



Weather Health Indices for Ranges of Rainfall in ITKs Through Murthy's Concepts

V R K Murthy, P Venkata Rao, B Jyothi Basu and S Kiran Kumar

Department of Agronomy, Agricultural College, Bapatla 522 101, Andhra Pradesh

ABSTRACT

A study was conducted for 30 years from 1983 to 2013 to convert the farmers usage of qualitative terms into quantitative terms with respect to rainfall in the state of Andhra Pradesh. The qualitative terms which depict the ranges of rainfall in traditional knowledge like “ No, Low, Moderate and Heavy “ were scientifically and technically quantified as “ 0, 0-16, 16-24 and 24-40 mm “ respectively. Also, farmers qualitative terms in ITWKs such as “Normal drought, moderate drought and severe drought” are quantified as “ < 25%, 25-50% and >50%” respectively of the normal rainfall of Andhra Pradesh. The quantitative terms are precisely defined as “Constants”, after the introduction of the terms “Weather health” and “Weather health indices” since 2012. A huge 81 per cent of the 2200 farmers/ teachers/ students who were interviewed / surveyed expressed that the weather health indices, thumb rules and agro-almanac helped them to overcome the daily weather related risks and uncertainties, more so during cyclones in their farms. In addition, the “Weather health indices” observed through Murthy's Daily Weather and Agriculture (MDWA) were found suitable as “Service” through the “Weather health indices”.

Key words : Health indices, Weather.

The farmers in the state of Andhra Pradesh, India have so far managed their agriculture and their environments in which they were living by following environmental friendly practices and without significantly damaging local ecologies. This clearly indicates that their indigenous technical weather knowledge bears the potential to address the issues related to climate change and variability. However, this traditional knowledge and ageing innovations are largely insufficient to meet the present day crop production risks occurring due to climate change and its variability trends. This is because, nearly 180 years of scientific agriculture has over exploited the natural resources of farmers. The situation necessitated the farmers to understand and select the products of contemporary science, innovations and improvements and mixing their ITWK and making it “ Blended weather technologies” in evolving coping strategies for climate change and variability (Murthy, 2016). The traditional/ indigenous knowledge of the farmers of Andhra Pradesh is very rich. It is well known and seen in Puranas, Vedas, upanishds, Brahma sutras ect. It is also available in their folk songs, proverbs. In addition it is seen in general

observations of plants as also animal, birds and insects behaviour. However, with the present day technology development, the vast ITWK is taking back seat. It is observed that the contemporary scientific knowledge is proving to be largely inadequate to suit to the needs of the farmers who needs the information on a tailor made form because of their illiteracy. It is believed that if a technique that involves the conjunctive use of ITWK with contemporary scientific knowledge is developed for the farmers of the State, it would serve as a bench mark in solving the problems of farmers on weather and climate related risks and uncertainties.

As a first step a technique to quantify the qualitative terms used by the farmers in the State are quantified/developed in this study. It was proposed to use the same in due course of time in developing a tailor made weather/climate forecast and prediction service for these farmers. Therefore, the objectives of the study were:

1. To quantify the qualitative terms on ITWKs of rainfall
2. To develop a climate service to overcome the risks and uncertainties of weather and climate

MATERIALS AND METHODS

Very simple questionnaires, interviews with the farmers, students etc., were recorded. The qualitative terms traditionally used by the farmers were segregated and categorized as “No rain”; “Little rain”; “Moderate rain” and “Heavy rain”. The actual rainfall recorded as per India Meteorological Department was tabulated as per Standard Meteorological weeks. This was compared with qualitative terms used in the villages for both local languages of farmers and panchangas used. The scale to convert qualitative terms into quantitative terms was developed as follows.

Computations

If actual rain occurred as per IMD is between 0 to 20 mm and farmers words are falling in this range, then it can be taken as 20 mm for comparison purposes on if the actual rain occurred is > 20 mm then farmers or panchangas indicate that it is light rain then it can be recorded as 10 mm (the average of 0+20 mm).

Similarly, if the recorded rainfall it is falling 20-50 mm it is taken as for both cases or if it is >50 mm by IMD then for farmer method it is recorded as 35 mm the average of (20+50) is taken.

