International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

DROUGHT AND MIGRATION IN THE CONTEXT OF CLIMATE CHANGE-A REVIEW

Tulika Guha, Sugata Hazra, Sourav Das*

School of Oceanographic Studies, Jadavpur University, Kolkata, India

*Corresponding Author

ABSTRACT

This paper tries to find out the relationship between environmental change and migration. Human migration is a common phenomenon since early times. People migrate from one place to another due to various reasons. But the relationship between environmental change and migration is not established till now. The overall objective of this paper is to explore the potential link between climate change, migration and increased risk of conflict. The present review article begins with a brief introduction of migration. It then shows the changing nature of the environment in the context of climate change and their potential impact on human lives. Then it emphasizes some spatial evidences of environmental degradation in the form of drought and cause-effect relationship with migration worldwide. In particular it illustrates occurrence of drought and migration in Indian context as evidence. The paper also shows some evidences of climate-induced migration and conflict. The paper then concludes with a discussion that environmental change plays an important role behind migration decision along with other factors.

Keywords: Climate change, Drought, Environmental change, Migration

I. INTRODUCTION

Migration, like fertility and mortality, holds a place of prominence in a geographical analysis of population change in any area[1]. International Organization for Migration[2] defines migration as a movement of people, either across an international border, or within a State. It is a movement of people, encompassing any kind of movement, whatever its length, composition and causes; it includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification. The world has an estimated 28 million internal migrant in 2018[3]. Factors that determine why a person migrates are related to the place of residence from where migration starts, also known as the origin, and the place of new settlement,

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

or where migration ends either completely or temporarily, also known as the destination. Both the origin and destination are characterized by factors that either support (enable.), or reject or are neutral (neither support nor oppose migration.). The favorable attributes of a location are pull factors, which attract a person. The unfavorable attributes operating at a location are the push factors, which force or compel a person to move away[4]. While many people move voluntarily, others migrate out of necessity. According to UNHCR[5] there are approximately 68.5 million forcibly displaced persons, including over 25.4 million refugees, 3.1 million asylum seekers and over 40 million internally displaced persons as of June 2018.Among the forcibly displaced persons, people displaced by disaster outnumber people displaced by conflict and violence at the end of 2018. 17.2 million people are displaced due to disasters whereas 10.8 million are displaced due to conflicts and violence[6].Weather-related disasters (storms, hurricanes, floods, heat waves and droughts) have more than doubled in number over the last 20 years. There are now over 400 weather-related disasters per year and almost 90 million people require immediate assistance as a result; projections suggest that by 2030, this figure could be as high as 350 million [7].The lives of millions of people are being threatened not only by conflict, violence but also by chronic poverty, natural disasters and environmental degradation including climate change. In a nutshell the present review aims to find out the relationship between migration and environmental problems, both of short and long duration. It shows how environmental degradation and climate change play a substantial role in triggering human migration.

II. CONCEPTUALIZING ENVIRONMENTAL MIGRATION

The concept of environmental migration is relatively new. But it is evident from many studies that there are already large numbers of people are on move due to environmental disruption. As early as 1985 EL Hinnawi[8] listed environmental refugee who had to leave their habitat either temporarily or permanently because of environmental hazards. Hutton in 1994 used the term “Climate refugee” for the first time. But the term environmental/climate refugee is not accepted globally. UNHCR in 1951[9] Convention did not mention environment as a reason behind migration. In the absence of international consensus, International Organization of Migration has proposed a working definition of “environmental migrants” as the persons or groups of persons who, for reasons of sudden or gradual 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[10]. This working definition includes people who are displaced by natural disasters as well as those who choose to move because of deteriorating environmental conditions.

III. CHANGING NATURE OF ENVIRONMENT

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

The Emergency Events Database (em-dat), a global disaster database maintained by the Centre for Research on the Epidemiology of Disasters (CRED) [11] in Brussels, records increase of 600 disasters globally each year .According to them, the number of natural disasters reported each year has been steadily increasing in recent decades. The frequency of natural disasters recorded in the Emergency Events Database (em-dat) has increased almost three-fold, from over 1,300 events in 1975–1984 to over 3,900 in 2005–2014[12]. According to EM-DAT there was an increase in all categories of natural disaster between 1987-2006.Annual Statistical Disaster Review[13] showed that in 2006 there were 427 natural disasters occurred worldwide and Asia was most hit by disasters, with over 44% of all reported disasters occurring in the region. In 2007, 414 natural disasters were reported across the world according to Annual Statistical Disaster Review [14] and Asia remained the region hardest hit and most affected by natural disasters in 2007 like previous year with 37% of reported disasters occurred in the region. Annual Statistical Disaster Review[15] reveal that in 2008, 354 natural disasters were recorded in that year which is less than previous years however, it had a larger impact on human settlement. Asia remained the most affected continent with 40% of reported natural disasters occurred in the region. According to Annual Statistical Disaster Review [16],335 natural disasters were reported in 2009 worldwide. Asia experienced the largest share in reported natural disaster occurrence (40.3%).It has been observed from Annual Statistical Disaster Review from 2010[17]to2017[18]that the reported numbers of natural disasters ranges between 324 to 385 per year. However, the position of Asia remained constant in terms of occurrence of highest percentage of natural disasters among the continents (34.8% in 2010 to 44% in 2017 respectively). According to National Disaster Management Authority[19], India is vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been a recurrent phenomenon in this country. 68% of the area of our country is susceptible to drought, about 60% of the landmass is prone to earthquakes; over 40 million hectares is prone to floods; about 8% of the total area is prone to cyclones and. During 1990-2000, an average of about 4344 people lost their lives and about 30 million people were affected by disasters every year. From 1990s onwards, both the number and severity of such events have increased. According to IPCC, Climate change is expected to increase the frequency and intensity of current extreme weather events and give rise to new vulnerabilities with differential spatial and socio-economic impacts on communities. The unprecedented increase of climate variability is going to have severe impacts on the hydrological cycle, water resource, droughts, flood, drinking water, forest and ecosystems, sea level/coastal area losses of coastal wetlands and mangroves, food security, health and other related areas. In global ranking, India's rank is 14th in terms of Global Climate Risk Index[20].

