

## A PERCEPTION STUDY ON KALBAISAKHI IN THE NEIGHBOURHOOD OF SANTINIKETAN, WEST BENGAL

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### Abstract

The present paper focuses on the perception of the people in and around Santiniketan about Kalbaisakhi or Nor'wester (a type of thunderstorm) occurred in the months of March, April and May (now also in June). This particular climatic hazard has become an integral part of their life that experiences it years after years. These people have built up their own traditional beliefs, practices on this storm. All these age-old rituals which remain unexplored have been neglected till now as superstition. But if examine minutely on these folklores and rituals these can become important tools to scientists to understand the genesis, nature and effect of Kalbaisakhi. The authors' present work is confined to integrate human perception with the weather data gathered from Automatic Weather Station and Regional Meteorological Station. Behaviour of various animals and insects changes onset of Kalbaisakhi has also been accounted in this regard. Some forecasting measures of the storm have been suggested with the help of people's perception to aware people about this calamity. Some beneficial effects of it on their life have been noticed. As natural hazard cannot be ignored, so some remedial measures and preparedness have been proposed in this paper.

### Introduction

Recently, people are in search of real remedial measures to cope with natural hazards. Hazards of Kalbaisakhi storm are an age-old problem in eastern India particularly in Bengal. Various programmes have been carried out in this connection. Present work is confined in the neighbourhood of Santiniketan to find out the people's perception in this regard. In addition, people's perception on Kalbaisakhi has been incorporated with the instrumental data. In this paper authors want to outline the beneficial part of this zonal natural calamity and its effect on environment. Though several attempts have been taken but the synergism of instrumental data with traditional practices is considered to be as pioneer work in this regard.

### Objectives:

- To determine the origin and dissipating regions of Kalbaisakhi.
- To explore the traditional knowledge and folklore on Kalbaisakhi.
- To develop awareness among the local people about this natural calamity.
- To identify the beneficial effect of Kalbaisakhi and
- To synergize perceptual data with instrumental data.

### Methods adopted:

- 1) Selection of observational sites through GPS survey.
- 2) Preparation of questionnaires for micro-site perception study.
- 3) Collection of diurnal weather data from AWS (Automatic Weather Station) and RMS (Regional Meteorological Station) for the consecutive months (March, April, May and June) of Kalbaisakhi
- 4) Documentation and collection of traditional knowledge and folklore.
- 5) Generation of models and maps through cartographic techniques.

### Genesis and characteristics of Kalbaisakhi

During the pre-monsoon season (March-May), the eastern and north-eastern states of India like West Bengal, Assam, parts of Orissa, Jharkhand and Bihar experience dramatic appearance of a special type thunderstorm known as Nor'wester (Mishra, 2006). The downdraft from the thunderstorms which constitutes the squall frequently strikes from the north-west gives the Nor'wester its popular name (Sen Gupta, 1951). But over the Bengal, it is locally known as Kalbaisakhi that means calamity in the month of Baisakh (first month in Bengali calendar). This thunderstorm has become a familiar feature of the hot afternoons of March, April and May (now also in June). In Bengal it starts to the end of February and the frequency increases towards March, April and May. With the onset of monsoon, the occurrence of it decreases (Mishra, 2006). The occurrence of Kalbaisakhi is highly variable. The conditions which appear to be necessary for afternoon 'Nor'wester' are given below:

1. Supply of moist southerly air from the Bay of Bengal (Pramanik, 1939). The surface condition favourable for the flow of moist air is west to east pressure gradient over Chhotanagpur plateau which is considered as a source region of Kalbaisakhi .
2. There should be a westerly or north-westerly dry air with a fairly high lapse rate flowing over the moist southerly air.

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3. There should be latent instability.
4. Cold easterly Himalayan air down the valleys of north-east Bengal and north-easterly winds at lower levels from north Bengal are favourable but do not appear to be essential (Pramanik, 1939).

These thunderstorms seem to develop anywhere over the Bengal in the Nor'wester season. But, it has been seen that there are a number of susceptible spots over the hilly regions or the base of the hills where thunderstorms form and then the activity seems to move in some direction (Sen Gupta, 1951). Sudden rise in wind speed, drop in temperature, rise in air pressure due to pouring of cold air, thunder, lightning, hail, rainfall are the well known features of Kalbaisakhi. Temperature decreases up to 2°C - 4°C generally. These thunderstorms occur in association with cumulonimbus cloud. The amount of rainfall from thunder squalls is highly variable from place to place and one squall to another.

