

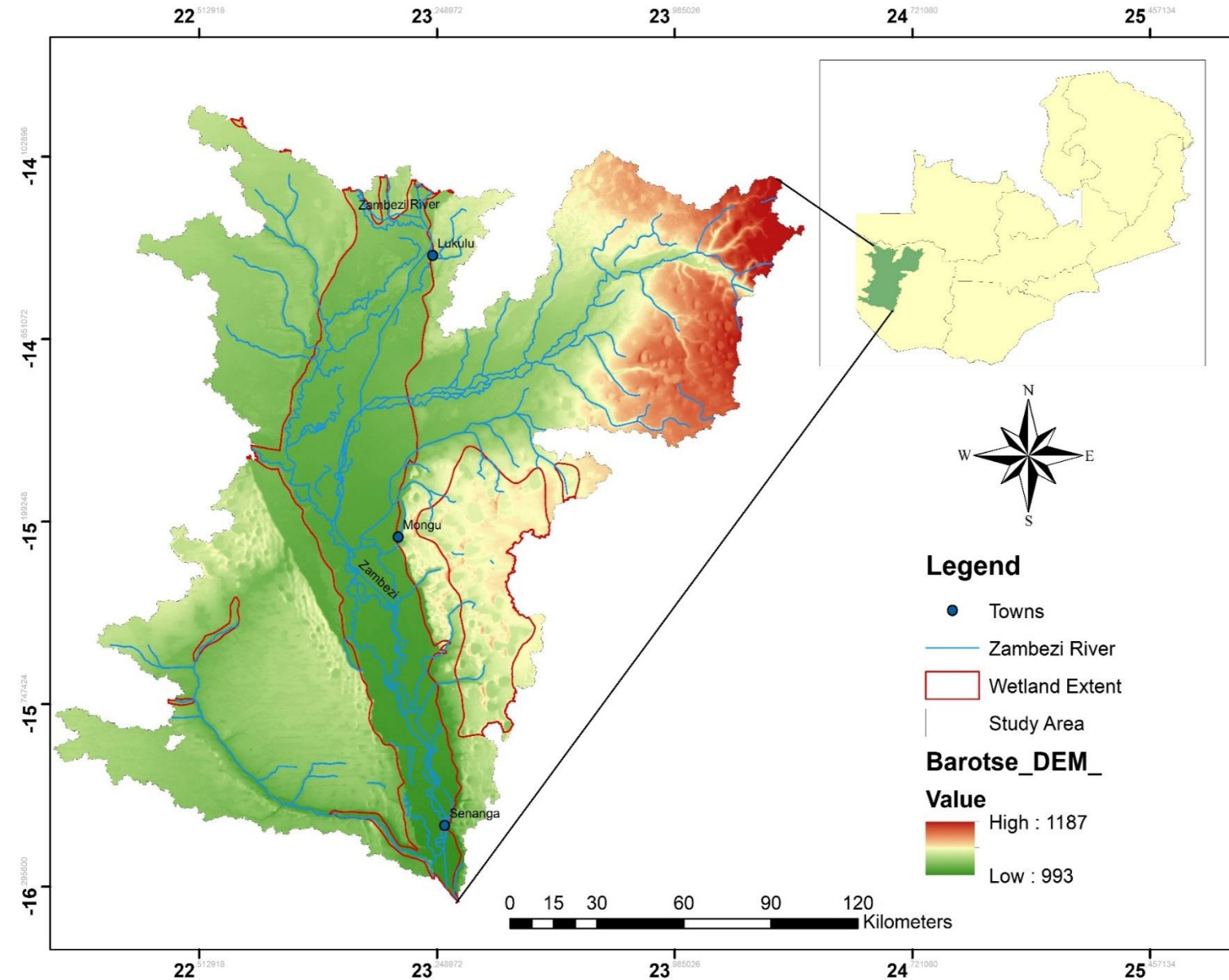
# ASSESSMENT OF RIVER-GROUNDWATER INTERACTIONS IN THE BAROTSE FLOODPLAIN.

