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Original Article

Initiation and Establishment of Agrometeorological Obesrvatory and Quantification of Weather at VCSG College of Horticulture, Bharsar

Ravi Kiran

Abstract

V.C.S.G. College of Horticulture, Bharsar, Pauri Garhwal, Uttarakhand,was established in 2001 under Govind Ballabh Pant University of Agriculture & Technology, Pantnagar till 2011 as 11th College of the university. V.C.S.G. College of Horticulture, Bharsar. The Latitude of bharsar (pauri garhwal) is 30.060 N. The Longitude of bharsar (pauri garhwal) is 78.990 E and height is 2000 m MSL altitude. An agrometeorological Observatory was established by the sole author of this research paper by the sole author of this paper, Dr. Ravi Kiran who was appointed as Assistant Professor (Agrometeorology) in January 2006 by the Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, during 2007-2008 and daily data recording of different weather parameters has been started by the author of this paper since May 2008 onwards.

Keywords: Agro Meteorological Observatory; Weather Data; Maximum Temperature; Minimum Temperature; Rainfall; Snowfall; V.C.S.G. College of Horticulture; Bharsar.

Introduction

Crop yield is influenced by several factors like weather, soil type and its nutrient status, management practices and other inputs available. Weather is the only environmental factor which influences the growth and final yield of the crop cycle. It governs the crop phenological development and the efficient conversion of biomass into economic yield. Weather assumes significance in nearly every aspect of agricultural activity, storage and plant protection measures, hence success or failure of crop is intimately related to the prevailing weather conditions. Therefore records of weather are a must for future planning.

Pauri Garhwal is located between 29^0 20'-29^0 75' N latitude and 78^0 10'-78^0 80' E longitude, which covers around 5540 km^2 area. The district is the most fascinating segments of Himalaya, stretches from the Ram Ganga river that separates Pauri-Kumaon border in the East, and to the Ganga depicting the Western border. Almora, Nainital (East), Chamoli, Tehri and Dehradun (North-West) and adjacent plains of Bijnor, Hardwar (South) districts, surround this district. Bharsar is about 60 km from the district head quarter (Pauri) in the East-South direction on the road side area of Pauri-Thalisain-Ram Nagar National Highway. Bharsar meaning in local dialect is 'flourished with natural wealth'. It contains the temperate evergreen forest towards North-East (Budha Bharsar), North-West (Chauri Khal), East-South direction have terracing crop fields and village namely Dhulet, Sakniyana, Buransi, Nauntha, Sainji.

The climate of the Bharsar is represented by the mild summer, higher precipitation and colder or severe cold prolonged winter. Major output of precipitation is in the form of rain fall, alongwith occasional occurrence of due, hailstorm, fog, frost, snow fall. The South-West monsoon starts by the end of June while the western disturbances cause occasional winter

Author's Affiliation: Associate Professor (Agrometeorology), Department of Agrometeorology, College of Agriculture, Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Uttrakhand 263145, India.

Corresponding Author: Ravi Kiran, Associate Professor (Agrometeorology), Department of Agrometeorology, College of Agriculture, Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Uttrakhand 263145, India.
E-mail: ravikiransaxena@rediffmail.com

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showers during November-February. During winter, snow fall is common in this region. During summer months, the valley has warm climate prevailing for few hours in a day, but the nights are cool. Climate change is expected to have serious environmental, economic, and social impacts in mountainous regions worldwide.

This region is situated in mid hills of garhwal region representing temperate climate.

Major farming systems/enterprises (based on the analysis made by the KVK's) are:

Farming System / Enterprise

1. *Bhabar Irrigated*: Rice, Wheat, Sugarcane, Rapeseed, Mustard, Potato, Lentil, Mango, Guava and Litchi
2. *Irrigated Lower Hills*: Rice, Wheat, Onion, Chilies, Peas, Potato, Radish, Cauliflower, Soybean, Mango, Guava, Plums and Peaches
3. *Rainfed Lower Hills*: Finger Millet, Maize, Rice, Wheat, Pulses, Mango, Plums, Guava, Peaches
4. *Mid Hills*: Barnyard Millet, Ffinger Millet, Rice, Wheat, Soy Bean, Potato, Tomato, Peas, Cole Crops, Pulses, Citrus, Plums and Peaches
5. *High Hills*: Barnyard Millet, Amaranth, Finger Millet, Cole Crops, Potato, Peas, Peaches, Plums, Pear, citrus, stone fruits.

