8

Gender-wise Rural-to-Urban Migration in Orissa, India: An Adaptation Strategy to Climate Change

Nirmala Velan & Ranjan Kumar Mohanty

Introduction

Migration caused by human action or natural hazards, or cyclical environmental factors, results in temporary or permanent dislocations of people. These displacements are caused by sudden events like flooding, earthquakes, volcanoes, hurricanes, cyclones, forest/bush fires, Tsunamis, industrial accidents or chemical leakages. These hazards affect both the livelihood and ecosystem of the area. An environmental hazard or adverse climatic change that results in immediate displacement or migration of people immediately after its occurrence is known as environmental emergency migration, as in the case of Tsunami, hurricane, flood, etc. Environmental migration is viewed as an adaptation strategy of households to either diversify or improve livelihood under constant threat of environmental change (UNDP 2009). From 2007, the IOM (2007) defines 'environmental migrants' as 'persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad'. It identifies three types of environmental migrants, namely, (i) Environmental emergency migrants; (ii) Environmentally motivated migrants; and (iii) Environmentally forced migrants. However, they are more commonly called as 'environmental migrants'.

Renaud, et al. (2007) categorises environmental migrants as environmentally motivated, environmentally forced and environment refugee migrants. According

to them, individuals who temporarily flee the worst environmental impact, like Tsunami, hurricane, etc., are 'environmental emergency migrants'. Whereas, 'environmentally forced migration' is the compulsion to move to avoid worsening environmental deterioration. It is a relatively slower process, which may or may not leave a choice for the affected individuals to return to their original place. The third category is environmentally motivated migration, under which people move from an area of gradually deteriorating environment. The process of migration here tends to be slow. Socio-economic factors assume a significant role in this case, unlike the two previous categories. Migration processes vary in the last two categories at global level, given the difference in vulnerability of the group involved. Among the three categories, 'environmentally emergency migrants' tend to require the maximum support for suitable alternative livelihood strategies and sustainable development. Therefore, while the emergency migrants would require immediate attention, the motivated ones would need information on alternative livelihood opportunities, safety and protection, and infrastructural support.

It is quite difficult to record, isolate or pin the displacements and migration caused by environmental degradation, due to multiplicity of factors leading to migration. Policy makers are unable to frame suitable policies to effectively contain or assist environmental migrants, for want of proper definitional pinning. The need to categorise the different migration processes arises from the fact that it can help in the formulation of suitable policies at national and international levels. Policy solutions for coping, support and adaptation would differ based on the type of migration. This requires researchers to identify factors that induce and affect environment-induced migration that would contribute to the development of policy framework to establish the adaptation and migration nexus (Stal and Warner 2009). Furthermore, people who decide not to move would also require support in terms of land management techniques, besides training to adopt or change employment. This would involve consideration of the impacts on children and women especially, as environmental changes are found to influence male and female migration differently (Findley 1994; Henry, et al. 2004; and Renaud et al. 2011), which requires different policy prescription at local and international level. Additionally, the government may use legislative measures to prevent returnee migrants or original residents from staying in the affected locality due to risk of recurring hazards (as in the case of floods), by demarcating the area as a danger zone.

Although all countries and people are affected by climate change, its impact distribution tends to be unequal and skewed towards the poorest, who lack sufficient economic, technical, institutional and scientific capacity to adapt or cope. This is true of countries as well as people, of whom the poor find it hard to respond to climate change. Rural areas are the most vulnerable to climate

changes, in which two-thirds of the world's poor reside with nature-based livelihood activities, and lack vital goods and services, including health (Horton et. al. 2010), education and information (Casillas and Kammen 2010). Hence, adverse climate changes like sudden flood or cyclones, impact livelihood, income and settlement, besides rural infrastructure. Heat waves and droughts generate economic stress due to reduced production and productivity. This results in unemployment leading to low and semi-skilled migration to urban areas (Gray and Mueller 2012). Thus, climate change hazards strongly influence rural poverty level. Meanwhile, it is also argued that since the rural people are often exposed to climatic risks, they tend to be more adapted to it (Nelson et al. 2010) than the urban poor (Ruel et al. 2009).

Climate change affects the basic requirements of human beings in terms of food, water, infrastructure and resources. A common trend of adaptation to climate change followed by rural people is livelihood diversification, shifting crop cultivation combinations, water harvesting or water shed, and migration, especially from rural to urban areas, all of which requires sufficient institutional support for sustainability of livelihood in the long run (Easterling et al. 2007). The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD 2009) stresses on research and adaptation strategies to promote participation, empowerment and social learning for rural people. The adaptation strategy is largely governed by the extent of climate change, its global inter-linkages and the resources needed for adaptation strategies. These, in turn, are likely to trigger stress tensions and even conflicts, both individual and societal, which tend to further aggravate inequity. Therefore, in such situations, coping requires socio-economic, environmental and political support. in addition to good social networks, local organisations/non-governmental organisations (NGOs) help at national or solidarity international levels in determining the strength of coping capacity (Renaud et al. 2011).

Though under-estimated in research, flooding frequently constitutes an important cause of internal displacement in the populated countries of Asia, like India, Pakistan, Bangladesh, China and Vietnam, and results in widespread severe economic, social demographic and health problems. Rising sea level and drought-induced famines also contribute to migration, largely within the country (Terminski 2012). Added to the political and economic reasons for migration in the last century, environmental and feminisation of migration at both national and international level, has captured the attention of research in recent times. In light of these issues, this paper analyses the circumstances under which an individual decides to move or not to move within the migration framework. Overall, it attempts to gauge the determinants of rural to urban migration and the adaptability of rural households under environmental change. An understanding of who migrates, under what circumstances, how far and why, would provide a

deeper insight into the nature, type and cause of migration, facilitating policy making for their welfare and for those who do not migrate. Therefore, the main objectives of the study are to:

i) gain an overview the variations in socio-economic background of the respondent households by migrant status before and after migration/given period by gender in Puri district, Orissa;
ii) analyse the factors inducing gender-wise rural to urban migration among the rural households in the study area;
iii) examine the impacts of migration in terms of the benefits gained and problems experienced by the migrants and their families;
iv) survey the reasons for non-migration by gender; and
v) assess the impact of climate change on poverty and income inequality of the sample households by gender and migrant status.

The remaining paper is organised in the following manner. After the introduction in section 1, section 2 summarises some of the theoretical issues, along with a few review of related literature. Section 3 gives a brief overview of the study area and its natural calamity, followed by an outline of the data and methodology used in section 4 The empirical results are discussed in section 5, while the concluding remarks are given in section 6.

Theoretical Issues and Related Literature

Migration is one of the livelihood stress reliever strategies adopted by households, under circumstances including climate change (Barnett and Adger 2007). In recent years, climate change induced migration has emerged into a coping mechanism to deal with the risks and uncertainty among vulnerable households with low capabilities and security (Tacoli 2009). Given that climate change is going to cause worse incidents of human displacement globally (Guterres 2008a, 2008b), it is necessary to fully understand the determinants of displacement and migration caused by environmental change and degradation, and gauge the adaptability, resilience and sustainability of environmental change induced migration (Boano et al. 2008; and Barnett and Webber 2009).

In the 1970s and 1980s, researchers working on environmental hazard mainly focused on forced displacement, which drew international attention to the potential severity of the problem. Towards the late eighties, environmental displacement was mainly associated with desertification, drought and famine. It was only after the establishment of the Inter-governmental Panel on Climate Change (IPCC) in 1988, the adoption of the United Nations Framework Convention on Climate Change, and the Convention on Biological Diversity, following the Earth Summit conducted in 1992 in Rio Janeiro, followed by the United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought

and/or Desertification, particularly in Africa (1994), that environmental research began to take shape in the 1990s. The subject also became the concern of several institutions, like IPCC, United Nations Environment Programme (UNEP), International Organisation for Migration (IOM), United Nations University – The Institute of Environment and Human Security (UNU-EHS 2003), and United Nations High Commissioner for Refugees (UNHCR - Terminski 2012).

The research works that followed focused on the association between climate change and migration, stressing the need for further evidence to substantiate it (Gómez 2013). The studies highlighted the difficulty of analysing the causes of environmental displacement/migration, which is influenced by various factors, comprising demographic, social, economic, political and environmental factors (Laczko and Aghazarm 2009). Initially, labour migration studies at micro- and macro-level modelling had considered only socio-economic variables influencing it, while ignoring the environmental and social influences as potential determinants. This could have been due to the methodological problems of quantifying or identifying suitable proxy variables for them (Radu 2008). The Asian Development Bank report (ADB 2009) suggested that climate change be included as one among the factors leading to migration. However, it is a known fact that it is difficult to isolate the impact of climate change, especially on the rural migration, due to the complexity and multiplicity of factors influencing it.

In addition, recent theoretical developments attempt to include the influence of social network into migration models, which contributes to the emergence of 'social multipliers or externalities' (Manski 2000; Durlauf 2001; and Glaeser and Scheinkman 2001). Its basic premise is that individual behaviour is influenced by choices made by other members of their group, giving rise to externalities resulting in population behaviour. This idea came to be incorporated into migration decision research, according to which the decision to migrate is not done by the individual in isolation, but are also determined by the actual choices of others in the group (endogenous effects) or their behaviour (contextual effects). Earlier, very little modelling was done by including these externalities, namely, migrant networks, immigrant cluster, herd behaviour, chain migration or peer influences (Radu 2008). The earliest studies that included it are by Thaddani and Taylor (1984); Chau (1997); and Helmenstein and Yegorov (2000). Recent researches, however, have theoretically and empirically demonstrated that social networks significantly influence a migrant's decision on where and when to migrate (Munshi 2003; Esptein and Gang 2004; and Bauer et al. 2006). Besides, variations in gender roles, capabilities and responsibilities are also expected to further widen disparities under climate change hazards (Vincent et al. 2010). This has been confirmed by the studies of Nelson et al. (2002), Huisman (2005) and Omolo (2011).