Natural hazards that lead to disasters can cause tremendous impacts on societies, the environment of the affected countries. Works that are closely related to climate, such as

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

agriculture, tourism, and water, are facing a great burden by extreme events[21]. The Intergovernmental Panel on Climate Change (IPCC) released a special report on extreme events and disasters in 2012.This special report said, "a changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events"[22]. The global increase in intense floods, storms, droughts, and heat waves has dire link to climate change. There is a growing literature on the evidence linking anthropogenic climate change with natural disasters[23]. Climate change according to IPCC refers to a change in the state of the climate which can be assessed by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or because of human activity. The global climate is changing has been proved in many reports published by the IPCC since 1990. The impact of climate change is being felt all over the world. Global temperature is rising, rainfall became more erratic, sea level is slowly rising, and extreme weather events are becoming more frequent and intense. The temperature is rising gradually over decades all over the world. The main reason behind it is basically anthropogenic in origin. Burning of fossil fuels leads to concentration of GHGs which traps heat and enhances the rise of temperature. The minimum temperature during winter in the northern hemisphere has risen compared to the maximum temperature resulting in a low diurnal range of temperature. Between 1906-2005 the global average surface air temperature increased by approximately 0. 74°C. The warming trends increased towards the end of this period (from 1979-2005), to a rate of 0.17°C/decade[24]. The trend fell in the period 2006-2009; with a global mean temperature rise of 0.24-0.28°C[25]. The following table gives an idea of the gradual increase in surface temperature over the last three IPCC reports.

Table no1: Rise of global surface temperatures according to the IPCC reports (2001, 2007, 2014)

Third assessment report (2001)	Fourth assessment Report (2007)	Fifth assessment Report (2014)
0.6°C	0.76°C ± 0.19°C (The warming from the first 50 years of instrumental record (1850–1899) to the last 5 years (2001–2005)).	0.85 °C, over the period 1880–2012(combined land and ocean surface temperature data as calculated by a linear trend)

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

IPCC's Fifth Assessment Report[26] says that number of cold days and nights have increased across most of Asia since 1950. Frequency of heat wave has also increased from the middle of the 20th century in large parts of Asia.

In October 2018, IPCC released a special report on Global warming[27]and according to that report human activities are responsible for the approximate rise of 1°C of global warming above pre-industrial levels, with a likely range of 0.8°C to1.2°C. Between 2030-2052 global warming is likely to reach 1.5°C, if it is continue to increase at current rate. Climate models project that there will be huge differences in regional climate characteristics between present-day and global warming of 1.5°C, and between 1.5°C and 2°C. Risks from droughts and precipitation deficits are projected to be higher at 2°C compared to 1.5°C of global warming in some regions[28].

In India level, the annual mean temperature of the country for the period 1901-2009, as whole has risen by 0.56°C[29] and by 2050s the temperature may rise by 2-4°C. By 2030's the annual mean surface air temperature may rise by 1.7°C to 2.0°C with respect to current climate base line (1960-1990) [30].

IV. EVIDENCE OF ENVIRONMENTAL CHANGE AND POPULATION MOVEMENT

Disaster, degradation and climate change affect human being in various ways (affecting livelihood conditions, making place of origin unsustainable etc.). "One of every seven people in the world is a migrant and more people are moving today in the context of disasters than ever before, mainly as a result of the concentration of populations and livelihoods in disaster-prone areas. Migrants are sometimes among the worst affected by disasters, being more exposed to hazards, less prepared and consequently less able to cope with and recover from the impacts of disasters"[31]. Internal Displacement Monitoring Centre provides information regarding the numbers of people displaced due to sudden onset disaster and conflict. The following table shows that over the years the numbers of people displaced due to disasters are increasing than conflicts.

Table no 2: Occurrence of displacement worldwide (2004 -2018)

Years	Displacement due to disaster	Displacement due to conflict
2004	Data not available	25 million
2005	Data not available	25 million
2006	Data not available	23.7 million
2007	Data not available	24.5 million
2008	36.1 million	26 million
2009	16.7 million	26 million

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

2010	42.3 million	27.1 million
2011	14.9 million	27.5 million
2012	32.4 million	28.8 million
2013	22 million	33.3 million
2014	19.3 million	38 million
2015	19.2 million	8.6 million
2016	24.2 million	6.9 million
2017	18.8 million	11.8 million
2018	17.2 million	10.8 million

Source: Global report of Internal Displacement Monitoring Centre (2004-18)

In case of disaster-induced displacement since 2008 to 2018 according to Global report on Internal Displacement Monitoring Centre[32]Asia ranks top. From 2008-2018 East Asia and pacific region experienced highest disaster-induced displacement followed by South Asia. According to Internal displacement monitoring centre country profile[33], India is exposed to a range of natural hazards. Around 68 per cent of the country is prone to drought, 60 per cent to earthquakes and 75 per cent of the coastline is vulnerable to cyclones and tsunamis. These physical factors combine with the country's high population density, poverty levels, rapid urbanization and environmental degradation which make the country most at risk of damage and displacement associated with disasters in South Asia. India has the highest level of displacement associated with disasters in South Asia in absolute terms[34]. From 2008-2014 in India 24.4 million people were displaced due to flood,5million due to storm,132,600 due to wet mass movements and 1500 due to earthquakes (IDMC Disaster-Induced Displacement Database as of 1 June 2015). During 2015, 3.7million were displaced from India. The impact of 2 major floods and storm events were responsible for displacement. Heavy rains and flash floods associated with a weak tropical cyclone that moved across the Bay of Bengal in November displaced 1.8 million in the states of Tamil Nadu and southern Andhra Pradesh. Monsoon flooding associated with cyclone Komen, which struck neighboring Bangladesh in late July, displaced 1.2 million, mostly in the northern and central states of West Bengal, Odisha, Manipur, Rajasthan and Gujarat[35]. In 2016, 2.4 million people were displaced from India. Flood in the state of Bihar led to more than 1.6 million displacements[36]. Around 8,55,000 people were evacuated in the Indian state of Bihar, where flooding also hit agricultural production. This has affected livelihoods and caused a sharp rise in unemployment, which in turn added to the number of people migrating from rural to urban areas in search of work[37]. During 2018, disaster triggers 2.7 million displacements. Above average rainfall triggered flooding and landslides nationwide between June and August. Tropical cyclones also struck the country's east coast between October and December, severely damaging homes and affecting millions of people in the states of Andhra Pradesh, Odisha and Tamil Nadu and Puducherry. Kerala flood accounted for more than half of India's displacement[38]. According

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

to initial reports by India's National Disaster Response Force, about 1.2 million people were evacuated from vulnerable districts in the eastern state of Odisha between 2 and 3 May 2019 ahead of Cyclone Fani, which made landfall near Puri on Friday 3 May. Global Disaster Displacement Risk - A Baseline for Future Work," Thematic Report[39],said that Bangladesh, India and Pakistan are among the ten countries in the world with the highest disaster-displacement risk and in future an average of 240 people out of every 1,000,00 might be expected to be displaced during any given year.

