

# Climate Change, Endangered Environment and Vulnerable Aboriginals of India – A Critical Study

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**ABSTRACT:** The severe effects of unprecedented climate change are justifiably considered a serious threat to human civilization in general and tribal-rural or aboriginal population in particular. The crisis has been identified globally but its consistently negative effects on indigenous people of the developing countries are not properly measured. In India such effects are projected to impact the millions of lives in folk-tribal heartland. It is historically proved that various effects of climate change such as sea level rise, recurrent floods, draughts, evaporation, increased cyclonic activities like tsunami, rising temperature have badly affected the downtrodden backward people like ‘adivasis’ (Indian tribal) and their tradition-bound livelihood in this subcontinent. Due to changed weather pattern agricultural production has been rapidly declined in the last few decades in India. The present study needs to state that if climate change occurs in such way, India will lose land especially in the coastline and the rural economy will be affected drastically. In fact, climate change is a scary prospect especially for these rural populations whose culture is predominantly subsistence-based and non-urbanized in basic nature. The paper also tries to focus on the age-old indigenous awareness of ills of global warming and ongoing climatic change. The forested tribes have raised again and again their voices against the abrupt tree-falling and the timber merchant-contractors-politicians nexus that lies behind it. Growing social awareness of climate change and balanced sustainable development can minimize the vulnerability of these marginal populations.

**KEYWORDS:** climate change, damage to environment, indian aboriginal, livelihood, vulnerability

## 1. Introduction

Our blue planet and its environment are explicitly endangered in present times, and it is happening with rapidity due to drastic climate change. The climate change as a phenomenon is being experienced by people all over the world in many forms like rising temperature or global warming, extreme climate events, changes in rainfall pattern and increase of drought like situations. It poses new challenges to natural resource management and livelihood of common people. It is rightly argued that since the birth of the Industrial Revolution, humankind has become a carbon-producing, greenhouse gas-making machine that is annihilating our earth’s atmosphere and destroying wildlife habitat at an unbelievable rate. The hard truth is ‘The unimpeded growth of greenhouse gas emissions is raising the earth’s temperature. The consequences include melting glaciers, more precipitation, more and more extreme weather events, and shifting seasons. The accelerating pace of climate change, combined with global population and income growth, threatens food security everywhere’ (Nelson et al. 2009). No doubt, it is a global crisis but at the same time, the effects of climate change on the aboriginals of the countries like India are extremely vibrant. The subsistence-based and non-urbanized rural tribal communities of India are considered the most vulnerable to the effects of climate change and changes in environment in our times. Persistent changes in the weather have resulted in the overall decrease in the quantity of available water in all water sources of land, habited by the rural and agrarian folk-tribal people of India. Rising temperature in increased level has led to a shift in forest diversity proved fatal for livelihood of the forested tribes of India. The present study attempts to reveal that tribal heartland mostly forest and hilly regions in India whose economy is completely dependent on natural resources have transformed into more fragile, complex and vulnerable to global climate changes. Indeed, India is the second most populous country in the world with population of nearly 130 crore people. Keeping pace with the growing population rapid industrialization and urbanization in this country, climate change could put additional pressures on its overall ecology, environment and socio-economic systems. India has justified reasons to be concerned about the climate change (Dhani 2010).

### **1.1. Objectives**

The principal aim of this proposed study is to identify and assess the multiplied impacts of climate change upon the aboriginal population living mainly in forest and hilly areas, scattered in different states of India. To assess especially the climate change impact on livelihood and changed socio-economic status of the tribal peoples. To study the social, economic and cultural vulnerabilities in this respect of those marginalized tribal societies of India. Besides, to unearth the truth that the impacts of this ensuing climate change even among the aboriginal are not gender neutral. Lastly, in this study attempts have been made to identify the traditional knowledge to face the climatic variability such as global warming and to promote the age old concept of sustainable development.

### **1.2. Methodology**

The random physical survey in the tribal core areas of this subcontinent was done. Primary data were collected in different times through participation in the community programs and interviews with individuals and tribal groups. Trend analysis was done by collecting secondary data on various subjects such as temperature, rainfall, flood and drought, crops production and animal husbandry from several governmental and also NGO levels. Secondary data had been accumulated mostly from *panchyaets* (village assemblies) and District Agriculture, Irrigation and Statistics Departments. Moreover, Focus Group Discussions (FGDs) were conducted with tribal-village folks to determine visible impacts of heavy and low rainfall on agriculture, livestock and overall livelihoods in the regions. These were conducted on in different groups based on gender, socio-economic status, and primary occupation. Apart from survey and interaction with the indigenous peoples, studying various literatures helped a lot in collection of empirical data.