A few related research works on different dimensions of environmental migration may be reviewed here. Although Findley (1994) found no change in

the overall migration level during the drought from 1983 to 1985 in Mali, a substantial rise in the migration of women and children was observed. A study on rural out-migration by Ezra and Kiros (2001) revealed that households affected by recurrent and severe droughts in Ethiopia adopted an income diversification strategy through migration of only some family members, with the others remaining behind.

Henry et al. (2004) analysed the association between variability in rainfall and migration in Burkina Faso, and found that while the probability of long-term female migration to other rural areas had declined during low rainfall, that of the males had increased. Meanwhile, in the case of Indian Ocean Tsunami, no long-term out-migration pattern was reported from the areas affected, although several families expressed their interest in migrating (Naik et al. 2007).

Doevenspeck (2008) examined the process and perpetuation of internal migration in rural Benin of West Africa and concluded that despite environmental problems, the affected migrants moved mainly due to socio-cultural factors, which rendered identification of the cause of migration difficult. Whereas, a review of impact of climate change by Black et al. (2008) revealed it to be aggravating prevailing problems, and increasing migration to safer locations that offer household security and reliable livelihoods. However, since migration occurred due to multiple factors, it was difficult to isolate the effects of environmental hazard from the economic factors. In developing countries, Ahmed et al. (2009) reported increase in poverty due to climate volatility, clearly evident in Indonesia, Bangladesh, Africa and Mexico.

Molaei, Santhapparaj and Malarvizhi (2008) analysed the earning gains of rural migrants settled in urban Iran and concluded that the migrants' demographic characteristics, employment sector and social network significantly influenced their earnings. Meanwhile, Ellis (2009) found that migration in general contributed to income diversification in rural areas. Groen and Polivka (2009) reported that 63 per cent of the migrated population due to Hurricane Katrina had returned to their original country after 13 months of its occurrence. The main determinants of their decision to return were age, ownership of house and severity of damage of their country. The non-returnees had the opportunity of restarting their lives, but some of them had to experience unfamiliar labour market conditions, besides the lack of support structures and social networks

In a study on Niger, Afifi (2010) observed that economic consequences of environmental change were more of a push factor to migration, calling it 'environmentally induced economic migration'. Black et al. (2011) concluded that individual migration decisions and flows were affected by economic, political, social and demographic factors operating in combination, on which the effect of the environment was highly dependent. Environmental change indirectly affected migration, and directly the hazardousness of place. Through economic drivers it

affected by changing livelihoods and through political drivers by causing conflicts over resources. Kartiki (2011) examined migration in response to cyclone Aila in rural Bangladesh and found that environmental stress had affected life, shelter, livelihood, drinking water and costal defence embankment. Although climate change increased migration, it was difficult to isolate environmental pressure due to multiple pressures. Furthermore, under repeated cyclones, migration became the last survival strategy.

In effect, migration decision modelling has developed over time into incorporating environmental change, social network and gender as additional determinants of environment induced migration. However, while studies are able to substantiate income and livelihood diversification, and social network influences of migration, it has not been easy to isolate the direct effect of environmental change on it, owing to the complexity of multiple factors influencing it.

Study Area Profile and Natural Calamities

Study Area Profile

Orissa State is bounded by the Bay of Bengal on the East, with a coast line of 450 kilometres (kms). It is the ninth largest in area (4.87 %), with the eleventh largest population. According to the Planning Commission (2012), the State has a much higher (57.2 %) population living below the poverty line, than at the all-India level (37.2 per cent) during 2004-2005. Of this, 60.8 per cent poor live in rural and 37.6 per cent in urban areas. In order to achieve inclusive growth, the State has launched several employment generation and poverty alleviation programmes, like Food Security and Public Distribution System, Indira Awas Yojana (IAY), Swarnajayanti Grameen Swarozgar Yojana (SGSY), and Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS), to generate livelihood and provide basic needs to the poor.

Spread over an area of 3,051 sq. km., Puri is one of the developed districts of Orissa, with the Bay of Bengal on its Eastern and South-Eastern part, and a coastline of approximately 151 kms. Its hottest month is May, while June to September is the South West monsoon period. Winds are quite strong, especially in the coastal regions during the months of summer and monsoon. Humidity is also high throughout the year, particularly closer to the coastal areas. The 2001 Census recorded a total population of 1,502,682 in the district, consisting of 50.80 per cent males and 49.20 per cent females, which rose to 1,697,983 in 2011 Census, with very little change in its sex composition (50.95 % and 49.05 % respectively). As much as 86 per cent of its population reside in rural areas. The combined literacy rate of Puri was 78 per cent in 2001 (88 % male and 66 % female literacy), which increased to 85.4 per cent in 2011 Census (92 % male and 79 % female literacy). The district has a low total working population

of 29.98 per cent, of which females constitute 12.6 per cent. Cultivators and agricultural workers account for 58 per cent of the main workers, with women workers comprising only 7.3 per cent of its total. Overall, agriculture and related activities are dominant, making employment highly vulnerable to adverse climate changes. Its major industrial activities are art, craft and handicrafts. Its small-scale and cottage industries are engaged in agro-based production activities, like seafood processing, rice milling, forest-based products and wooden furniture, leather products, snacks, cashew processing, coir, molasses, sauce, pickles, ice cream, and jams, jellies and squash. Owing to the coastal location of Puri, fishing industry is also very much developed (Population Census estimates, various years).

Natural Calamities

The geo-climatic situations of Orissa are such that they induce occurrences of multiple natural calamities like earthquake, drought, heat-wave, fire, lightning, hailstorm, cyclone, flooding and tsunami. Recurring natural calamities have been a major obstruction to the socio-economic development of the State. Flooding, hailstorm, cyclone, heat-wave and fire are more frequent in the State, causing intense misery to its people. The major rivers of the State (namely, Mahanadi, Baitarani, Brahmani, Budhabalanga, Rushikulya, Subarnarekha, Vamsadhara) and their tributaries, besides depressions in the Bay of Bengal, are often flooded, making it vulnerable to devastations. The State also faces drought several times due to the vagaries of monsoon. In addition, a large percentage of the State's area falls under seismic vulnerability zone.

Since 2003, Orissa has faced regular recurring floods, with the worst occurring in 2001, 2003, 2006, 2007 and 2008, during which 21 out of its 30 districts were the worst affected. The downstream flood of September 2008 affected Cuttack, Jajpur, Jagatsinghpur, Kendrapara, Khurda and Puri districts in the Mahanadi basin. During June to September, 21 districts were devastated, affecting 871 villages in 145 blocks (10 in Puri district) in September. It damaged 34,437 houses (majority huts) and dislocated 772,275 people, with eight casualty. Furthermore, 382,080.70 hectares (19 % in Puri) of Kharif crop of small and marginal farmers were damaged, resulting in more than 50 per cent crop loss, and 14,059.31 hectares of agricultural land sand cast (2.0 % in Puri). In addition, it caused loss of livelihood, especially the traditional crafts and handloom weavers; damaged nets and boats of fishermen; and public infrastructure, including roads, rural water supply, irrigation projects, river and canal embankment, drainage system, school and other official buildings. About 30,856 people were rescued and evacuated to safer places and kept in temporary shelters during the floods. Food was provided through 1,118 free kitchen centres, benefiting 30,198 people for eight days. Besides, care was taken to provide health and sanitation facilities, safe drinking water and livestock feed. The state government is not only involved

in relief and rehabilitation works, but is also constantly focused on disaster preparedness and mitigation, so as to minimise the adverse effects of the recurring natural shocks and risks on its persistent development efforts (Government of Orissa 2009, 2010).

Data and Methodology

In 2001, Orissa accounted for 11,054,202 migrants, consisting of 22.47 per cent males and 77.53 per cent females, indicating feminisation of migration in the State. Intra-State migration dominates total migration (93.58 %), with inter-State migration comprising only around 6.0 per cent of it (Population Census estimates 2001). The present study was conducted in the 2008 flood-affected Rupdeipur Gram Panchayat of Pipli block in Puri district, Orissa, from June-July 2009. A random sample of four villages was selected for the study, namely, Alapur, Nahamanga Patana, Kolitara and Panda Sahi. These villages experience adverse climatic change effects, like cyclonic flooding and droughts, and record a heavy incidence of migration, which is often environmentally induced. It is worth noting that some members of families in the sample villages have been migrating seasonally or temporarily for diversification of livelihood, even without the climatic changes aggravating their socio-economic conditions, due to poverty, landlessness, smaller land holdings or seasonality of agricultural employment. The presence of a known person, friend or relative in another place makes it much easier for them to migrate, resulting in chain migration.

The data have been directly collected by the researchers through personal interview method using pre-tested schedule from a random stratified sample of an experimental group of 120 migrants and a control group of 120 non-migrants having similar developmental background from the sample villages. This contributed to a total sample of 240 respondents, comprising 60 males and females each under the two categories. Respondents from both migrant and non-migrant households have been selected in order to make a comparison of their socio-economic background, that contributes to their decision to migrate or not. Further, while changes in living conditions of the migrants and their families left behind in villages have been examined across the pre- and post-migration periods; information for the non-migrants the survey period has been compared with their living status three years prior to the interview. Therefore, it was ensured that the migrant respondents selected should also have migrated for a minimum of three years, a period sufficient enough for the socio-economic impacts of migration to become evident. Further, in the study, a migrant household by gender is identified as the one consisting of at least one or more migrant male or female members at the time of interview. Contrarily, in the case of the non-migrants, the household is classified as male and female on the basis of their respective dominance in earnings and household decision-making.

