfall in the state of Odisha, shows a decreasing trend in monthly rainfall in the months of June, July, and September, and an increasing trend in August, more predominant in the last 10 years. Further, rainfall analysis also showed an increased number of dry years compared to wet years after 1950 (Patra et al. 2012 in Panda, 2017). Similarly, analysis by Tanner et al. (2007) shows that after 1961, the rainfall patterns were below the normal (CES data (GoO) indicates that normal rainfall is 1431mm per annum), suggesting a drier spell in Odisha. Other studies also indicate that the state is experiencing decreasing rainfall in some parts of the year (Mahapatra and Mohanty 2006 and Patra et al. 2012 in Panda 2017). Likely impacts of climate change in Odisha shows the possibility of an increase in hydrologic extremes (Ghosh and Majumdar 2006) including increasing probability of severe and extreme droughts (Ghosh and Majumdar 2007).

Since rural areas are considered the most vulnerable to impacts of climate change, such as health and livelihoods, production and productivity and, employment, it has led to high levels of migration for the poor who have very low adaptive capabilities. Western Odisha is no exception and has long been prone to distress migration due to the large numbers of landless and marginal farmers who are faced with extreme levels of poverty, unequal land distribution and degradation of natural resources. A combination of erratic monsoons and unstable livelihoods has made farmers of the region adopt migration as a survival strategy. People from this region prefer to migrate to neighbouring Telangana and Andhra Pradesh states to work in brick kilns, for which they possess traditional skills. The attraction is an advance paid by the contractors to tide over the lean period of agriculture income. Since there are few studies that explore the impact of climate change on migration, this study is extremely timely and critical.

Methodology

The study adopted both quantitative and qualitative approaches. The sample included three blocks from each of the four districts with high occurrence of migration which were based on

a stratified random sample. Further, two gram panchayats (GP) from each block (lottery method) with two villages from each GP (lottery method) and, twenty five households from each village were identified for the study. A questionnaire was designed, pre-tested and revised (in the local language), administering which a total of 600 interviews were conducted with individuals of migrant households. A training program was first conducted for a group of Research Assistants local to the regions of data collection on the survey instrument and the participatory methods relevant to this research. 66 Focus Group Discussions (FGDs) were also conducted with Self Help Group (SHG) members and individuals of migrant households. The data so collected was the source of rich qualitative data, which was analysed through content analysis. Information on convergence of various programs was also derived through interviews with different government (Block and Gram Panchayat offices) and non-government officials.

To understand the extent to which climate change has induced distress migration, chi square test was conducted to assess the association between climate change indicators and distress migration. This was followed by Cramer's V test which measures the strength of association between climate change and distress migration.

This paper is divided into five sections. Following the introduction, the second section delves into the literature around climate change and its impact on people's lives, migration and MGNREGS and the relation between these variables. The third section presents the framework and approach of this study and analyses data with the aim to understand the extent to which climate change has induced distress migration, despite the presence of social protection programmes like the MGNREGS in the area distress migration. The fourth section deals with the relationship between climate change, distress migration and MGNREGS. Finally, the limitations, recommendations and some concluding remarks are presented.

II Climate Change, Distress Migration and MGNREGS

Climate change has become a matter of great concern for Odisha. Odisha's seasons have become irregular, its trees have altered their flowering pattern, and farmers have changed their farming practices. The converse may also be true; that the aggregate of changing practices of farmers might be responsible for climate change. While summers have become longer, winters have become warmer and monsoon has shortened from 120 to 90 days while becoming erratic beyond a point (Jena, 2017). The rainfall of the State is 1451.2 mm but there is high variation across districts. Even though the quantum of rainfall is quite high, its distribution during the monsoon period is highly uneven and erratic. Occurrence of floods, drought and cyclones have become frequent with varying intensities (Panda 2016). Further, Raleigh and Jordan (2010) in reviewing the environment migration literature note that during periods of chronic environmental degradation, the most common response by individuals and communities is to intensify labour migration patterns.