## **2. Climate Change and Indigenous People of India: An Overview**

As a consequence of ongoing climate change, the climate of India in general has become increasingly volatile over last few decades. This dangerous trend is expected to continue. Extreme weather events like flood and drought indicate climate change which used to affect badly the indigenous rural people of India. It is argued empirically that India will be among the worst hit countries that may face calamities like floods, and heat waves and reduced GDP (Sharma 2018). Climate change and its ways of affecting the present world is a burning issue, no doubt. But rarely does its impact on minorities and indigenous groups get a mention, even though they are among the worst affected (Baird 2008). Indeed, ‘The close relationship of some indigenous peoples and minorities with their natural environments makes them especially sensitive to the effects of global warming. In some cases, people’s way of life and even their way of existence are being threatened by climate change’ (Baird 2008). It is equally applicable for India also. Aboriginal in India who relies more heavily upon natural resources for food, medicine, travel and utility in their daily lives are affected badly by ongoing climate change (Mc Lean 2009). Consequently, they are now facing cultural, health and food security challenges and are in need of finding solutions to adapt (Downing & Cuerrier 2011).

Unquestionably, the existing problems of poor indigenous farming peoples in India, if not addressed in time, will become more acute due to global warming induced climate change and growing environmental hazards. Saxena observes few vital effects of climate change on both tribal and non-tribal populations in India such as growing rise of sea level and further displacement of peoples, ingress of saline water and food insecurity, reduced fresh water supplies, spread of water-related diseases and so on (Saxena 2009, 39-40). In fact, the most vulnerable to climate change are the poor indigenous peoples of India and unfortunately their assets and livelihoods are mostly tied to climate-sensitive factors of production. It is assumed that globalization and climate change are two interrelated phenomena that have eroded indigenous communities’ forest rights and traditional forms of livelihoods.

### **2.1. Aboriginal or Tribal people of India: in Nutshell**

Aboriginal or indigenous people in Indian subcontinent are generally called tribal or ‘*Adivasi*’ (implying original inhabitants of the land) and India has the second largest concentration of tribal population, after

that of the African continent. There are about 360 tribal groups or communities speaking more than 100 languages and dialects in India. Tribal population of the country, according to 2011 census, was 1,210,193,422 and constituted 8.6% to the total Indian population (Census Report of India 2011). The areas comprising a large number of states or provinces like Andhra Pradesh, Chattisgarh, Orissa, Jharkhand, Madhya Pradesh, Rajasthan, Uttarakhand, Himachal Pradesh, West Bengal and North-East regions habited by the tribal people (STs) in India are known as ‘Scheduled Areas’. Those tribal people are living mainly in forest and mountainous regions, within the close proximity of nature. Thus, most of those *Adivasis* depend on forests and forest resources for their livelihood. Tribal have been facing so many socio-economic and psychological problems since historical times. Now there has been an addition such as climatic and environmental changes which expedited their hardship immensely. These primitive tribal communities of India have virtually reached a state of total collapse, and their sufferings have been enhanced due to changes in climate and ecology. Gradual but steady changes in natural resource base due to global warming will affect lives and livelihood of these *Adivasis* permanently.

## ***2.2. Impact of Climate Change on Tribal womenfolk: Gender Discrimination***

These aboriginal people have fewer resources to assist them adapt to climate change and who usually depend more directly on local ecosystem than their wealthier neighbors do. However, the interesting point is womenfolk among the tribal peoples even in India used to suffer most in the backdrop of climate change induced natural disasters. Minj in respect of tribal societies of Jharkhand, India observed, ‘If climate change has a huge impact on tribal community as a whole, then women are the most disproportionately affected the change. Gender discrimination combined with current marginalized situations increase the probabilities of women casualties and victims during disaster and emergency situations’ (Minj 2013, 39). Women usually risk their lives because of their tendency to stay behind to rescue their children and the elders. In tribal societies also, food securities may force womenfolk to eat last and eat least even if they are pregnant or nursing mother making them susceptible to illness and diseases (Tebtebba Foundation 2008).

