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الملتقى السوري الثاني لتنظيم المعلومات الجغرافية



## Crop Monitoring and Area Estimation for Wad Altrabi Division at Al Gezira Scheme

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# Background- Introduction

- Most developing countries and, indeed, African countries have an economy strongly dominated by the agriculture sector that generates up to 50 percent of gross domestic product (GDP).
- Sudan is one of African countries that highly dependent on agriculture, as it accounts for nearly 50 percent of the GDP.
- The sudan's irrigated agriculture is estimated at some 4 million feddans.
- 2.1 of 4 million feddans found at Al Gezira scheme .

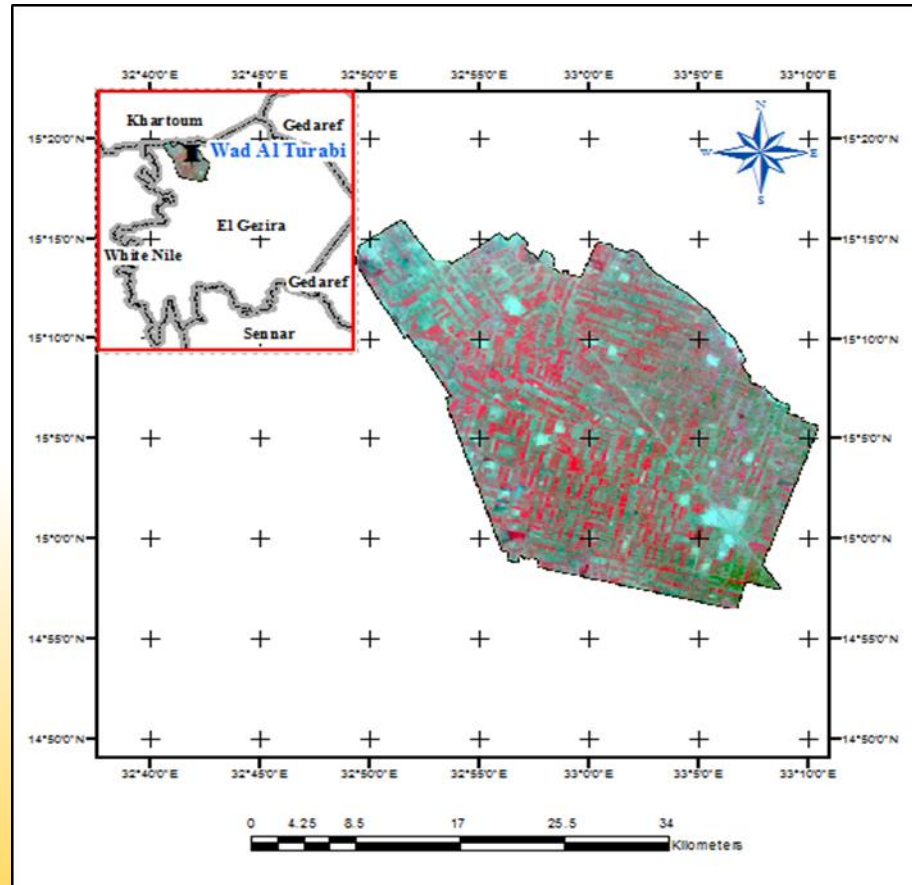
# Aims /Objectives

- Using remote sensing Imagery to detect farming activities and crop type for main crops at summer season (crop distribution map).
- estimating crop area into Wad El Turabi division.
- Finally assessing crop condition from NDVI value (crop health condition).