### STORM project under Govt. of India

The Govt. of India formulated and implemented the STORM (Severe Thunderstorms: Observations and Regional Modeling) programmes after Tsunami in 2006 to understand and forecast thunderstorms and cyclones. As Santiniketan and its neighbourhood area face a considerable number of thunderstorms with a particular period, so this area is taken for understanding this thunderstorm. The study area lies within Meso-net Quadrangle area of STORM programmes (Fig. 1). It is bounded by Farakka in the north-east, Katwa in the south, Dumka in the west and Illambazar in the south-east covering an area of 1650 sq. km. (approx). A few observational sites have been selected within the study area, covering nearly 25-35 sq. km by each station.

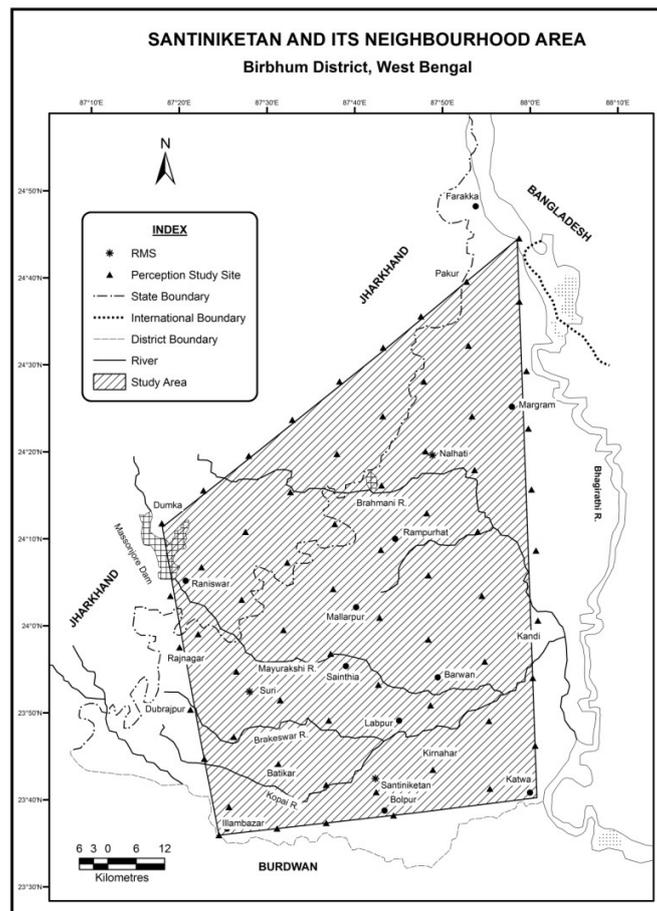


Fig. 1

**Significance of Perception study**

The individual organization stimuli relating to extreme events or a human adjustment is defined as perception. Study on perception has an objective to know how people viewed the occurrence or threat of extreme events and of the opportunities open to them in coping with the event.

Perception is the process of acquiring, interpreting, selecting and organizing sensory information. Socio-economic and environmental impact analysis is devoting increasing attention to perception study. It is believed that community perceptions reflect upon local conditions more intensely, thereby helping to make more informed decisions.

This area has been experiencing nearly dozen of severe Kalbaisakhi within two to three months every year. In response to STORM programme, it is felt that the perception study on spatio-temporal dimension of this convective system of thunderstorm may open up a new avenue for understanding man-nature relationship.

**Popular wisdoms in connection with Kalbaisakhi storm**

People who experience Kalbaisakhi years after years within this project area have built up their own conceptions about Kalbaisakhi. These are popular traditional practices, beliefs, rhymes etc. through which they express their concern about this storm. A few have been enlisted here.

**Colloquial customs on Kalbaisakhi:**

1. People put a low wooden seat in the courtyard of the house and pray to *Pavan Devta* (God of wind) to sit on the wooden seat by which they think this will impress *Pavan Devta* who will stop the harmful storm.
2. In 13<sup>th</sup> Baisakh (around 28<sup>th</sup> April) villagers tuck in a stem of *Streblus Asper* (locally named 'Shaora' n their thatched roof. According to village people, new cloud shows the first sign on that particular date and to prevent the flying away of the roof by these clouds, this usage was introduced.

**An age-old belief:**

People believe that during Kalbaisakhi, if they surrender themselves to God, God will stop the storm.

**Rhyme on Kalbaisakhi:**

“Akashe utheche megh, Pakhira jai nire  
Darjai kora nare Kalbaisakhir jhore”

It means, if there is cloud in the evening sky during summer birds come back to their nests by realizing something hazardous is going to happen and it indicates that Kalbaisakhi is knocking at the door.

**Treatise on Kalbaisakhi:**

Rainfall in the month of Chaitra (last month in Bengali calendar) leads to weak rainy season and in such case the possibility of violent Kalbaisakhi may be realized.

**Festival after Kalbaisakhi:**

In a village named Palita (Burdwan district) within the study area people celebrate after termination of Kalbaisakhi by cooking fresh vegetables as villagers think that 'kal' or 'calamity' is over and it's the time to festive.