Description of Agro-climatic Zone & major agro ecological situations (based on soil and topography)

S. N.	Agro - Climatic Zone	Characteristics
1	Zone A (Up to 1000m)	Alluvial mixed with boulders and shingles, Alluvial sandy soil, residual sandy loam.
2	Zone B (1000-1500 m)	Sandy loam.
3	Zone C (1500-2400 m)	Red to Dark.

Source: http://paurigarhwal.kvk4.in/district-profile.html)

Having a wide variation in climate and weather the area had an urgent requirement of recording of weather data on regular basis in an agrometeorological observatory.

Materials and Methods

V.C.S.G. College of Horticulture, Bharsar, Pauri Garhwal, Uttarakhand, was established on June 12, 2001 under Govind Ballabh Pant University Of Agriculture & Technology, Pantnagar. There was no agrometeorological observatory till 2006. The imitative was taken to establish an agrometeorological observatory for regular records of various weather data on daily basis, by the sole author of this paper, Dr. Ravi Kiran who was appointed as Assistant Professor (Agrometeorology) in January 2006 by the Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, to establish an agrometeorological observatory for regular records of various weather data on daily basis So, in the campus out of 3 proposed sites for establishment of agrometeorological observatory, one at the heart of campus was selected by the sole author of this paper. Site finally selected was situated at the area adjacent the road near Dean's office / girls' hostel adjacent to floriculture block and medicimnal and aromatic block in the campus. Hill top of the selected site was levelled before installation of the instruments. Required masonry work was done for installation of the instruments. Following instruments were installed in agrometeorological observatory (plate 1).

1. Maximum and minimum thermometers.
2. Wet and dry bulb thermometers.
3. Soil thermometers (5, 10, 20 cm).
5. Rain gauge (ordinary).
6. Wind vane and anemometer.
7. U.S.W.B. open pan evaporimeter.
8. Sunshine recorder.
9. Snow gauge

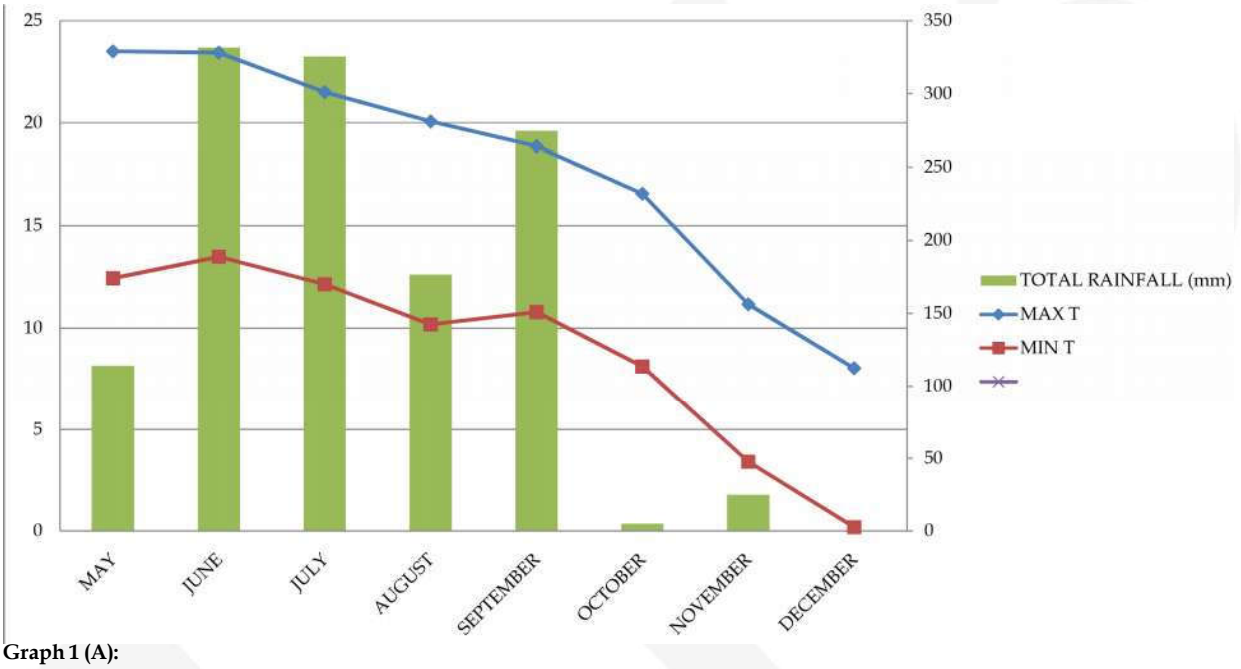
A temporary fencing of the agrometeorological observatory area was made to watch and ward off the wild animals. The recording of weather data was started by May, 2008.

