Indigenous Knowledge of Weather Prediction

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ABSTRACT

The results of the study explained that the correctness of the predictions of rainfall (rainy days) in Panchangam in respective months of the years varied from 6.6 to 100.00 per cent. The findings also indicated that year wise percentage of correct predictions of fourteen years (1979-93) varied from 38.7 to 96.9. The highest correct predictions were made in the year 1989-90 followed by 1990-91. The lowest correct predictions were made in the year 1992-93. Further, the results indicated that overall mean percentage of correct prediction of rainfall (days) in fourteen years i.e., from 1979-93 is 71.42.

Key Words: Indigenous Knowledge, Weather Prediction.

Man is the Prime predictor of weather. His correct prediction depends upon the correct interpretation of indicators. Originally interpretation required expert knowledge of environmental objects comprising. Prediction of the nature of the present or coming year is considered as traditional skill. Nowadays the people, irrespective of caste and creed, have developed knowledge of facts pertaining to environment including climate and vegetation changes, animal behavioural changes for predicting the nature of the year.

MATERIAL AND METHODS

The documentary sources were used for studying indigenous weather prediction. Meteorological data reported by Deputy Coffee Plantation Manager, Maredumilli Mandal praja parishad were taken into account for analysis with panchang which was published by Panditha, Nemani Sri Ramasasthri, Sidhanthi, Sri Saraswathi Jyothishalayam, Kakinada – fourteen years data were collected i.e, from 1979-93, in meteorological data standard rainy days were recorded. In panchang also the predictions were made day basis which were quantified for the purpose of analysis. Percentage and average were worked out for comparing the data.

Indicators of weather prediction have been woven into villager's folk culture, as revealed in the local sayings. Such saying show their knowledge and beliefs regarding the winds, clouds, stars, vegetation, animal behaviour and their relationship with the good or bad prospects of crops have been documented.

People watch the behaviour of animal, insect, plant, panchang and other components of nature very minutely and predict the mood of the nature to minimize the risk. Based on this observation of people few methods of predicting the nature is given here.

Selvanayagum (1991) has suryed five villages in the Nellai Kathabamman district and documented farmers predictions, regarding their surroundings (1) the flowers of coriander will scatter down to the ground during moist and winter (2) If ants transport their eggs to a place of safety, the rain will come (3) Thumb (an insect) if it flows low, then rain will come, and (4) if the wind blows from North – East direction, then rain will come.

Proverbs for predicting the mood of monsoon :

(1) Sparrow dust bathing, faint colouration of bronze articles and dark blue sky are the signs of the possibility of heavy rains (2) If the sky reddish then there will be heavy rain, if the sky is faint yellow then there is less hope of rain (3) If "Kachanda" (Reptile) bears reddish colour on its lower portion of throat and the wind is blowing from North to West direction rain is expected immediately (4) If rain comes in the month of "Chaitra" then there would be dry spell during the month of Shrawana" (Golakia, 1992).

Trees as a forecaster of rain :

Farmers forecast the rain on the basis of flowering and ripening of the fruits of some trees. Rain is expected to start when full blooming of the "Ambil" tree (*Tamarindus indica*) take place ripening of fruits of "Ankul" and "Jambu" (*Syzqium cumini*) tree also indicates the commencement of rain (Rathva Metrabhal Khatpabhai, 1992).

Table 1. Month wise prediction of rainfall (days) in panchangamu.