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# INTRODUCTION



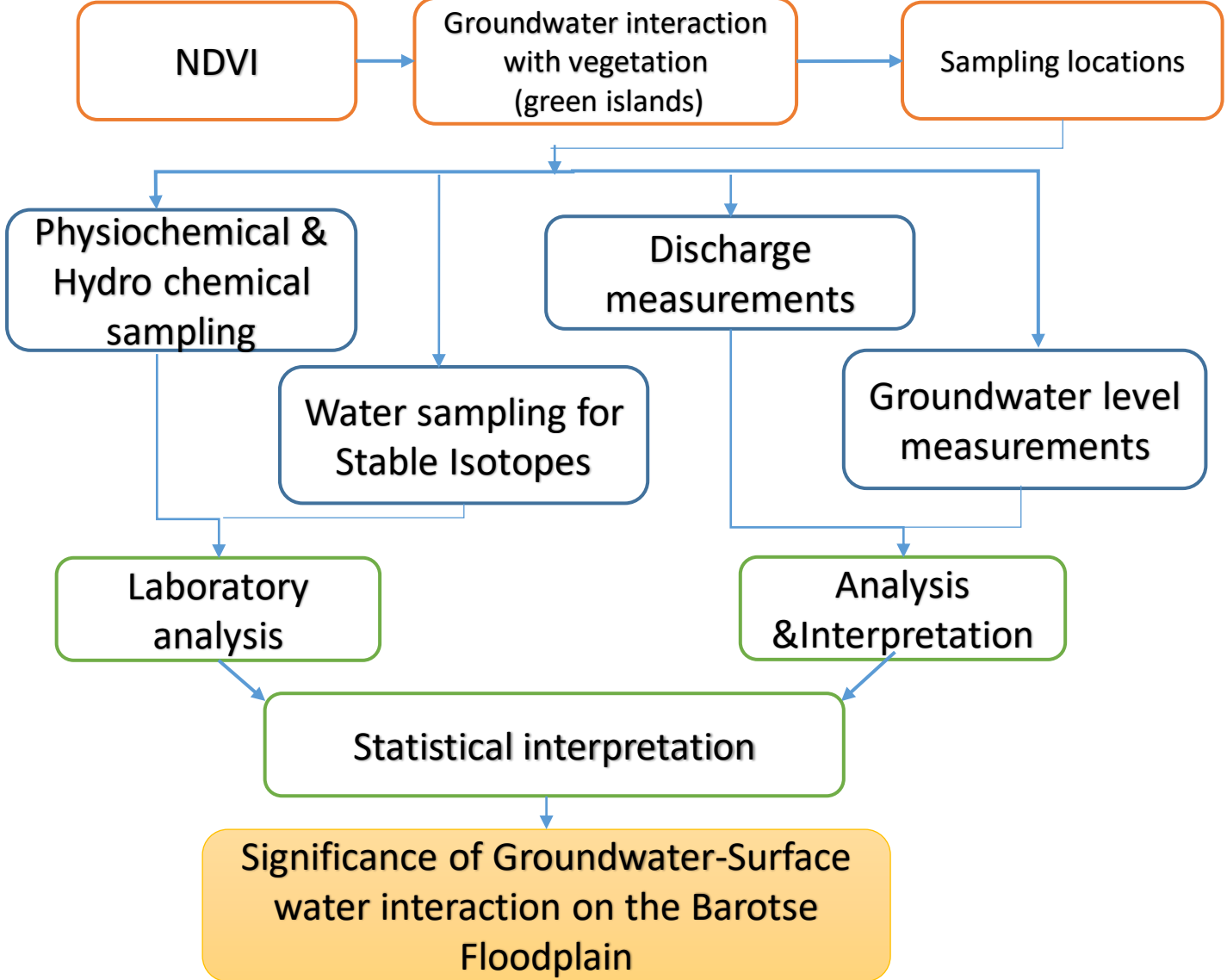
- The Barotse Floodplain is located in the Western Province, Zambia
- River-groundwater interactions are at key to the environmental management of the wetland ecosystem.
- Monitoring of wetland ecosystems is undermined by poor in-situ monitoring networks and data gaps
- Poor management of the wetlands threatens the loss of biodiversity in river ecosystems
- The main focus of this study is to To evaluate groundwater-surface water interactions in the Barotse Floodplain

**Objectives**

Objective 1: To identify areas of groundwater diffuse discharge to the floodplain region.