The above-mentioned displacement (disaster-induced) are from sudden-onset disaster. Slow-onset disasters include drought, desertification, erosion etc. Slow onset disaster affects livelihood system of a region and force people to flee. Drought is a slow-onset disaster. Drought is an insidious natural hazard characterized by lower than expected or lowers than normal precipitation that, when a season or longer period extended over is insufficient to meet the demands of human activities and the environment. It occurs in both high and low rainfall area and virtually all climate regimes[40]. According to FAO[41] drought has become more frequent and intense worldwide. IPCC special report on Global warming of 1.5° C[42] also said that there will be an increase in frequency and intensity of drought. Global estimates report that by 2050, around 150-200 million people will be permanently displaced due to droughts, floods and hurricanes[43]

Table no 3: An overview of drought-induced migration in Africa is shown in the following table

SL No.	Area	Relation btw Environmental change (drought)& migration	Migration type	Year	Source of information/Reference
1	Ethiopia	Drought has important consequences for population mobility in rural Ethiopia.	Internal migration	1999,2002-2003, 2005,2008	[44]Gray, C. and Mueller, V., 2012. Drought and population mobility in rural Ethiopia. *World development*, *40*(1), pp.134-145.
2	Ethiopia	One of the worst meteorological droughts for 50 years in 2015.Drought contributed to	Internal migration	2015	[45]Global report on internal displacement monitoring centre,2016

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

		food insecurity, malnutrition and forced people to move out in search of livelihood.280,000 people were displaced internally due to drought			
3	Senegal	During drought, short cycled migration increased.Abou48% families said, members worked as a casual labor elsewhere (Mali, Dakar etc.) during the Drought.	Internal migration	1983, 1984, 1985	[46]Findley, S.E., 1994. Does drought increase migration? A study of migration from rural Mali during the 1983–1985 droughts. *International Migration Review*, *28*(3), pp.539-553.
4	Niger: Niamey, Tillabér	Droughts, soil degradation, deforestation, shrinking of lake Chad .Environmentally induced economic migration	Internal & international migration; return migration	2008	[47]Afifi, T., 2011. Economic or environmental migration? The push factors in Niger. *International Migration*, *49*, pp.e95-e124.
5	Tanzania: Kilimanjaro District	Relationship between rainfall shortage and out-migration	Internal migration; short & long term migration; defined	2013	[48]Afifi, T., Liwenga, E. and Kwezi, L., 2014. Rainfall-induced crop failure, food insecurity and out-migration in Same-Kilimanjaro, Tanzania. *Climate and Development*, *6*(1), pp.53-60.
6	Senegal:	Drought, lack of water,	Internal	2008	[49]Bleibaum, F., 2010. Case

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

	Peanut Basin and River Valley	low soil fertility	migration; short-term & long-term migration		study Senegal: environmental degradation and forced migration. In *Environment, Forced Migration and Social Vulnerability* (pp. 187-196). Springer, Berlin, Heidelberg.
7	northwest Benin, Nigeria	Drought, shifting seasons, deforestation, soil erosion)	International migration; short-term & long-term migration; defined	2013	[50]Dreier, V. and Sow, P., 2015. Bialaba migrants from the northern of Benin to Nigeria, in search of productive land—Insights for living with climate change. *Sustainability*, *7*(3), pp.3175-3203.
8	Ethiopia: Tigray, WelloNorthShewa	Shortage of rain, food insecurity, effect of environmental change and persisting food insecurity on demographic behavior	Internal migration; temporary & permanent migration;	1994-1995	[51]Ezra, M. and Kiros, G.E., 2001. Rural Out-migration in the Drought Prone Areas of Ethiopia: A Multilevel Analysis *International Migration Review*, *35*(3), pp.749-771.
9	Northwest Nigeria	Three drought events (50s, 70s, 80s) occurred in rural northwest Nigeria during the latter half of the twentieth century	Internal migration; family migration; temporary & permanent migration	1988 - 1990	[52]Grolle, J., 2015. Historical case studies of famines and migrations in the West African Sahel and their possible relevance now and in the future. *Population and Environment*, *37*(2), pp.181-206.
10	Burkina Faso	Drought frequency, precipitation, severity of soil degradation, logged cotton yield, percentage of cultivated land area)	Internal migration;	1985	[53]Henry, S., Boyle, P. and Lambin, E.F., 2003. Modelling inter-provincial migration in Burkina Faso, West Africa: the role of

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

					socio-demographic and environmental factors. *Applied Geography*, *23*(2-3), pp.115-136.
11	Tanzania	Average household, a 1 per cent reduction in agricultural income induced by weather shock increases the probability of migration by 13 percentage points on average within the following year	Internal migration; permanent migration	2008/2009-2010/2011	[54]Kubik, Z. and Maurel, M., 2016. Weather shocks, agricultural production and migration: Evidence from Tanzania. *The Journal of Development Studies*, *52*(5), pp.665-680.
12	Ethiopia	104 peasants who had to migrant due to persistent drought, vulnerability to climate change has shown to be a complex issue, including the multiplicity of factors comprising a household environment	Internal migration	1999	[55]Meze-Hausken, E., 2000. Migration caused by climate change: how vulnerable are people inn dryland areas? *Mitigation and Adaptation Strategies for Global Change*, *5*(4), pp.379-406.
13	Mali, Senegal	Study areas face climatic change like reduction of rainfall, drought. Most people rely heavily on agriculture as their main economic activity. They are thus considered as highly vulnerable to decreasing soil fertility and decreasing and highly variable rainfalls that lead to decreasing and unreliable yields	Internal & international migration	2012	[56]Van der Land, V. and Hummel, D., 2013. Vulnerability and the role of education in environmentally induced migration in Mali and Senegal. *Ecology and Society*, *18*(4).

