

# Impact of Climate Change on Ethnobotanical Plants of the Karkos: A Case Study of Karko Village, Upper Siang District

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## Abstract

Among the geographical conditions, climate affects the distribution of plants and animals. The climate determines the species and distribution of biotic components over the earth's surface, even a minor change in the climate has a great impact on the distribution of plants especially on the extinction of ethnobotanical plants.

The climate change and changes among the biotic lives very much affect the human beings, especially the crops production. The appearance of new weeds, new pests, disease in crops, change in time of germination, flowering, etc. are very much affected by climatic change. In such cases, crops failure is common because farmers are unaware of such occurrences. The erratic climatic conditions such as occurrence of dry spell, extended hot days or cold days are injurious to crops. Many diseases, either with human being or animals are also associated with the climatic change. In such situation of climate change, plants tend to adopt to new changes either by physiologically or behavioral changes within the area. The behavioral changes of plants such as disappearance or appearance of new ones are some of the indicators of climatic change. The Upper Siang district lies in the Central-northern part of Arunachal Pradesh lying roughly between Latitude 94°-95° N and Longitude 28°-29° E comprising roughly an area of 6590 square kilometers. It is bounded by Lower Dibang Valley and Dibang Valley Districts in the East, East Siang District in the South, West Siang in the West and China (MacMohan line) in the North.

**Keywords:** Climate Change, Impact of Climate Change on Ethnobotanical Plants of Karkos, Upper Siang

## 1. Introduction

Climate is a significant component of environment which directly or indirectly affects human activities. In general, climate is known as the average weather condition prevailing in an area over a long period of time. The long-term changes in characteristics of climate of a region can be changed by the astrophysical, geophysical or human-induced parametric variations as such changes have varied significant influences on life processes on earth, mostly on man and his living environment. Climate is a dynamic phenomenon that changes continuously. It is evident from historical records that with the advent of human civilization changes in climate have changed human economy, infrastructure and land use (IPCC, 2007).

Among many geographical conditions, climate affects plants and animals and their distribution over the earth surface. Even a minor change in climate has a great impact on biotic components; in turn affects the human being. But for the recent climate change, man is responsible mainly due to technological

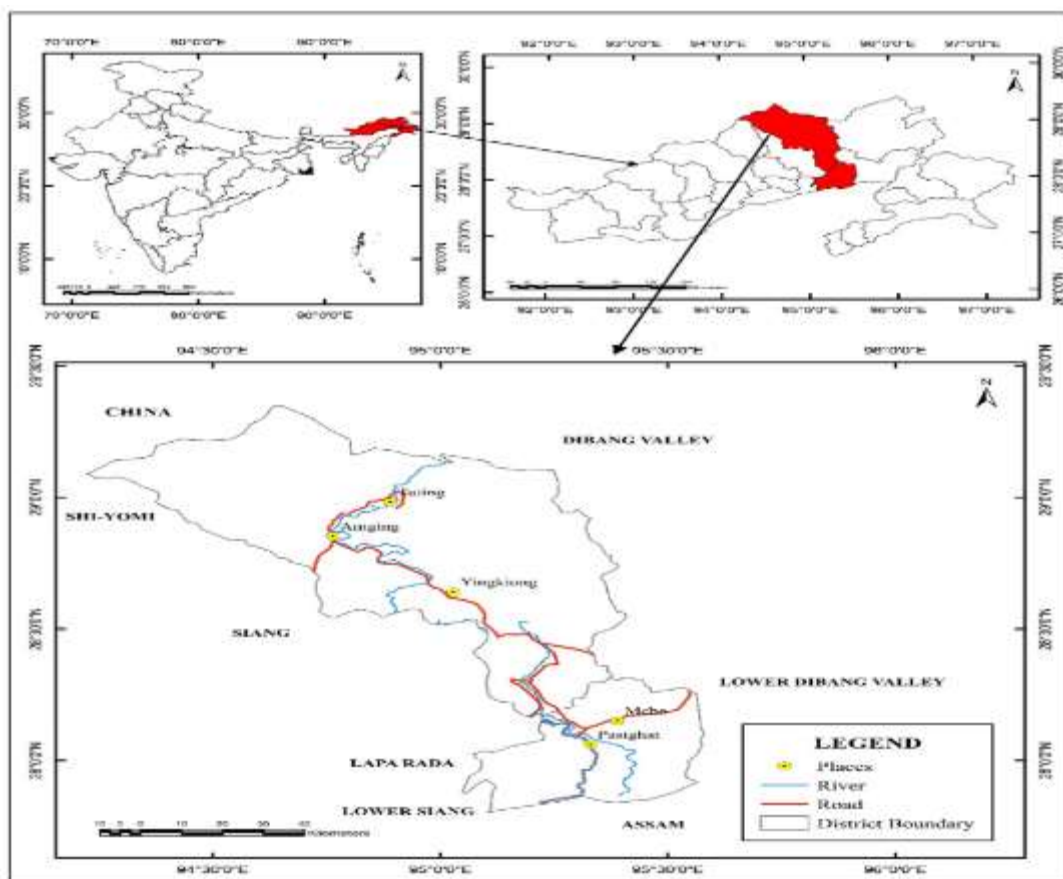
development. Global warming is mainly due to the Green House Effect. The increase in number of automobiles, development of more cultural landscape, modernization of agriculture, increase in industries and factories, clearing of more and more forest for settlement, roads and railways, construction of dams, etc. are the sum total responsible for climatic change especially the increase in temperature and irregularities in rainfall. It is said that the vegetation is the index of climate of any area (IPCC, 2019).