Result and Discussion

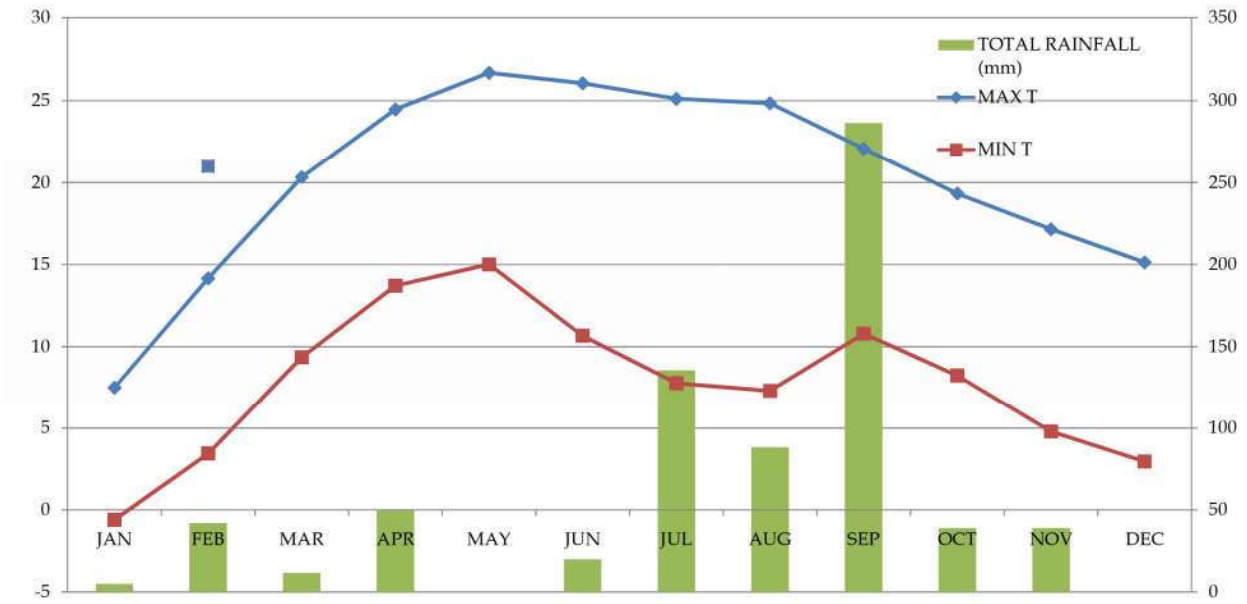
The climate of the Bharsar comprises of the mild summer, higher precipitation and cold prolonged winter. The weather parameters like. precipitation, temperature, relative humidity and wind, along with elevation (valleys or mountain range from temperate zone), proximity to Great Himalaya, slope aspects, drainage, vegetation etc are responsible for highly variable the micro-climate of this area. Precipitation comes in the form of rainfall, besides occasional hailstorm, fog, frost, snow fall etc. The South-East monsoon commences towards the end of June while the western disturbances cause occasional winter showers