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

14	Horn of Africa, francophone Sub-Sahara Africa	Drought, deforestation, land degradation	International migration;	Not specified	[57]Veronis, L. and McLeman, R., 2014. Environmental influences on African migration to Canada: focus group findings from Ottawa-Gatineau. *Population and environment*, *36*(2), pp.234-251.
15	Algeria, Morocco, Syria, Yemen, Egypt	Migration is a widespread strategy to cope with and adapt to changes in climatic and environmental conditions. Weather shocks increase the likelihood of temporary migration.	Internal & international migration; temporary & permanent migration		[58]Adoho, F. and Wodon, Q., 2014. Do changes in weather patterns and the environment lead to migration? *Climate change and migration: Evidence from the Middle East and North Africa*, pp.145-162.

Migration on the African continent occurs mainly internally within countries as well as sub regionally across borders, with West Africa representing 42 per cent of all regional movements[59]. In 2011, after consecutive years of irregular and failing seasonal rainfall, Somalia experienced its most destructive drought in 50 years[60]. According to IOM s Working paper (Dimensions of crisis on migration in Somalia, 2014)[61] this 2011s drought in addition to country's insecurity, scare resources added to hundreds of thousands to the already war-torn displacement. Mali is another example from Africa where according to IOM (The Mali Migration Crisis at a glance, March, 2013)[62] impact of drought cycle and severe food insecurity increase the migration of rural people to urban areas.2012 Sahel food crisis affect Burkina Faso which is responsible for the 20% loss in the cereal production because of drought and environmental degradation and internal rural to rural migration over short distances played a key role in survival strategies to the drought[63]. These examples represent how environmental change (drought) shapes migration decision by interacting with other drivers. Impact of environmental change is mediated through economic, social, political drivers. A slow-onset environmental change progressively increasing livelihood insecurity and vulnerability might trigger seasonal and circular migration[64].

Apart from Africa, Asia pacific region is also affected by drought. One of the most serious climate change risks to India is the increased frequency, intensity and geographical coverage of drought[65]. Between the periods from 1901 to 2010, about 17% were drought years in India which

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

has severe impacts on agriculture, water resources, food security, economy and social life in the country[66]. According to Karnataka drought vulnerability assessment report 2017 [67] droughts are a regular phenomenon in India. In 1951, the drought affected area was 34 % while in 1972; it affected 42 percent of the area. In 1985 and 2009, the drought affected area was 42.3 percent and 59 percent respectively. Again in 2015, the spread of drought was 39 percent of the area in the country affecting food production in West Bengal, Uttar Pradesh, Madhya Pradesh and acute water shortage in Maharashtra, Andhra Pradesh, Telangana and Karnataka States. Due to drought and acute shortage of drinking water, there is mass migration in search of green patches for the livelihood from the villages. There are several occasions wherein the people in whole village leave their dwellings and migrate to the nearby towns/cities in search of jobs, this, leads to abandoned villages/ghost villages in due course of time

Table no 4: following table provides an overview of drought and migration in Indian context

SL No.	Area	Relation btw Environmental change (drought)& migration	Migration type	Year	Source of information/Reference
1	Bolangir (Orissa)	Out-migration is especially widespread during drought years, when agriculture is incapable of sustaining minimum livelihoods for a large proportion of the population. Migration is particularly widespread during drought years, with approximately 60,000 people having left the district in search of employment during the 2001 drought.	Internal migration	2001-2003	[68]Wandschneider, T. and Mishra, P., 2003. The role of small rural towns in Bolangir District, India: a village-level perspective (NRI report no. 2750).
2	Madhya Pradesh	High levels of outmigration from both drought-prone and forested tribal areas. For example, Deshingkar and Start (2003) found that	Internal migration	Not defined	[69] Deshingkar, P. and Start, D., 2003. Seasonal migration for livelihoods in India: Coping, accumulation and

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

		more than half the households in four out of six study villages in Madhya Pradesh included migrant family members. The proportion was as high as 75 percent in the most remote and hilly village with infertile soils.			exclusion (Vol. 111). London: Overseas Development Institute.
3	Ananthapur, Mahbubnagar district, Andhra Pradesh	During 1977 drought the villagers have adapted to: (i) heavy migration for fodder and water and work. During 1995 drought, they have adapted to: (I) migration only for fodder and water.	Mainly seasonal migration	1977,1995	[70]Household coping/survival strategies in drought-prone regions: A case study of Anantapur District, Andhra Pradesh, India Society for Promotion of Wastelands Development, New Delhi
4	Salem, Dindigul , Dharmapuri,Ramanathapur,Tamil Nadu	There is a close nexus between drought and migration. Greater the intensity of drought, larger the migration of agricultural households to urban areas in search of employment in the non-agricultural activities. Th	Internal migration	1965-66 - 1974-75 - 1982-83, 1987 and 1989 - 1998, 1999 - 2001 and 2002	[71]Sundari, S., 2005. Migration as a livelihood strategy: a gender perspective. *Economic and Political Weekly*, pp.2295-2303.
5	Maharashtra (Marathwada, Nasik, Amravati, Nagpur and upper	Drought mainly affects the crop and livestock production, therefore, about 78.8% of farmers preferred not to sell their crop produce, and instead they stored it to deal with	Internal migration (mainly seasonal)	2011-2016	• [72]Katalakute, G., Wagh, V., Panaskar, D. and Mukate, S., 2016. Impact of drought on environmental,

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

	Bhima catchment area)	anticipated droughts. About 47.9% of farmers stored crop residues to fulfill the fodder demand during the anticipated drought, and 51% of farmers reduced their expenses and saved money. Farmers seek various options such as migration for employment			agricultural and socio-economic status in Maharashtra State, India. *Natural Resources and Conservation*, *4* (3), pp.35-41. • [73]Udmale, P., Ichikawa, Y., Manandhar, S., Ishidaira, H. and Kiem, A.S., 2014. Farmers′ perception of drought impacts, local adaptation and administrative mitigation measures in Maharashtra State, India. *International Journal of Disaster Risk Reduction*, *10*, pp.250-269.
6	Bundelkhand	Bundelkhand region has a long-standing history of droughts and famines. Crop production, livestock rearing and seasonal out-migration provide more than 90% of rural income in Bundelkhand region	Internal migration (mainly seasonal)	2000-10	[74]Gupta, A.K., Nair, S.S., Ghosh, O., Singh, A. and Dey, S., 2014. Bundelkhand drought: retrospective analysis and way ahead. National Institute of Disaster