The vegetation of any area tells the climatic type of an area. A keen geographer can read the climate of an area from vegetation. Vegetations are more sensitive to climate change. The warm and humid climate will support more vegetation. Along with the change of climate especially the temperature and precipitation, plant would change its seasonal behavior, the time of flowering, fruiting, shedding of leaves, germination, even the production, etc.

The climate change and changes among the biotic lives very much affect the human beings, especially the crops production. The appearance of new weeds, new pests, disease in crops, change in time of germination, flowering, etc. are very much affected by climatic change. In such cases, crops failure is common because farmers are unaware of such occurrences. The erratic climatic conditions such as occurrence of dry spell, extended hot days or cold days are injurious to crops. Many diseases, either with human being or animals are also associated with the climatic change. In such situation of climate change, plants and animals tend to adopt to new changes either by moving to new habitat, physiologically or behavioral changes within the area. The behavioral changes of plants and animals such as disappearance or appearance of new ones are some of the indicators of climatic change.

## **2. Study Area**

For the present study, the Upper Siang district lies in the Central-northern part of Arunachal Pradesh lying roughly between Latitude 94°-95° N and Longitude 28°-29° E comprising roughly an area of 6590 square kilometre. It is bounded by Lower Dibang Valley and Dibang Valley Districts in the East, East Siang District in the South, West Siang in the West and China (MacMohan line) in the North. The Karkos is a sub tribe of Adi community that resides in Karko village of Upper Siang District, Arunachal Pradesh. The karko community has a strong ecological relationship with its natural surroundings and relies directly on natural resources for its sustenance.



Source: [bhuvan.nrsc.gov.in](http://bhuvan.nrsc.gov.in).

### 3. Impact of Climate Change on Ethnobotanical Plants of Karko Community, Upper Siang District

#### Ethnobotanical Plants of Karko Village, Upper Siang District

| SL.No. | Vernacular Name | Common Name                  | Scientific Name                                  | Family        | Any Change in the Behaviour of the Plants |
|--------|-----------------|------------------------------|--------------------------------------------------|---------------|-------------------------------------------|
| 1      | Angyat          | Adlay Millet/<br>Job's tears | <i>Coix lacryma-jobi</i>                         | Poaceae       | Decreased productivity                    |
| 2      | Ing             | Bitter vine                  | <i>Mikania micrantha</i>                         | Asteraceae    | New appearance                            |
| 3      | Tasat           | Sugar Palm                   | <i>Arenga obtusifolia</i> Griff.                 | Arecaceae     | Decreasing                                |
| 4      | Namdung         | Perilla/<br>Chinese basil    | <i>Perilla ocymoides</i>                         | Lamiaceae     | Disappearing                              |
| 5      | Taje            | Japanese ginger/Wild onion   | <i>Zingiber mioga</i>                            | Zingiberaceae | Decreasing                                |
| 6      | Velak           | Native Cardomon              | <i>Hornstedtia scottiana</i> (F.Muell.) K. Schum | Zingiberaceae | Decreasing                                |
| 7      | Tugap/ tuka     | Wild Mustard,                | <i>Sinapis arvensis</i>                          | Brassicaceae  | Decreased                                 |