Year/ month	1979-80			1980-81			1981-82			1982-83			1983-84			1984-85			1985-86		
	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%
Jan	-	-	-	-	-	-	13	1	7.7	3	-	-	-	-	-	1	-	-	7	2	28.6
Feb.	-	1	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	3	1	33.3
Mar.	-	-	-	-	3	-	21	4	19	-	-	-	-	-	-	-	1	-	8	1	12.5
Apr.	7	3	42.8	8	6	75	7	4	57.1	4	6	-	10	-	-	8	3	37.5	10	2	20.0
May	7	6	85.7	11	8	72.7	7	5	71.4	4	4	100	17	7	41.2	11	3	27.3	13	4	30.8
June	13	9	69.2	9	30	-	7	11	-	10	10	100	17	11	64.7	12	12	100	8	12	-
July	11	9	81.8	16	20	-	10	19	-	15	15	100	16	22	-	10	14	-	10	14	-
Aug.	13	15	-	13	17	-	12	18	-	12	22	-	17	22	-	10	16	-	13	11	84.6
Sept.	11	8	72.7	12	14	-	16	17	-	11	11	100	17	22	-	9	10	-	10	7	70.0
Oct.	17	7	41.1	11	6	54.5	10	5	50.0	12	13	-	17	10	58.8	13	7	53.8	12	9	75.0
Nov.	14	5	35.7	14	-	-	4	2	50.0	10	1	10	11	1	9.1	6	2	33.3	15	1	6.6
Dec.	9	1	11.1	11	-	-	-	-	-	5	-	-	10	1	10.0	7	-	-	13	-	-

Year/ month	1986-87			1987-88			1988-89			1989-90			1990-91			1991-92			1992-93		
	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%	P	A	CP%
Jan	13	1	7.7	5	1	20	-	-	-	-	-	-	-	-	-	13	1	7.7	8	-	-
Feb.	8	1	12.5	1	-	-	-	-	-	-	-	-	-	2	-	11	-	-	10	1	10
Mar.	12	-	-	4	-	-	-	-	-	-	3	-	-	3	-	12	-	-	8	1	12.5
Apr.	6	1	16.7	17	2	11.8	10	7	70	9	1	11.1	12	1	25	9	5	55.6	10	3	30
May	10	5	50.0	10	3	30.6	5	5	100	8	3	37.5	8	6	75	10	8	80	7	3	42.9
June	11	7	63.3	2	3	-	9	4	44.4	15	17	-	13	13	100	12	18	-	17	9	52.9
July	9	8	88.9	11	12	-	15	23	-	16	16	100	13	29	-	14	24	-	17	11	64.7
Aug.	14	12	85.7	14	14	100	11	24	-	13	26	-	15	23	-	13	20	-	14	15	-
Sept.	5	4	80	13	10	76.9	15	23	-	20	19	95	15	16	-	15	15	100	15	8	53.3
Oct.	12	10	83.3	14	10	71.4	21	6	28.6	5	9	-	10	15	-	16	13	81.3	18	2	11.1
Nov.	13	2	15.4	13	10	76.9	6	-	-	9	-	-	12	-	-	12	5	41.7	12	-	-
Dec.	9	-	-	14	-	-	4	-	-	3	1	33.3	14	-	-	11	-	-	1	-	-

P : Prediction   A : Actual   CP % : Percentage of Correct Prediction

Table 2. Year wise predictions of rainfall (days) in Panchangamu.

Year	Total number of predictions	Actual number of rainy days	Percentage of correct prediction
1979-80	102	64	62.7
1980-81	105	94	89.5
1981-82	113	86	76.1
1982-83	86	82	95.3
1983-84	132	96	72.7
1984-85	87	68	78.2
1985-86	122	64	52.5
1986-87	122	51	41.8
1987-88	118	65	55.1
1988-89	96	92	95.8
1989-90	98	95	96.9
1990-91	112	108	96.4
1991-92	148	109	73.6
1992-93	137	53	38.7

Table 3 . Over all prediction of rainfall (days) for fourteen years i.e. from 1979-93 in Panchangamu.

Total number of predictions : 1578
Actual number of rainy days : 1127
Overall mean percentage of correct prediction : 71.42

Insect pest as a forecaster of rains :

Farmers forecast the possibility of rain on the basis of appearance of pest. Appearance of larval pest (locally known as "Zara") in abundance on crop indicates, that there will not be rain upto 27 days. This pest can be found in only rainy season. It cannot be destroyed by any means except rain water, so farmers do not take any preventive measures to control it (Sinha and Mohan Sinha Mahita, 1992).

The farmers do not begin to prepare their fields in dry zone of Sri Lanka until they hear the cry of the pitta (*Pitta brachyars*). It is migratory bird and arrives in Sri Lanka around September. However, it is a week flyer and takes advantage of N-E monsoon winds. These winds blow the moisture loden air from the Indian peninsular to Sri Lanka, that carrier the rain needed for their "Maha" or major rice cropping season. The truth behind the superstition now is clear. The birds cannot migrate until the monsoon begins. Hence their arrival is a signal that rains are due soon and the field preparation should begin (Similar practice about gram sowing in Western Haryana linked with sighting of the bird "Kunji:). (Peterwise, 1992).