**Changes in the behaviour of animal and insects**

In the study area, a few perceptions based on changing behavior of animals and insects with the onset of Kalbaisakhi have been noticed. All these are collected through questionnaire survey from different villages in the neighbourhood of Santiniketan.

- If ants transport their eggs to a place of safety then Kalbaisakhi is expected.
- Cockroaches become very active and start flying before storm.
- If garden lizard bears a reddish colour in its lower portion of throat, Kalbaisakhi is expected very soon.
- When flying ants swarm, thunder is imminent.
- Before Kalbaisakhi, cows lie down and refuse to go to pasture.
- With the onset of Kalbaisakhi, due to stuffy weather earthworms come out from their hole and rub over dust on their body.

**Synergism of perceptual data with weather data**

During field study in 2008, several occurrences of Kalbaisakhi in the Nor'wester season have been recorded. Here, the authors have chosen Kalbaisakhi occurrence on 19<sup>th</sup> March, 2008 at Santiniketan to show the integration of perceptual data and instrumental data acquired from AWS at Santiniketan (Fig. 2).

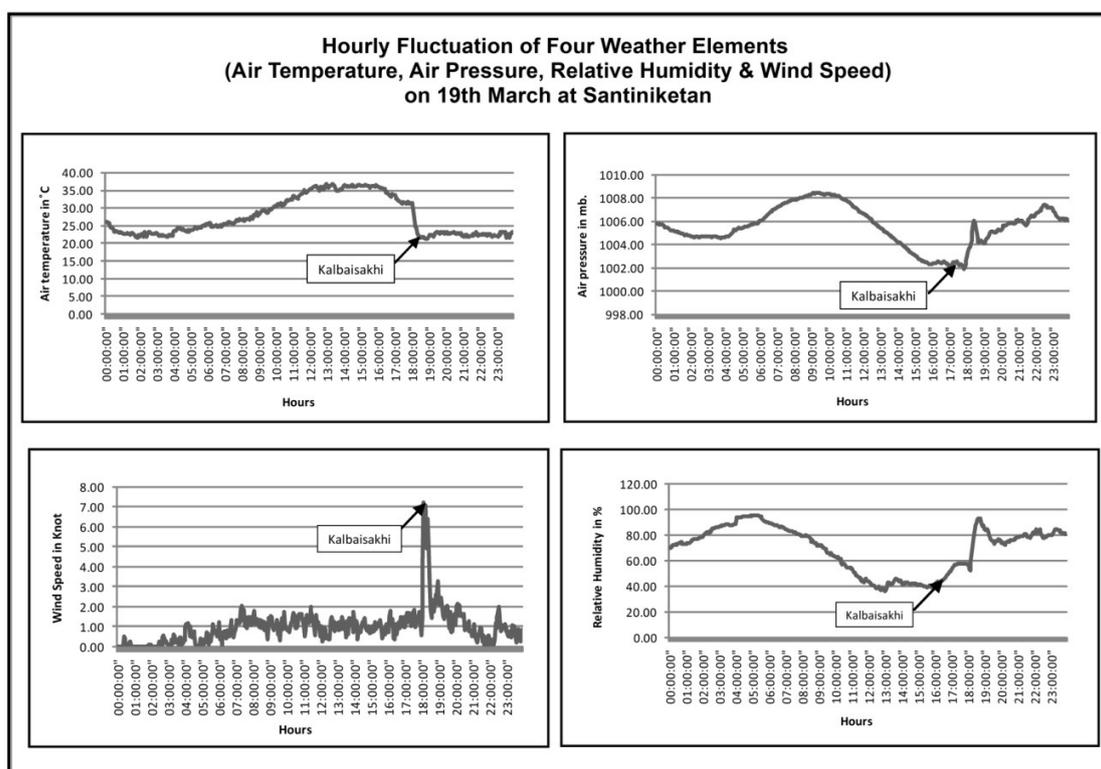


Fig. 2

Kalbaisakhi occurrence needs some extent of unusual conditions in the daily weather and these abnormalities can be proven by weather data of concerned date. The occurrence of Kalbaisakhi is reported around 5:30 pm in the questionnaire booklet. The above diagrams on four important weather elements also reflect abnormality around 5:30 pm, such as sudden rise in wind speed, steep decline in air pressure etc. By observing the above diagrams minutely, it can be concluded that the above said weather elements indicate very specifically the same as it was in perception data.

There are many perceptions which have no direct bearing with logic or science but might be of importance. The main challenge is to identify relevant perceptions and formalize them into important tools to scientists.