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

		(Samra, 2008), the effect of recurrent drought on this region is palpably devastating.			Management, New Delhi, 148.
7	Western Rajasthan(Barmer,Bikanir,Churu,Hanumangarh,Jaisalmir)	In 2002 India was hit by a major drought. Western Rajasthan was worst hit. During this period mass out-migration occurred within and outside the state	Internal migration	2001-02	[75]www.cazri.res.in/publications/krishikosh/102.pdf Drought in western rajasthan - central arid zone research institute
8	Karnataka(Raichur,Bidar,Yadgir,Vijayapura,Ballari)	Due to drought and acute shortage of drinking water, income loss due to failure of crops there is mass migration in search of green patches for the livelihood from the villages	Internal migration	2002,2012,2015	[76]KSNDMC (2017) Drought Vulnerability Assessment in Karnataka
9	Telengana	From early 2000s severe drought conditions have led to crop failure mounting debts, chronic unemployment and failure of the NREGA scheme, especially in the districts of Mahbubnagar, Medak, Nalgonda and Adilabad, forcing large-scale exodus of farmers and others.	Internal migration	From 2000s	[77]Deccan chronicle published aug 7, 2015, 6:51 am ist Updated mar 28, 2019, 7:08 am ist wednesday, may 15, 2019 | last update : 04:37 pm ist

During 2002-2012 in India had three major droughts (2002, 2009 and 2012), with the 2012 drought causing 0.5% reduction in India's gross domestic product[78]. Maharashtra, Orissa, Karnataka, Andhra-Pradesh, Rajasthan, Telengana are some of the drought prone States. A majority of the villages in the dry areas stretching across eastern Maharashtra, South and western Orissa, eastern Karnataka, western Andhra Pradesh, and southern Madhya Pradesh have very high rates of out-migration as well[79]. According to Agriculture Department of Orissa, Southern and Western Orissa are drought affected region. Seasonal migration takes place from western

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

part of Orissa mainly because of drought, famines, poverty etc[80].Orissa is affected by drought 19 years between 1961 to 2012.

Dhenkanal, Cuttack, Puri, Balasore, Phulbani, Koraput, Kalahandi, Keonjhar, Ganjam, Mayurbhanj, Sambalpur, Sunderganj, Bolangir are the districts affected by drought according to Agricultural department of Orissa. An estimated 3, 00,000 laborers migrate from drought-prone Bolangir district in western Orissa every year[81]. Maharashtra is another state where drought is one of the major natural disasters. About 40% of the Maharashtra State falls under DPA, having annual average rainfall less than 750 mm[82]. Parts of western Maharashtra and Marathwada are the worst sufferers of the state. Drought occurs once or twice in 5 to 7 years[83]. The people from drought affected areas started migration towards urban areas for employment[84]. Karnataka ranks second, next only to Rajasthan in India, in terms of total geographical area prone to drought. Among its 27 districts, 18 are drought prone. During the years, 2001-02, 2002-03 and 2003-04 it faced consecutive droughts[85].Northern districts such as Bidar, Gulbarga, Bijapur and Raichur are drought affected. Large-scale migration of people in search of employment has been reported in many parts of the state[86]. In West Bengal, Purulia district is drought prone [87],[88]. Purulia district suffers from serious water scarcity due to drought conditions [89].Every summer, many parts of Purulia district suffers from water shortage[90].Majority of the people used to migrate to the nearby districts of Bankura and Burdwan for better opportunities in terms of survival strategies, livelihood etc [91].

These above-mentioned states of India are already drought prone. Climate change increases their frequency, severity and intensity. Out-migration is already taking place from these states. In the coming years their number will increase because these people will not be able to support their livelihood due to the climatic variability. Therefore, we need to acknowledge the role of environmental change behind migration decision until it is too late.

V. NEXUS BETWEEN CLIMATE CHANGE, MIGRATION AND CONFLICT

Are there evidences that link to climate-migration to increased risk of conflicts? Climate change will restrict resource availability in many areas of the world [92].People living in lesser developed countries may be more likely to leave affected areas, which may cause conflict in receiving areas. The Middle East and North Africa, which is the two most water-scarce region of the world, have seen significant increase in the frequency of droughts over the last two decades. In this area, decreased water availability has significant consequences some Arab countries are dropping below levels of absolute scarcity per capita. In these contexts, it is possible that increased water scarcity is more likely to cause conflict than in moister regions[93].Over different years Africa remains top position in the case of displacement as a result of conflict and violence[94].According to the reports of International Displacement Monitoring Centre (2004-18)

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

during the period from 2004-2010 highest displacement took place from Sudan due to conflict. UNEP on 2007 in its report on Sudan -Post conflict environmental Assessment[95]said that there is a very strong relationship between desertification, land degradation and conflict in Dafur, Sudan and desertification and regional climate change are contributing factor to poverty and conflict.

The report further add that Sudan suffers from long and devastating droughts from many decades and decline in precipitation due to regional climate change affect agriculture, food security, pastoralist society and thereby contributing to conflict and displacement. In 2011 Intergovernmental Panel on Climate Change said that some regions including West Africa have experienced more intense and prolonged droughts than middle of 20th Century. In recent years, few African regions have been immune to climate-driven resource pressures. Erratic rainfall has contributed to communal conflict across sub-Saharan Africa [96]. In Eastern Africa in particular, drought and livestock diseases have sparked 'range wars'[97]. In Northwest Africa, one can see the growing nexus between climate and international security. Migrant workers used to trek from Nigeria to Niger, Algeria, and Morocco and according to Center for American Progress report, not only do these migrants face heightened threats of drought, flooding, and coastal erosion as they cross through the Sahel, which is affected by climate change , they also have seen their numbers swell in size. As a result, migrants have increasingly come into violent contact with insurgents in Nigeria and Algeria, a trend that will likely continue without major policy intervention[98]. Syria is another example of conflict induced displacement which accounted for 3.5 million displacements at the end of 2013[99]. Over the past century (from 1900 to 2005), there were six significant droughts in Syria, where the average monthly level of winter precipitation—the major rainfall season—dropped to around one-third of normal. Five of these droughts lasted only one season; the sixth lasted two[100].From 2006-2011, up to 60% of Syria's land experienced "the worst long-term drought and most severe set of crop fail-rues since agricultural civilizations began in the Fertile Crescent many millennia ago.". This situation led to the massive exodus of farmers, herders and agriculturally dependent persons to move from rural to urban area[101]. In the current civil war, some analysts have argued that factors related to drought, including agricultural failure, water shortages, and water mismanagement, have played an important role in contributing to the deterioration of social structures and spurring violence[102].

