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Impact of Climate Change on Gujjar and Bakarwal Communities of Jammu and Kashmir

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Abstract: Climate change is a global issue that affects everyone. It has been estimated that the developing nations will suffer the most from the effects of climate change. The underdeveloped nations will most likely experience the negative effects of climate variability. They are more susceptible to climate change due to their low adaptive capacity. This study has found the impact of climate change on the Gujjar and Bajarwals of Jammu and Kashmir. The present study is based on the primary data collected from 507 respondents of Thanala village of Bhaderah tehsil of Doda district of Jammu and Kashmir. The data was collected using survey questionnaire and was analysed through various statistical tools to draw results. The pastoralist community is one of the many communities that were most vulnerable to the effects of climate change. Modernization was identified as the major cause behind climatic changes. Climate change and the livelihood patterns of pastoralists are interlinked with each other. This relationship is not only linked to the traditional adaptation strategies but also to the level of land-use change.

Keywords: *Bakarwal, Climate change, Gujjar, Jammu and Kashmir, Modernization*

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1. Introduction

Climate change refers to any modification in climate over an extended period due to natural variability and anthropogenic factors. The United Nations Framework Convention on Climate in its Article 1 defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods' (UNFCCC, 1992). According to the Intergovernmental Panel on Climate Change (IPCC), "Climate change is a change in the state of the climate that can be identified by changes in the mean temperature and the variability of its properties, and that persists for an extended period, typically decades or longer" (IPCC, 2007).

Climate change is a global phenomenon affecting all of us but unequally. It may result in worsening the living conditions in many areas of the world. There are estimates that the developing and underdeveloped countries will suffer the most from climate change. The developing countries have done the least to cause climate change but will bear the most negative consequences. These countries are more open to climate variability due to the multiple stresses and low adaptive capacity. These countries are already struggling with many social and environmental issues. The losses occurring due to climate change are enormous and require ample resources (IFPRI, 2010)

During the twentieth century, climate change had caused a global average surface temperature increase of about 0.6 0C (IPCC, 2001). The current temperature is predicted to increase further –between 1.4 and 5.8 0C by 2100–depending mainly on the level of fossil-fuel combustion. Most of the observed increase in temperature is because of the increase in anthropogenic greenhouse gas concentrations. The implicit and explicit consequences of climate change will have effects on the different dimensions of human life and biodiversity. These impacts include melting of glaciers, floods, frequent, prolonged droughts, reduction in water supply, and the decline in

crop yields to food insecurity. It also results in the increase in pests and diseases for livestock, wildlife, and crops, increases in invasive species, an increase of vector-borne diseases including malaria and water-borne diseases including cholera and typhoid, declining levels of freshwater sources, rising sea levels leading to the displacement of people, etc.

As the surface temperature increases, it is expected that there will be an increase in severe rainfall events across the South Asian region. The prediction states that tropical cyclones will intensify by 10 to 20% in response to a 2 to 40 rise in temperatures (Knutson, Tuleya, Shen, and Ginis, 2001). The Intergovernmental Panel on Climate Change (IPCC, 2007) also confirms that these effects of climate change have already been observed. The scientific findings also indicate that precautionary and prompt action is needed. According to United Nations Human Development Report (UNHDR, 2007), the effect of the increase in temperatures across the earth's surface will lead to changes in average temperatures, rainfall patterns, and monsoon timings. Actually, the climate has already begun to change, and if we do not act fast, it has the potential to undermine human development in India and across the world.

According to Anderson & Mowjee (2008), the climate of drylands is characterised by limited, unpredictable, and short rainy seasons, which are often of limited availability for human use. There is no doubt that most of the people who will feel the harmful effects of climate change will be poor and marginalised women, men, and children (Krikbride and Grahn 2008).

The himalayan glaciers are exceedingly vulnerable and act as climate change indicators. The melting of glaciers is caused by rising temperatures and less snowfall in the winter. Several dozens of smaller glaciers have perished in the state of Jammu and Kashmir over the previous 50 years. Changes in precipitation and evapo-transpiration are expected to reduce the amount of water available. Also precipitation and a loss of soil moisture are the result of climate change (Desta, Getachew, Tezera, and Coppock, 2006).

Environmental degradation due to climate change can increase the poverty and also magnify the conflicts between the communities. Climate change will result in the depletion of fish stocks, deforestation, polluted water and these can lead to scarcity of resources and also put the communities out of their place from traditional lands. This type of displacement can have unfavorable consequences for those communities who are totally dependent on conventional and inherited lands for basic sustenance, livelihood and cultural survival. The areas of land suitable for cropping and crop yields are expected to decrease due to climate change in the future (FAO, 2008). The climate change effects will be felt mostly by the poor people and those in arid and semi-arid lands, essentially because of their dependence on natural resources and their limited capacity to adapt (WRI, 2005). It is also predicted that a change in the pattern of rainfall and temperature will increase water scarcity and could have severe impacts on rain-fed agricultural production.