Objective 3: To evaluate the influence of groundwater discharge to the Floodplain

**Methodology**

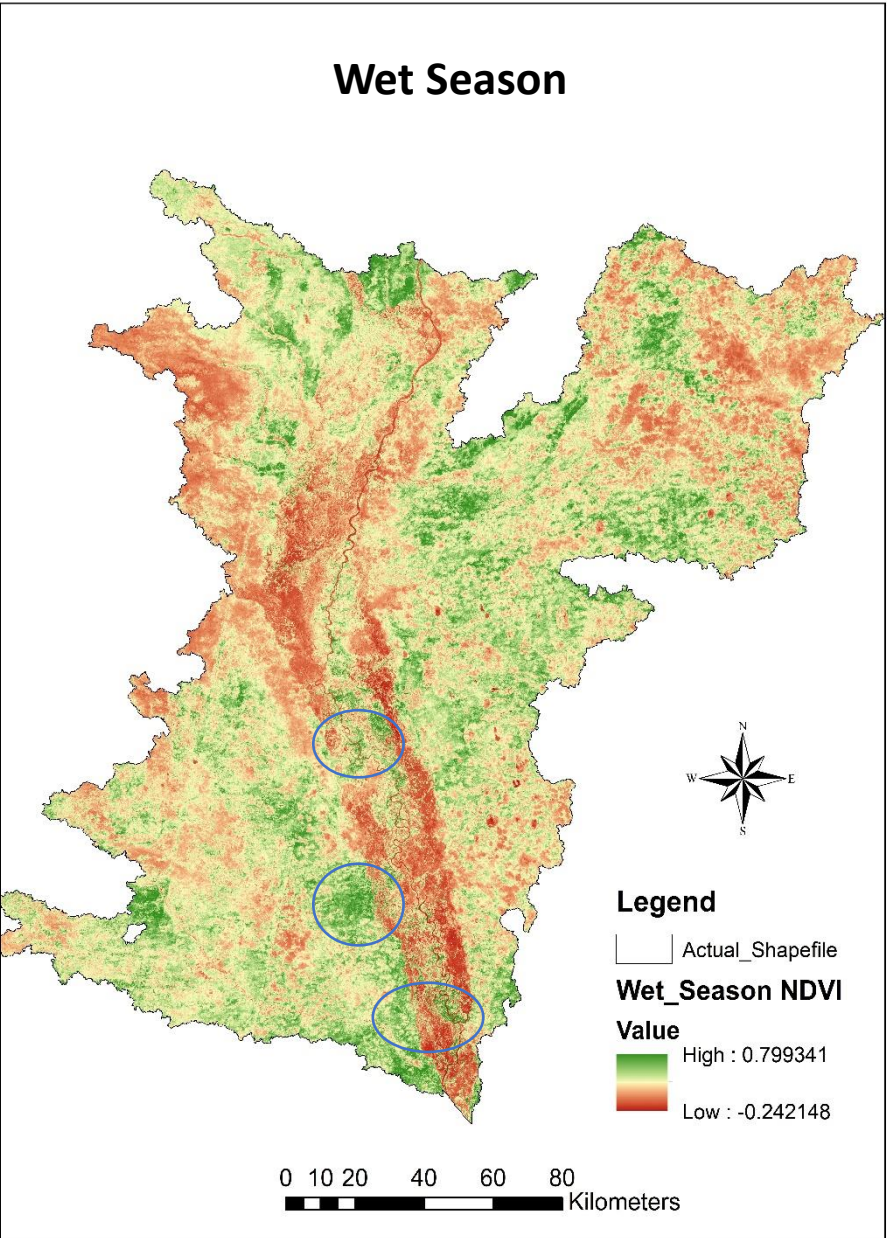
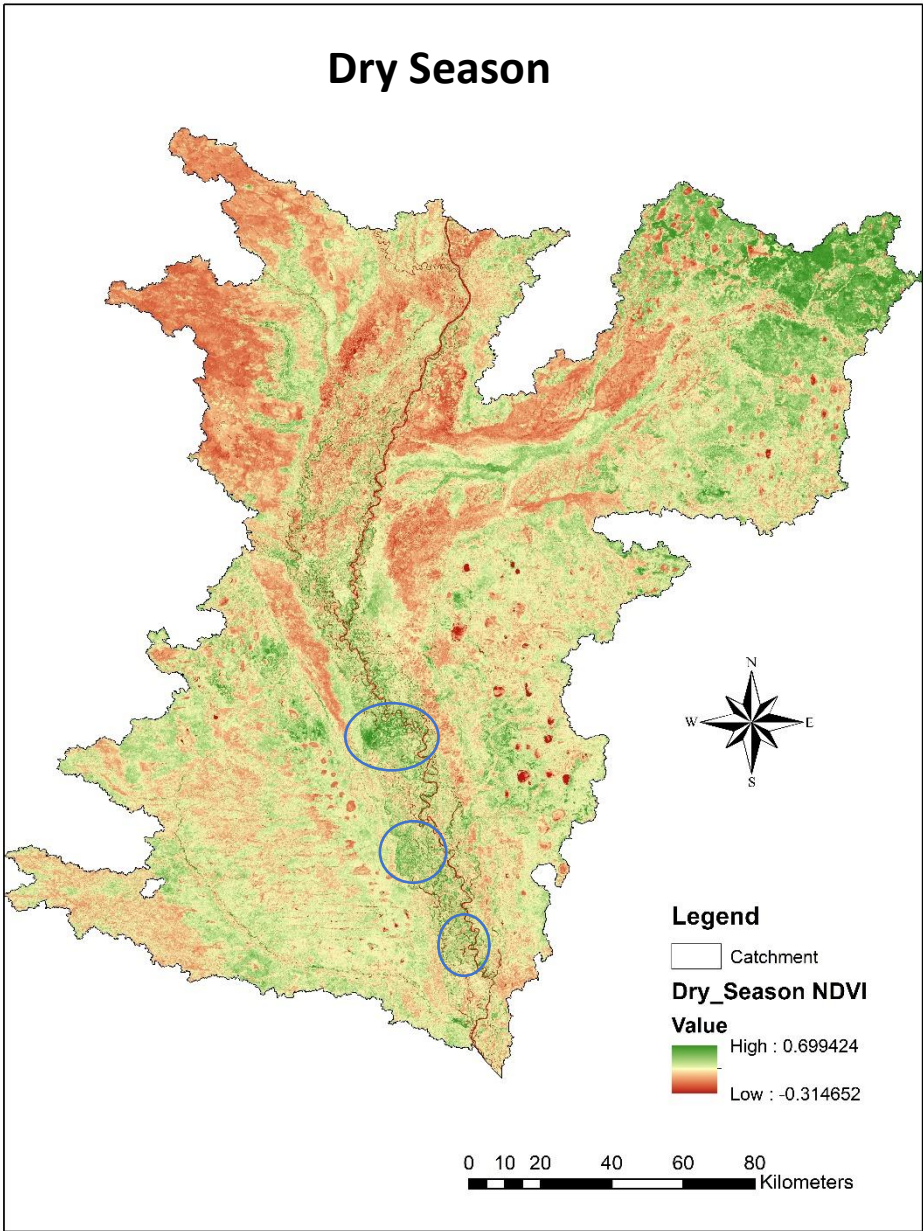