during November-February. During winter, snow fall is common in this region. During summer months, the valley has hot climate prevailing for noon hours in a day, the maximum temperature during May-June is recorded between 30^{0}C-35^{0}C however, and nights are cool. December and January are the coldest months, the minimum temperature reaches to 1^{0}C to -4^{0}C. The average monthly maximum temperature was 20.24, 16.25 and 15.45^{0}C having highest and lowest monthly values 26.68, 19.86, 20.38^{0}C and 7.5, 9.0, 7.3^{0}C, respectively during 2009, 2010 and 2011.The average monthly minimum temperature was 6.98, 7.0 and 5.3^{0}C having highest and lowest monthly values 10.8, 11.57, 10.75^{0}C and 2.9, -0.9, -2.5 ^{0}C, respectively during 2009, 2010 and 2011. The annual rainfall was 667.6, 1684.4 and 970.3 respectively during 2009, 2010 and 2011.

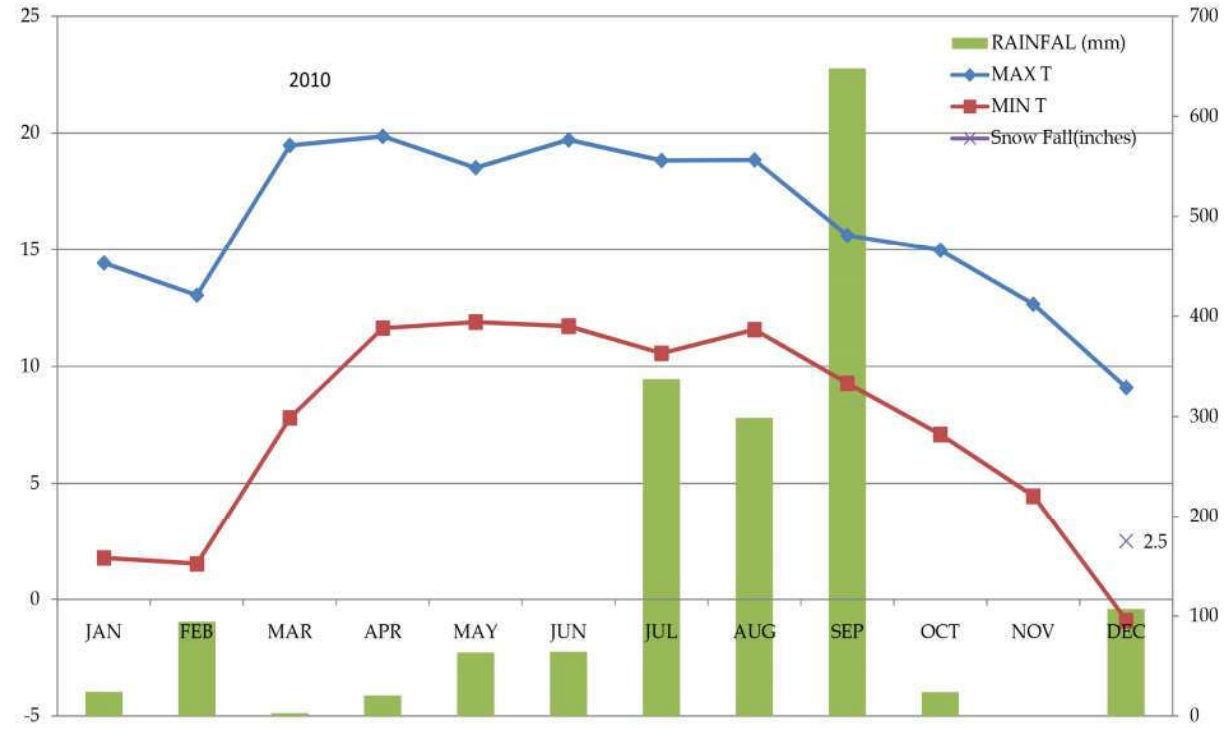
The rainfall during sowth west monsoon was 530.4, 1411.8 and 877.3 respectively during 2009, 2010 and 2011.The rainfall during October-December was 39.0, 13.8 and 2.4 respectively during 2009, 2010 and 2011 (Graph 1 A-E).