In case of India which has a history of tension (particularly one that is related to migration) might be susceptible to increased violence due to migration. Drought hit states of India which experience out-migration as well as farmers suicide could be a major concern in near future from the perspective of conflict/violence. Karnataka, Maharashtra, Kerala, Andhra Pradesh and Madhya Pradesh which have seen the highest incidence of farmer suicides also feature among the top five states with the highest percentage of drought prone area[103]. Out-migration is also reported from these states.

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

Current literature about climate change, migration and conflict suggest that climate change and climate-induced migration will not cause conflict independent of other factors like economic, political, social and cultural factors[104],[105]. Climate change alone does not cause conflict however it is acknowledged universally that climate change has the potential to exacerbate or catalyze conflict in association with other factors. The primary challenge of linking climate-migration to conflict is the difficulty in determining the relative importance of climate-migration, among the many other drivers, as a potential factor for conflict[106]. Despite the uncertainty, it is clear from the above evidences that climate change is one of the most significant challenges for mankind which will need to address and the potential impacts of climate variability and change on migration and conflict is an important area of research.

VI. CONCLUSION

In the present review, numerous examples are presented to substantiate the relationship between environmental change and migrations. The above-mentioned countries/regions have experienced environmental change, drought, and flood, etc and displacement as well. The regions which are/were facing environmental change also face a myriad of other social, economic and political problems. Rapid population growth, civil war, poverty etc are also present. Environmental changes affect migration through its influence on a range of economic, social and political drivers which in turn affect migration decision. For example Sudan from where millions of people displaced over the years due to conflict and violence. Drought, desertification, land degradation and regional climate change damage the livelihood condition in Sudan and thereby causing conflict and displacement. In India, drought manifests its impact by affecting crop yield, water scarcity and finally livelihood conditions. In both world and India, it is evident from the above-mentioned examples that people migrate internally due to environmental change. Climate change is making drought severe and in future it will bring about significant changes in migration pattern. So, it is important to recognize “environment” as an important factor behind migration decision along with economic, political and religion factors. United Nations High Commissioner for Refugees (UNHCR) did not acknowledge environment as a reason behind migration. In India, Census do not accept environment as a cause of migration and there is no provision for secondary reasons of migration. The social consequences of climate change especially migration is under-researched. These people need protection. They have to be registered, require international recognition and rehabilitation program me.

ACKNOWLEDGEMENTS

The first author (Tulika Guha) is thankful to UGC, India for providing the Junior Research Fellowship (JRF).

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

REFERENCES

1. Trewartha, G.T., 1969. Geography of population: world patterns.
2. Perruchoud, R. ed., 2004. Glossary on migration. Intl Org for Migration.
3. http://www.internal-displacement.org/global-report/grid2019/
4. https://www.weforum.org/reports/migration-and-its-impact-on-cities. it appeared on 27 Mar 2019 23:16:57 GMT
5. United Nations High Commissioner for Refugees, https://www.unhcr.org/figures-at-a-glance.html
6. http://www.internal-displacement.org/global-report/grid2018/. It appeared on 27 Mar 2019 13:53: 44 GMT
7. Global Humanitarian Forum, 2009. The anatomy of a silent crisis. Global Humanitarian Forum.
8. El-Hinnawi, E. (1985). Environmental Refugees. Nairobi: United Nations Environment Programme
9. http://hrlibrary.umn.edu/instree/refugeehandbook.pdf.
10. https://publications.iom.int/system/files/pdf/meccinfosheet_climatechangeactivities.pdf
11. Emergency Events Database (EM-DAT). 2007. EM-DAT- the OFDA/CRED International Disaster Database. Universite Catholique de Louvain, Brussels Belgium.
12. Thomas, V. and López, R., 2015. Global increase in climate-related disasters. Asian Development Bank Economics Working Paper Series, (466).
13. Hoyois, P., Below, R., Scheuren, J.M. and Guha-Sapir, D., 2007. Annual Disaster Statistical Review 2006: Numbers and Trends. Centre for Research on the Epidemiology of Disasters (CRED).
14. Scheuren, J.M., De Waroux, O., Below, R., Guha-Sapir, D. and Ponserre, S., 2007. Annual disaster statistical review. The numbers and trends.
15. Rodriguez, J., Vos, F., Below, R. and Guha-Sapir, D., 2009. Annual disaster statistical review 2008: The numbers and trends. Centre for Research on the Epidemiology of Disasters (CRED).
16. Vos, F., Rodríguez, J., Below, R. and Guha-Sapir, D., 2010. Annual disaster statistical review 2009: the numbers and trends. Centre for Research on the Epidemiology of Disasters (CRED).
17. Guha-Sapir, D., Vos, F., Below, R. and Ponserre, S., 2011. Annual disaster statistical review 2010. Centre for Research on the Epidemiology of Disasters.
18. https://cred.be/sites/default/files/adsr_2017.pdf
19. https://www.undp.org/content/dam/india/docs/disaster_management_in_india.pdf

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

20. Kreft, S., Eckstein, D., Melchior, I. and Global climate risk index, 2017. Who suffers most from extreme weather events. Global Climate Risk Index, 10.
21. IPCC (2012a) In: Field CB, Barros V, Stocker TF, Qin D, Dokken DJ, Ebi KL, Mastrandrea MD, Mach KJ, Plattner G-K, Allen SK, Tignor M, Midgley PM (eds) Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of working groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, UK/New York, p 582
22. Field, C.B., 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, edited by: Field, CB, Barros, V., Stocker, TF, and Dahe, Q.
23. Thomas, V. and López, R., 2015. Global increase in climate-related disasters. Asian Development Bank Economics Working Paper Series, (466).
24. Solomon, S., Qin, D., Manning, M., Averyt, K. and Marquis, M. eds., 2007. Climate change 2007-the physical science basis: Working group I contribution to the fourth assessment report of the IPCC (Vol. 4). Cambridge university press.
25. Rummukainen, M., 2010. State-of-the-art with regional climate models. Wiley Interdisciplinary Reviews: Climate Change, 1(1), pp.82-96.
26. https://cdkn.org/wp-content/uploads/2014/04/CDKN-IPCC-Whats-in-it-for-South-Asia-AR5.pdf
27. SR15, I.P.C.C., 2018. 1, 5 Degree Global Warming Report.
28. SR15, I.P.C.C., 2018. 1, 5 Degree Global Warming Report.
29. Annual climate Summary (2004 to 2016), National Climate Centre, Indian Meteorological Department, Pune
30. https://unfccc.int/resource/docs/natc/indnc1.pdfappeared on 8th April 2019 12:41 GMT
31. https://www.fmreview.org/sites/fmr/files/FMRdownloads/en/FMRpdfs/FMR31/FMR31.pdfappeared on 21 Mar 2019 19:58:59 GMT
32. www.internal-displacement.org/global-report it appeared on 21 Mar 2019 23:58:02 GMT
33. http://www.internal-displacement.org/countries/india
34. Ginnetti, J. and Lavell, C., 2015. The risk of disaster-induced displacement in South-Asia– technical paper. Internal Displacement Monitoring Centre, Geneva.
35. Council, N.R. and Grid, I.D.M.C., 2016. Global Report on Internal Displacement. Consultado en http://www. internal-displacement. org/publications/2016/2016-global-report-on-internal-displacement-grid-2016.