The objectives for the study have been examined using simple averages, ratios, percentages, logit multiple regression, t-test, Garret ranking technique (Garret and Woodworth 1969), Standard of Living Index (SLI – Roy, Jayachandran and Banerjee 1999), Lorenz curve and Gini index. The multiple regressions have been estimated within the migration decision framework for male, female and combined samples separately, to examine the varying factors influencing their migration decision. Demographic, socio-economic, environmental and social capital variables have been included as the explanatory variables in the model. The estimated logit multiple regression equation is as given:-

$$MGRNi = b0 + b1AGER + b2EDCN + b3MART + b4DEPR + b5LAND + b6ALDB + b7HHYB + b8SLIB + b9HDTB + b10SCLK + b11CLMT + b12GNDR + U$$

where,

MGRNi = gender-wise migration dummy, taking value one if migrant and zero otherwise (i = male, female and combined respondents);

AGER = age of the respondent in years;

EDCN = education of the respondent in years;

MART = marital status dummy, taking value one if married and zero otherwise;

DEPR = dependency ratio (computed as number of non-working members divided by number of working members);

LAND = value of land owned by the respondent household in rupees;

ALDB = annual labour days worked by the respondent before migration/three years;

HHYB = household income per month in rupees before migration/three years;

SLIB = standard of living index of the respondent household before migration/three years;

HDTB = household debt in Rupees before migration/three years;

SCLK = social capital dummy, taking value one for presence of known friends or relatives at destination and zero otherwise;

CLMT = degree of adverse effect of climatic change experienced;

GNDR = gender dummy, taking value one for male and zero for female; and

U = error term.

Step-wise procedure has been adopted in the estimation of the equation, in order to overcome the chances of emergence of multicollinearity problem, if any. The theoretically expected relationship between the dependent and independent variables are as outlined.

Migration tends to decline with an increase in age, owing to the desire to settle down peacefully as one gets older. Hence, the expected association between age of the respondent (AGER) and the dependent variable is negative.

A rise in education level (EDCN) is likely to increase migration if job prospects are good at target destination; otherwise, its expected impact is negative.

Marital status of the respondent (MART) is expected to encourage migration due to increased family responsibilities, especially for the males. Whereas for females, it is likely to have a reverse effect due to different roles assumed by them as a home-maker, care taker and child-bearer. Likewise, higher dependency ratio (DEPR) in the family is also hypothesised to have a similar impact on migration for the same reasons.

On the other hand, higher land value (LAND), representing larger land ownership by the respondent household, is expected to discourage migration due to the availability of sufficient earnings from and work in own land.

Increase in annual number of days worked (ALDB) in own village before migration/three years is hypothesised to reduce migration, due to the availability of sufficient employment opportunity in native place. Similarly, higher household monthly income (HHYB) and standard of living before migration/three years (SLIB) are expected to discourage migration, due to the economic soundness of the family. Standard of living index score (SLI) is a measure of material possessions of a household, reflecting its economic well-being. Weights are assigned to each good and amenity possessed by the household, which are summed up to obtain the total score. These scores are then classified into three SLI categories, viz., low (0-9), medium (10-19) and high (20 and above) standard of living households (for computation of SLI, refer Roy, Jayachandran and Banerjee 1999).

Large household debt in Rupees (HDTB) before migration/three years is hypothesised to increase migration, due to the economic pressure to repay loan.

Presence of known friends or relatives in other places, reflecting social capital (SCLK), is expected to encourage migration by generating chain migration effect.

The paper makes an attempt to isolate the perceived effect of degrees of environmental hazard suffered by the sample households, by including climate change as a determinant of migration. The variable is expressed as a scale, with the lowest degree of impact taking value 1, reserving 2 for relatively severe effect, and 3 for very severe effect. Rise in the degree of adverse climatic change (CLMT) impact experienced by a household is expected to encourage migration as both livelihood and survival strategies.

Being a male (GNDR) is hypothesised to increase migration due to the socio-cultural gender norms more commonly prevalent in rural areas that encourage male but restrict female mobility.

Garrett Ranking Technique (Garret and Woodworth 1969) has been applied to rank on a priority basis the push and pull factors, and problems of migration, besides the reasons for non-migration. The percentage position of each item is computed using the following formula:

$$\text{Percentage position} = \frac{100*(Rij - 0.5)}{Nj}$$

where,

Rij = rank allotted to the ith factor by the jth individual; and

Nj = total number of factors ranked by the jth individual.

The percentage position thus arrived at is converted into scores by using Garret's table. These scores of all respondents for each factor are then added up and divided by the total number of respondents who had responded, to obtain the mean score for each item. These mean scores are again arranged in a descending order and ranks allotted.

Further, besides Gini index, Lorenz curve has been used to illustrate the income inequality across gender-wise migrant and non-migrant households.

Results and Discussion

Table 1 presents the socio-economic background of the sample respondents by migrant status and gender during the survey. The mean age of the migrant male and female respondents is lower than that of the non-migrants, indicating that younger people have a greater tendency to migrate. In general, education level is observed to be very low among the sample respondents, with its average for the migrants (primary school) much lower compared to that of the non-migrants (middle school). This could be because there are no High Schools in the sample villages, besides the lack of importance attached to education.

More than half the sample respondents are married, with their percentage being much higher among the non-migrants (58 % males and nearly 77 % females). Furthermore, more non-migrants live in nuclear families (58 % males and 45 % females), than the migrants. Their percentage is the lowest among the female migrants (27 %), who prefer living in joint families, so that their family members have the support of their parents or in-laws. The average family size is around six and dependency ratio around two, regardless of gender and migration status, though their numbers are slightly more in the migrant households.

As regards land ownership, relatively more non-migrants than the migrants and more males than the females own land. About 75 per cent of the non-migrant males, as against 63 per cent migrant males own land. Whereas among the females, 57 per cent non-migrants against only 15 per cent migrant households own land. The average land value of the non-migrant males is as high as Rs. 804,050, whereas that of their migrant counterpart is only worth Rs. 93,667. While land values of the female households are also much lower compared to that of males', the land value of migrants (Rs. 5,800) is relatively much lower than for the non-migrants (Rs. 56,000). Thus, low land holdings could also have been one of the main drivers of the decision to migrate in the sample villages.

Table 8.1: Descriptive Statistics

Sl. No.	Variables	Male		Female	
		Migrant	Non-Migrant	Migrant	Non-Migrant
1.	Age in years	32.30 (7.62)	33.67 (8.44)	31.48 (8.99)	36.32 (10.11)
2.	Education in years	2.50 (0.58)	7.78 (2.08)	4.47 (1.94)	6.38 (3.40)
3.	Marital status (married = 1; others = 0)	51.66 (0.38)	58.33 (0.49)	55.16 (0.51)	76.77 (0.63)
4.	Family size (No.)	6.08 (0.77)	5.95 (0.75)	5.71 (0.75)	5.55 (1.06)
5.	Type of family (nuclear = 1; joint = 0)	0.44 (0.50)	0.58 (0.53)	0.27 (0.26)	0.45 (0.50)
6.	Dependency ratio	2.23 (1.15)	2.45 (1.10)	1.48 (0.54)	2.23 (1.30)
7.	Land ownership (yes = 1; no = 0)	0.63 (0.49)	0.75 (0.44)	0.15 (0.36)	0.57 (0.50)
8.	Land value in Rupees	93667 (38483)	804050 (80037)	5800 (17175.86)	56000 (78703)
9.	Total family income per month	3020.00 (1012)	3778.00 (1500)	2097.00 (578.41)	4001.70 (2720.76)
10.	Household debt in Rs. (before)	48633 (59832.53)	28833 (57234.03)	34583 (19956.98)	25017 (13678.71)
11.	SLI (before)	8.47 (2.66)	10.54 (2.64)	9.13 (2.50)	10.28 (3.99)
12.	Remittance per month in Rs.	3452.00 (1025)	–	847.50 (246.06)	–
13.	Per cent of income remitted	65.32 (4.99)	–	41.77 (9.56)	–
14.	Social capital - relatives/ friends at destination (yes = 1; no = 0)	0.87 (0.34)	0.34 (0.12)	0.78 (0.42)	0.16 (0.07)

Note: Brackets show standard deviation; 1 US $ = Rupees 48 during the survey.

The average monthly household income of migrant males (Rs. 3020) and females (Rs. 2097) was comparatively lower in the pre-migration period, than those of their non-migrant counterparts (Rs. 3778 and Rs. 4001.70 respectively) three years back. During the same period, the migrant households had belonged to low SLI category, whereas the non-migrant households belonged to the lower

medium category. Further, the migrants and male households in general had relatively higher debts before migration/three years than the non-migrants and female households, which are again the potential push factor.

The average remittance per month by male migrants to their family is Rs. 3452 and by the females Rs. 847.50, accounting for almost two-thirds and 41.77 per cent of the earnings remitted to their respective families in native villages.

As regards social capital, which significantly contributes to chain migration, 87 per cent males and 78 per cent females claimed to know a friend or some known person at the urban destination. In the case of non-migrants, their respective percentages are as low as 34 and 16.

In effect, migrants are relatively socially and economically worse-off than the non-migrants, which is one of the reasons for their decision to migrate. And by gender, female households are more affected than those of the males.

Table 2 illustrates the gender-wise occupational distribution of sample migrants before and after migration, and for the non-migrants before and after a minimum period of three years. The sample migrant and non-migrant males were largely temporarily (56.67 % and 55 %) and seasonally (43.33 % and 41.67 %) employed, respectively, before migration/three years prior to the survey. But after migration, 86.67 per cent of the former are temporarily and the rest permanently employed. Whereas, among the non-migrants not much change was observed at the time of interview, of whom 50 per cent males have temporary, 41.67 per cent seasonal and the rest permanent employment. In the case of females, only 16.67 per cent migrants were seasonally employed before migrating, but post-migration, 93.33 per cent have temporary employment, while the rest are seasonally employed. Of the non-migrants, only 8.33 per cent were seasonally employed before three years, which rose to nearly 11.67 per cent after it.