Brundtland commented on this few years ago: ‘Poor people are more vulnerable to climate change due to their limited adaptive capacities to a changing environment. Among them, the rural poor, rural women and girls are the ones most immediately affected. Climate change impacts are not gender neutral (Brundtland 2007). In fact, climate change and natural disasters such as floods, droughts, cyclones and storms affect the aboriginal women differently, and more severely. Climate change induced large-scale migration from inundated areas is expected, and migration again leads to extra hardships for women among downtrodden ethnic communities.

## **3. Climate Change, experienced by the Aboriginal in India: Vulnerable Life and Livelihood**

Climate Vulnerability Index (CVI), calculated from social, economic, agriculture, water resources, forest and climate indices, suggest that millions of aboriginal-tribal people in India are threatened by climate change and changing nature of the environment. It is rightly observed that the close relationship of some indigenous peoples and minorities with their natural environments makes them especially sensitive to the effects of global warming. In some cases, peoples’ ways of life and even their very existence are being threatened by climate change (Baird 2008, 341).

### ***3.1. The Himalayan Tribes in India and their Vulnerability***

So far India’s hilly tribes or tribal folks living particularly in the Himalayas Mountain regions are concerned; the situation produced by the climate change is graver as well as alarming. Researches show that ‘In addition to the already existing threats and pressures on mountain ecosystems, climate change can be additional burden to bear by the mountain ecosystems, species and peoples. Mountain people have lived with and survived great hazards for thousands of years, but the current rate of climate change is very rapid which adds to the socio-economic pressures. Mountain regions are seeing the greatest impacts on livelihoods and ecosystems with reduced ice and snow cover affecting biodiversity and water resources’ (Dhani 2010, 34). The Himalayan tribes are witnessing with fear in last fifty years the effects of global warming: retreat of glaciers, abrupt melting snow, advancement in leafing time in trees and plants, delay in autumnal leaf shedding, upward movement of wood species, and disappearing of several flora and fauna in

mountain. Stretching from east to west are, covering 3000 km, is the massive Himalayan mountain chain which represent one of the largest wilderness areas of the planet. The evolution of monsoon rainfall pattern of Asia is attributed to the rise of the Himalayan Mountain range. The uncontrolled global warming might severely affect the rivers that flow from the Himalaya through the Gangetic Plains, as well as the climate regime of the entire region (Dhani 2010, 34).

However, the flowering time, fruiting time and new leaf formation time in this hilly regions has shifted from February-April to December-February are clear examples of climate change. These new phenomena have bewildered the mountainous ethnic peoples of India whose livelihood predominantly depended on plantation and vegetation. Patwal (2010) in his study on Himalayan villages has shown that how the tribal-folks expressed their valued observation relating to ongoing changes in climate. There were rare snowfalls in recent years in their locality which earlier used to be a regular annual feature. They observed that there were huge apple and orange trees in the villages, but now almost they are nowhere to be seen. Though the villagers tried to re-plant them the tree could not survive due to higher temperatures (Patwal 2010). Patwal (2010) further argues that rapid melting of Himalayan glaciers or decrease in snow cover has affected the overall availability of water for drinking, agriculture, hydropower and other purposes. Shift in forest vegetation, biodiversity and cover will have positive or negative impact on the livelihood of local communities.

### ***3.2 Experiences of Sufferings of the Indian Forest Tribes***

Fourth Assessment Report of Intergovernmental Panel on Climate Change (IPCC) after a prolonged debate in 2007 finally accepted that communities who live in marginal lands and whose livelihoods are highly dependent on natural resources are among the most vulnerable to the climate change (Fourth Assessment Report of IPCC 2007). Undoubtedly, forest is the basic supporting system of these tribes. Their economy is agro-forest based which substituted with livestock and skilled labor. Macchi observes in this context that many indigenous and traditional peoples who have been pushed to the least fertile and most fragile lands as a consequence of historical, social, political and economic exclusion are among those who are at greatest risk (Macchi 2012). In this complex perspective, aboriginal people such as innumerable forest tribes living in different regions of India are considered the worst victims of the climate change. In his research of nearly 32 tribal communities of Jharkhand, India Minj comments explicitly, ‘Vulnerabilities of climate change in Jharkhand can effect health, education, family, gender, social conflicts, access to political power, income generating activities, migration, dignified access to food and employment’ (Minj 2013, 40). Tribal communities of these regions of India are often highly dependent on local natural resources such as forests, hence are far more vulnerable to the impacts of climate change than urbanized parts of the country (Bhattacharya & Prasad 2009). Sushant argues that climate change can affect forests by causing shifts in vegetation types and altering the frequency, intensity, duration, and timing of fire, drought, insect and pathogen outbreaks. Changes in the climate and atmospheric carbon dioxide concentration also affect forest structures and species composition, as these conditions determine the ecological niches within which different organisms can thrive and the amount of primary productivity that can be sustained by the ecosystem (Sushant 2013, 339).