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

36. GRID, D., 2017. Global Report on Internal Displacement. URL: http://www. internal-displacement. org/global-report/grid2017.
37. http://www.internal-displacement.org/global-report/grid2018/downloads/2018-GRID.pdf
38. http://www.internal-displacement.org/sites/default/files/publications/documents/2019-IDMC-GRID.pdf
39. http://www.internaldisplacement.org/sites/default/files/publications/documents/201710-IDMC- Global-disaster-displacement-risk.pdf
40. Wilhite, D., 2006. Drought monitoring and early warning: Concepts, progress and future challenges. World Meteorological Organization, Geneva, Switzerland. WMO,(1006).
41. http://www.fao.org/land-water/water/drought/en/
42. SR15, I.P.C.C., 2018. 1, 5 Degree Global Warming Report
43. Stern, N. and Stern, N.H., 2007. The economics of climate change: the Stern review. cambridge University press.
44. Gray, C. and Mueller, V., 2012. Drought and population mobility in rural Ethiopia. World development, 40(1), pp.134-145.
45. Council, N.R. and Grid, I.D.M.C., 2016. Global Report on Internal Displacement. Consultado en http://www. internal-displacement. org/publications/2016/2016-global-report-on-internal-displacement-grid-2016.
46. Findley, S.E., 1994. Does drought increase migration? A study of migration from rural Mali during the 1983–1985 droughts. International Migration Review, 28(3), pp.539-553
47. Afifi, T., 2011. Economic or environmental migration? The push factors in Niger. International Migration, 49, pp.e95-e124.
48. Afifi, T., Liwenga, E. and Kwezi, L., 2014. Rainfall-induced crop failure, food insecurity and out-migration in Same-Kilimanjaro, Tanzania. Climate and Development, 6(1), pp.53-60
49. Bleibaum, F., 2010. Case study Senegal: environmental degradation and forced migration. In Environment, Forced Migration and Social Vulnerability (pp. 187-196). Springer, Berlin, Heidelberg
50. Dreier, V. and Sow, P., 2015. Bialaba migrants from the northern of Benin to Nigeria, in search of productive land—Insights for living with climate change. Sustainability, 7(3), pp.3175-3203

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

51. Ezra, M. and Kiros, G.E., 2001. Rural Out-migration in the Drought Prone Areas of Ethiopia: A Multilevel Analysis 1. International Migration Review, 35(3), pp.749-771.
52. Grolle, J., 2015. Historical case studies of famines and migrations in the West African Sahel and their possible relevance now and in the future. Population and Environment, 37(2), pp.181-206.
53. Henry, S., Boyle, P. and Lambin, E.F., 2003. Modelling inter-provincial migration in Burkina Faso, West Africa: the role of socio-demographic and environmental factors. Applied Geography, 23(2-3), pp.115-136
54. Kubik, Z. and Maurel, M., 2016. Weather shocks, agricultural production and migration: Evidence from Tanzania. The Journal of Development Studies, 52(5), pp.665-680.
55. Meze-Hausken, E., 2000. Migration caused by climate change: how vulnerable are people inn dryland areas? Mitigation and Adaptation Strategies for Global Change, 5(4), pp.379-406.
56. Van der Land, V. and Hummel, D., 2013. Vulnerability and the role of education in environmentally induced migration in Mali and Senegal. Ecology and Society, 18(4).
57. Veronis, L. and McLeman, R., 2014. Environmental influences on African migration to Canada: focus group findings from Ottawa-Gatineau. Population and environment, 36(2), pp.234-251.
58. Adoho, F. and Wodon, Q., 2014. Do changes in weather patterns and the environment lead to migration? Climate change and migration: Evidence from the Middle East and North Africa, pp.145-162.
59. Black, R., 2004. Migration and pro-poor policy in Africa.
60. Maxwell, D. and Fitzpatrick, M., 2012. The 2011 Somalia famine: Context, causes, and complications. Global Food Security, 1(1), pp.5-12.
61. https://www.iom.int/files/live/sites/iom/files/Country/docs/Dimensions-of-Crisis-on-Migration-in-Somalia.pdf
62. https://www.iom.int/files/live/sites/iom/files/Country/docs/Mali_Migration_Crisis_2013.pdf
63. Pearson, N. and Niaufre, C., 2013. Desertification and Drought Related Migrations in the Sahel–The Cases of Mali and Burkina Faso. The State of Environmental Migration, 3, pp.79-98.
64. Miletto, M., Caretta, M.A., Burchi, F.M. and Zanlucchi, G., 2017. Migration and its interdependencies with water scarcity, gender and youth employment. UNESCO Publishing

