Rainfall Cycles, Livelihood and Migration in India

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Abstract

Rainfall is an important component of climate and it has shown considerable variation over time and space in India. About 70 per cent of the population in India lives in rural areas and is dependent on agriculture or related activities, which in turn are largely dependent on timely and adequate rainfall. This paper using long term data (1871-2008) first examines the trends and cycles in rainfall in India and then looks into whether the rural out-migration in recent years are related to the rainfall deficiency and resultant loss of livelihoods. The paper shows that (a) at all-India level the temporal cycle of wet and dry periods is of about 30 years but some meteorological subdivisions seem to follow 60 years cycle, (b) central India has shown considerable deficit in rainfall in recent decades while some coastal areas and north-west India are getting wetter, (c) the deficiency in rainfall seems to be acting as push factor for migration of people from central India and Gangetic plain.

Keywords: *India, Rainfall Cycles, Livelihood, Migration*.

1. Introduction

A considerable research and debate in the last few years have taken place on possibility of climate change due to changing atmospheric composition and vegetational cover. These literature and debates also point out that climate refugees may grow enormously in coming years mainly due to variation in rainfall. A large number of scientific researches led by Inter-Governmental Panel on Climate Change (IPCC) now almost have created a universal conviction with regard to possibility of climate change and certainty that temperature of the earth will rise to a few degrees in the next 50 years or so causing a significant change in global climate and weather. The tropical and sub-tropical countries are specifically predicted to be more affected from climate change because of their lower level of economic development (so lower capacities of adaptation and mitigation) and dependence of large share of population in these countries on primary economic activities (IPCC, 2007; UNEP, 2011; Raghunandan, 2011; Bidwai, 2011 and Indian Meteorological Department, 2011). It is projected that droughts will rise throughout 21st century in tropical regions (Kruger, 2006 and Pal and Al-Tabbaa, 2009). There is evidence that in many countries in tropical climate the rainfall is declining, *e.g.* south-eastern Australia (Murphy and Timbal, 2008). It is also predicted that the "changes in local regions can be far more dynamic than changes in global averages" (Pal and Al-Tabbaa, 2009). Fisk (1997) argues that Indian agriculture will be impacted very high because it is largely rain-fed and as such loss of livelihood sources may lead to outmigration of people from the affected areas. The rainfall variations may also severally impact industrial activity like power generation due to low availability of water in rivers/reservoirs, having cascading effects on other sectors. Urban centres are also likely to be adversely affected due to lack of water (Shaban and Sattar, 2011). As the different regions of the country are likely to get impacted differently with regard to rainfall, the degree and nature of adaption and mitigation strategies will also be needed to be varied. In this context, the present study attempts (a) to examine rainfall behaviours (the annual, seasonal and monthly) in India over the 30 meteorological subdivisions during 1871-2008 to locate the regional and temporal trends in increase/decrease of rainfall, if any, and (b) to understand whether there is any impact of the declining rainfall in recent years on migration of people. The paper is divided into 6 broad sections. Section 2 describes the data and statistical methods employed for the analysis. The trends at all-India level and in sub-divisional annual rainfalls are examined in Section 3, while Section 4 analyses the epochal rainfall behaviours over India and at sub-divisional level. Section 5 discusses the out-migration of people from the rainfall scarcity regions of the country due to loss of livelihood. The last section concludes the study.