Rath (1992) compiled following proverbs from Orissa :

(1) If banana is planted in "Jestya" and "Pandanas" in "Aashada" month even if you throw / neglect then they will survive (2) Planting of beetle vine in"Sravana" month will double the profit (3) If star is seen inside the ring of moon there will be heavy rain (4) More mango, more paddy, more tamarind, definitely there will be flood.

Forecasting rain :

(1) Ants : Ants coming out from their nest carring their pupae, indicates, that rain will come soon (2) Goat: Goats can sense approaching rain, and through behavioural change signal the coming 2-3 days in advance. They change their usual resting places, show little interest in taking food or water, and bawl and stout the day long (3) Neem: If the neem (*Azadirachta indica*) tree bears plenty of fruit and the "Saval" *Acacia nilotica*) tree produces plenty of pods, then the total rainfall for the monsoon will be high.

Forecasting of frost :

Farmers in this area (Nagrada, Gujarat) grow native varieties of cotton called "Kalyan" and "Ghumad" over large areas in Viramagam and Surendranagar districts. In the winter, delayed crops of cotton can suffer heavy losses due to frost. If there is a rain in seventh day of next fortnight of the month Shravan there is a high chance of frost that winter and if rain comes on eighth day of next fortnight of month shravan (they called Janmashthami) the chance of frost that winter will be low. Using this method, farmers decide whether or not to go for later sowing (Gupta and Patel, 1993).

Parasar (1993) explained indicator used by ancient people to predict the occurrence of instant rains, which includes the activity of animals such as cat, peacocks, ants, deer, human beings and snakes etc. Panchang (Almanac): The percentage of correct predictions of eleven year (1976-86) varied from 46.42 to 75.86. The highest correct predictions were made in the year 1986 followed by 1982 (Singh and De, 1993).

RESULTS AND DISCUSSION
A. Folk lore and prediction :
1). Winds :

(1) If the wind blows from North to East direction then rain will come (2) High wind activity in "Arurdra" constellation indicates drought (3) If rain will occur in the entrance of "Arurdra" constellation, then there will be dry spell for the coming 60 days. If rain in the night at the entrance of "Arurdra" constellation then the future occurrence of rain in the night only (4) If there is lightening in "Mukna" constellation, there will be no problem for rain for coming constellation periods. (5) From September onwards Eastern winds prevail, this will prevent the pest and disease attack.

2) Clouds :

Based on cloud colour, distance and movement farmers decide the occurrence of rain (1) Presence of more dark coloured clouds without wind and closure to the earth, indicates occurrence of rain within 2-3 hours (2) Black/dark colour clouds with fast movement and far from earth, indicate rain will not come (3) Presence of red clouds in the Western side with gaps, the rain will come within 5-6 hours.

3) Stars :

(1) If there is a ring around moon, then rain will come. If ring is close to the moon, in far places rain will occur; if ring is distance to the moon, in nearer places rain will occur. (2) Stars movement from North to South towards East bending, indicates occurrence of rains.

4) Vegetation :

(1) The vegetation of forest regrowth is indication of starting of monsoon and farmers starts their farming occupations on this basis (2) Farmers forecast the rain on the basis of presence of number of seeds on "Moduga" (a plant species) fruit. If the fruit having 3 seeds in the three locules, that means rain will occur in all three stages of cropping i.e. Beginning, middle and end of cropping season. Missing of seeds indicates drought in that year (3) In a particular year if the tamarind tree bears more fruits, that year may be drought year, if the mango bears more fruits, in that year may be non-drought year and crop situation will be better.