## Ethnobotanical Plants of Karko Village, Upper Siang District

|    |               |                                     |                                                         |               |                           |
|----|---------------|-------------------------------------|---------------------------------------------------------|---------------|---------------------------|
|    |               | Charlock,<br>Field Mustard          |                                                         |               |                           |
| 8  | Sitong pettu  | One-Rowed<br>Water-Cress            | Nasturtium<br>microphyllum<br>(Boenn. ex. Rchb)<br>Rchb | Brassicaceae  | Decreasing                |
| 9  | Rungdum       | Oriental false<br>hawksbeard        | Youngia japonica                                        | Asteraceae    | Decreasing                |
| 10 | Ekkam         | Packing Leaf                        | Phyrninum pubinerve                                     | Marantaceae.  | Increasing                |
| 11 | Kopi          | Nightshade                          | Solanum khasianum                                       | Solanaceae    | Increased                 |
| 12 | Eepum         | Calabash/<br>Bottle gourd           | Lagenaria siceraria                                     | Cucurbitaceae | Decreased                 |
| 13 | Ejuk          | Dipper gourd                        | Lagenaria siceraria                                     | Cucurbitaceae | Decreased                 |
| 14 | Takeng        | Ginger                              | Zingiber officinale<br>Roscoe                           | Zingiberaceae | Increased<br>productivity |
| 15 | Elaichi       | Black<br>Cardamom                   | Amomum subulatum                                        | Zingiberaceae | Increased<br>Productivity |
| 16 | Oyik          | Hairy<br>Pouzolz's<br>Bush          | Pouzolzia hirta                                         | Urticaceae    | Decreased                 |
| 17 | Marsang       | Tooth-ache<br>plant                 | Spilanthus acmella                                      | Asteraceae    | Decreased                 |
| 18 | Roram         | Fish mint/<br>Chameleon<br>plant    | Houttuynia cordata                                      | Saururaceae   | Decreased                 |
| 19 | Onger         | Winged<br>Prickly Ash               | Zanthoxylum<br>armatum                                  | Rutaceae      | Decreased                 |
| 20 | Oko<br>Mamang | Black Night<br>shade                | Solanum nigram                                          | Solanaceae    | Decreased                 |
| 21 | Ra'el         | Yellow<br>wood/Indian<br>pepper     | Zanthoxylum rhetsa                                      | Rutaceae      | Decreased                 |
| 22 | Taling anne   | Malacca                             | Alpina malaccensis                                      | Zingiberaceae | Decreased                 |
| 23 | Ori           | False<br>coriander                  | Eryngium foetidum                                       | Apiaceae      | Decreased                 |
| 24 | Ogok          | Orchid tree or<br>mountain<br>ebony | Bauhinia variegata                                      | Fabaceae      | Decreased                 |

#### 4. Photographs of Ethnobotanical Plants



Ing (*Mikania micrantha*)



Angyat (*Coix lacryma-jobi*)



Marsang (*Spilanthes acmella*)



Ogok (*Bauhinia variegata*)



Roram (*Houttuynia cordata*)



Takeh Mareng (*Ocimum basilicum*)



Taling (*Alpinia malaccensis*)



Takeng (*Diplazium esculentum*)



Eting (*Bambusa spinosa*)



Rumbdum (*Blumea fistulosa*)



Velak (*Hornstedtia scottiana* k. Schum)



Onger (*Zanthoxylum armatum*)



Ra'el (*Zanthoxylum rhetsa*)



Namdung (*Perilla ocymoides*)



Eejuk (*Lagenaria siceraria*)



Taje (*Zingiber mioga*)

Source: Field Survey (2025)

## 5. Conclusion

One of the important environmental factors that influences the growth, distribution and seasonal behavior of plants is the change in climate. Ethnobotanical plants are significantly important as they are interwoven with food security, traditional knowledge, health care, cultural practices as well as livelihood systems of local communities. Any climatic irregularities, change in temperatures, precipitation and the occurrence of prolonged dry spells can modify the natural habitats of such important ethnobotanical plants of a region. The karkos of Upper Siang, Arunachal Pradesh and its changing climatic conditions may have profound effects for the availability and sustainability of ethnobotanical plants traditionally used by the Adi community. The following factors such as changes in flowering, growth patterns, fruiting, germination and also the appearance or disappearance of certain plant species are the ecological indicators of Climate Change. As a result, such changes may also affect the dissemination of traditional ethnobotanical knowledge when these plant species become less available or difficult to find.