2. Relevant literatures

2.1. Bakarwal and pastoralism

Pastoralism is the branch of agriculture which deals with the raising of livestock. Pastoralism is like animal husbandry. According to Watson et al. (2000), the pastoralists as a production system has the most potential to meet the daily subsistence needs of humans, maintain ecosystem health and minimise adverse impacts of climate change through proper grazing managements in arid and semi-arid areas. It is well adapted in those areas where there is low rainfall. "Pastoralism has historically been a viable livelihood option. However, increased environmental stresses and changes in policies and practices, including restricting access to land and water, have increased the environmental impacts of pastoralism"(CBD, 2010).

The term pastoralism is sometimes used interchangeably with the term "nomadism". All members of the pure nomadic pastoralist group move throughout the year. There are also groups where some people are settled in permanent habitats and some people travel with their livestock for periods of several months at a time. Pastoralism replicates a lifestyle which is based upon the maintenance of livestock that depend mainly on natural resources for their food. The seasonal and daily movements of the pastoralist are defined by water, diseases and other pressures (Awogbade, 1991). Pastoralism is the use of widespread grazing on forest lands for the increase in livestock production. It is known for making risk management strategies and these strategies help people to survive in arid and unpredictable environment.

The implications for pastoral livelihoods are yet to be fully understood, and indeed two entirely different opinions seem to prevail in context of climate change. Some people see pastoral groups as the 'canaries in the coal mine' due to ongoing processes and impacts of climate change, the rangelands will tend to become drier and decrease in water supply. This whole process will affect the overall sustainability of pastoralists' livelihoods (Suvarna, Rodrigues, Rao, & Nair, 2022). Others see pastoralists as the most proficient way in adapting to climate change. The pastoral livelihoods are wrought to deal with scarce and variable natural resources to tackle difficult and uncertain agro-ecological conditions. The climate change could conceivably lead to the extension of territories where pastoralism could show comparative advantage (Hartmann, & Sugulle, 2009).

According to Barfield (1993), the nomadic pastoralism was a result of the Neolithic revolution. Nomadic pastoralism is commonly thought to represent a stage of evolution that lies between hunting and agriculture. Animal domestication and plants for food and forming cities started during this revolution. Nomadism is the best possible adaptation of the non-industrial populations, to the use to the full extent the arid areas outside the oasis. Therefore, small groups may stick on to nomadism as long as they continue to exist. Nomadic life is different from

other groups like transhumance because nomads are highly mobile in nature, and it is also quick in adaptation to environmental conditions. Pastoral nomads are usually self-sufficient regarding food and most of other necessities. The pastoral nomads rarely kill their animals for family use. In most nomadic cultures and societies, nomads have successfully managed their rangelands with a high degree of diversity.

2.2. Gujjars and Bakarwal of JandK

In JandK, Gujjars and Bakarwal are mostly involved in pastoral activities. Pastoralists are those people who derive more than 50% of their income from livestock and livestock products. The agro-pastoralists are those people who derive less than 50% of their revenue from livestock and livestock-related products. Pastoralists communities are mostly depend on livestock rearing for survival in marginal arid and semi-arid lands (Kirkbride & Grahn, 2008). Pastoral systems come in a variety of shapes and sizes, and they are tailored to certain natural, political, and economic conditions. Pastoralism has made a tremendous contribution to the economic regime of the developing countries in providing employment opportunities, income and nutrition to the poor people. However, pastoralism as an economic system is always being threatened by various government policies. Different factors like climate of the area, environmental factors, and availability of water, forests, grasslands, and geographical area, all these factors influence the pastoralists' choice of livestock. Livestock include cows, buffaloes, camels, goats, sheep, yaks, and horses.

The difference between pastoral, agro-pastoral and other rural groups is the particular relevance of livestock and livestock based activities in pastoral life and also the pattern of mobility for their livelihoods. The sedentary community stays in one place throughout the year, whereas the pastoral people move with their herds and flocks, even with their households from one place to another seasonally, and they feed their livestock on natural resources as opposed to cultivated fodders and pastures. They manage their resources on a complex set of temporary or semi-permanent claims on pasture, water, and other resources. It totally depends on the principles of flexibility and reciprocity. Land is not fixed but rather flexible asset for these people with specific use and access mechanisms (Koocheki, & Gliessman, 2005).