In addressing the potential impact of climate change on migration, Brown (2008) argues that it is important to make a distinction between climate and non-climate drivers. Climate drivers include slow onset, gradual processes such as sea level change and climate events which are

sudden and dramatic hazards such as monsoon floods, glacial lake outburst floods, storms, hurricanes and typhoons. Non-climate drivers are equally important.

“A natural hazard (like an approaching storm) only becomes a ‘natural disaster’ if a community is vulnerable to its impacts. A tropical typhoon, for example, becomes a disaster if there is no early warning system, the houses are poorly built and people are unaware of what to do in the event of a storm” (Brown, 2008, p. 11).

Hence, poverty becomes a critical factor since poorer communities are much less likely to have the resources and capacity to have adaptive mechanisms in place. Thus, population, poverty and governance are crucial mediating factors which can influence whether or not climate change produces migration and if so what type of migration (Brown, 2008). Castelli (2018) refers to these as ‘macro-factors’ (political, demographic, socio-economic and environmental situations) that are major contributors to migration.

There is a need to differentiate between climate change and climate variability as mentioned by scientists. While climate change is a shift in average rainfall and temperature in the long term, climate variability is an increase in the variance of these factors also resulting in extreme weather events (Easterling et.al., 2000; Rowhani et.al., 2011 in Panda 2017). Hence climate change may have two type of impacts on migration – those arising (a) due to frequent extreme events and (b) due to change in variance of rainfall and temperature along with other climatic factors (ibid). The impact of climate change on the poor and marginalised will be adverse compared to others in terms of loss of lives and livelihoods, loss of crop yields, incomes, assets and employment.

Further, the Report on the Intergovernmental Panel on Climate Change (IPCC, 2007) highlighted the relationship between migration, climate change and development; it had estimated in 1990 that the greatest single impact of climate change could be human migration with 250 million by 2050 displaced due to shoreline erosion, coastal flooding and agriculture disruption (IOM 2008). There is a need to understand the complex relationship between climate change and migration from the perspectives of social, economic and environmental factors. Much of the literature on climate induced migration flows from the ‘Environmental/ Ecological Refugees’ literature (Gadgil and Guha 1995, Myers 1997, Piguet 2010, Gemenne 2010) where the relationship between environment related degradation as linked with migration has been clearly established in developing countries including India.

Before delving into the relationship between climate change, distress migration and MGNREGS, it is important to understand the worlds largest employment guarantee scheme (Vanitha et al, 2012) and public works program providing social security net to 15% of the country’s population (World Bank, 2015). The ‘Mahatma Gandhi Rural Employment Guarantee Act (MGNREGA), the basis for the Scheme, was enacted in 2005 to provide minimum 100 days guaranteed wage employment in every financial year to the rural households who want to do unskilled manual work that includes creation of productive assets in the village such as wells, tanks, ponds, roads, etc. (Jacob and Varghese, 2006 and Datar, 2007). According to the Ministry of Rural Development (GoI, 2012) this programme was to

