

People Perspective on Climate change and its impacts on Livelihoods –Tribal Villages Field study in Koraput District, Odisha

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ABSTRACT

Climate change is one of the greatest challenge faced by all the nations across world, especially monsoon dependent country like India. Even though there is not significant change in the amount of rainfall over the years, there is huge regional variations in its intensity and frequency and also there is a slower temperature increase which altogether affects people livelihoods in a greater manner. In this study, a random sample of 104 households from three different villages, belonging to tribal context, in Koraput district of Odisha, were taken. Their major livelihood are agriculture, livestock rearing and Non-Timber Forest Product (NTFP) collection. Among the samples, 85-90% respondents observed that there is increase in temperature, uneven rainfall, frequency of drought and decrease in number of rainy days. The forest area has been decreased from 70.77% to 21.22% by 2007 (MSSRF), due to urbanization, which resulted in reduction of NTFP activities. Within 2011 to 2016 itself, there is increasing trend of average temperature as 0.017 degree Celsius, 93 to 100 of the respondents observed that there is raise in crop, livestock diseases and decrease in ground water level. This study in detail analyses the impact of climate change and the strategies such as crop diversification, chemical inputs, etc adopted by the community and how much it helped them to overcome the effects of climate change. The findings clearly shows how climate change affects the people in the sample area and the reach of government policy to those vulnerable areas. The study also suggests what are the steps to be taken by various stakeholders and their needs to combat this changing climate pattern. And also recommendations the policies and other steps taken by the government which has to improve in a greater manner to protect vulnerable communities across the nation.

Keywords: Climate change, Tribal context, Impact, People perceptions, Government policy

1.Introduction

Climate, as one of the dominant natural phenomenon, impacts all human activities. The seasonal and regional variations in climate have shaped the living and livelihood patterns of human society since time immemorial. However, the societal evolution of human civilization from hunting/gathering through agricultural to industrial stage has also witnessed the changing relationship between human and natural systems but now the climate change has exceeded its equilibrium point and start impacting negatively all over and the reality of climate change is now a well-accepted reality and there is emerging evidence that climate change poses a massive threat for development especially in poor and developing countries. An understanding of the emerging trends of climate change and its effects in local ecologies is an important starting

point in addressing the negative effects of climate change. The impact of climate on livelihood is imposing a negative impact on all livelihood activities like agriculture, livestock rearing, NTFP collection and other activities. Climate change refers to the variation in the earth's global climate or in regional climates over time. It is change of climate which attributed directly or indirectly to human activity that alters the composition of the global atmosphere (UNFCC, 2001). Climate change is a phenomenon due to emissions of greenhouse gases from fuel combustion, deforestation, urbanization and industrialization (Upreti, 1999). An understanding of the emerging trends of climate change and its effects in local ecologies is an important starting point in addressing the negative effects of climate change. As Boyd et. al. (2009) point out climate change risks altering the physical and human geography with telling consequences for human beings.

One of the great challenges in agricultural development and sustainable intensification is the assurance of social equity in food security oriented interventions. Development practitioners, researchers, and policy makers alike could benefit from prior insight into what interventions or environmental shocks might differentially affect farmers' food security status, in order to move towards more informed and equitable development. (**Santiago Lopez-Ridaura**). Adaptation can be a key strategy that can alleviate severity of climate change impact on Agriculture and food production. Adaptation Strategies are unlikely to be effective without understanding the farmers' perception of climate Change. To build resilience households have undertaken a wide range of farming and non farming strategies. The important strategies include new crop varieties, change planting time, planting trees and migration. (*G.M Monirul Alam*). This study is an attempt to use group information collected on climate change from farmers about how to encourage farmers to adopt climate change. Results suggest that though the farmers are aware of long term effect of climate change factor, they are unable to identify the change is due to climate change and farmers are changing their farming practices. (*Tripathy, Ashok k. Mishra*). Mountain regions worldwide are impacted by climate change at the same time represent distinctive areas for the assessment of climate related impact. In the Himalaya region it has impact on food production, Natural ecosystem, human and animal health and human wellbeing. As agriculture, livestock, forestry are the important parts of livelihood people's perception and understanding about climate change is important. (*Vikram S. Negi, Rakesh K Maikhuri*). Therefore, the present challenge of bringing in sustainability in animal husbandry sector justifies the adoption of risk management mechanisms. Insurance is a 'form of adaptive capacity for the impacts of climate change' that provides the insurance users with a better control over physical and business risks (**Mills 2005**). Climate change may initially have small positive effects on a few rich countries in high latitudes but is likely to be very damaging when temperature increases by mid- to late-century under Business as Usual (BAU) scenarios. (**Stern Review, 2007**). A wide array of adaptation options is available but more extensive adaptation than is currently occurring is required to reduce vulnerability to future climate change. There are barriers, limits and costs, but these are not fully understood. (**IPCC, 2007**). The idea