Occupational structure of the male migrants in the pre-migration period shows that 35 per cent were agricultural labourers, 20 per cent construction and related workers, and nearly 17 per cent each farmers and unemployed, while the rest were businessmen and service sector employees. Post-migration, all males are employed as construction and related workers (100 %). In the case of females, only five per cent were agricultural labourers and nearly two per cent engaged in construction and related works before migration, with as much as 70 per cent being housewives and more than 23 per cent unemployed. But post-migration, nearly 97 per cent are employed as construction and related workers, and the rest in service the sector.

As regards the non-migrants, around one-third of the males (33.34 %) were unemployed three years prior to the survey, about 28.33 per cent each were farmers and agricultural labourers, and five per cent each were construction and related workers, and businessmen. But at the time of interview, 35 per cent males are construction and related workers in their native village. Of the rest,

Table 8.2: Gender-Wise Occupational Structure by Migrant Status

Sl. No.	Details	Male		Female		Total	
		Before	After	Before	After	Before	After
A.	Non-Migrants						
1.	Type of employment:						
	a) Seasonal	33(55.00)	25 (41.67)	5 (8.33)	7 (11.67)	38 (31.67)	32 (26.66)
	b) Temporary	25(41.67)	30 (50.00)	-	-	25 (20.83)	30 (25.00)
	c) Permanent	2(3.33)	5 (8.33)	-	-	2 (1.66)	5 (4.16)
	Total	60 (100)	60 (100)	5 (8.33)	7 (11.67)	65 (54.16)	67 (55.82)
2.	Occupation:						
	a) Farmer	17 (28.33)	17 (28.33)	-	-	17 (14.16)	17 (14.16)
	b) Agricultural labour	17 (28.33)	8 (13.33)	3 (5.00)	2 (3.33)	20 (16.67)	10 (8.33)
	c) Construction and related work	3 (5.00)	21 (35.00)	-	5 (8.33)	3 (2.50)	26 (21.67)
	d) Business	3 (5.00)	6 (10.00)	-	-	3 (2.50)	6 (5.00)
	e) Service	-	4 (6.67)	-	4 (6.67)	-	8 (6.67)
	f) Housewife	-	-	44 (73.33)	42 (70.00)	44 (36.67)	42 (35.00)
	g) Unemployed	20 (33.34)	4 (6.67)	13 (21.67)	7 (11.67)	33 (27.50)	11 (9.17)
	Total	60 (100)	60 (100)	60 (100)	60 (100)	120 (100)	120 (100)

B.	Migrants						
1.	Type of employment: a) Seasonal b) Temporary c) Permanent	 26 (43.33) 34 (56.67) -	 - 52 (86.67) 8 (13.33)	 10 (16.67) - -	 4 (6.67) 56 (93.33) -	 6 (30.00) 34 (28.33) -	 4 (6.67) 108 (90.00) 8 (13.33)
	Total	60 (100)	60 (100)	10 (16.67)	60 (100)	70 (58.33)	120 (100)
2.	Occupation: a) Farmer b) Agricultural labour c) Construction and related work d) Business e) Service f) Housewife g) Unemployed	 1 (16.67) 21 (35.00) 12 (20.00) 5 (8.33) 2 (3.33) - 10 (16.67)	 - - 60 (100) - - - -	 - 3 (5.00) 1 (1.67) - - 42 (70.00) 14 (23.33)	 - - 58 (96.67) - 2 (3.33) - -	 10 (8.33) 24 (20.00) 13 (10.83) 5 (4.17) 2 (1.67) - 24 (20.00)	 - - 118 (98.33) - 2 (1.67) - -
	Total	60 (100)	60 (100)	60 (100)	60 (100)	120 (100)	120 (100)

Note: Brackets show column percentages.

28.33 per cent are farmers, 13.33 per cent agricultural labourers, and 10 per cent businessmen. The remaining 6.67 per cent each are in service sector or still unemployed. As for their female counterparts, only five per cent were engaged as agricultural labourers, while the rest were housewives (73 %) and unemployed (21.67 %) before. Not much had changed for them in three years of the interview. Only 8.33 per cent are engaged in construction and related works, 6.67 per cent in service sector and merely 3.33 per cent as agricultural labourers. The remaining 70 per cent are still housewives and 11.67 per cent unemployed. Thus, not much change is visible in the occupational structure of the non-migrants by gender over the three year period in their native village.

Table 3 shows the perceived degrees of adverse effects of climate changes suffered by the sample households by gender and category during the June-September 2008 and earlier floods. As Puri is located in a coastal area, all households reported having suffered varying degrees of adverse effect of the climate change depending on the proximity of their village to the coast. More than 70 per cent of all sample households experienced very severe impact of the adverse climatic changes, excepting non-migrant female households of whom 53.33 per cent had suffered. The impacts were less severe for less than 10 per cent and relatively severe in all cases, wherein the percentage of non-migrant females was comparatively more. Majority of them had lost their houses, livestock and livelihood in the floods. The government had provided them with food and drinking water, and alternate shelter until the problem receded.

Table 8.3: Perceived Degree of Climatic Change Effects

Sl. No.	Degree of Adverse Effect	Male	Female
A.	Migrant Household		
1.	Less severe	9 (15.00)	5 (8.33)
2.	Relatively severe	9 (15.00)	8 (13.33)
3.	Very severe	42 (70.00)	47 (78.34)
	Total	60 (100.00)	60 (100.00)
B.	Non-Migrant Household		
1.	Less severe	8 (13.33)	10 (16.67)
2.	Relatively severe	7 (11.67)	18 (30.00)
3.	Very severe	45 (75.00)	32 (53.33)
	Total	60 (100.00)	60 (100.00)

Note: Brackets show column percentages.

Gender-wise details of migration pattern of the sample migrants is furnished in Table 4. The destination of migration is urban for all the sample migrants by gender. Majority of the males (91.67 %) and females (75 %) have migrated to the neighbouring state of Andhra Pradesh to work in Vijaywada Thermal Power Station (VTPS), located at a distance of 600-900 kms from their villages. The nature of migration reflects chain migration, with most of them following their friends or other known persons there. The rest have migrated to other urban areas within the state, travelling a distance of less than 300 kms (females 25 %) and 300-600 kms (males 8.33 %). A few males also migrated to a longer distance of 900-1200 kms.

Table 8.4: Gender-wise Details of Migration

Sl. No.	Details	Male	Female	Total
A.	Nature of Migration			
1.	Rural to Rural	-	-	-
2.	Rural to Urban	60 (100.00)	60 (100.00)	120 (100.00)
B.	Destination of Migration			
1.	Inter-state	55 (91.67)	45 (75.00)	100 (83.33)
2.	Intra-state	5 (8.33)	15 (25.00)	20 (16.67)
	Total	60 (100.00)	60 (100.00)	120 (100.00)
C.	Distance Migrated (km)			
1.	Below 300	-	15 (25.00)	15 (12.50)
2.	300-600	5 (8.33)	-	5 (4.17)
3.	600-900	52 (86.67)	45 (75.00)	97 (80.83)
4.	900-1200	3 (5.00)	-	3 (2.50)
	Total	60 (100.00)	60 (100.00)	120 (100.00)

Note*:* Brackets show column percentages.

Table 5 presents the logit regression results of the estimated migration decision function by gender. It reveals an increase in age of the respondent to be negatively affecting the decision to migrate across gender. This is because as individuals grow older, their inclination to migrate declines. However, the influence of the variable emerges insignificant in all cases.

Regardless of gender, a rise in the respondent's education level is found to significantly reduce the probability of migration. Given that the mean education years are quite low among the sample respondents, any further improvement in their education would discourage them from migrating to take up manual jobs.

Table 8.5: Logit Regression Results – Migration Decision Function

Sl. No.	Variables	Male	Female		Combined	
		Model-I	Model-I	Model-II	Model-I	Model-II
1.	Constant	-100.425 (10.80)*	-2.894 (0.47)	-4.549 (1.27)	-17.138 (16.77)*	-18.551 (21.07)*
2.	AGER	-0.042 (0.12)	-0.040 (0.84)	-0.026 (0.39)	-0.008 (0.09)	-0.010 (0.15)
	EDCN	-1.546 (9.51)*	-0.322 (5.82)*	-0.314 (6.65)*	-0.315 (10.94)*	-0.341 (13.87)*
4.	MART	-1.402 (0.50)	0.438 (0.35)	-0.750 (1.08)	0.379 (0.76)	0.552 (1.67)***
5.	DEPR	3.879 (3.99)*	-0.174 (0.07)	-0.026 (0.002)	0.094 (0.06)	0.176 (0.23)
6.	LAND	-0.265 (4.46)*	-0.230 (5.70)*	-0.225 (6.89)*	-0.095 (5.49)*	-0.101 (6.63)*
7.	ALDB	-0.012 (0.85)	-0.010 (10.50)*	-0.012 (16.27)*	-0.007 (12.19)*	-0.008 (15.86)*
8.	HHYB	14.237 (13.89)*	-0.436 (2.30)**	-0.451 (2.76)*	2.783 (30.16)*	2.994 (37.79)*
9.	SLIB	-1.289 (12.30)*	0.341 (5.69)*	0.292 (4.88)*	-0.191 (6.24)*	-0.210 (8.17)*
10.	HDTB	-0.199 (2.28)**	-0.007 (0.01)	-0.045 (0.29)	-0.021 (0.20)	-0.039 (0.72)
11.	SCLK	3.210 (4.53)*	2.294 (6.46)*	-	1.567 (12.75)*	-
12.	CLMT	-0.104 (0.02)	0.401 (0.45)	1.374 (9.07)*	0.095 (0.12)	0.406 (2.49)**
13.	GNDR	-	-	-	-0.370 (0.50)	0.015 (0.001)
	Log-likelihood	37.33	68.80	76.71	188.55	202.28
	Pseudo R2	0.88	0.72	0.70	0.60	0.56

Note*:* Brackets show t–value; and*, ** and *** indicate significance at 1, 5 and 10% levels respectively.