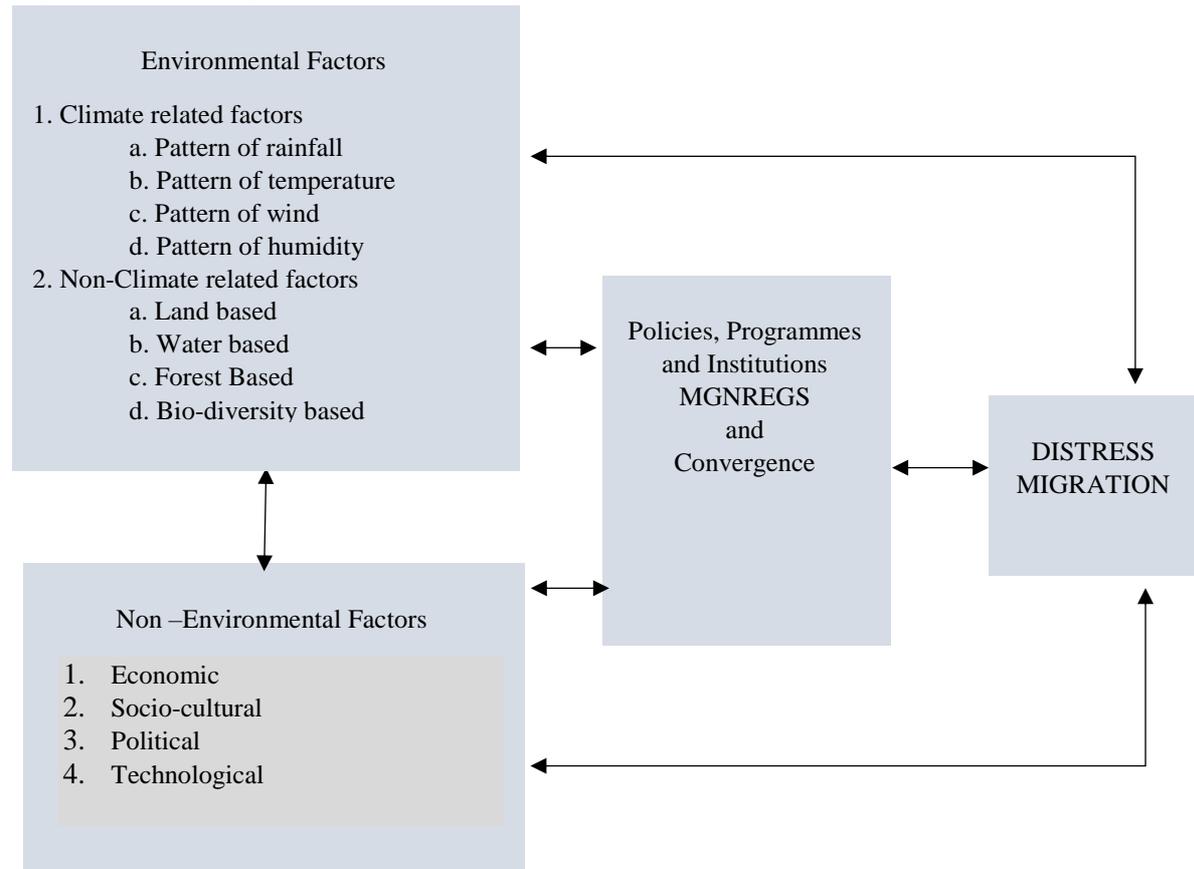
regenerate the natural resource base and provide sustained stimulation to the agrarian economy, thus, boosting rural wages and restricting distress migration. The performance of MGNREGS has varied across different states, largely depending on the commitment of the local leadership at the village council level, the level of institutional preparedness and governance capacities (Reddy et al., 2010). Broadly, Carswell and de Neve (2014) state that the scheme is benefitting the poorest households – and Dalits and women in particular - especially in terms of providing a safety net and as a tool for poverty alleviation. Several studies have also confirmed that MGNREGA is successful in largely reducing the distress migration (Awasthi et al, 2011, Parida 2016).

In assessing the relationship of MGNREGS and Migration, Das (2015) in his study of MGNREGS in rural India found no significant impact of household participation in the scheme on migration decision. However, he found that the extent of participation in terms of number of days of work and earnings had a significant negative impact on short-term migration but not on longer duration ones. Thorat et. al (2011) found a negative relationship between migration of family members and income from agriculture. As off-farm income of a household increases, the probability of migration of its family member decreases (by an odds ratio of 0.018 per cent). However, Alex Randall (2018) of the Climate Change and Migration Coalition observed that 'Migration is increasingly becoming a way that some communities adapt to climate change impacts. Regardless of any policy, people are using migration as a coping strategy'.

III Framework and Approach of the Study

A holistic understanding of the inter-linkages between climate change and migration requires to consider both the vulnerability context of the migrants (including asset vulnerability) as well as the factors that influence their decision to migrate and its destination. The study focuses on factors, which may either push or pull families into migration and the role of MGNREGS. Figure 1 shows the linkage between environmental and non-environmental factors with distress migration.