that developing countries like India and China must share the blame for heating up the earth and destabilising its climate, as espoused in a recent study published in the United States by the World Resources Institute in collaboration with the United Nations, is an excellent example of environmental colonialism. (*Global Warming In an Unequal world, CSE, 1992*). The extreme significance of impacts related to climate variability were demonstrated in the 1999 tropical cyclone that hit the state of Orissa, on the eastern coast of the country, which resulted in a death toll of about 55,000 cattle (**CSO 2000, p.189**).

Earlier Koraput district of Odisha state experienced heavy rain and the temperature variation in this district was minimum 3^o to 4^oC and maximum 20^o to 21^oC. But now there is seen a tremendous climate change in this region and the change is unparalleled in the history of world. Now the temperature is changing drastically as it is increasing day by day. New industries like HAL (Hindustan Aeronautics Limited), NALCO (Nalco Aluminium Company) and deforestation has changed the climate dramatically which in turn gives a result in increasing temperature, decreasing rain fall, uneven rain fall, and increase in use of fertilizer in the farm for more yield. Now the farmers are depending on hybrid seeds for more yields which in turn results in increase in disease not only to the human being but also the livestock. This research gives a systematic and clear evidence of the effect of climate change in the basis of change in temperature, rainfall, reduced forest area, increasing diseases to livestock and the adoption strategy adopted by the local community to overcome the effect of climate change.

2. Methods

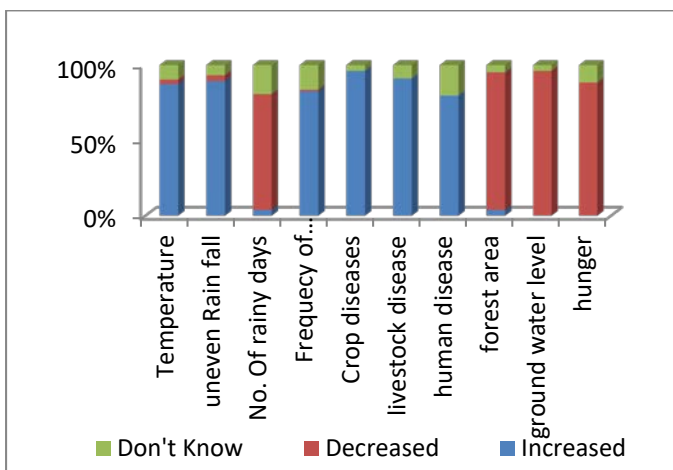
A literature study and secondary data on different livelihood activities and climate change from the block office of Semiliguda helped me selecting the study location. A cross sectional household survey was carried out with qualitative and quantitative data. Purposive sampling technique was used as the focus was on different livelihood activities. The research was focused on primary as well as secondary data. Data was collected structured questionnaire and face-to-face interviews as well as some Participatory rural appraisal (PRA) technique. The

questionnaire was prepared keeping an eye on different livelihood activities like agriculture, livestock rearing and NTFP collectors. The questionnaire also consists of parts people perception on climate change and constraints for implementing any adaptations strategies by farmers, livestock rears and NTFP collators. Most prominently, the respondents were asked to compare the climate conditions of past twenty to thirty years with respect to change in temperature and rain fall. The questionnaire was pre-tested with ten households involving in different livelihood activities in Bileiguda, pitaguda and Kumbhariput village where the study was conducted.