Contrary to expectation, marital status is observed to be negatively associated with the male decision to migrate, while it emerges indeterminate for the females. However, in both cases, the effect is insignificant. Whereas under combined analysis, the relationship is positive and significant under model-II, which implies that being married increases family economic responsibility, and hence encourages migration.

Increased number of non-working dependents in the family significantly encourages male migration, owing to higher economic burden. On the other hand, for females, the association is negative and insignificant. This is attributable to the differential gender roles prevailing in the social system, which expects them to be care-takers if the dependents are children, the sick or elderly. However, its insignificance is reflective of the fact that these norms may weaken under economic pressure or over time. Meanwhile in the case of combined sample, the relationship emerges positive but again insignificant.

Regardless of gender, land ownership is observed to significantly discourage migration, implying that individuals with own land might not be willing to migrate in search of alternative livelihood elsewhere due to sufficient employment and earnings in their own land. Likewise, increased pre-migration/three years' period annual days of work in the native village also negatively and significantly affect the decision to migrate across gender. This indicates that if the respondents are gainfully employed for sufficient number of days in their own village, they may not be willing to move out.

Higher monthly household income before migration or over the past three years significantly encourages the male and combined sample respondents to migrate. This could be because the mean income of the sample respondents was quite low then, and therefore more paying jobs through migration is favoured. Whereas in the case of females, it significantly discourages migration, implying that they would prefer not to migrate if the household income level is already high enough in the home village.

Higher pre-migration period standard of living is found to significantly discourage migration among the male and combined respondents, who might not wish to move away from family if the SLI is already better. However in the case of females, the relationship emerges positive and significant, implying that they would still migrate to further improve their household living standards.

Contrary to the hypothesised association, the relationship between pre-migration household debt and migration decision emerges negative across gender. But, the association is significant only for the males.

Increased social capital is found to strongly influence migration decision by gender, indicating that the presence of a friend or known person at the destination significantly induces migration, as it makes it easier to know about the work place condition, employer, nature of work, wages, accommodation and other facilities.

Adverse climatic changes are found to encourage female and combined migration, which emerges significant in model-II, when social capital variable is dropped from the regression under step-wise analysis. This clearly implies that the sample respondents prefer to move to safer locations under environmental threat, both for survival and livelihood. On the other hand, the association emerges negative, but insignificant for males, which could be because the males tend to migrate even otherwise.

The inclusion of gender into the model indicates an indeterminate and insignificant influence of being a male on the decision to migrate.

The pseudo R2 values indicate that the included independent variables in the regression models explain 56 to 88 per cent of the variations in the dependent variable.

Table 6 records the ranked push and pull factors of migration by gender.

Table 8.6: Gender-wise Push/Pull Factors of Migration

Sl. No.	Details	Male			Female		
		Total Score	Mean Score	Rank	Total Score	Mean Score	Rank
A.	Push Factors						
1.	Lack of infrastructural facilities	1623	28.47	8	1521	35.37	5
2.	Lack of non-agriculture and regular employment	4081	68.01	2	1438	28.76	8
3.	Low income in village	3713	61.88	3	1215	63.94	2
4.	Presence of known person	1410	39.16	6	422	32.46	6
5.	Poverty	4325	72.08	1	4768	79.46	1
6.	Friends moved	2491	45.29	4	1527	30.54	7
7.	To repay debt	1961	40.85	5	2912	49.35	4
8.	Need to save for future	1816	30.26	7	3204	53.4	3
B.	Pull Factors						
1.	Better income	4700	78.33	1	4596	76.6	1
2.	Better medical facilities	2337	38.95	4	2914	48.56	3
3.	Food and accommodation at work place	2827	47.11	3	2221	37.01	4
4.	Better job opportunity	3870	64.50	2	3608	60.13	2
5.	Better infrastructure	1744	38.48	5	1441	30.65	5

The foremost push factor for both the male and female respondents is poverty, caused by various factors like no or small land holding, and adverse climate changes. For males, the second push factor is lack of non-agricultural and regular

employment, followed by low income in native village. The priorities appear to be different for females, who ranked low income second and the need to save for future third. Existence of social capital, in terms of friends moved and presence of known person at destination of migration, are ranked fourth and sixth by males, while the females ranked them seventh and sixth, respectively. The next more important push factors for the females are repayment of household debt (fourth) and lack of infrastructure in home village (fifth). On the other hand, for males, repayment of debts ranked only fifth; the need to save for the future seventh; and lack of infrastructure eighth. Meanwhile for the females, lack of non-agricultural and regular employment ranked only eighth.

As regards the pull factors, better income, followed by better job opportunities are the main pull factors for both the sample male and female migrants. Food and accommodation at the work place is ranked third by the males, while the females ranked it fourth. For the latter, better medical facilities ranked third, while the males ranked it fourth. Finally, better infrastructure has been ranked fifth by both the sample males and females.

The ranked reasons for non-migration by gender are given in Table 7.

Table 8.7: Gender-wise Reason for Non-Migration

Sl. No.	Details	Male			Female		
		Total Score	Mean Score	Rank	Total Score	Mean Score	Rank
1.	Sufficient-employment opportunities in village	2637	47.94	3	434	72.33	2
2.	Own landholding, assets and agriculture cultivation	4018	66.96	1	1751	33.67	5
3.	Kinship around	1510	35.95	4	2900	48.33	4
4.	Marriage	342	22.36	6	2916	72.99	1
5.	Education and health facilities available	422	32.46	5	135	27.00	6
6.	Sentimental attachment	3195	57.65	2	2813	49.35	3

The males ranked own landholding, assets and agricultural cultivation as the first reason for non-migration. However, this appears less important for the females, who assigned it the fifth rank. This could be because, in Indian society, women

are seldom property owners of any kind. Rather for them, marriage comprises the foremost reason for non-migration, which holds the last priority (sixth) for the males. This is attributed to the fact that females are more strongly culture-bound in rural areas, for whom the husband's home becomes the ultimate place of stay after marriage, unless the spouse/family decide to move.

Sentimental attachment to the village is ranked second by the males, while the females ranked it third. Availability of sufficient employment opportunities in the village is ranked third by the males, which is ranked second by the females. Kinship around is ranked fourth by both the males and females. The males ranked the availability of education and medical facilities in the village fifth, which is ranked last by the females. Thus, wide variations are evident in the priorities attached to non-migration by gender, largely governed by gender socialisation in the State.

Table 8 shows the gender-wise changes in work and living conditions of the sample respondents across the pre- and post-migration periods. The data for non-migrants are not reported in the table, as very little change was observed in their conditions across the three-year period considered. The average number of hours worked per day by males before migration was 5.50 hours, which significantly rose to around eight hours post-migration. Likewise for females, the work hours rose significantly from a mere 2.12 hours to about eight hours per day. The average number of days worked per month significantly increased from around 17 to 26 days for the former, and from merely seven days to almost 25 days for the latter. Their respective average gainful employment increased significantly from almost six and only two months in their villages before migration to nearly 10 months each per annum post-migration.

The migrant's average monthly income, which was Rs. 1520 for males and only Rs. 356 for females, significantly rose to Rs. 5310 and Rs. 2038, respectively. Correspondingly, their monthly household income significantly increased from an average of Rs. 2890 and Rs. 2160 to Rs. 7460 and Rs. 4574, respectively.

The average monthly expenditure of male households rose significantly from Rs. 2890 to Rs. 5210, and for females from Rs. 2160 to Rs. 3800 post-migration. As regards personal monthly savings, while it almost doubled for the males (Rs. 647) from Rs. 306 during the pre-migration period, it increased from a mere Rs. 8.33 to Rs. 233 post-migration for the females. This added to an increase in their respective monthly household savings from Rs. 492 to Rs. 877, and from Rs. 8.33 to Rs. 330.

The pre-migration period debt amount was substantially higher than in the post-migration period, and comparatively more for the male than female households. While the household debt was as high as Rs. 48,633 for males and Rs. 34,583 for females in the pre-migration period, it significantly declined to Rs. 28,289 and Rs. 14,083 respectively during the post-migration period. Thus, the migrants contributed significantly to repaying their household debts.

Table 8.8: Comparative Pre and Post-Migration Work and Living Conditions

Sl. No.	Variables	Male		t-value	Female		t-value
		Before	After		Before	After	
1.	Hours of work/day	5.40	8.53	9.38*	2.12	7.78	12.48*
2.	No. of days worked per month	17.33	25.80	8.13*	7.12	24.78	13.95*
3.	No. of months worked/year	5.60	9.83	11.94*	2.20	9.77	16.59*
4.	Migrant monthly income (Rs.)	1520	5310	27.27*	356	2038	46.78*
5.	Monthly household income (Rs.)	3020	7460	23.02*	2097	4574	36.47*
6.	Monthly household expenditure (Rs.)	2890	5210	20.81*	2160	3800	34.96*
7.	Debt amount of household (Rs.)	48633	28289	-7.41*	34583	14083	-13.06*
8.	Migrant monthly savings (Rs.)	306	647	3.76*	8.33	233	11.26*
9.	Household monthly saving (Rs.)	492	877	11.39*	8.33	330	17.53*
10.	Standard of Living Index	8.47	30.93	51.08*	9.13	22.85	28.78*

Note: * and ** indicate significance at 1% and 5% respectively.