About 100 million people mostly tribal in ethnicity living around forests in India derive their livelihoods from the collection and marketing of non-timber forest products (NTFPs) (Saxena 2003). Changes in forestry due to change in climate could have profound implications for the traditional livelihoods of these aboriginal population. Again, most of the tribal in India are victims of acute poverty and are living in worst living conditions (Sharma & Dwivedi 2007). In India, seventy-five tribes such as *Gond* and *Baiga* (Sushant 2013, 341), categorized as Primitive Tribal Groups (PTGs) generally known as forest-dwellers are suffering most on account of severe changes in climate.

## **4. Indigenous Knowledge and Perception of Environment and Sustainable Development in Aboriginal Culture**

*“A sustainable society meets the needs of the present without sacrificing the ability of future generations to meet their own needs.”*

—The World Commission on Environment and Development (Davis 2007)

Survival and existence of human beings primarily depends on environment in which they dwell. Development of mankind on the earth is profoundly connected to the environment and nature. Hence, environment and development are interlinked and interdependent. In other words, ‘The “environment” defined as those whole outer physical and biological systems in which man and other organisms live as a whole, albeit a complicated one with many interacting components. The wise management of that environment depends upon an understanding of those components: of its rock, soil, minerals and waters, of its present and potential vegetation, of its animal life and potential for livestock husbandry and of its climate’ (Subramanyam & Bhadrudu 2013). On the other hand, sustainable development has many definitions. ‘Sustainable development is a process of social and economic wellbeing. In order to meet this end, we must ensure that the demand in the environment does not exceed its carrying capacity for the present as well as for future generations’ (Subramanyam & Bhadrudu 2013). It demands a change of attitude towards nature. Nature is not just natural resources for human consumption (Subramanyam & Bhadrudu 2013). In this new perception development process should not disturb the ecological balance and environmental purity as well as equality. Interestingly, aboriginal people all over the world do possess such basic knowledge since earliest times.

#### ***4.1 Global Warming in Indian Tribal Mythology and Folklore***

In India aboriginal people through the ages preserved their own indigenous knowledge to understand the changes in climate and phenomenon like global warming. Sarangi observes, ‘Traditional *Adivasi* food systems tie together ecological realities, *Adivasi* identity, indigenous knowledge, social meanings, health, nutrition, and economics’ (Sarangi 2019). It is also argued that production practices are grounded in ecological principles like sustaining soil fertility, sustaining biodiversity, and conserving energy through practicing poly-cultural farming, with numerous crops growing in tandem (Sarangi 2019).

Primitive tribes of this subcontinent are well aware of the global warming over the ages. Several myths are current in tribal folklore demonstrate that the earlier tribal peoples knew this environmental phenomenon very well. Indeed, climate change in general and global warming in particular is not recent phenomena. It is argued that our planet has passed through several warming phases as proved by geological evidences. Times of glaciations on the earth have followed by warm intervals and the duration of years both cold and warm intervals has varied by several orders and magnitude. Priyadarshi adds a new dimension and comments, ‘Other than scientific evidences some of the Indian Tribes of Jharkhand State indicate in their folk stories warming as a major factor of disaster in ancient times...They expressed global warming in the form of Fire Rain, which God showered from Heaven to destroy the evil people’ (Priyadarshi 2007). Mythologies and folk stories of the *Munda*, *Asura*, *Santhal* and *Ho* tribes of Eastern India reveal such stories of global warming. The essence of these stories tells us that *Sing Bonga*, the Sun and Supreme God of the aforesaid clans once became so furious against the mankind, and showered down on the earth below a terrible rain of fire to destroy them. Here rain of the fire can be interpreted as scorching heat (during the phase of global warming) at that time which affected human civilization (Priyadarshi 2007).

