



LONG-TERM MONITORING OF CLIMATE-DRIVEN EFFECTS ON INDIAN FORESTS

As the lead institute under all India coordinated project on climate change, Forest Research Institute (FRI), Dehradun, has established 152 ha permanent research plots in different forest types of India in collaboration with nine ICFRE institutes and four outside institutes to study the climate driven effects on Indian Forests.

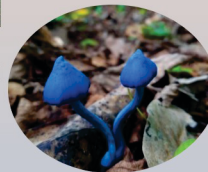
Project Activities

- Phenological study is being conducted on 2921 geo-tagged individuals belonging to 264 species in different forest types



- A total of 1,88,667 woody individuals above 1 cm DBH have been measured, mapped and tagged with unique numbers following common protocol.

- Fungal fruit bodies and their abundance, fruiting pattern, and host preferences are being recorded along with the geo-tagging.



- Soil health is being monitored along with litter dynamics.
- Weather parameters are being recorded at each study site.

- Physiological parameters are being recorded in the dominant tree and shrub species



- Observations on flowering host plants, their pollinators, and the frequency of insect pollinators are being recorded.

- The biodiversity of the respective areas has been studied following the belt transect method and been published.



Forest Ecology and Climate Change Division

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ASSESSMENT OF WATER REQUIREMENT OF DIFFERENT FOREST TREE SPECIES AND ITS IMPACT ON SUBSOIL MOISTURE

Introduction

The project aims to identify the best suitable forest species for plantation under different rainfall conditions in the country to maximise water yield from a catchment. Under the study, several forest tree species have been tested under different rainfall conditions. The total water requirement for transpiration of a particular tree species has been measured with the help of the measurement of sap flow velocity.

Tree species and location- selected under the study

1. *Quercus leucotrichophora* (BANJ OAK) -Benog Wildlife Sanctuary, Mussoorie
2. *Shorea robusta* forest (SAL) Champion Block, Fri, Dehradun
3. *Prosopis juliflora* forest at Sanjay Van, New Delhi

Installation of Sap flow monitoring system



Quercus leucotrichophora (Banj Oak)



Shorea robusta (Sal)



Prosopis juliflora



Pinus roxburghii (Chir Pine)

Location of the experimental site

Quercus leucotrichophora (Banj Oak) at Benog Wildlife sanctuary (30.53392°N; 77.18410°E)



Shorea robusta forest Champion block, FRI, Dehradun (30°20'18.20"N; 78°0'39.40"E)



Prosopis juliflora forest at Sanjay Van, New Delhi (28.53920°N; 77.18410°E)

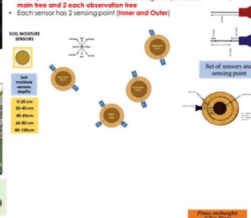


Pinus roxburghii (Chir Pine) at Susekholi, Mussoorie Range (30°25'03.7°N; 78°09'44.7°E)



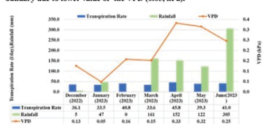
Layout of the observation tree

- Observation trees (OT) has been selected on the basis of enumeration survey and identify the main and replicate trees.
- The sap flow sensors has been installed diagonally, 3 for the main tree and 2 each observation tree.
- Each sensor has 2 sensing point (Inner and Outer)



Relationship between transpiration rate, rainfall and VPD

- Higher transpiration rate (46.1/day) was observed due to higher value of VPD (0.332, kPa) in the April month.
- Whereas, the minimum transpiration rate (33.5, l/day) was observed in January due to lower value of the VPD (0.05, kPa).



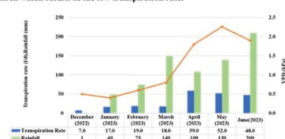
Relationship between transpiration rate, rainfall and VPD

- The transpiration rate increases (92 l/day), as the VPD decreases (0.9 kPa).
- Rainfall occurrence lowers the transpiration rate as well as VPD



Relationship between transpiration rate, rainfall and VPD

The increased in the rainfall was leading to decrease in the transpiration rate this was due to low VPD. The high rainfall was occurred in the month of march which results in the low transpiration rate.



Relationship between transpiration rate, rainfall and VPD

The transpiration rate was maximum (28.1 l/day), in month of February having VPD of 1.4 kPa and minimum transpiration rate (16 l/day) in the month of December, having VPD of (0.6 kPa).