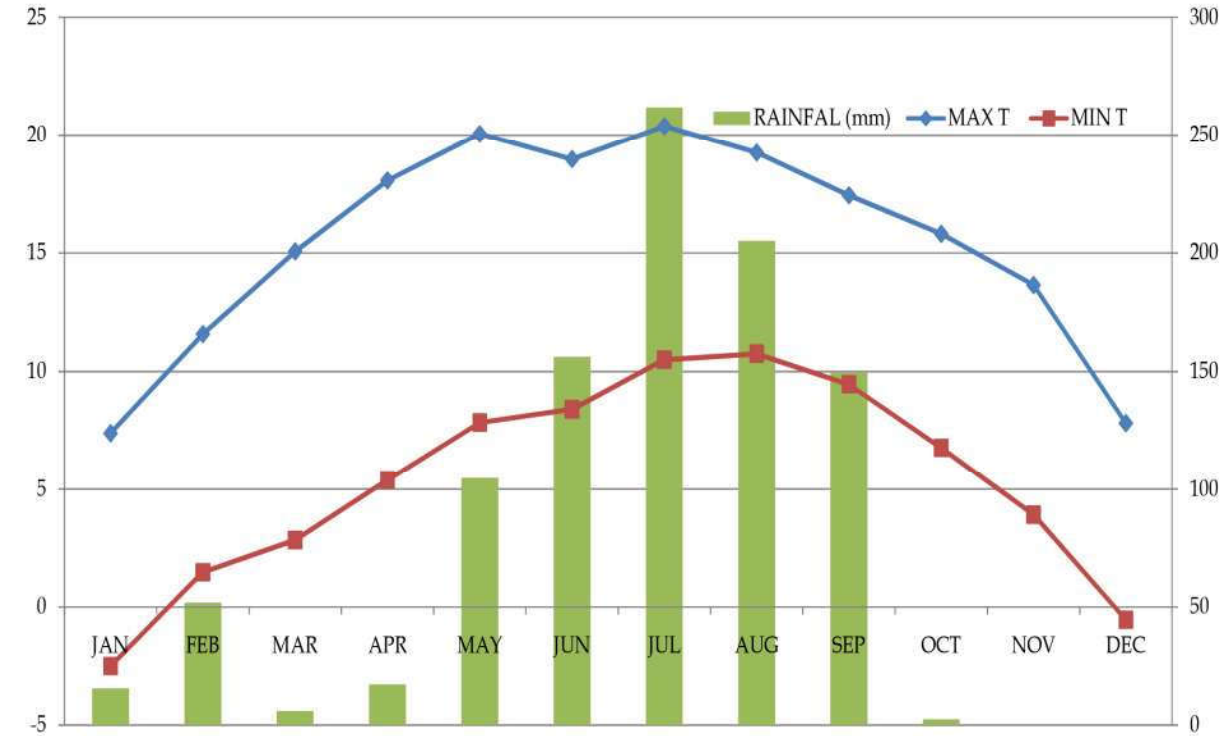
Graph 1 (A):