Further, the SLI indicates that both the male and female households that belonged to low standard of living category, significantly moved into high standard of living category, which rose much faster for the former than for the latter in the post-migration period.

The ranked problems of having migrated by gender are shown in Table 9.

Table 8.9: Problems of Having Migrated by Gender

Sl. No.	Details	Male			Female		
		Total Score	Mean Score	Rank	Total Score	Mean Score	Rank
1.	Family left behind	4708	78.46	1	4607	76.78	1
2.	Double expenditure	3704	61.73	3	4067	67.78	3
3.	No known person	1510	35.95	9	698	53.69	6
4.	Away from own community people	2575	42.91	8	2825	1	7
5.	Language problem	3374	56.23	4	3208	69.73	2
6.	Wage not received in time	3143	52.38	5	1342	22.36	10
7.	Accommodation problem	2637	47.94	6	1581	26.79	9
8.	Food problem	2168	44.24	7	3266	54.43	5
9.	Loneliness	4611	76.85	2	3580	62.80	4
10.	Risky job	695	33.09	10	1159	34.08	8

The major problem quoted by the male and female migrants is family left behind. The second problem for males is loneliness, which is ranked fourth by the females. For both, double expenditure for maintenance comprises the third main problem. Language problem is ranked fourth by the males, whereas for females it is the second major problem.

Wage not received in time is ranked fifth by the males, while the females ranked it tenth. Accommodation and food problems are ranked sixth and seventh by the former, and fifth and ninth by the latter, respectively. Staying away from own community people is ranked eighth by the males, and seventh by the females. No known person and risky job are assigned ninth and tenth ranks by the males, whereas the females ranked them sixth and eighth, respectively. Thus, male and female migrants experience different problems, governed by their respective socialisation.

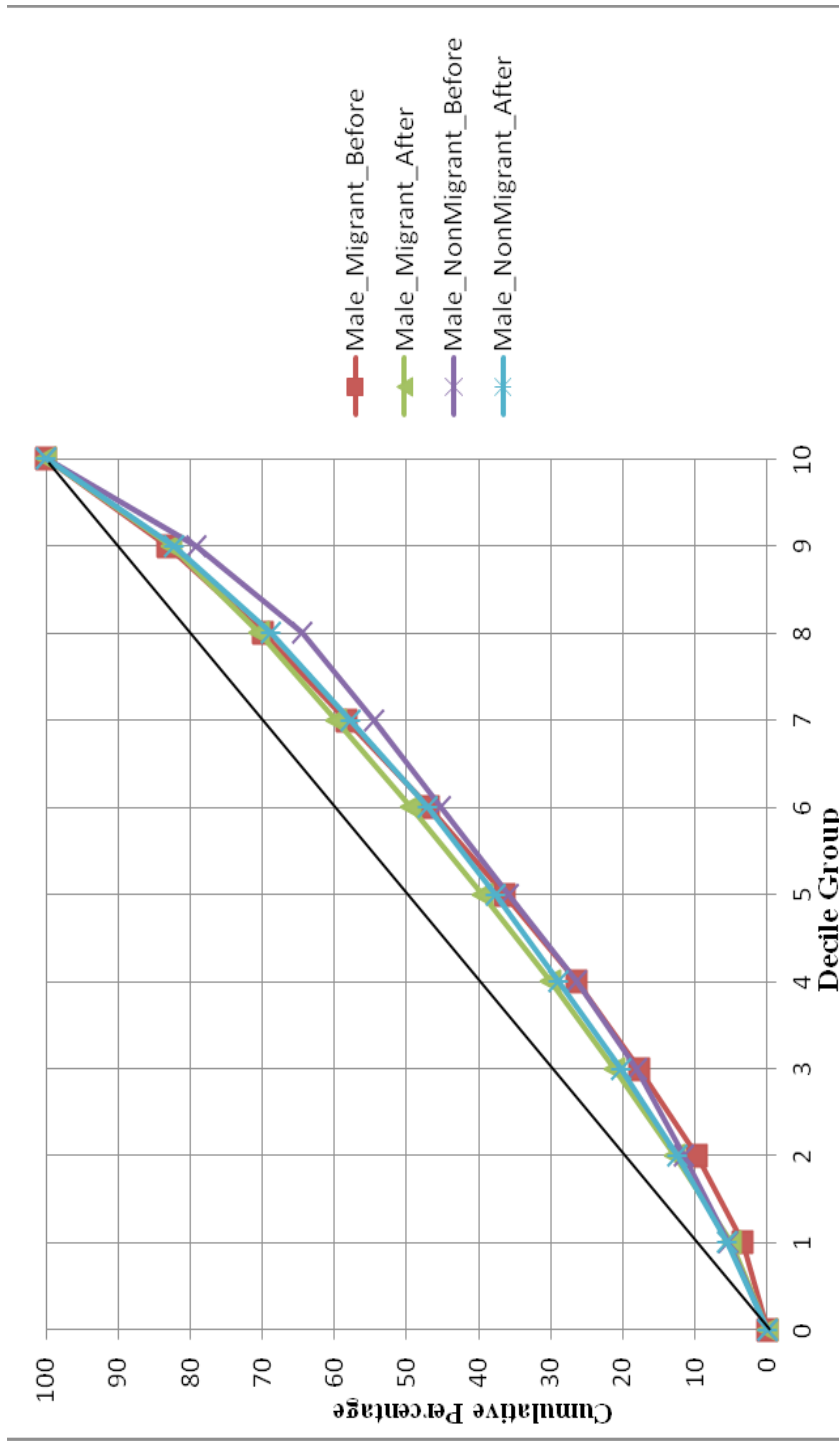

Figure 8.1: Male Migrants and Non-migrants

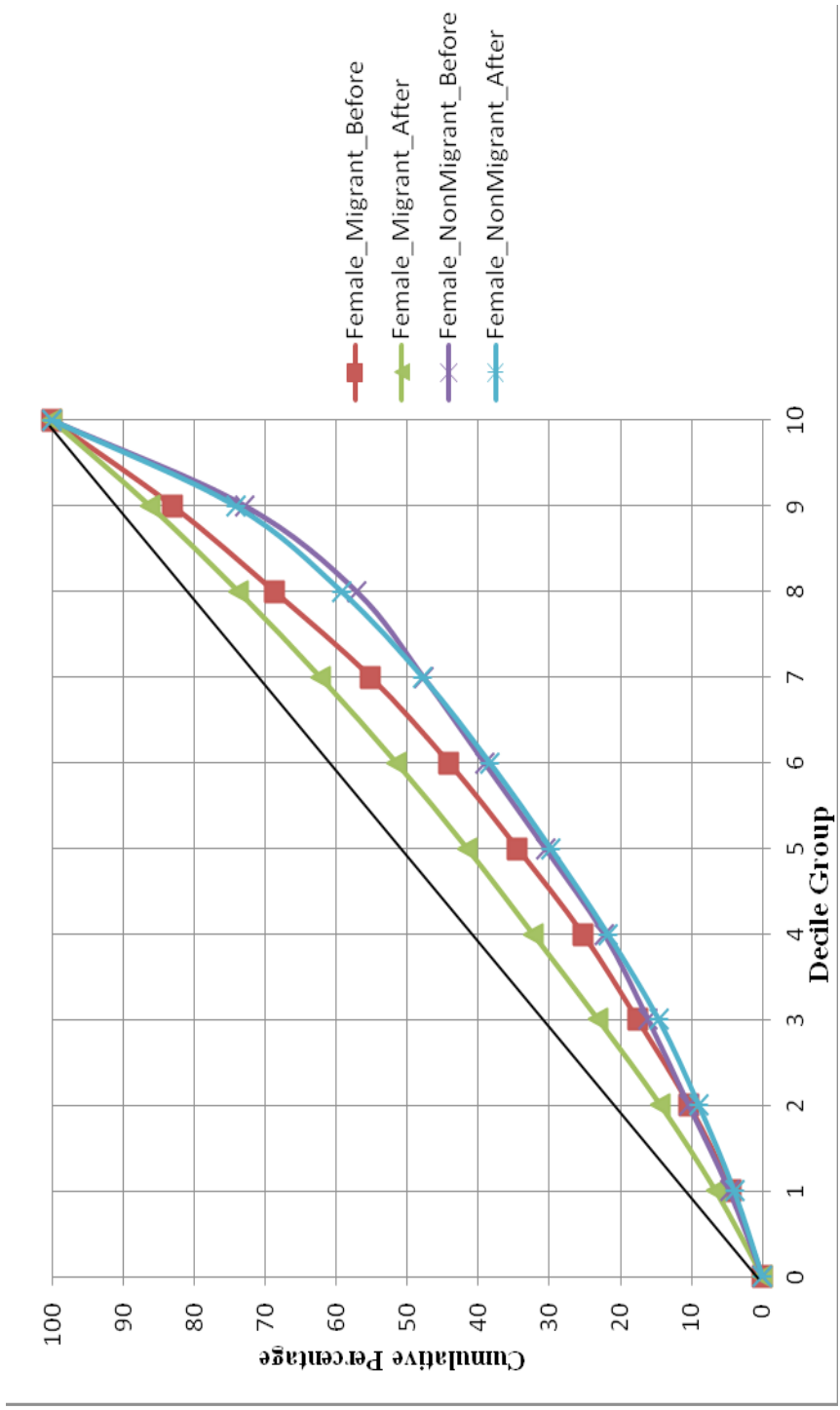

Figure 8.2: Female Migrants and Non-migrants

Figures 1 and 2 illustrate the income distribution of male and female respondents by migrant status, across the pre- and post-migration/interview periods. The central 450 diagonal line is the equi-income distribution curve, representing perfectly equally distributed income. Figure 1 shows that the household income in the earlier period was more unequally distributed than during the later period for both the migrant and non-migrant males. Between the two groups, the Lorenz curves depict the migrant households' income to be more equally distributed than that of the non-migrants. Further, their household income distribution after migration improves, indicating that migration has resulted in narrowing down income inequality within the group. However, at points where the Lorenz curves for the two periods intersect, it becomes difficult to confirm this. Nevertheless, there is an indication that although the income distribution of the non-migrants also improved in period two, there is a relatively greater improvement in the income distribution of the migrants.