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

65. Panda, A., 2010. Climate refugees: implications for India. Economic and Political Weekly, pp.76-79
66. Kumar, K.N., Rajeevan, M., Pai, D.S., Srivastava, A.K. and Preethi, B., 2013. On the observed variability of monsoon droughts over India. Weather and Climate Extremes, 1, pp.42-50.
67. https://www.ksndmc.org/PDF/DVI_REPORT_KARNATAKA_2017.pdf
68. Wandschneider, T. and Mishra, P., 2003. The role of small rural towns in Bolangir District, India: a village-level perspective (NRI report no. 2750).
69. Deshingkar, P. and Start, D., 2003. Seasonal migration for livelihoods in India: Coping, accumulation and exclusion (Vol. 111). London: Overseas Development Institute
70. Household coping/survival strategies in drought-prone regions: A case study of Anantapur District, Andhra Pradesh, India Society for Promotion of Wastelands Development, New Delhi
71. Sundari, S., 2005. Migration as a livelihood strategy: a gender perspective. Economic and Political Weekly, pp.2295-2303
72. Katalakute, G., Wagh, V., Panaskar, D. and Mukate, S., 2016. Impact of drought on environmental, agricultural and socio-economic status in Maharashtra State, India. Natural Resources and Conservation, 4(3), pp.35-41
73. Udmale, P.D., Ichikawa, Y., Kiem, A.S. and Panda, S.N., 2014. Drought impacts and adaptation strategies for agriculture and rural livelihood in the Maharashtra State of India. Open Agric. J, 8(1), pp.41-47.
74. Gupta, A.K., Nair, S.S., Ghosh, O., Singh, A. and Dey, S., 2014. Bundelkhand drought: retrospective analysis and way ahead. National Institute of Disaster Management, New Delhi, 148.
75. www.cazri.res.in/publications/KrishiKosh/102.pdfDrought In Western Rajasthan - Central Arid Zone Research Institute
76. https://www.ksndmc.org/PDF/DVI_REPORT_KARNATAKA_2017.pdf
77. DECCAN CHRONICLE Published Aug 7, 2015, 6:51 am ISTUpdated Mar 28, 2019, 7:08 am ISTWednesday, May 15, 2019 | Last Update: 04:37 PM IST
78. Udmale, P.D., Ichikawa, Y., Kiem, A.S. and Panda, S.N., 2014. Drought impacts and adaptation strategies for agriculture and rural livelihood in the Maharashtra State of India. Open Agric. J, 8(1), pp.41-47.
79. Deshingkar, P., 2008. Circular internal migration and development in India. Migration and development within and across borders: research and policy perspectives on internal and international migration. Geneva: International Organization for Migration/Social Science Research Council, pp.161-87.

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

80. http://www.researchpublish.com/download.php?file=Flexibility%20of%20Rural%20Household-3021.pdf&act=book
81. Deshingkar, P., 2008. Circular internal migration and development in India. Migration and development within and across borders: research and policy perspectives on internal and international migration. Geneva: International Organization for Migration/Social Science Research Council, pp.161-87.
82. Udmale, P.D., Ichikawa, Y., Kiem, A.S. and Panda, S.N., 2014. Drought impacts and adaptation strategies for agriculture and rural livelihood in the Maharashtra State of India. Open Agric. J, 8(1), pp.41-47.
83. Kale, S. and Gond, J.K., 2016. Drought in Marathwada: Water Scarcity Worsening Situation in Marathwada. International Journal of Innovative Research in Science, Engineering and Technology, 5(5).
84. Katalakute, G., Wagh, V., Panaskar, D. and Mukate, S., 2016. Impact of drought on environmental, agricultural and socio-economic status in Maharashtra State, India. Natural Resources and Conservation, 4(3), pp.35-41.
85. Biradar, N. and Sridhar, K., 2009. Consequences of 2003 drought in Karnataka with particular reference to livestock and fodder. Journal of Human Ecology, 26(2), pp.123-130
86. Rajendran, S., 2001. Drought in Karnataka: Need for Long-Term Perspective. Economic and Political Weekly, pp.3423-3426
87. http://censusindia.gov.in/2011census/dchb/DCHB_A/19/1914_PART_A_DCHB_PURULIYA.pdf
88. UNDP, 2012, District Human Development Report, Puruliya Published by United Nations Development Programme, Newyork, USA
89. Halder, S and Saha, P (2015) "Identifying the Causes of water Scarcity in Purulia, WestBengal, India-A Geographical Perspective, Journal of Environmental Science, Toxicology and Food Technology, Volume 9, Aug, 2015
90. State action plan on climate change (2012). Available at (http://moef.nic.in/ccd-sapcc)
91. UNDP, 2012, District Human Development Report, Puruliya Published by United Nations Development Programme, Newyork, USA
92. Challinor, A.J., Watson, J., Lobell, D.B., Howden, S.M., Smith, D.R. and Chhetri, N., 2014. A meta-analysis of crop yield under climate change and adaptation. Nature Climate Change, 4(4), p.287.
93. Greenwood, S., 2014. Water insecurity, climate change and governance in the Arab world. Middle East Policy, 21(2), pp.140-156.
94. http://www.internal-displacement.org/global-report

ISSN: 2455-8834

Volume: 04, Issue: 05 "May 2019"

95. https://postconflict.unep.ch/publications/UNEP_Sudan.pdf
96. Fjelde, Hanne & von Uexkull, Nina. (2012). Climate triggers: Rainfall anomalies, vulnerability and communal conflict in Sub-Saharan Africa. Political Geography. 31. 444–453. 10.1016/j.polgeo.2012.08.004
97. Butler, C.K. and Gates, S., 2012. African range wars: Climate, conflict, and property rights. Journal of Peace Research, 49(1), pp.23-34.
98. Werz, M. and Conley, L., 2012. Climate change migration and conflict in Northwest Africa: rising dangers and policy options across the Arc of tension. Center for American Progress, http://www.American progress.org, 4
99. http://www.internal-displacement.org/sites/default/files/inline-files/201405-global-overview-2014-en.pdf
100. Mohtadi, S., 2012. Climate change and the Syrian uprising. Bulletin of the Atomic Scientists, 16.
101. Femia, F. and Werrell, C., 2012. Syria: Climate change, drought and social unrest. Center for Climate and Security, February, 29, p.2012.
102. Gleick, P.H., 2014. Water, drought, climate change, and conflict in Syria. Weather, Climate, and Society, 6(3), pp.331-340
103. Parida, Y., Dash, D.P., Bhardwaj, P. and Chowdhury, J.R., 2018. Effects of drought and flood on farmer suicides in Indian states: an empirical analysis. Economics of disasters and climate change, 2(2), pp.159-180.
104. Raleigh, Clionadh, and HenrikUrdal. "Climate change, environmental degradation and armed conflict." Political geography 26, no. 6 (2007): 674-694.
105. Salehyan, I., 2008. From climate change to conflict? No consensus yet. Journal of Peace Research, 45(3), pp.315-326
106. Burrows, K. and Kinney, P., 2016. Exploring the climate change, migration and conflict nexus. International journal of environmental research and public health, 13(4), p.443