Fig 1: Distress Migration and its Linkage with Environmental and Non-Environmental Factors



It is important to note that the environmental and non-environmental factors are not exclusive of each other. Both the above have a strong influence on each other. For example, the pattern of rainfall determines agricultural produce, which in turn indicates the economic condition of the household, which may or may not induce migration. Similarly, in spite of inadequate rain, introduction of drought resistant crops will also have a strong influence on decisions of families around migration.

Therefore, the framework for the study comprises the environmental factors, non-environmental factors and policies, programmes and institutions, especially MGNREGS with its convergence with other schemes.

IV Relationship between Climate Change, Distress Migration and MGNREGS

A total of 600 interviews were conducted with individuals from migrant households and 66 FGDs were conducted with SHG members and individuals from migrant households. Based on a stratified random sample, the data was collected from three blocks from each of the four districts (Bolangir, Bargarh, Kalahandi and Nuapada) where there is high occurrence of migration. Further, two gram panchayats (GP) from each block (lottery method) with two villages from each GP (lottery method) and, twenty five households from each village were identified for the study. Information on convergence was also derived through interviews with different government (Block and Gram Panchayat offices) and non-government officials.

Scheduled Tribe individuals comprised 40.8% of the population of migrant households surveyed, followed by 29.1% from Other Backward Classes and 28.1% from the Scheduled Castes. Only 2% of the migrant households surveyed belonged to the general category. Thus, it is evident that there is close relationship between social categories and migration, where there is a greater likelihood of scheduled tribe individuals migrating than individuals from other groups.

An average of 40% (NSSO unit level data 2013) of the households had no job cards under the MGNREGS. While 95.1% households were small farmers (less than 2 hectares), 4.8% were medium farmers (between 2 and 10 hectares) and the numbers of large farmers (over 10 hectares) in Odisha were negligible. In the four study districts, the production of pulses and cereals by households were mainly for subsistence (Nuapada 93.90 per cent followed by Kalahandi at 82.20 per cent, Baragarh at 76.50 per cent and Bolangir 63.10 per cent). More than 90 per cent of households mentioned unavailability of wage labour in local job market as the sole reason for out-migration.

For the analysis, climate change included perception of subjects regarding inadequate and excessive rains, frequent droughts and floods, delay in monsoons, duration of rainy and warmer days. As Table 1 indicates over 80 per cent of households perceived the occurrence of climate change in their area. Drought, flooding, increases in infections due to vector spreading in regions where measures to counter them are difficult to implement due to scarcity of means also indirectly impact on morbidity. Shortage of water, food and agricultural resources forces people and livestock to move. Land degradation and reduced agricultural productivity has meant reduction in wage employment in the local market.

Pop perceptions on climate change in %		% pop migrated due to drought		% pop able to get wage employment in the local market		% pop migrated due to insufficient income	
Yes	No	Yes	No	Yes	No	Yes	No
82.6	17.4	61.5	38.5	92.5	7.5	70.4	29.6

Source: Primary Survey, 2018

In the study area, distress migration was understood as mobility for survival due to economic and social hardships often without any choice of an alternative livelihood option locally. 61.5 per cent of households mentioned that they migrated because of drought. Since drought is derived from rainfall data, the secondary data indicate that all the blocks of the four districts receive scanty rainfall (between 50 and 100 mm for a week) in rainy season. Rainfall trend of over 100 mm was recorded for only 2-5 days over the last 20 years. This was corroborated by people's perceptions around rainfall and its impact in the FGDs. While the number of rainy days has declined, the intensity of rainfall during the rainy days has increased. As a result, the area does not get adequate rainfall when they need it most during agriculture season which eventually leads to crop damage at a large scale. In general, the FGDs revealed that the annual duration of rainy season has reduced from four months (July – October) to three months (July – September).

