

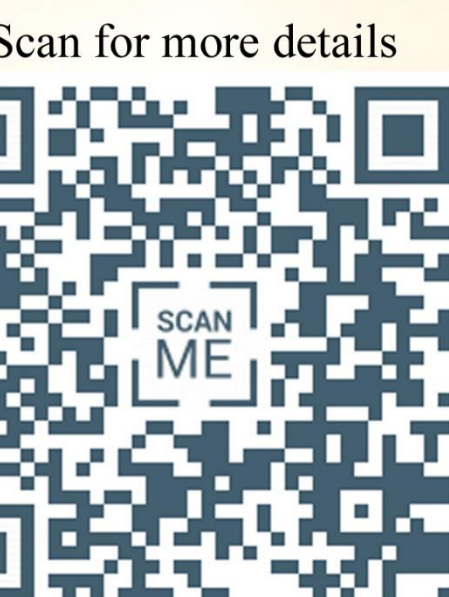
Assessing the Occurrence of Drought Based on SPI, NDVI & LST for Indian Region

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1 ABSTRACT

Water scarcity is one of the major global problem leading to severe drought. Droughts are recurring climatic events, bringing significant water shortages, economic losses and adverse social consequences.

The current drought management practices focus more on the symptoms and impacts of drought than underlying the causes for the vulnerabilities associated with these impacts. The preparedness for drought should form an important part of national environmental policy which focuses more on risk reduction accompanied with drought mitigation and preparedness plans.

At present, India have limited institutional and technical capacity to prepare for a drought and to mitigate its impact. Hence, the present study aims to develop an early warning system (EWS) based on historical monthly precipitation data through commonly used meteorological index SPI and NDVI.

The results from the two analyses are compared and correlated with Land Surface Temperature (LST) to estimate the severity of drought since temperature also plays a significant role in occurrence of drought.

2 INTRODUCTION

Drought is a long-term phenomenon lasting from months to years causing significant ecological as well as economic damage. It is manifested with reference to depletion in surface and groundwater resources and crop failure (NAAS, 2011). There is an expected increase in drought severity and frequency with climate change (Vasiliades et.al., 2011; Wilhite et.al., 2014).