#### ***4.2 Tribal Knowledge of Ecology, Environment and Sustainable Development***

Tribal peoples of this ancient land have their sufficient age old knowledge to maintain eco-friendly as well as symbiotic relationship with mainly the forest environment in which they inhabits centuries together. But presently outside influences are the major threats to the natural forest environment inside India. Large scale of forest degradation is taking place due to ‘commercialization of forests’ since colonial regime in India (Priyadarshi 2007). However, the tribes in India have a lot of empirical knowledge on the basis of their experiences while dealing with the forest and its resources as well as entire environment. It is argued emphatically that ‘The traditional wisdom is based on the intrinsic realization that man and nature form a part of an indivisible whole, and therefore should live in partnership with each other. This eco-centric view of tribal communities is widely reflected in their attitudes towards plants, animals, land and water. The whole body of knowledge centered in the economic value of plant and animal species, is part of ethno-biology, and has potential value for the forest dwellers of this country (Subramanyam & Bhadrudu 2013).

One can hardly ignore that indigenous knowledge of the aboriginals also play a pivotal role in conservation of natural resources such as forest, land, water, minerals etc. the aboriginals have traditional knowledge of the flora and fauna, to which they interact in everyday life to meet their basic prime need of food. In general, the *Adivasi* people of India rarely kill the animals, bird or cut a tree or plant with which they claim totemic affiliation (Subramanyam & Bhadrudu 2013). Those people draw their sustenance largely from the forests which provide them with food, timber, medicinal plants and herbs, materials for construction of houses etc. Moreover, ‘Their belief systems, social, economic and ritual activities are intricately interwoven around forest and hills. They have coexisted since time immemorial. The tribals hold this symbiotic relationship in great esteem and they regard various species of forest as their kith and kin (Subramanyam & Bhadrudu 2013).

In the above wider perspective, it may be assumed that the so-called modern concept of sustainable development is not at all new or unknown to the indigenous people in India. In brief, a strong environmental ethics is embedded in India’s aboriginal life and culture. These people believe from their hearts over the centuries that proper protection, conservation and regeneration of natural resources are the best solution to achieve the sustainable environment which can diminish or reduce the impact and effects of the ongoing climate change.

## 5. Conclusions

The present study hardly claims to encompass the whole human-environment interaction consisting of so many fundamental and huge aspects in the background of multi-faced climate change. But simultaneously, this study has been successful in highlighting and analyzing the major issues and perceptions related to climate change and changes in environment. Besides, the most and prime concern of this topic was to focus light on a gray area, i.e. the growing vulnerability of the aboriginal-tribal peoples of contemporary India in the context of climate change. The study has reviewed the status of indigenous peoples’ perception and concern of climate change along with their unique adaptation strategies for survival. Indigenous people not only in this subcontinent but in everywhere in the world have long been exposed to many types of environmental changes and have developed strategies for coping with these phenomena. (Minj 2013, 35) They have valued knowledge about adapting to climate change, but the magnitude of future hazards may exceed their adaptive capacity, especially given their current conditions of marginalization (Macchi 2012). It is rightly argued that ‘Science and technology are useful but, it is traditional knowledge that has kept these people in a flux of adaptation’ (Downing & Cuerrier 2011, 67).

In current times, ongoing climate change has made the environment fatally endangered in one hand and pushed the aboriginal peoples towards vulnerability on the other. Researches carried out by the United Nations High Commissioner for Refugees, Geneva has substantiated the fact that environmental change and climate change is one of a larger set of factors that affect human migration and displacement worldwide (Warner 2011). Moreover, social interaction between different tribal groups and communities can have positive effects to face this crisis. Groups hit by adverse conditions can acquire resources from other groups not experiencing the same problems (Salick & Byg 2007). Stronger democratic institutions, open and democratic platform are highly needed for supporting community resilience to the livelihood impacts of climate change (Sushant. 2013, 353). As concluding statement it may be stated that for understanding the complex nature and its effects of climate change on the aboriginal population more comprehensive studies covering both social sciences and natural sciences together (Minj 2013, 37) are required. Study of climate change and its coherent volatile impacts upon the life and culture of indigenous peoples needed a holistic approach for an interdisciplinary understanding.

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