Thus, a total of 104 respondents were selected randomly and questionnaires were administered. Interviews for the selected respondents were conducted individually in their homes or their cultivated lands based on the availability of the head of the household during may-June 2018. The respondents interviewed include male, female, elderly and young farmers, livestock rears and NTFP collectors.

3. Analysis and Discussions

3.1. Peoples perception on climate change



Source: Primary data collection

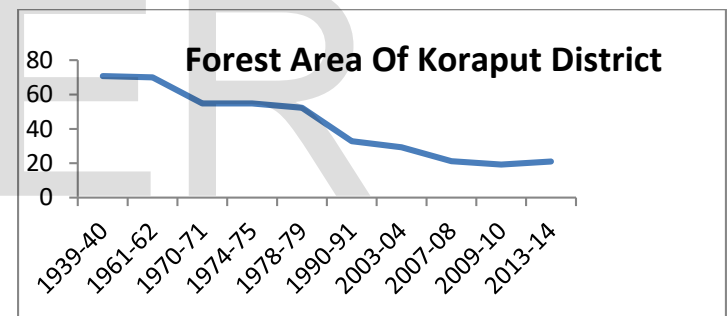
Almost all the respondents interviewed had observed a change in the climate in the last 15 to 30 years and they were in the opinion of increasing temperature and uneven rainfall. Extreme climatic events like floods, drought, dry

seasons were accounted to have increased in the last 25 years. The forest area has reduced drastically. Livestock and human diseases has increased. The ground water level has decreased.

3.2. Factors affecting livelihood activities

3.2.1. Forest area

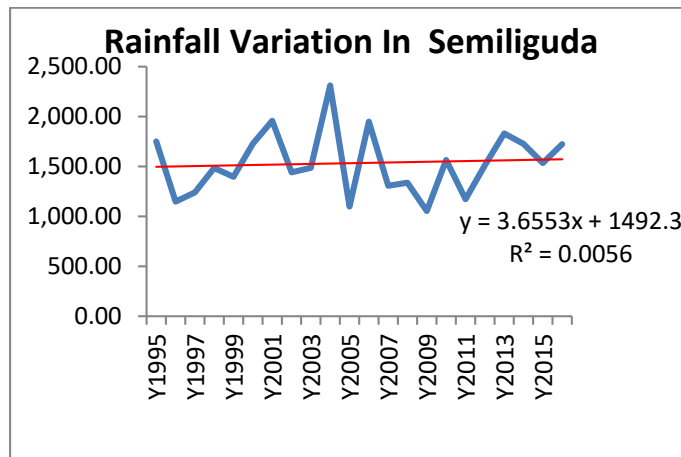
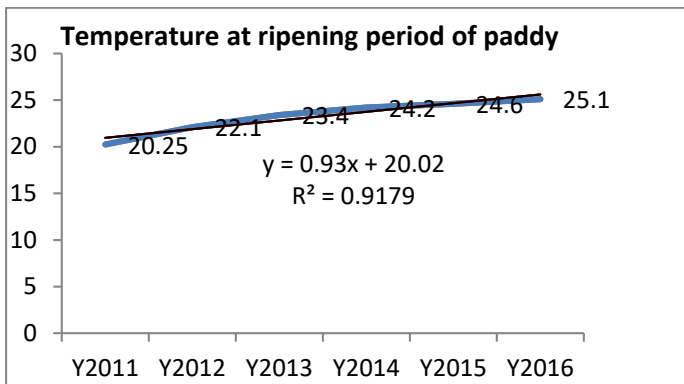
The climate change in Semiliguda mainly seen due to deforestation in the region. Not only the total forest area but the very dense forest area and moderate dense forest area are drastically reduced / vanished. If we take consideration of forest area in Koraput region has decreased from 70.77% in the year 1939-40 to 21.22% in the year 2006-07. In the year 2009 the forest area has decreased to 19.23%. After that the forest department and government of Odisha took effective steps like banning the tribal people to enter in to the forest, planting trees which increased the total forest area from 19.23% to 21.89% in the year 2013. But still the climate change has put a major effect.