In the case of females, a similar trend is observed with respect to the migrant and non-migrant groups in general. The income distribution is far more unequally distributed in period one for the non-migrants, which narrows down very little in period two. Whereas in both periods, the migrant households' incomes are far more equally distributed. Here again, the intersection of Lorenz curves of the non-migrant households makes it difficult to confirm the decline in income inequality across the two periods.

In effect, Figures 1 and 2 show the Lorenz curves for male migrants and non-migrants, and female migrants to be lying relatively closer to the equi-income distribution curve, whereas the corresponding curves for female non-migrants lie farther away from it. This implies that migrant male and female household incomes are more evenly distributed than that of the non-migrants by gender across the two periods under study. Furthermore, the household income distribution of the female migrants is slightly more equally distributed than that of the migrant males in both the periods. This is also depicted by Table 10, containing the Gini index for the two groups by gender, across the two reference periods of study.

Income inequality among the female migrant households is observed to be higher in the pre (40.46) than in the post (35.80) migration period. The female non-migrant households have the highest income inequality across the two periods (46.27 and 45.92 respectively). Although the male migrants (44.33) had higher income inequality than the non-migrants (43.17) in period one, their post-migration income inequality (41.75) declined more than that of the latter (42.19) in period two. However, overall, income inequality had registered a decline across the two reference periods for both the male and female households by migrant status.

Table 8.10: Gini Coefficient

Sl. No.	Details	Male	Female
A.	**Migrant Household**		
	i) Before	44.33	40.46
	ii)After	41.75	35.80
B.	**Non-Migrant Household**		
	i) Before	43.17	46.27
	ii) After	42.19	45.05

Conclusion

The paper analysed the factors influencing migration decision by gender, and verified whether adverse climatic changes influence it in Puri district, Orissa. It also examined the changes in socio-economic conditions of the sample migrant and non-migrant respondents, and their income distribution over a period of three years before and after migration/interview. Furthermore, the pull and push factors of migration, problems, and the reasons for non-migration were examined. The study is based on primary data collected from a random sample of 120 migrant and non-migrant respondents each, comprising 60 males and 60 females each from four sample villages in the flood affected Rupdeipur Gram Panchayat of Pipli block of Puri district, from June-July 2009.

The findings reveal the migrant households to be comparatively socially and economically poorer than their non-migrant counterparts, while across gender the female households were relatively worse off than the male households. The majority of both categories of the sample households had reported being severely affected during the floods of June-September 2008 and the earlier ones.

As regards employment status, a vast majority of the migrants was seasonally and temporarily employed, whereas their non-migrant counterparts were either working on their own land or unemployed or housewives. Post-migration, the migrants were more regularly employed in their neighbouring state, while not much change was observed in the case of the non-migrants in the village.

An analysis of the decision to migrate revealed that while better education level and more land ownership negatively and significantly affected it regardless of gender, the influence of social network was positive and significant. The latter finding is confirmed by the studies Munshi 2003; Bauer et al. 2006 and Molaei, Santhapparaj and Malarvizhi 2008. On the other hand, while pre-migration household income level significantly discouraged female migration, it significantly encouraged male and combined migration. Studies of Ellis (2009), and Ezra and Kiros (2001) revealed similar income diversification effects.

Higher pre-migration standard of living was found to significantly reduce male and combined migration, whereas it significantly encouraged female migration. Meanwhile, an increase in pre-migration annual employment days in native village significantly discouraged female and combined respondent's migration, whereas a rise in the degree of climatic change significantly encouraged it. The latter is supported by the findings of Black et al. (2008), who reported increased migration to safer locations in response to aggravating climatic change.

Contrary to expectation, higher household debts were found to significantly discourage male migration, whereas higher dependency ratio significantly increased it. With respect to the combined respondents, marital status significantly encouraged migration.

The foremost push factor for both male and female migrants was poverty, caused by factors like lack of assets and climate change hazards (Afifi 2010). Meanwhile, better income and job opportunity constituted the main pull factors regardless of gender (Ellis 2009; and Ezra and Kiros 2001). Wide variations were observed in the priorities attached to reasons for non-migration and problems faced by the migrants by gender, which are attributable to the different socialisation norms prevailing in the society.

Regardless of gender, the impact of migration on the migrant households revealed significant increase in their labour supply per day/month/annum, income, household expenditure, savings, debt and SLI in the post-migration period, with the significance level emerging relatively higher for females in all cases except SLI. Whereas, comparatively greater reduction in income inequality was observed among the migrant than non-migrant sample households.

In sum, the flood affected villages of Rupdeipur Gram Panchayat in Pipli block of Puri district have compelled the low skilled rural poor to resort to migration as adaptation to climatic changes, survival and livelihood diversification strategies. Although multiple factors have led to migration in the study area, climate change and poverty have also been identified as its significant determinants. Moreover, the findings revealed evidences of gender variations in the factors leading to migration. The study calls for implementation of suitable adaptation, coping and support policies from a gender perspective. This would include provisions of alternative employment schemes to protect and mitigate the problems of the affected people, training and land management methods, in the selected villages. The problems of migration due to climate change can also be minimised through timely dissemination of information on impending climatic catastrophe with the help of Meteorological department and media to ensure preparedness of the villagers in advance that could minimise damage and loss of life and material. Towards this end, the National Disaster Management Authority (NDMA) in the State is engaged in activities to reduce the vulnerability of coastal areas to cyclones, with the involvement of Orissa State Disaster Management Authority (OSDMA)

of NDMA. Its aim is to protect target villages during disasters, besides facilitating communication under natural calamities, in coordination and protection of the fishing communities. Information Education and communications (IEC) activities are conducted for Dissemination of Early Warning and Safety, through the media to inform villages of advancing catastrophe at least two days before the flood, to ensure preparedness for mitigation and safety of all people (Government of Orissa 2013). In addition, the Orissa Water Resources Department (WRD) under National Cyclone Risk Mitigation Project (NCRMP) is managing the saline embankments, besides having a Resettlement Action Plan (RAP) under the NCRMP; which is implemented under the guidance of environmental and social management framework (ESMF). However, the effective implementation of these ongoing government projects and schemes requires the committed, integrated and coordinated efforts of all the relevant stakeholders.

References

Afifi, T., 2010, 'Economic or Environmental Migration? The Push Factors in Niger', *International Migration*, Vol. 49, No. S1, pp. e95–e124.

Ahmed, S.A., Diffenbaugh, N.S., Hertel, T.W., Lobell, D.B., Ramankutty, N., Rios, A.R. and Rowhani, P., 2009, *Climate Volatility and Poverty Vulnerability in Tanzania*, Policy Research Working Paper 5117, Washington DC: World Bank.

Government of Orissa, 2009, *Annual Report on Natural Calamities 2008-09*, Special Relief Commissioner, Revenue and Disaster Management Department, Bhubaneswar: Government of Orissa Publication. (http://www.orissa.gov.in/disaster/src/ANNUAL_REP_04-05/2008-09/Natural_Calamities_2008-09.pdf). 10 May 2014.

Government of Orissa, 2010, *Annual Report on Natural Calamities 2009 - 10*, Special Relief Commissioner, Revenue and Disaster Management Department, Bhubaneswar: Government of Orissa Publication. (http://www.orissa.gov.in/disaster/src/ANNUAL_REP_04-05/Annual_Report_2009-10.pdf). 10 May 2014.

Asian Development Bank, 2009, *Climate Change and Migration in Asia and the Pacific*, Manila, Philippines: Asian Development Bank.

Barnett, J. and Adger, N., 2007, 'Climate Change, Human Security and Violent Conflict', *Political Geography*, Vol. 26, No. 6, pp. 639–655.

Barnett, J. and Webber, M., 2009, *Accommodating Migration to Promote Adaptation to Climate Change*, Commission on Climate Change and Development, Stockholm, Sweden: Commission on Climate Change and Development. (http://www.ccdcommission.org/Filer/documents/Accommodating%20Migration.pdfv). 12 May 2014.

Bauer, T., Epstein, G.S. and Gang, I.N., 2006, 'The Influence of Stocks and Flows on Migrants' Locational Choices', *Review of Development Economics*, Vol. 10, No. 4, pp. 652-65.

Black, R., Kwiveton, D., Skeldon, R., Coppard, D., Murata, A. and Schmidt-Verkerk, K., 2008, *Demographics and Climate Change: Future Trends and their Policy Implications for Migration*, Migration DRC Working Paper T-27, U.K.: University of Sussex.

Black, R., Adger, W.N., Arnell, N., Dercon, S., Geddes, A. and Thomas, D.S.G., 2011, 'The Effect of Environmental Change on Human Migration', *Global Environmental Change*, Vol. 21, Supplement 1, pp. S3-S11.

Boano, C., Zetter, R. and Morris, T., 2008, *Environmentally Displaced People: Understanding the Linkages between Environment Change, Livelihoods and Forced Migration*, Forced Migration Policy Briefing Refugee Studies Centre, United Kingdom: University of Oxford.

Casillas, C.E. and Kammen, D.M., 2010, 'The Energy-Poverty-Climate Nexus', *Science*, Vol. 330, November, pp. 1181-1182.

Chau, N., 1997, 'The Pattern of Migration with Variable Migration Costs', *Journal of Regional Science*, Vol. 37, No. 1, pp. 35-54.