#### Some beneficial effects of Kalbaisakhi

Though Kalbaisakhi is regarded as a calamity in the month of Baisakh, but it has some positive effect on environment and daily life. These are –

1. The stormy wind of Kalbaisakhi scatters the dried seeds of leguminous plants which restore nitrogen from the atmosphere in the form of nodules. As it happens in the pre-monsoon period, so it helps those seeds to germinate during the rainy season. Thus, the natural cycle goes on.
2. In Gangetic West Bengal, people use cow dung cakes as domestic fuel and cow dung is also used as organic manure for making platforms for agricultural crops. But sometimes, it is harmful. One type of fungus grows over cow dung named *Pylobolus Clinae* which contains *Bronchitis nematode*. This nematode is very much harmful for cow. To retain their life cycle they have to enter as quickly as possible into some other cow's body. It enters through one kind growth over the cow dung known as *Soralgae*, which burst out in the afternoon due to stuffy condition before Kalbaisakhi and sores of the fungus scatters in a small area up to 2 to 3 feet radius. If any cattle groups come into contact of these bacteria, immediately it gets affected by this which can cause even death of the animal. The strong wind of Kalbaisakhi scatters the *Bronchitis nematode* reducing the harmful attack of those nematodes in cattle groups. This is one of the most important contributions of the Kalbaisakhi storm.
3. Kalbaisakhi winds takes away all the dried leaves shredded by the trees and deposits over the water bodies like ponds, lakes, rivers etc. When the leaves dissolved into the pond water and started decomposing, they release the nutritious organic matter which helps in the growth of planktons which are good sources of food for different kind of fishes in those ponds.

4. For shredding of big leaves like Palm and Coconut trees, very strong winds like Kalbaisakhi is needed. Naturally, because of Kalbaisakhi, these leaves come down to the ground and decompose in the rain water and supply nature manure to the soil.
5. Sudden gusty wind sometimes kills huge number of worms and insects which is in favour of ecological balance situation.
6. After a long dry spell, Kalbaisakhi brings the first heavy shower of rain and a sudden drop in temperature give relief to the living beings. This actually enhances the trust and dependency of human beings on nature.
7. The rainfall associated with Kalbaisakhi is extremely helpful for the pre-kharif crops like Jute, Aus paddy and a large number of vegetables and fruits.

### **Forecasting by means of people's perception**

It is very much difficult to forecast any kind of atmospheric phenomena but extremely important. The loss of life and damage to properties can be reduced considerably if protective measures are taken in time, which require timely and reasonable accurate prediction of storms. In case of Kalbaisakhi, it is much tougher to forecast compared to others. The forecast has to be issued in the morning for small areas as most of Kalbaisakhi occur in afternoon and it is difficult to anticipate the changes likely to occur during the day and to estimate the conditions in the afternoon (Pramanik, 1938). At this stage it does not appear possible to state definitely what conditions in the morning are sufficient to give rise to nor'westers in any particular part of Bengal (Pramanik, 1938).

Today, forecast is done with the help of satellite imagery, weather data gathered from different meteorological stations. But in this paper, authors have attempted to forecast with the help of people's perception. Followings are ---

- Presence of red clouds in the western horizon with gaps indicates that storm will come within 5 - 6 hours.
- Ponds and ditches stink and smell stale before Kalbaisakhi.
- Wells give murky water before storm.
- Knots get tighter before rain due to high relative humidity in air.
- Salts become sticky and gains weight before storm as there is high relative humidity in the air.
- If temperature falls immediately with rainfall during storm, then lightning will be less in number and vice versa.

All these can be used as important forecasting tools through proper channelization.

### **A few preparedness approaches**

Warning through forecasting is of little use if no remedial measures and preparedness to be with the hazard are taken. Therefore for the area or community under threat, appropriate preparation both short term and long term is very important.

A few preparedness approaches have been proposed to reduce the hazardous effect of this special type of thunderstorm.

- ✓ It is very easy to say that plantation of trees is most important but in case of Kalbaisakhi mainly Pakur, Palm and Shaora trees are important.
- ✓ Considering the path of Kalbaisakhi in any Nor'wester prone settlements, designing of house should properly be made.
- ✓ Assessing the hazard risk and vulnerability of the areas under the threat and developing an infrastructure capable of handling the threat are required.
- ✓ To be aware by noticing the abnormal behaviour of cattle groups and others.
- ✓ Developing local voluntary groups to help the needy and so called preparedness for social defense (Mohanty and Mondal, 2006).

### **Inference**

Though many researchers have been carried out on Kalbaisakhi but research on people's perception has not been done yet. So, an attempt has been made by the present authors to study perception of the people who experience Kalbaisakhi in their daily life within the project area. This sort of research may innovate the sciences in the traditional beliefs and human perception and its relation with the modern technologies. Therefore, such perception study may be conducted at different places of West Bengal where Kalbaisakhi strike is regular during March-May. In this matter, local community participation is very much important as they will help us to know about the local cultural associations with Kalabsakhi, such as prevalent popular customs, beliefs etc. and to make a knowledge and awareness within the people of the area under threat about this hazardous thunderstorm.

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