% pop benefitting from plantations		% pop benefitting from Water harvesting structures	
Yes	No	Yes	No
11.7	88.3	22.9	77.1

Source: Primary Survey, 2018

Table 2 indicates that while approximately 23 percent households mentioned that they were beneficiaries of water harvesting systems, 11.7 per cent reported to have benefitted from plantations. Further, no statistically significant relationship was seen between natural resource management (NRM) works and distress migration. The PRA data also indicates an inverse relationship between migration and investment/ implementation of NRM structures, where considerable numbers of water harvesting structures and farm ponds were constructed, there was still about 50 per cent out migration from the villages. On the other hand, where water harvesting structures and farm ponds constructed were few, out-migration was comparatively low. One of the reasons provided for the above during FGDs related to poor quality of water harvesting structures which was responsible for inadequate retention. Further, members of the community reported a complete lack of participation in the planning (location), implementation (quality of material used and the quality of work) and use (who and when) of the NRM structures.

Details of work	Kalahandi	Nuapada	Baragarh	Bolangir
	Total no. of villages with NRM works under MGNREGS - 6	Total no. of villages with NRM works under MGNREGS- 13	Total no. of villages with NRM works under MGNREGS- 12	Total no. of villages with NRM works under MGNREGS – 8
No of WHS	0	9	25	14
No of farm ponds	6	22	48	14
No of plantations	95	2	6	150
No of land developed	0	133	0	7
No of canals	1	2	3	0
Total HH in the villages	613	3249	1883	821
No. of migrant HH in the village	209	468	419	414
% of migration	34	14	22	50

Source: Primary Survey, 2018

Distress Migration occurs primarily due to “insufficient income”. While the implementation of MGNREGS has resulted in arresting migration partially in the districts, people are not able to get more than three weeks of wage work in a year through MGNREGS against their need for seven months. Furthermore, there is little instance of adequate livelihood asset creation, supply chain and enabling systems and institutions in place to smoothen the functioning of MGNREGS. Similarly, convergence with other programmes for creating sustainable livelihoods is not clearly visible. MGNREGS in the study area has been able to generate on an average 21.40 days of wage employment which is much below that is stipulated by the government which is significantly different from the Government data (www.nrega.nic.in). Table 4 notes the wage rates from 2014-15 to 2018-19. This difference most likely is due to the four sample districts.

Name	2018-19	2017-18	2016-17	2015-16	2014-15
Bolangir	38.34	47.82	43.79	54.63	39.58
Nuapada	34.04	39.63	38.70	43.54	32.28
Kalahandi	25.96	30.63	30.55	38.44	34.38
Baragarh	27.46	29.16	28.19	28.45	27.64
ODISHA	35.66	39.98	38.09	44.78	36.44

Source: www.nrega.nic

Insights based on FGD data regarding the reasons for poor uptake of the provisions of MGNREGS are as follows:

- **Poor awareness of the processes and provisions of MGNREGS:** There is a lack of awareness amongst communities around the processes and provisions of the scheme, thus disadvantaging those demanding for work. Further, although families had demanded on an average 48 days of wage employment, they were provided employment (wage days) around half of their demand.
- **Poor Facilitation:** Strong community based organisations including PRIs to facilitate various processes of the scheme are limited.
- **Irregular payments:** On an average, only 14.9% of households reported receiving payments on a fortnightly basis. This has created a trust deficit in the programme and officials.

In summary, therefore, there is a strong and statistically significant association between climate change and distress migration in the households studied in the districts of Bolangir, Bargarh, Kalahandi and Nuapara. MGNREGS plays a limited part in arresting distress migration.

Climate Change	Distress Migration	
	No	Yes
No	47.1	52.9
Yes	25.9	74.1
Chi-Square***	18.538 (.000)	
Phi Cramer's V***	.176 (.000)	

Table 5 gives an idea about the relationship between climate change and distress migration using chi-square values. The test on chi-square value shows that it is highly significant which means that there is an association between climate change and distress migration. Phi and Cramer's V were also calculated to identify the strength of association. The result shows the strength of association is strong and statistically significant. The Phi and Cramer's V values indicated that there was no statistically significant relationship between NRM works and distress migration. This is primarily due to inability in creating technically sound systems for adequate water retention, and soil and water conservation.