Source: from forest office Semiliguda

3.2.2. Temperature

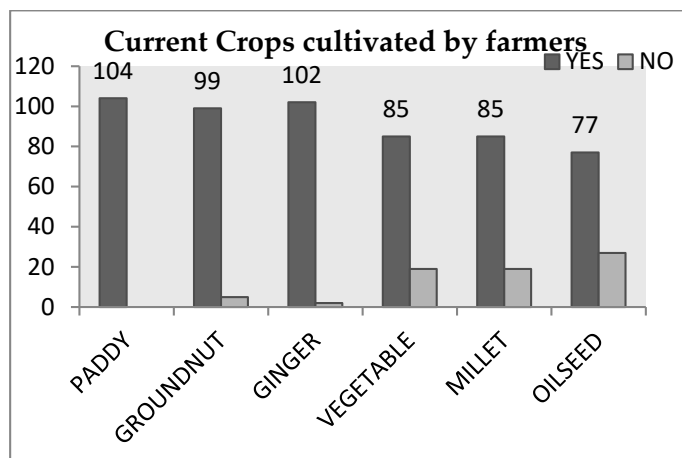
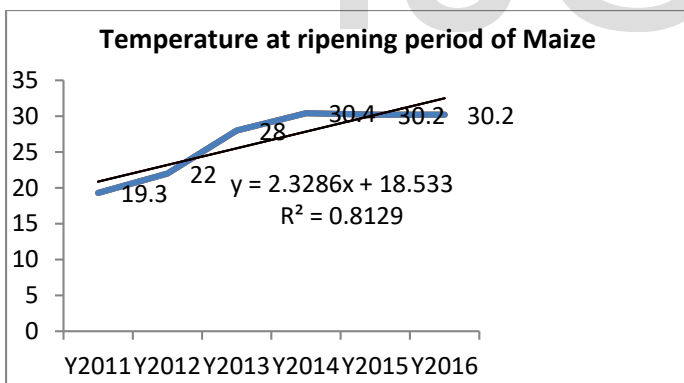
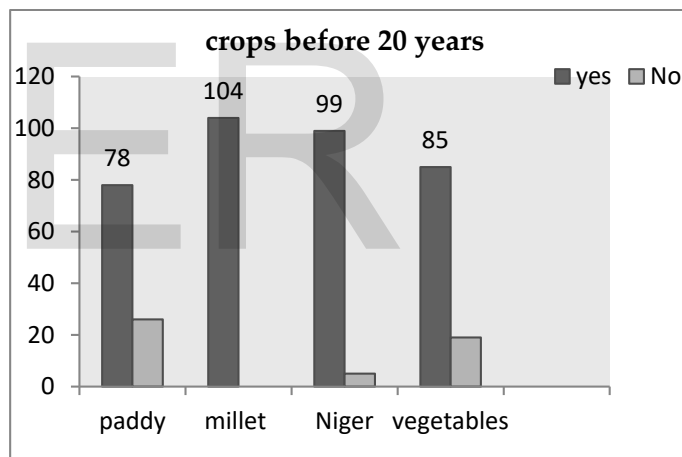
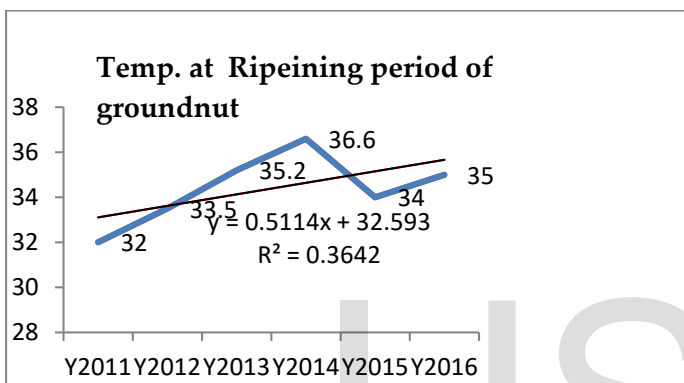
People are unaware of flowering and fruiting exact time but they felt that maturation and harvesting of some crops has shortened. Crops have been taking less time to mature and harvest. The effect of increased temperature seems to pose this decreased senescence day of crops. The figure below shows a increasing temperature during the ripening period of different major crops in the study areas.