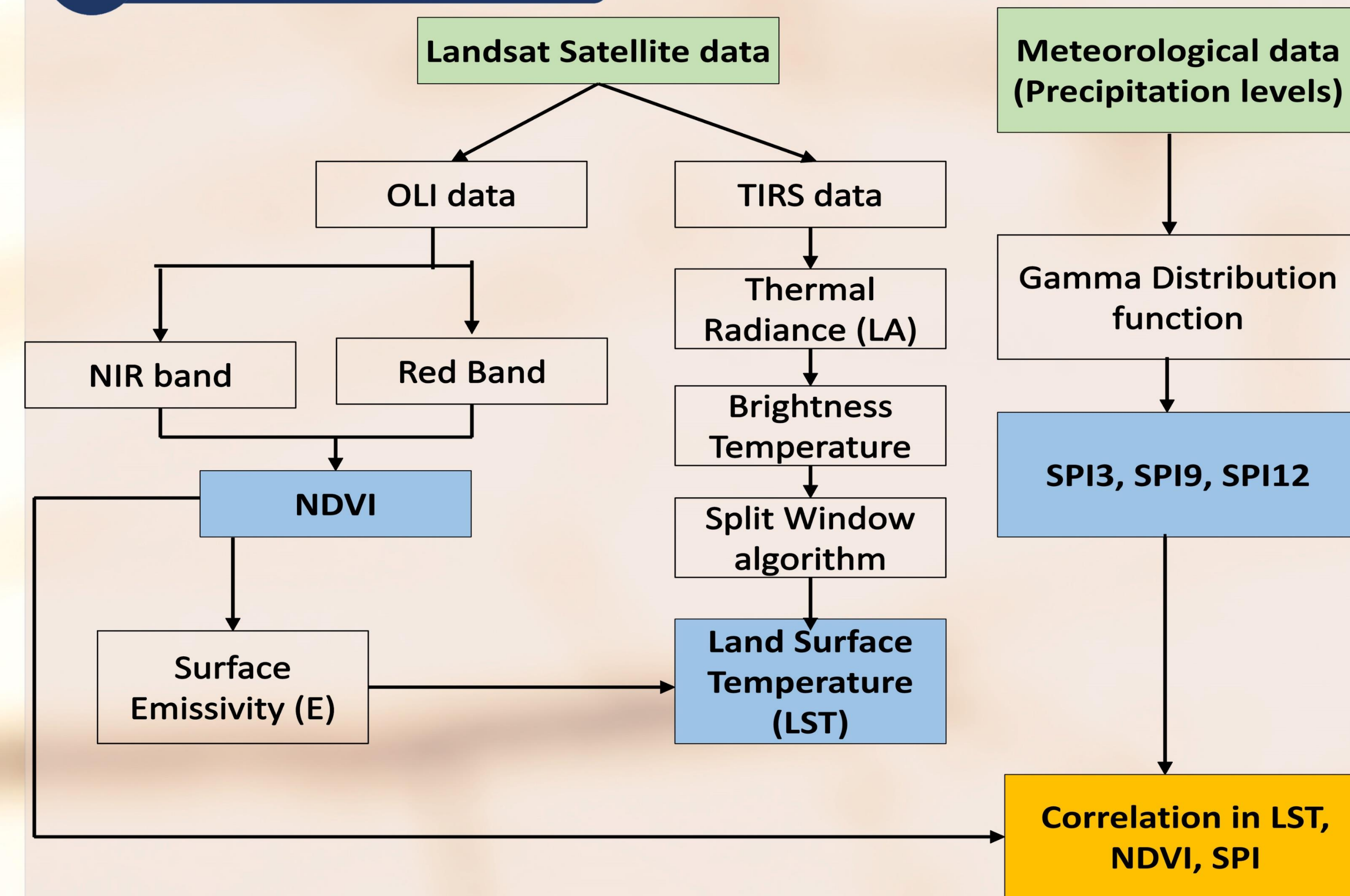
Increasing population coupled with frequent occurrence of droughts is threatening the food security of a developing country like India. Among the different regions of India, Marathwada experiences drought very frequently. The occurrence of drought is mainly a climatic phenomena and its effect cannot be eliminated unless there is prior information to the decision makers about the occurrence of drought.