V Concluding remarks

Although the study found that number of village level institutions did exist, they did not specifically respond to activities related to MGNREGS. Therefore, the study recommends that appropriate village level institutions may be formed and strengthened for participatory planning, execution, monitoring of works and ensuring timely payments under MGNREGS to ensure that the benefits accrue to the poorest. Local civil society organisations could be approached for the purpose. Women farmer groups could be promoted as they are engaged in most of the agricultural operations in the area. A paradigm shift from wage to self-employment as a strategy for livelihood could be put in place to ensure long term benefits to the people. As the current works under MGNREGS is not adequate to ensure restoration and regeneration of the natural resource base of the area, it is recommended that they be taken up through an area saturation approach. By identifying appropriate clusters for integrated natural resource management, the area saturation approach has the potential to strengthen ecosystems in the area. Further, a convergence could be planned between NRM and Livelihood Development Plans of the state. The cluster level plans could incorporate livelihood planning for the landless households keeping in view the entrepreneurship opportunities and indigenous knowledge of the local communities, especially women. Similarly, community engagement could be enhanced by engaging producer companies for procurement of the materials for different works under MGNREGS. Finally, it is critical that the skills of migrant households, both traditional and acquired, be assessed and appropriate training and employment opportunities be created to absorb them in the local area. Overall, for MGNREGS to be effective, there is a need to ensure availability of work from October through February to dissuade people against distress migration.

Acknowledgement

This study was commissioned by The Infrastructure for Climate Resilient Growth (ICRG) in India, a Technical Assistance (TA) Program, supported by UK's Department for International Development (DFID), to improve the design and implementation of works under MGNREGS, safeguarding previous investments. The funding received from ICRG is gratefully acknowledged. The focus of the program is to impact the durability of assets enshrined in MGNREGA by building climate resilient perspectives so as to enhance livelihood security of the rural poor, particularly of those dependent on rain-fed agriculture. The opinions expressed in this publication are those of the authors. They do not purport to reflect the opinions or views of the ICRG or DFID.

References:

- Awasthi P K, Rathi D, Raghuwanshi N K, (2011), *MGNREGA and its impact on Distress Migration: Some Facts and Emerging Issues*, *Agricultural Economics Research Review*, 24: 557.
- Brown O. (2008). *Migration and Climate Change*, *International Organization for Migration, Geneva. IOM Migration Research Series. 31: 1-64.*
- Carswell, G and De Neve, G. (2014). *MGNREGA in Tamil Nadu: A Story of Success and Transformation?* *Journal of Agrarian Change*, 14(4): 564-585.
- Castelli F. (2018). *Drivers of Migration: why do people move?* *Journal of Travel Medicine*. 25(1): 1-7.
- Datar, C. (2007). *Failure of National Rural Employment Guarantee Scheme in Maharashtra*, *Economic and Political Weekly*, 42(34): 3454-3457.
- Mambo Julia., Faccar K. (2017). *South African Risk and Vulnerability Atlas: Understanding the Social & Environmental Implications of Global Change*. CSIR. 2: 1-160.
- Das U. (2015). *Can the Rural Employment Guarantee Scheme Reduce Rural Out-migration: Evidence from West Bengal, India*. *The Journal of Development Studies*. 51(6): 621-641.
- Easterling D.R., Meehl GS., Parmesan C., Changnon SA., Karl TR., Mearns LO. (2000). *Climate Extreme: Observations, Modeling and Impacts*. *Science*. 289: 2068-2074.
- Gadgil M and Guha R. (1996). *Ecology and Equity: The Use and Abuse of Nature in Contemporary India*. *Bulletin of Science, Technology & Society*. 16(4): 215-219.
- Gemenne F. (2010). *Why the Numbers do not Add Up: A Review of Estimates and Predictions of People Displaced by Environmental Changes*. *Global Environmental Change*. 21(S1): 41-49.
- Ghosh S. and Majumdar P. P. (2006). *Future Rainfall Scenario over Orissa with GCM Projections by Statistical Downscaling*. *Current Science*. 19(6): 396-404.
- Ghosh S. and Majumdar P. P. (2007). *Nonparametric methods for modelling GCM and scenario uncertainty in drought assessment*. *Water Resource Research*. 43: 1-19.
- Government of India, Ministry of Rural Development. (2012). *MGNREGA Sameeksha: An Anthology of Research Studies on the Mahatma Gandhi National Rural Employment Guarantee Act, 2005, 2006-2012*. *Orient Blackswan Private Limited, New Delhi*.
- Government of Odisha. (2018). *Odisha Economic Survey, Planning and Coordination Department*. 1-302.
- Inter Governmental Panel on Climate Change (IPCC) (2007). *Climate Change 2007: Impacts, Adaptation and Vulnerability, Summary for Policy Makers*. IPCC, Brussels. 1-987.