5 Animal behaviour :

(1) Frog make special sound, there will be rain on that day (2) Goat: goats have sensed approaching rain, and through behavioural change signal the coming one or two days in advance. Changes their usual resting places, show little interest in taking food or water and bawl and stout (sneezing) the day long (3) If the "dragon fly" flies on nearer to the ground indicate, rain will occur (4) If the butterfly flies low, indicate, there will not be any rain (5) If calves "Sneeze" there will be rain (6) when a bird "Kolakodi" makes sound and moving outside indicate, there will not be any rain (7) Based on "Fowl" (Hen) behaviour, farmers will predict occurrence of rain, if fowl will bend on oneside, that indicate low intensity of rain (8) Farmers forecast the possibility of rain on the basis of appearance of bird.

"Kannepitta" will indicate the ready of all crops for harvesting and also indication for coming of heavy rains. This bird will come in the month of October-November i.e., "Munikodinela".

Panchangamu :

There is a practice to go through Almanac (Panchangamu) before any auspicious activity like birth and death anniversaries, marriage, agricultural practices and construction activities etc. Either individual reads himself/herself or go to the professional persons (Brahmin) for getting the answers of their queries. In the present study an attempt has been made to compare the data regarding rainfall (days) for fourteen years i.e., from 1979-93 available with governmental departments with the predictions made in panchangamu for the same period.

The results from Table : 1, explained that the correctness of the predictions of respective months of the years varied from 6.6 to 100.00 per cent.

1. Correct predictions :

The cases where predicted rainfall days are equal to actual rainy days or no prediction and no rainfall were considered as correct predictions. From the data, 1982-83 (May, June, July, September), 1984-85 (June) 1987-88 (August), 1988-89 (May), 1989-90 (July), 1990-91 (June), 1991-92 (September) years predictions were 100.00 per cent in respective months. Where as 1979-80 (January, March) 1980-81 (February) 1988-89 (January, February, March), 1989-90 (January, February), 1990-91 (January) years no prediction and no rain fall had resulted.

2. Predictions more than actual / predicted but no rain :

In the following years and respective months the number of predictions were more than actual, which include 1979-80 (April – July, September, December), 198081 (April, May, October), 1981-82 (January, March, May, October, November) 1982-83 (November), 1983-84 (May, June, October – December), 1984-85 (April, May, October, November), 1985-86 (January-May, August-November), 1986-87 (January, February, April-November), 1987-88 (January, April, May, September-November), 1988-89

(April, June, October), 1989-90 (April, May. September, December), 1990-91 (April, May), 1991-92 (January, April, May, October, November), 1992-93 (February – July, September, October). The percentage of correct predictions according to month wise ranges from 6.6 to 100. According to month wise the highest correct predictions (i.e 4) were recorded in the year 1982-83. In case of predicted but no rain, 1980-81 (November, December), 1981-82 (February), 1982-83 (January, December), (1983-84) (April) 1984-85 (January, December), 1985-86 (December), 1986-87 (March, December), 1987-88 (February, March, December), 1988-89 (November, December), 1989-90 (November), 1990-91 (November, December), 1991-92 (February, March, December) 1992-93 (January, November, December).

3. Predictions less than actual / not predicted but rain :

In the following years and respective months the number of predictions were less than the actual, which include 1979-80 (August), 1980-81 (June – September), 1981-82 (June – September), 1982-83 (April, August, October), 1983-84 (July, August, September), 1984-85 (July, August, September), 1985-86 (June, July), 1987-88 (June, July) 1988-89 (July, August, September), 1989-90 (June, August, October) 1990-91 (July, October), 1991-92 (June-August), 1992-93 (August). In case of no predictions but rain 1979-80 (February), 1980-81 (March), 1984-85 (March), 1989-90 (March), 1990-91 (February, March) years and respective months were recorded.

The Table 2, revealed that year wise percentage of correct predictions of fourteen years (1979-93) varied from 38.7 to 96.9. The highest correct predictions were made in the year 1989-90 followed by 1990-91. The lowest correct predictions were made in the year 1992-93.

In Toto, the results indicated that the correct predictions of rainfall (rain days) in panchangamu are very high i.e., 6.6 to 100%., 38.7-96.9% and 71.42% in month wise, year wise and overall mean of fourteen years (i.e) from 1979-93 respectively. Therefore, it seems to be an appropriate time for the scientific community to revaluate its importance and scope for solving the problems and meet needs of rural people.

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