By systematically documenting the plant diversity, seasonal changes, their local uses as well as the perceptions of community can provide essential reference data and information for perceiving the outcome

as well as recognizing the repercussions of climate change. Therefore, the present study emphasizes the need to document and also conserve ethnobotanical plants as well as the traditional knowledge linked with them. Important aspects such as conservation of natural habitats, strengthening of traditional ecological knowledge, participation of local community as well as advocacy for ecofriendly resource collection, conservation-oriented harvesting advocacy and the encouragement of low impact extraction methods are significant for preserving indigenous plant knowledge of the study area.

Henceforth, we may conclude that the research highlights that the climate change is not only an ecological concern but also a socio-cultural issue for the Karko community that fully dependent on the available botanical assets, vegetation resources and plant raw materials. Conservation and climate resilience planning in Upper Siang should therefore incorporate scientific knowledge with local and traditional knowledge.

## 6. References

### Book

1. Cairns, M., & Riba, T. (2017). *Shifting Cultivation Policies: Balancing Environmental and Social Sustainability*. CABI.

### Journal

1. Bharali, S., & Khan, M. (2011). Climate change and its Impact on Biodiversity; Some Management Options for Mitigation in Arunachal Pradesh. *Current Science*, 101(7), 855–850. <https://www.researchgate.net/>

### Thesis

1. Adinehvand, M. (2018). *Impact of Climate Change on Agriculture in Varanasi District: A Study in Applied Climatology (Thesis)*. Banaras Hindu University, <https://inlibnet.ac.in/http://hdl.handle.net/10603/305491>
2. Baruah, U. D. (2018). *Crops and Farmers' Responses to Climate Change: A Case Study of Assam (Thesis)*. Department of Geography, Guwahati University, Assam, <https://inlibnet.ac.in/http://hdl.handle.net/10603/215236>
3. Chakraborty, A. (2017). *Impact of Climate Change on Agriculture in Chhattisgarh Plain (Thesis)*. Pt. Ravishankar Shukla University, Raipur, <https://inlibnet.ac.in/http://hdl.handle.net/10603/252351>
4. Pertin, O. (2015). *Tracing the Migration Routes of Adi Tribe of the Siang River Basin, Arunachal Pradesh (Thesis)*. Rajiv Gandhi University, Itanagar, <https://inlibnet.ac.in/http://hdl.handle.net/10603/200615>
5. Ravindra, B. G. (2016). *Adaptation to Climate Change in Agriculture: A Critical Analysis in Andhra Pradesh (Thesis)*. Indira Gandhi National Open University, IGNOU, <https://inlibnet.ac.in/http://hdl.handle.net/10603/219599>
6. Sharma, L. (2019). *Traditional Knowledge: A Tool to Mitigate Climate Change and Need for Legal Framework (Thesis)*. Amity University, Uttar Pradesh, <https://inlibnet.ac.in/http://hdl.handle.net/10603/321278>
7. Upadhyay, J. (2014). *Climate Change and Its Impact on Agricultural Productivity: A Case Study of Assam (Thesis)*. Assam University, Silchar, <https://inlibnet.ac.in/http://hdl.handle.net/10603/293130>

### Articles

1. Lister, A. M. (2009). The biotic effects of climate change. *Clinical Medicine*, 9(1), 14–15. <https://doi.org/10.7861/clinmedicine.9-1-14>
2. Leiman, A. (2007). The Economics of Climate Change (The Stern Review) By Nicholas Stern. *The South African Journal of Economics*, 75(2), 369–372. <https://doi.org/10.1111/j.1813-6982.2007.00119.x>
3. Thomas, C. D., & Williamson, M. (2012). Extinction and climate change. *Nature*, 482(7386), E4–E5. <https://doi.org/10.1038/nature10858>

## **Departmental Articles and Report**

1. Census of India Report, 2011
2. IPCC, 2007, Solomon, S. D., & Manning, Z. M. (2007). Contributing of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Report). *The Physical Science Basis*. <https://www.ipcc.ch>
3. Ecosystems and Human welfare, Washington D.C. (2005). A Report of the Millennium Ecosystem Assessment (M.E.A) (Report). Island Press, Washington D.C. <https://www.millenniumassessment.org>