The pastoralists are very knowledgeable. Pastoralists are an excellent source of information about animal feeds mostly unknown in the farming community. They have identified several trees, bushes, grasses and weeds which increase milk yields, fat percentages in the milk and improve reproduction. There are conflicts between the pastoral and farming communities. There is a greater need for cooperation and complementary policies, as these policies will help not only in adapting to climate change but also lead to minimizing the existing levels of violence. These policies will assist in building cooperation across communities. But if the pattern of neglecting pastoralists' rights and favoring inequitable development strategies which are based on unsuitable farming models continues, conflict and instability may follow (Hartmann & Sugulle, 2009).

The pastoral groups reside in those areas where there is limited soil, less rainfall and increase in temperature conditions which provide limited options for land use so they engage themselves in mobile livestock rearing. There are few countries in which pastoralists normally represent a minority of the national population, but they claim large areas of land where land shortages often threaten the peasant majority. These people use mobility to deal with uncertainty and risk on arid lands (Kirkbride & Grahn, 2008).

Seasonal migration is necessary for pastoralists, because as rainfall and temperature patterns changes, it result into variations in livestock grazing resources. Mobility depends on different factors like utilization of lands, knowledge of ecosystem, access to key rangeland resources, water sources and migratory corridors.

3. Materials and methods

In order to understand how the recent changes in climate has influenced the livelihood pattern of pastoral population, this study was confined in Doda district of Jammu and Kashmir state. The study was mainly focused on tehsil Bhaderwah of Doda district. Multistage purposive sampling technique was used to select 507 respondents from two blocks of the selected tehsil. The study was confined to villages with a high concentration of pastoral population. The main reason behind the selection of these villages was their population with maximum number of STs because these people mostly belong to pastoralists/nomadic communities.

The data for the study was collected from both primary and secondary source. Primary data and information sources include the heads of households, village leaders, and key informants of the village. Secondary data was obtained from government reports and research publications.

4. Results and discussion

4.1. Impact of climate change on Gujjars and Bakarwal of JandK

Pastoralists' lives are significantly impacted by climate change. There is a relationship between the climate change and livelihood patterns of pastoralists. Climate change and traditional adaptation strategies have long been a part of the pastoral production system, but the convergence of unprecedented levels of land-use change together with increasing climate insecurity is wearing down the resilience of ecological and social systems alike. Variations in the weather pattern have major implications for pastoral livelihood and security. Threats from climate change like constant droughts, floods, and diseases have devastating consequences (Gumel, 2022). Severe droughts

affect water resources and have led to the death of large numbers of livestock in most pastoral areas. Therefore, current climate change and the antecedent ecological changes will have significant negative effects on the pastoralists and their livelihood, unless effective and sustainable intervention measures are put in place. Pastoralists live in a hostile and arid environment. Gradual climate change and extreme weather conditions have destabilized the progress in poverty alleviation and food insecurity.

The position of Gujjars and Bakarwalls in the Government of Jammu and Kashmir's developmental policies and programmes was investigated on a 5-point Likert scale. It was found that the government of Jammu and Kashmir needs to take more effective efforts to ensure the safety of Gujjars and Bakarwals. Thornton (2014) found that the biggest consequences of climate change are on livestock. Climate change has a great potential to impose a severe threat to the livestock industry's development. There is a need to formulate appropriate adaptation and mitigation options for the sector.

Table 1: Position of Gujjars and Bakarwalls in developmental policy and programme by the government of JandK

Questions	Mean	Standard deviation	Variance
Is industrialization considered a priority over environment by JKGOVT in its own development policies?	3.0178	0.75028	0.563
How much support is given to Gujjars by the central government in its annual budget?	3.1164	0.57300	0.328
Is there a clearly elaborated policy for development of Gujjars?	3.3767	0.66095	0.437
Is there sufficient coordination between national and international agencies in their support for environmental awareness and development?	2.9961	0.66830	0.447