Remote Sensing

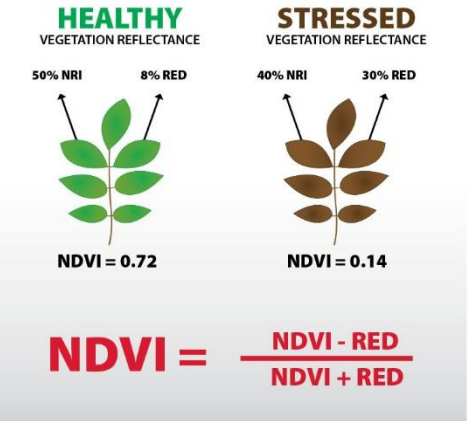
Fieldwork

Analysis and Interpretation

# RESULTS

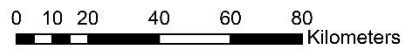
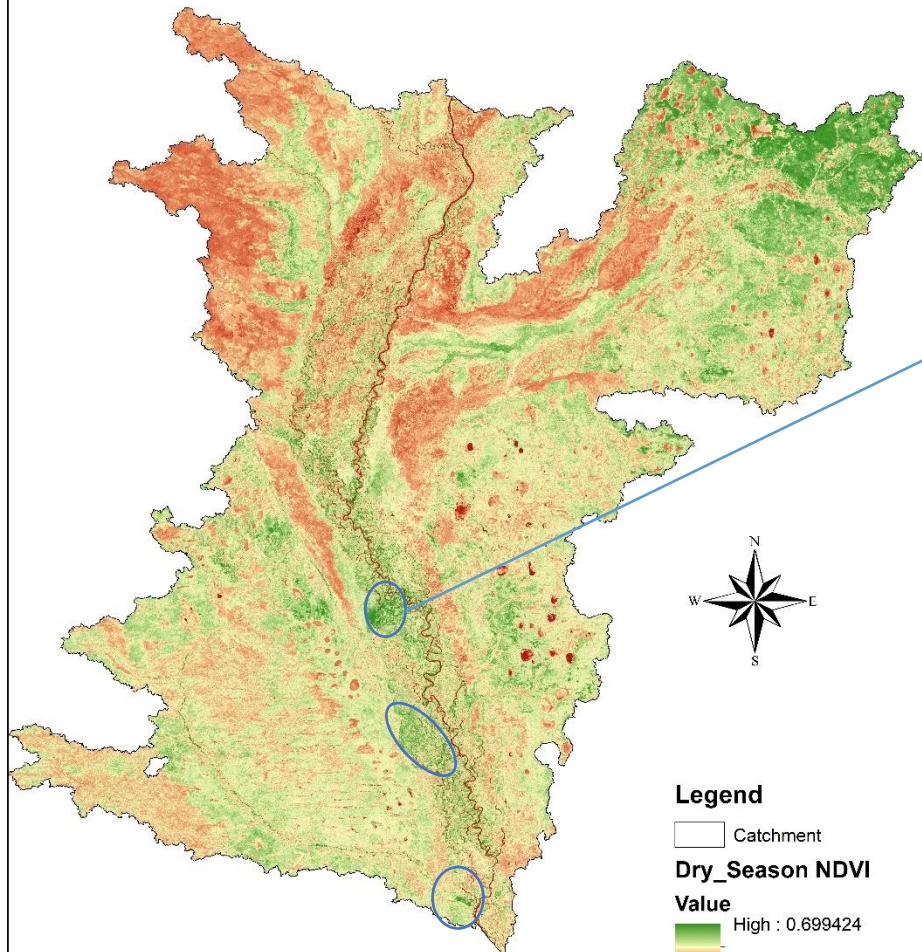


- Healthy vegetation showed the highest NDVI values while
- Bareland and Flooded areas showed the least NDVI vales
- During the dry season areas with healthy vegetation were assumes to be tapping from groundwater