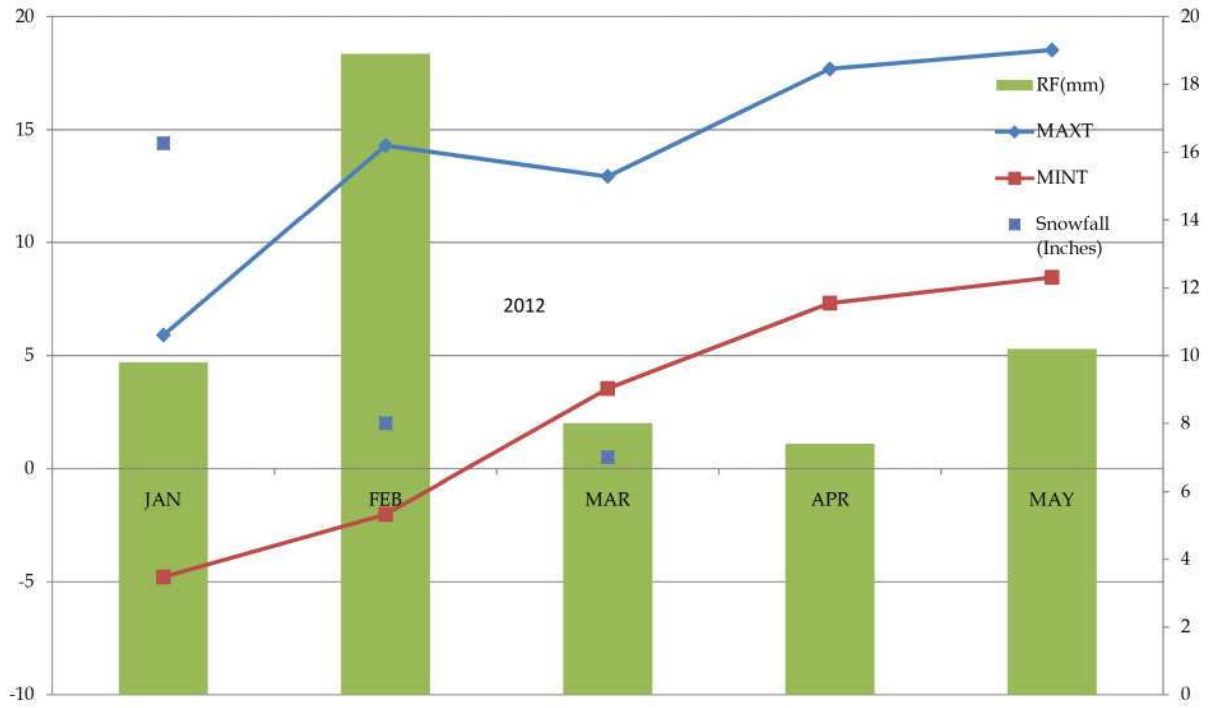
Graph 1 (B):



Graph 1 (C):



Graph 1 (D):



Graph 1 (E):

Graph 1 (A, B, C, D, E): Variations in Maximum (^{O}C), minimum temperature (^{O}C) , snowfall (inches) on primary Y axis and rainfall (mm) on secondary Y axis recorded during 2008- 2012 at VCSGC, Bharsar

Plate 1 (A):

Plate 1 (B):

Plate 1 (C):

Plate 1 (D):

Plate 1 (E:

Plate 1 (F):

Plate 1 (G):

Plate 1 (H):

Plate 1 (I):

Plate 1 (J):

Plate 1 (K):

Plate 1 (L):

Plate 1 (A, B, C, D, E, F, G, H, I, J, K, L)**:** Preparation and installation of agrometeorological Observatory at VCSG College of Horticulture, Bharsar.

Conclusion

On the basis of data it may be concluded that there is wide variation in case of Maximum, minimum temperature, rainfall in the region. There is wide variation in the temperature range also. The average monthly maximum temperature range was 19.18, 10.77 and 12.99^{0}C respectively during 2009, 2010 and 2011. The average monthly minimum temperature range was 7.84, 12.47 and 13.25^{0}C respectively during 2009, 2010 and 2011. Therefore, a thorough analysis is highly needed for proper planning of agriculture under the climatic conditions of Bharsar.

References

1. http://paurigarhwal.kvk4.in/district-profile.html.