Doevenspeck, M., 2008, *The Fine Line between Choice and Flight: Environmental Drivers, Socio-Economic Processes and the Perpetuation of Migration in Rural Benin, West Africa*, Paper Presented at the International Conference on Environment, Forced Migration and Social Vulnerability (EFMSV), Bonn, Germany, 9–11 October.

Durlauf, S., 2001, 'A framework for the Study of Individual Behaviour and Social Interactions', *Sociological Methodology*, Vol. 31, pp. 47-87.

Easterling, W.E., Aggarwal, P.K., Batima, P., Brander, K.M., Erda, L., Howden, S.M., Kirilenko, A., Morton, J., Soussana, J.F., Schmidhuber, J. and Tubiello, F.N., 2007, 'Food, Fibre and Forest Products', in M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, eds., *Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, UK: Cambridge University Press.

Ellis, F., 2000, *Rural Livelihoods and Diversity in Developing Countries*, Oxford: Oxford University Press.

Government of Orissa, 2013, *Environmental and Social Screening from National Cyclone Risk Mitigation Project*, Document 2009105/EC/Resettlement Action Plan (RAP), Environment and Ecology Department, Orissa: Government of Orissa Publication.

Epstein, G.S. and Gang, I.N., 2004, *The Influence of Others on Migration Plans*, IZA Working Paper 1244, Bonn, Germany: IZA.

Ezra, M. and Kiros, G.E., 2001, 'Rural Out-Migration in the Drought Prone Areas of Ethiopia: A Multilevel Analysis', *International Migration Review*, Vol. 35, No. 3, pp. 749–771.

Findley, S.E., 1994, 'Does Drought Increase Migration? A Study of Migration from Rural Mali during the 1983-1985 Drought', *International Migration Review*, Vol. 28, No. 3, pp. 539–553.

Garret, Henry E. and Woodworth, R.S., 1969, *Statistics in Psychology and Education*, Bombay: Vakils, Feffer and Simons Private Limited.

Glaeser, E.L. and Scheinkman, J.A., 2001, 'Measuring Social Interactions', in S.N. Durlauf and H.P. Young, eds., *Social Dynamics*, Washington, D.C.: Brooking Institute, pp. 83-131.

Gómez, Oscar, 2013, *Climate Change and Migration: A Review of the Literature*, A Study Commissioned by the International Institute of Social Studies, Rotterdam, The Hague: Erasmus University.

Gray, C. and Mueller, V., 2012, 'Drought and Population Mobility in Rural Ethiopia', *World Development*, Vol. 40, No. 1, pp. 134-145.

Groen, J.A., and Polivka, A.E., 2009, *Going Home after Hurricane Katrina: Determinants of Return Migration and Changes in Affected Areas*, Working Paper 428, Washington, D.C.: US Bureau of Labor Statistics.

Guterres, A., 2008a, 'Millions Uprooted: Saving Refugees and the Displaced', *Foreign Affairs*, Vol. 87, No. 5, pp. 90–99.

Guterres, A., 2008b, *Climate Change, Natural Disasters and Human Displacement: A UNHCR Perspective*, Geneva: United Nations High Commissioner for Refugees. (http://www.unhcr.org/refworld/type, RESEARCH,UNHCR,492bb6b92,0.html.). 12 May 2014.

Helmenstein, C. and Yegorov, Y., 2000, 'The Dynamics of Migration in the Presence of Chains', *Journal of Economic Dynamics and Control*, Vol. 24, No. 2, pp. 307-23.

Henry, S., Schoumaker, B. and Beauchemin, C., 2004, 'The Impact of Rainfall on the First Out-migration: A Multi-Level Event-History Analysis in Burkina Faso', *Population and Environment*, Vol. 25, No. 5, pp. 423–460.

Horton, G., Hanna, L. and Kelly, B., 2010, 'Drought, Drying and Climate Change: Emerging Health Issues for Ageing Australians in Rural Areas', *Australasian Journal on Ageing*, Vol. 29, No. 1, pp. 2-7.

Huisman, H., 2005, 'Contextualising Chronic Exclusion: Female-Headed Households in Semi-Arid Zimbabwe', *Tijdschrift Voor Economische En Sociale Geografie*, Vol. 96, No. 3, pp. 253-263.

McIntyre, B.D., Herren, H.R., Wakhungu, J. and Watson, R.T., eds., 2009, *Agriculture at Crossroads, Global Report*, International Assessment of Agricultural Knowledge - IAASTD, Science and Technology for Development, Washington, D.C., USA: Island Press.

International Organisation for Migration, 2007, *Discussion Note: Migration and the Environment* (MC/INF/288 – 1 November 2007 - Ninety Fourth Session), 14 February 2008IOM, Geneva, Switzerland: International Organization for Migration.

Kartiki, Katha, 2011, 'Climate Change and Migration: A Case Study from Rural Bangladesh', *Gender and Development*, Vol. 19, No. 1, March, pp. 23-28.

Laczko, F. and Aghazarm, Ch., eds., 2009, *Migration, Environemt and Climate Change: Assessing the Evidence*, Geneva: IOM.

Manski, C., 2000, 'Economics Analysis of Social Interactions', *Journal of Economic Perspectives*, Vol. 14, No. 3, pp. 115-36.

Molaei, Mohammed Ali, Santhapparaj, A. Solucis and Malarvizhi, C.A., 2008, 'Rural-Urban Migration and Earning Gains in Iran', *Journal of Social Sciences*, Vol. 4, No. 3, pp.158-164.

Munshi, K., 2003, 'Networks in the Modern Economy: Mexican Migrants in the US Labor Market', *Quarterly Journal of Economics*, Vol. 118, No. 2, pp. 549-99.

Naik, A., Stigter, E. and Laczko, F., 2007, *Migration, Development and Natural Disasters: Insights from the Indian Ocean Tsunami*, IOM Migration Research Series No. 30, Geneva: International Organization for Migration.

Nelson, V., Meadows, K., Cannon, T., Morton, J. and Martin, A., 2002, 'Uncertain Predictions, Invisible impacts, and the Need to Mainstream Gender in Climate Change Adaptations', *Gender and Development*, Vol. 10, No. 2, pp. 51-59.

Nelson, G.C.R., Rosegrant, Mark W., Palazzo, Amanda, Gray, Ian, Ingersoll, Christina, Robertson, Richard, Tokgoz, Simla, Zhu, T., Sulser, T.B., Ringler, C., Msangi, S. and You, L., 2010, *Food Security, Farming and Climate Change to 2050: Scenarios, Results, Policy Options*, IFPRI Research Monograph, Washington DC: IFPRI e-brary. (ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/127066). 10 May 2015.

Office of Registrar General and Commissioner, Various Years, *Census*, New Delhi: Government of India.

Omolo, N., 2011, 'Gender and Climate Change-Induced Conflict in Pastoral Communities: Case Study of Turkana in North-western Kenya', *African Journal on Conflict Resolution*, Vol. 10, No. 2, pp. 81-102.

Planning Commission, 2012, *Press Note on Poverty Estimates: 2009-10*, New Delhi: Government of India, 19 March. (http://planningcommission.nic.in/news/press_pov1903.pdf.). 10 May 2014.

Radu, Dragos, 2008, 'Social Interactions in Economic Models of Migration: A Review and Appraisal', *Journal of Ethnic and Migration Studies*, Vol. 34, No. 4, May, pp. 531-548.

Renaud, Fabrice G., Bogardi, Janos J., Dun, Olivia and Warner, Koko, 2007, *Control, Adapt or Flee: How to Face Environmental Migration?*, InterSecTions, No. 5/2007, Bonn, Germany: UNU-EHS.

Renaud, Fabrice G., Dun, Olivia, Warner, Koko and Bogardi, Janos, 2011, 'A Decision Framework for Environmentally Induced Migration', *International Migration*, Vol. 49, Supplement 1, pp. e5-e29.

Roy, T.K., Jayachandran, V. and Banerjee, Sushanta K., 1999, 'Economic Condition and Fertility: Is there a Relationship', *Economic and Political Weekly*, Vol. 34, Nos. 42s & 43, October 16-23, pp. 3041- 3046.

Ruel, M.T., Garrett, J.L., Hawkes, C. and Cohen, M.J., 2010, 'The Food, Fuel, and Financial Crises Affect the Urban and Rural Poor Disproportionately: A Review of the Evidence', *Journal of Nutrition*, Vol. 140, No. 1, January, pp. 170S-6S.

Stal, M., and Warner, K., 2009, *The Way Forward: Researching the Environment and Migration Nexus*, UNU-EHS Research Brief, Bonn, Germany: Institute for Environment and Human Security, United Nations University.

Tacoli, Cecilia, 2009, 'Crisis or Adaptation? Migration and Climate Change in a Context of High Mobility', *Environment and Urbanization,* Vol. 21, No. 2, pp. 513-525.

Terminski, Bogumil, 2012, Environmentally-Induced Displacement: Theoretical Frameworks and Current Challenges, May, Geneva.

Thadani, V.N. and Todaro, M.P., 1984, 'Female Migration: A Conceptual Framework', in J.T. Fawcett, S.E. Khoo and P.C. Smith, eds., *Women in the Cities of Asia: Migration and Urban Adaptation*, , Boulder, Colorado, United States: Westview Press, pp. 36-59.

United Nations Development Programme, 2009, Overcoming Barriers: Human Mobility and Development, *Human Development Report 2009*, New York: Palgrave Macmillan.

Vincent, K., Cull, T. and Archer, E., 2010, 'Gendered Vulnerability to Climate Change in Limpopo Province, South Africa', in I. Dankelman, ed., *Gender and Climate Change: An Introduction*, London: Earthscan, pp. 160-167.