UN conference on Sustainable Development in Rio de Janeiro, 1992	Agenda 21 (UNCED) in 1992 called for "the integrated approaches to the development, management and use of water resources"	International Conference on water and environment, Dublin, Ireland 1992	Millennium Development Goal (MDG) for 2015 in Millennium Summit of UN in 2000	International Decade for Action, 'Water for Life' 2005 to 2015
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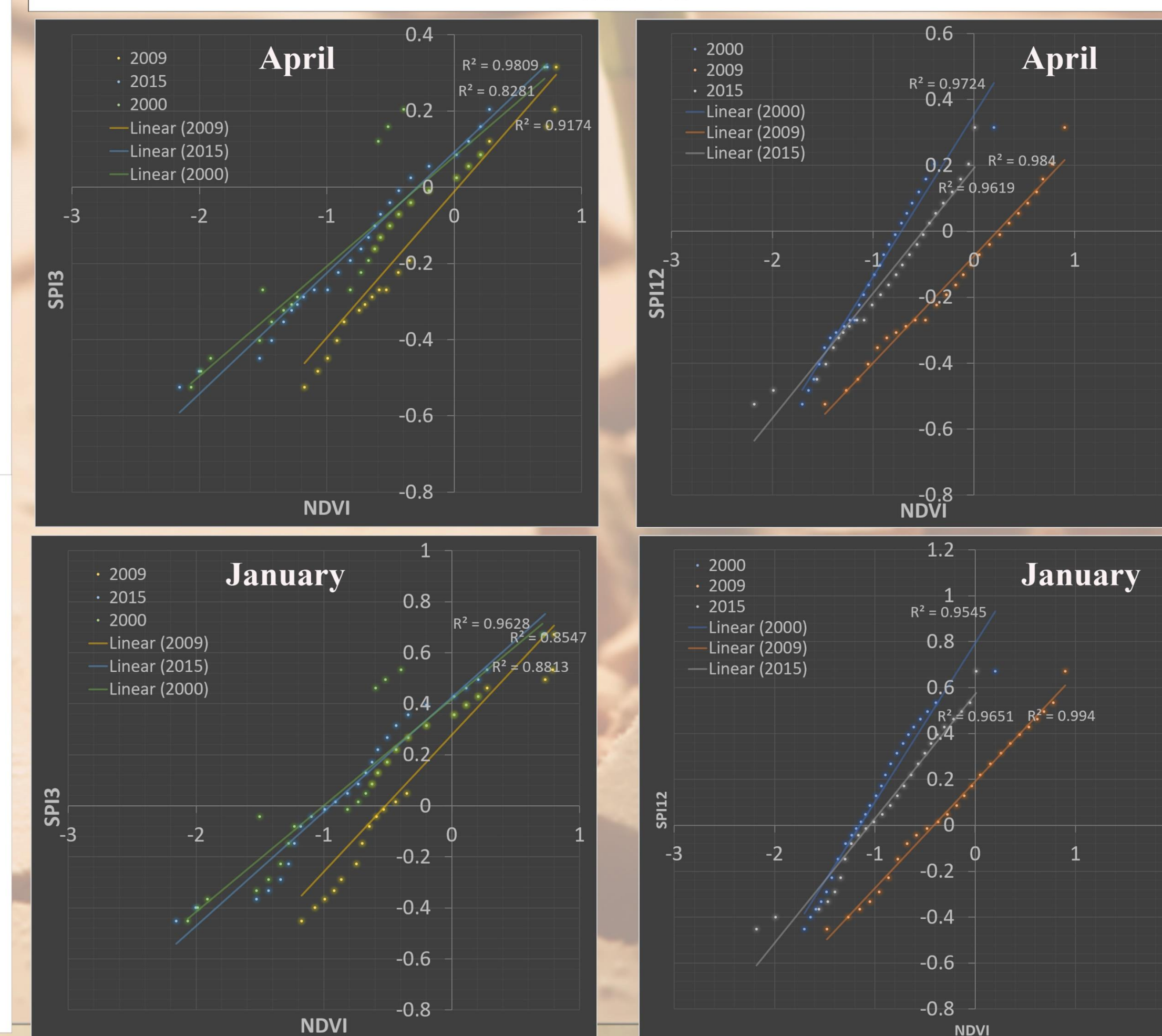
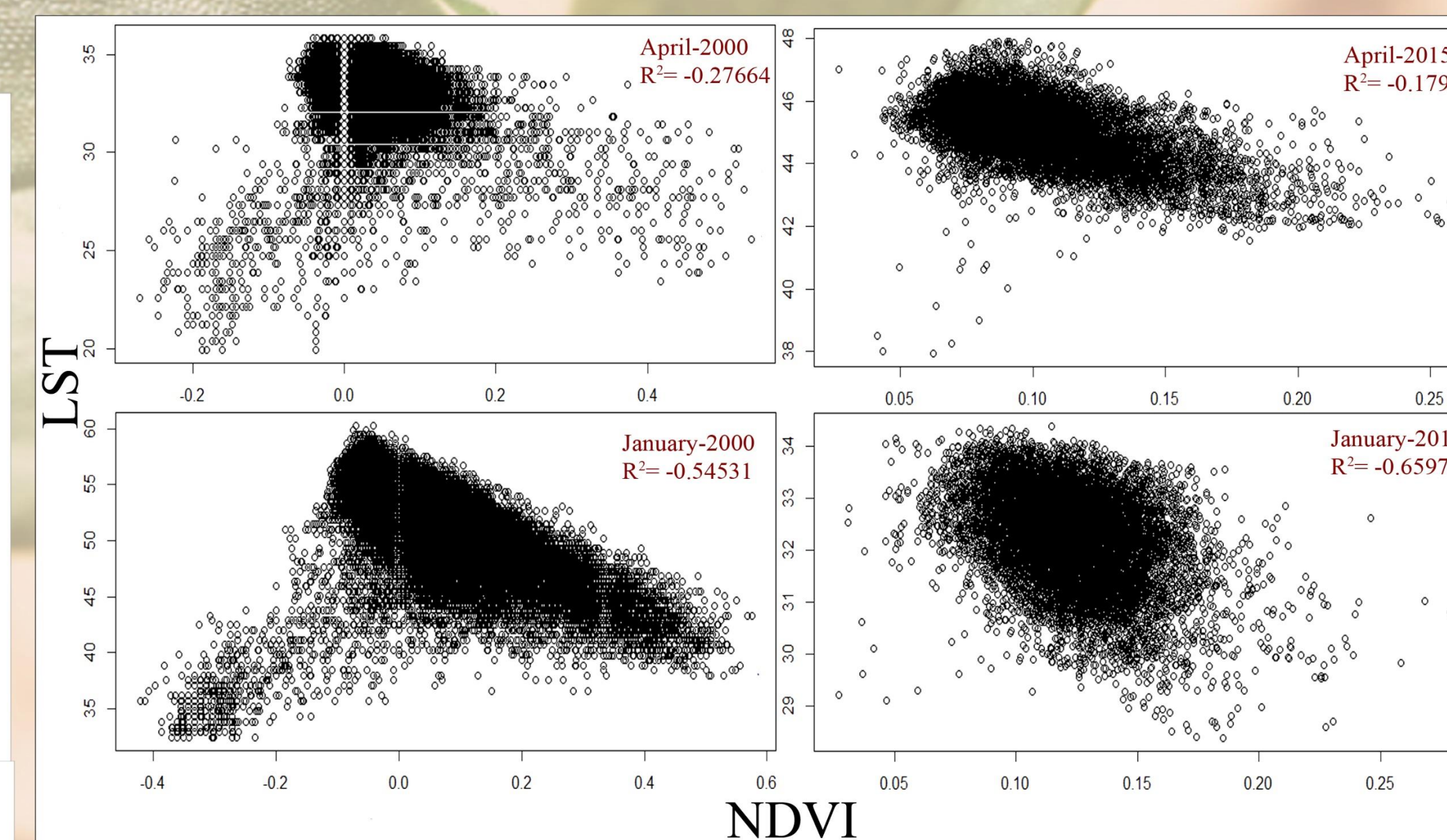
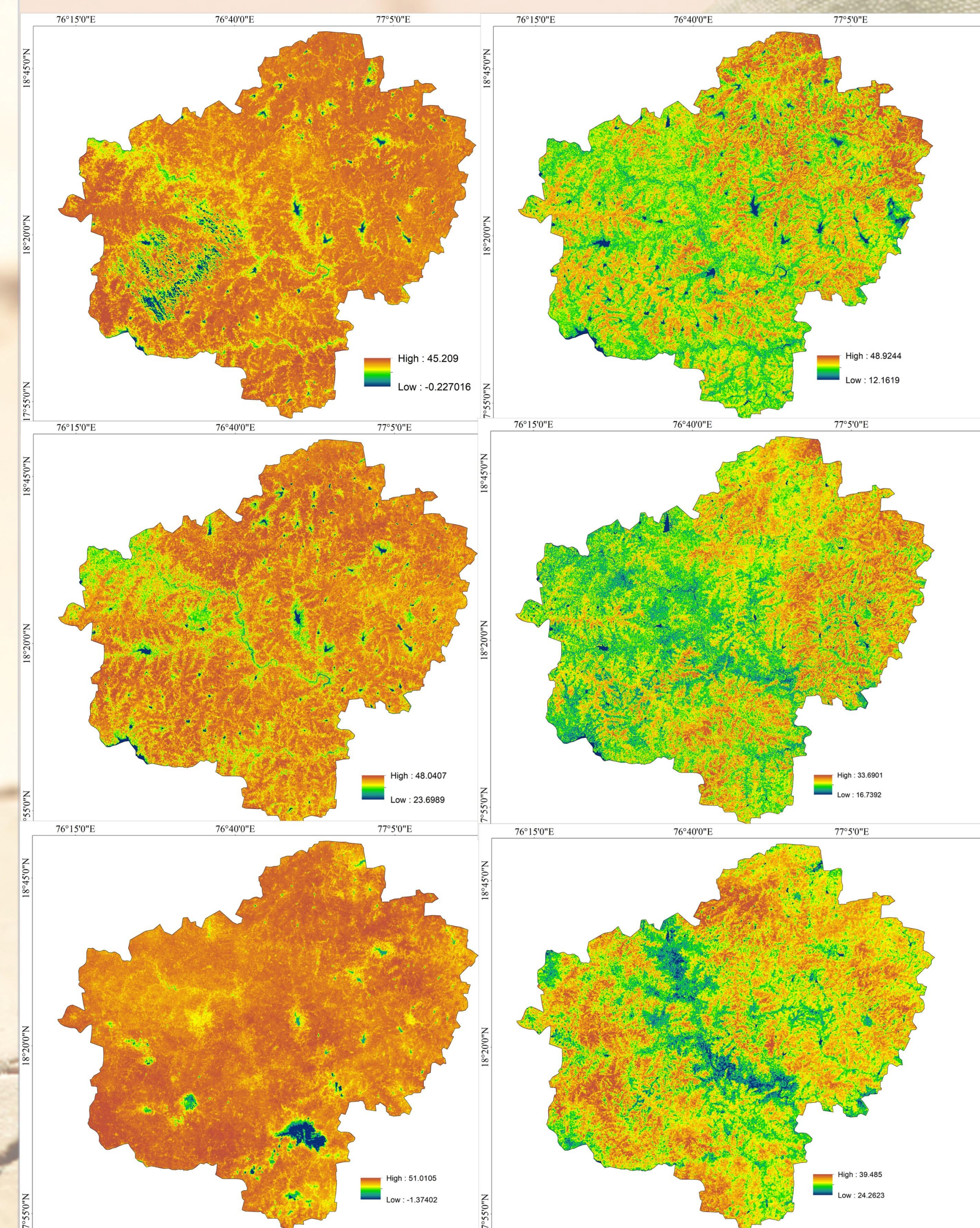
3 RESEARCH OBJECTIVE