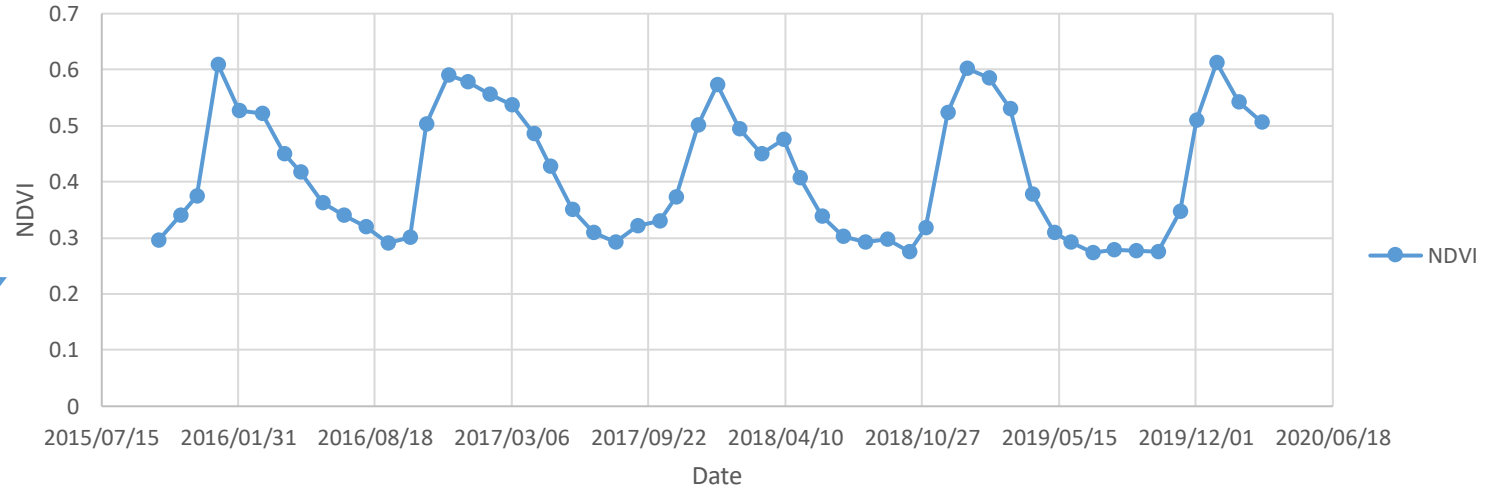


# RESULTS

## Dry Season

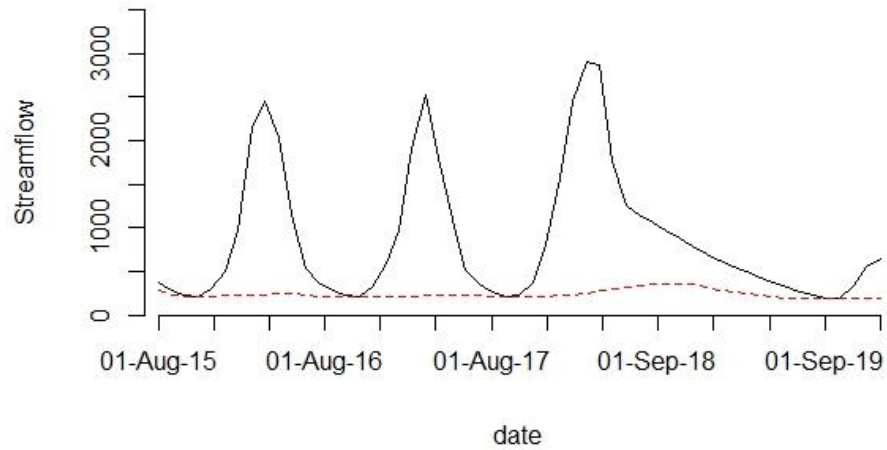
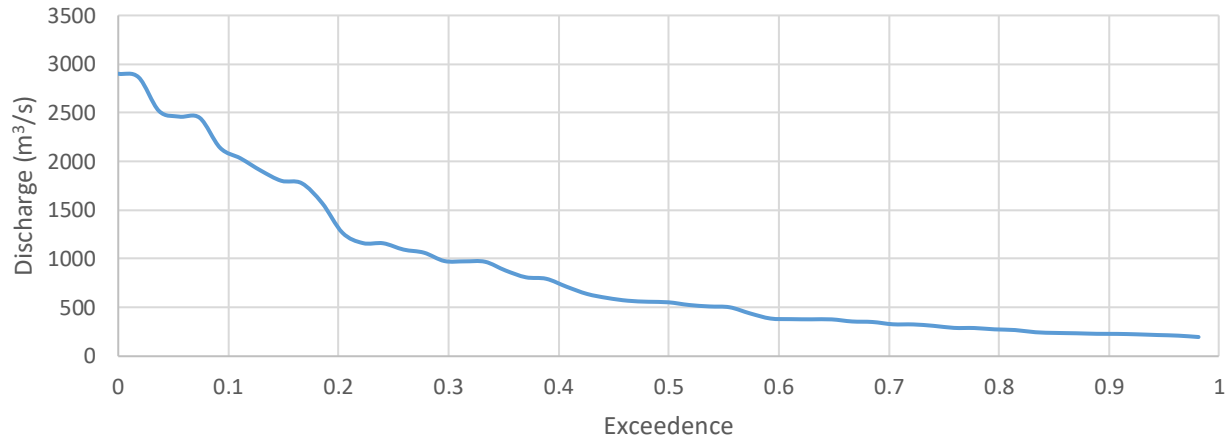