Source: Block office Semiliguda

3.3. Effect of climate change on different livelihood activities

The below figure clearly indicate that there is a shift in crops during last 20 years due to climate change.



Source: Primary data collection

Source: Analysis of data From block office of Semiliguda

3.2.3. Rain fall

The rainfall analysis shows that there is a increasing trend of uneven rain fall in the district and the statistical data shows that there is increase of rainfall in the rate of 3.655mm/year.

Due to climate change there seen a decrement in livestock rearing due to increase in livestock diseases like foot and mouth disease, milk fever, Inflammation, anthrax etc. Dependency on non timber forest products(NTFP) has reduced drastically as there is a significant change in forest area and availability of NTFP which will help in livelihood sustainability.

3.4. Coping Strategies

The farmers are growing short duration rice varieties like Heera, KalingaIII, Ghanteswari, Pathara, Vandana, Khandagiri . Also Intercropping is one of the strategies adopted by the farmers. To save the crop from odd monsoon time the timing of seeding of crops also changed. Apart from that small and marginal farmers go for migration in off seasons and drought periods. The livestock rears have reduced their livestock in fear of loss due to disease attack and go for other daily wage labour works. The NTFP collectors almost have shifted their job of collecting NTFP and either they are going for agriculture or as a last option going for migration.

3.5. Constraints to Adopting Coping Strategies

In terms of adoption of climate change adaptation strategies, the community in the study area are facing different constraints like lack of availability of water for both irrigation as well as drinking purpose. Available water is hard to manage-either for crop production or drinking as there is no such system available for it. With increase in population land shortage also increasing as a result of which the tribal community going for *Podu cultivation* which in turn results in decreasing forest area again and reduces the NTFP. As the climate is changing unpredicted weather is becoming a constraint to adopting coping strategies. Even if the farmers are shifting their cropping period for different crops extreme events like heavy rainfall and hail stones destroying the crop frequently. So the farmers are going more in debt. As a shift in agriculture due to low productivity and crop loss, the farmers are going for milch animals but unknown disease making it impossible for the community to keep alive the milch animals which make them to bear heavy loss. So the community thinks that may be the change in climate is the cause for livestock death. The 19th livestock census shows Odisha has witnessed a 5.59 per cent decline in the total cattle population. Besides the direct effects of climate change on animal, there are profound indirect effects as

well, which include climatic influences on quantity and quality of feed and fodder resources such as pastures, forages, grain and crop by-residues, and the severity and distribution of livestock diseases and parasites. Beside this other constraints are lack of credit(money) at the time of need, lack of market access, lack of farm inputs, lack of transportation availability, and lack of information becoming major constraints to adopting coping strategies. Out of all lack of water ranked first as 96% of the respondents have biggest concern about it and seems to be the most severe problem of the farmers in the study area where as lack of credit availability at time of need ranked second as sever problem.

4. Conclusion

Likewise other tribal areas, the community in Semiliguda block of Koraput have also been facing challenges emerged due to climate variability and change. While rain fed agriculture in small and marginal land is the main livelihood practice, the NTFPs and livestock provides, nutrition and income security round the year. The fluctuation in rainfall pattern over the year and during monsoon season, higher summer temperature and long dry period are impacting the livelihood resources, hence the food security. With the coping strategies the stress also increases on livelihood. It is seen that the income of a family also reduced due to the change in cropping pattern or adopting any other livelihood activities. The change in climate is going to hamper the tribal community very badly in future.

Way forward

The government should take adoptive measures like a forestation, crop insurance, livestock insurance keeping eye on the context and specially support the farmers to overcome the barriers like water availability, fund availability and seed availability according to the soil type and environmental adoptive crops.

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