Dominic Kniveton., Kerstin Schmidt-Verkerk., Christopher Smith., Richard Black. (2008). *Climate Change and Migration: Improving Methodologies to Estimate Flows*. IOM Migration Research Series. 33: 1-72.

Jacob, A. and Varghese, R. (2006). *Reasonable Beginning in Palakkad, Kerala*, *Economic and Political Weekly*, 41(48): 4943-4945.

Jena P.P. (2017). *Impact of Climate Change on Odisha, Economic Development-A Comparative Analysis*. *IOSR Journal of Humanities and Social Science*. 22 (6): 21-25.

Mahapatra M and Mohanty U.C. (2006). *Spatio-temporal variability of summer monsoon rainfall over Orissa in relation to low-pressure systems*. *Journal of Earth System Science*. 115(2): 203–218.

Myers N. (1997). *Environmental Refugees. Population and Environment*. 19: 167-182.

Myers N. (2002). *Environmental Refugees: A Growing Phenomenon of the 21st Century*. *Philosophical Transactions of the Royal Society B: Biological Sciences*. 357(1420): 609–613.

Nirmala Velan and Mohanty R.K. (2015). *Gender-wise Rural-to-Urban Migration in Orissa, India: An Adaptation Strategy to Climate Change*. In: G. C. D. Ramos (ed.). *Inequality and Climate Change: Perspectives from the South*. Council for the Development of Social Science Research in Africa (CODESRIA). 137–170.

Panda A. (2016). *Vulnerability to climate variability and drought among small and marginal farmers: a case study in Odisha, India*. *Climate and Development*. 9(7): 605-617.

Panda A. (2017). *Climate change, drought and vulnerability: A historical narrative approach to migration from Eastern India*. *Climate Change, Vulnerability and Migration*. Routledge, India. 1-19.

Parida, J. K. (2016), *MGNREGS, distress migration and livelihood conditions: a study in Odisha*, *Journal of Social and Economic Development*, 18(1-2): 17-39.

Raleigh G. and Jordan L. (2010). *Climate Change and Migration: Emerging Patterns in the Developing World*, In *Social Dimensions of Climate Change*, World Bank. 103-33.

Randal A. (2018). *Migration is a successful climate adaptation strategy*, *Aljazeera: Opinion: Immigration*, 11th March. <https://www.aljazeera.com/indepth/opinion/migration-successful-climate-adaptation-strategy-180310102243520.html>

Reddy, D N. Reddy, A A & Bantilan, M C S. (2014). *The Impact of Mahatma Gandhi National Rural Employment Guarantee Act on Rural Labour Markets and Productivity*, *India Review*, 13(3):251-273.

Piguet E. (2010). *Linking Climate Change, Environmental Degradation and Migration: A methodological overview*. *Climate Change*. 1: 517-524.

Stern N. (2006). *The Stern Review on the Economics of Climate Change*, Cambridge University Press. 1-576.

Tanner T. M. Nair S. Bhattacharjya S. Srivastava S.K. Sarthi P. P. Sehgal M. Kull D. (2007). ORCHID: climate risk screening in DFID India. Research report. Institute of Development Studies, Brighton. 1-56.

Thorat V. A. Dhekale J. S. Patil H. K. Tilekar S. N. (2011). Determinants of Rural- Urban Migration in Konkan Region of Maharashtra, Agriculture Economics Research Review. 24: 503-509.

Vanitha S.M, Murthy P. and Mysore C. (2012), MGNREGA of India: Worlds Largest Employment Guarantee Programme, Lambert Academic Publishing.

World Bank. (2015). The State of Social Safety Nets 2015. Washington.