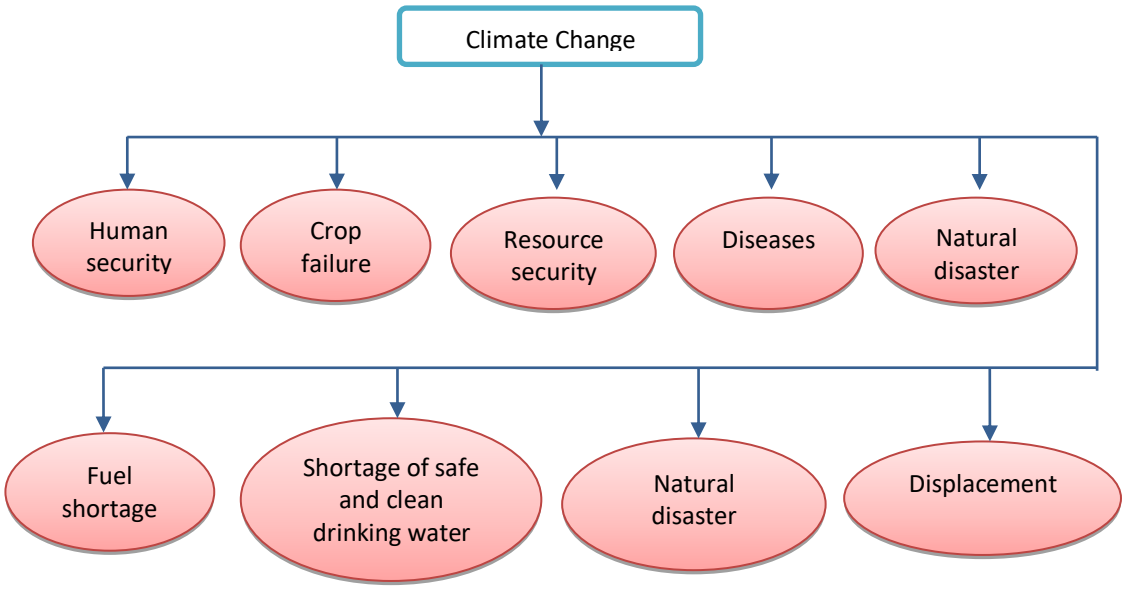

Figure 1: Climate change challenges (WEDO, 2007)

In Kashmir valley, they inhabited in the side valleys and slopes of Lidder, Sind, Lolab and their tributaries. The Gujjar settlements stud the mountain slopes and valleys surrounding the valley of Kashmir. These areas are Uri, Baramulla, Kupwara, Ganderbal, Kangan, Pahalgam, Anantnag, Daksum and Kulgam administrative divisions. The higher ranges of Pir Panjal and greater Himalayas are the summer pastures of these pastoral people, which are known as Dhoks (pastures). In Dhoks their houses consist of Kothas (mud houses) which are quite different from the Kashmiri houses. In Jammu Division, the Gujjars have occupied the areas which are appropriate for their animals. The areas in the south on the outer hills do not receive snowfall in winter. These areas include the valleys and slopes of Poonch, Mendhar, Surankot, Darhal, Rajouri, Nowshera, Sunder Bani, Udhampur, Jammu and Kathua districts. The areas ranges from 1220 to 2440 meters contour level on the southern side of the Pir Panjal mainly

the middle mountain ranges and valleys in Rattan Pirshah, Gool Gulab Garh, Arnas, Bhadarwah, Ladhadhar, Dudu Basant Garh, Doda Sarthal which receive snowfall for less than three months, are also inhabited by the Gujjars. In Kishtwar and Doda districts, their habitations are near the summer pasturing grounds (Gooch, 1992).

On asking weather climatic change has its influence on livelihood of the household, 55 % (279) responded positive effect, 35% (177) negative effect and 10% (51) gave no responses.

4.2. Impact of modernization on climatic changes

Due to the expansion and modernization of industries in India, rise have been seen in the capital investment in travel and tourism industry, transportation industry, textile and construction industry in recent years. It acts as an influential instrument for economic growth but on the other side it has direct effect on our environment that affects us in various ways. The data analysis stated that modernization plays role in economic development but on the other side it effects the environment that causes changes. Out of 507 respondents, majority (53.6%) of respondents shared modernization as the major cause behind climatic changes.

Various Gujjar families are residing in Rajouri, Reasi, Jammu, Poonch, Udhampur and Kathua region. Their ancestors came from the Gujarat district of Punjab (Pakistan). They have migrated to these hills after the outbreak of a serious famine. They settled along the Mughal majestic road leading to Srinagar through Rajouri and Pir Panjal Pass. The Gujjars of Kashmir Valley claim that their ancestors had entered the territories of Kashmir from other regions but now need to move to plains due to climatic changes.

5. Conclusion

Climate change is considered a top threat to the planet's future. Modernization was identified as the major cause behind climatic changes. Climate change is expected to affect the nutritional and food security of the world. The pastoralist community belong to poor communities and are most vulnerable to climate-related disasters. The convergence of land-use change and climate insecurity is impairing the resilience of various social and ecological systems. Government of Jammu and Kashmir need to take measures to safeguard the vulnerable communities from the adverse effect of climatic variations.

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