On the same analogy if the IMD rainfall is >50 mm and farmers prediction is heavy the IMD recorded is taken as it is. If the IMD recorded is <50 mm then this actual figure and 50 mm as base is added for the farmers and panchangas prediction. The term “Indigenous Technical Knowledge (ITK)” is used as synonym to ‘local’ and ‘traditional’ knowledge to differentiate it from ‘Scientific’, ‘Modern’ and ‘Rational’ knowledge.

RESULTS AND DISCUSSION

History unveils that agriculture in totally practiced in the ancient times based on ITK produced healthy crops and better environment. So, there is a need to increase awareness on the subject for sustainable crop production in modern Agriculture in India (Murthy, 2007). The rich heritage and knowledge base reflected in ITKs in Indian Agriculture and Andhra Pradesh in particular needs to be disseminated to the present day agricultural scientists, Murthy (2016). This stimulates them to dig more into this precious knowledge base and plan research either to confirm

or otherwise. The long range weather forecasting is a specialty with ancient astrologers which is a difficult task with present day meteorologists. These astrological methods should not be ignored because these are unique to Indian culture which predicts the rainfall of coming year (s) with high percentage of accuracy. The rules and laws governing weather prediction through ITK are simple, cost effective and no apparatus is required. The ITK on weather is holistic, because these methods take into account the extra-terrestrial happenings which are significant in rainfall forecasting (Murthy 2002 and 2007).

Development of Agro Almanac

It was found in the present study that even though the ITK on rainfall forecasting is less precise than modern ones they will definitely form foundation techniques/ blocks and serve even as landmarks in the evolution of more accurate modern rainfall prediction techniques. Based on the findings of the present study it is observed that this indomitable spirit of research will help in the development of sustainable agriculture in the years to come. It was also noted that an Agro-almanac be published in local colloquial language annually, with low cost and made available sufficiently to all stake holders. It must suggest region-wise, season-wise and crop-wise strategies for undertaking/ avoiding farm related operations based on anticipated weather on daily/weekly/monthly/annual weather forecasting. It should be comprehensive in coverage of contents. The study also related that the Blended Weather Technology (BWT) can easily disseminate even to illiterate farmers through personal interactions, casual conversations and observations during the agricultural field operations. However, the challenge is how to bring together ITK and modern rainfall forecasting techniques without substituting each other and respecting these two sets of values and build a Blending Technology (BT) on their respective strengths. Finally a book “Vatavaranam and Vyavasayam” was published.

Conclusions

- a) The qualitative terms which depict the ranges of rainfall in traditional knowledge like “ No, Low, Moderate and Heavy “ were scientifically quantified as “ 0, 0-16, 16-24 and 24-40 mm “ respectively.

Table 1. Weather data used in the study.

S.No	Station Index	Station Name	District	Latitude (North)	Longitude (East)	Altitude Mtr AMSL	Weather data available
1	43168	Mahbubnagar	Mahbubnagar	16° 442	77° 592	498	36 years
2	43177	Rentachintala	Guntur	16° 332	79° 332	104	31 years
3	43184	Nidadavole	West Godavari	16° 542	81° 402	18	40 years
4	43187	Narsapur	West Godavari	15° 272	81° 452	15	19 years
5	43212	Nanadyal	Kurnool	15° 292	78° 292	216	36 years
6	43213	Kurnool town	Kurnool	15° 502	78° 042	274	38 years
7	43220	Bapatla	Guntur	16° 222	80° 272	10	30 years
8	43237	Anantpur town	Anantpur	14° 412	77° 372	335	38 years

- b) The farmers qualitative terms in ITWKs such as “Normal drought, moderate drought and severe drought” are quantified as “ < 25%, 25-50% and >50%” respectively of the normal rainfall of Andhra Pradesh
- c) The quantitative terms are precisely defined as “Constants” . These are converted into the terms “Weather health” and “Weather health indices” since 2012, after the coining of these terms.
- d) A huge 81 per cent of the 2200 farmers/ teachers/ students who were interviewed / surveyed expressed that the weather health indices, thumb rules and agro-almanac helped them to overcome the daily weather related risks and uncertainties more so during cyclones in their farms.

LITERATURE CITED

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