NDVI Time series



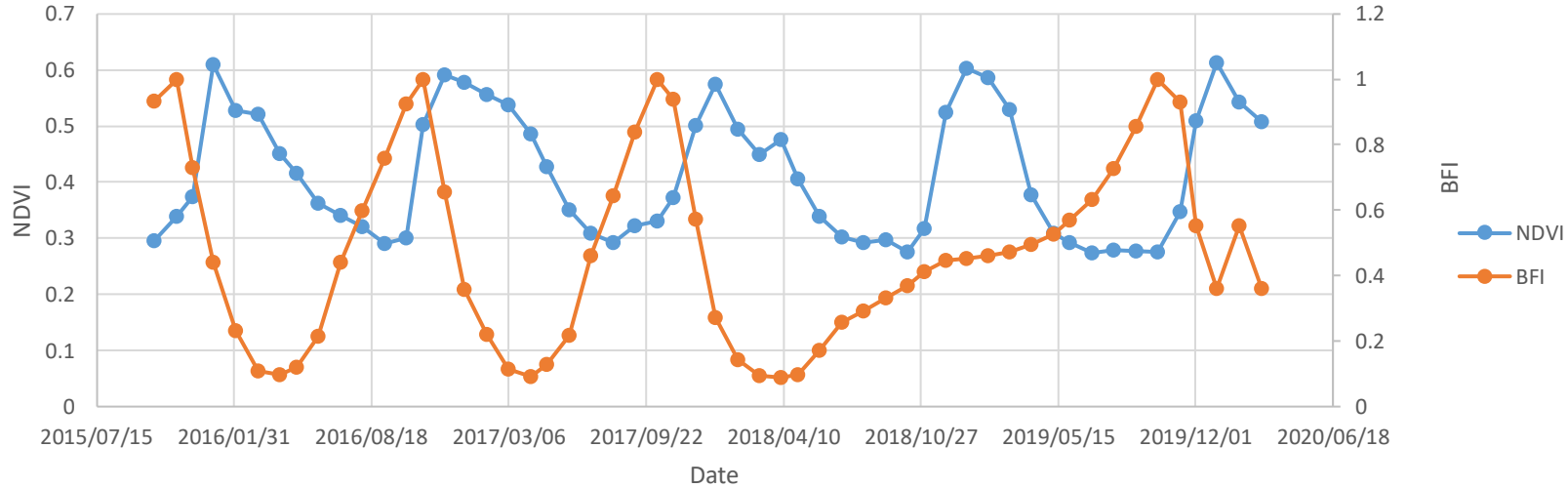
- time series shows a sinus trend in the NDVI.
- May have been an influence of hydrological regimes
- Using the available data in the catchment. Investigated the connectivity to groundwater and river channel.

Flow Duration Curve



- From the Zambezi River Discharge data at Senanga a flow duration curve was plotted. To observe the behavior of river flow.
- Steep curve (high flows for short periods) precipitation/runoff feed in the Wet season.
- Flat curve indicates large groundwater capacity which sustains the base flow to the stream for the dry season.
- What is the influence of base flow to the floodplain
- R statistical package (EcohydRology Library)
- Used Base flow Separation to separate Base flow from quick flow
- $Base\ flow\ contribution = \frac{Mean\ Baseflow}{Mean\ total\ flow}$
- Base flow contribution = 39.45%

NDVI vs BFI



	<b>BFI</b>	
<b>NDVI</b>	-0.364	correlation coefficient
	0.00694	P-Value
	54	Number of samples

	<b>BFI</b>	<b>NDVI</b>	
<b>D.O</b>	0.67	-0.467	correlation coefficient
	0.03	0.16	P-Value

- Shapiro-Wilk test showed that the data is non parametric
- Inverse relationship between BFI and NDVI from the spearman correlation test
- Positive correlation between BFI and the amount of dissolved oxygen in the river system

# Preliminary Conclusion

- NDVI can be used estimate changes hydrological dynamics at sub catchment level in the Floodplain.
- NDVI alone cannot be ideal to estimate hydro chemical dynamics in the catchment