The aim of the study is to analyse the region using meteorological drought indicator i.e. Standardised Precipitation Index (SPI) and agricultural drought indicator i.e. Normalised Difference Vegetative Index (NDVI). Hence, LST is calculated to understand the effect of temperature on drought areas. The objective of the study is to understand the correlation between LST, NDVI and SPI with respect to seasonal variation. This study will help us plot the positive or negative correlation between different indicators of drought.

4 METHODOLOGY



6 RESULTS



Parameters	Month	Year	R ² value
LST ; NDVI	April	2000	-0.27664
LST ; NDVI	Jan	2000	-0.54531
LST ; NDVI	April	2015	-0.17968
LST ; NDVI	Jan	2015	-0.65977
SPI3 ; NDVI	April	2000	0.8281
SPI3 ; NDVI	April	2015	0.9809
SPI12 ; NDVI	April	2000	0.9724
SPI12 ; NDVI	April	2015	0.9619
SPI3 ; NDVI	Jan	2000	0.8457
SPI3 ; NDVI	Jan	2015	0.9628
SPI12 ; NDVI	Jan	2000	0.9545
SPI12 ; NDVI	Jan	2015	0.9651

7 CONCLUSION

The study shows negative correlation between LST and NDVI for the summer months and positive relation during winter due to sudden drop in temperature. The framework of this study which includes correlation of SPI, NDVI and LST can be used to forecast drought. The study will help in formulating policies and strategies based on local and national level drought analysis. Further, the approach can be used to analyse the hydrological drought using ground water levels and correlate with the present approach to develop more precise EWS.