# Study area-framework

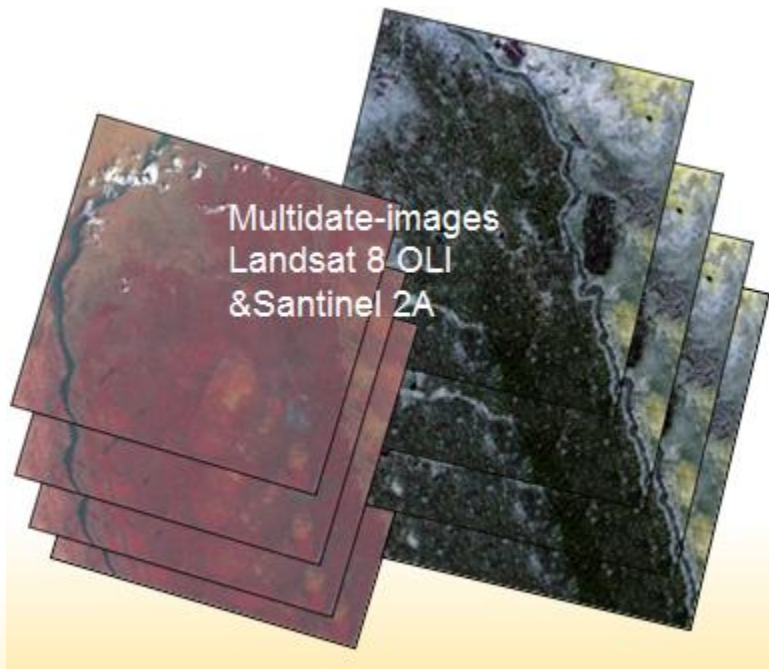
- The study area is Wad El truabi that lies just south of the Khartoum State and northern Al Gezira Scheme.
- It sits between (latitude  $15^{\circ} 14' 17''$  N, longitude  $32^{\circ} 48' 43.1$  E) (latitude  $14^{\circ} 57' 11''$  N, longitude  $33^{\circ} 10' 59''$  E) far from white Nile river on the left (44 km) and nearby Blue Nile River on the right that flows west from Ethiopian highlands .

# Study Area Location

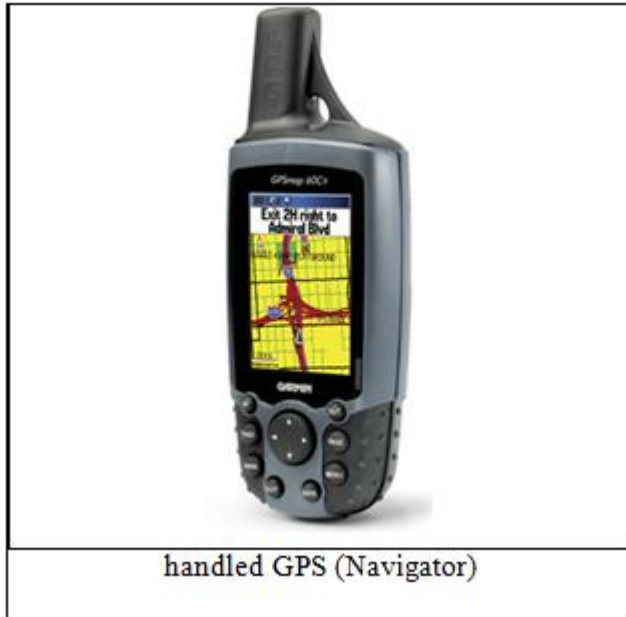


# Material and Methods

- Data are collected for this study area from two sources based on the data availability, accessibility and data quality.
  - The first one is satellite images .
  - The second one is Handheld GPS .
- To extract information from study area the image classification method was used to achieve that.
- by developing spectral signatures of crops using multi-date imagery.



E	N	Type	Name	Code
507791.275	1663596.148	Waypoint	G1	4



handled GPS (Navigator)

it	G2	4
it	G3	4
it	G4	4
it	G5	4
it	G6	4
it	G7	4
it	G8	4
it	G9	4
it	G10	4
it	G11	4
it	G12	4
it	G13	4
it	G14	3
it	G15	4
it	G16	2
it	G17	4
it	G18	4
it	G19	2

496109.426	1678785.091	Waypoint	G20	1
512597.187	1672135.901	Waypoint	G21	4
508698.99	1678858.712	Waypoint	G22	1
494640.369	1678263.229	Waypoint	G23	5
497014.284	1677498.317	Waypoint	G24	1
506145.606	1681623.889	Waypoint	G25	2
508156.443	1679864.407	Waypoint	G26	1
506541.688	1681500.329	Waypoint	G27	4
504737.248	1680094.199	Waypoint	G28	1
495606.248	1674168.857	Waypoint	G29	2
512466.326	1671774.966	Waypoint	G30	1
494694.233	1679943.67	Waypoint	G31	1
504282.59	1679419.984	Waypoint	G32	3
499202.654	1676811.006	Waypoint	G33	1
499703.306	1676899.104	Waypoint	G34	4

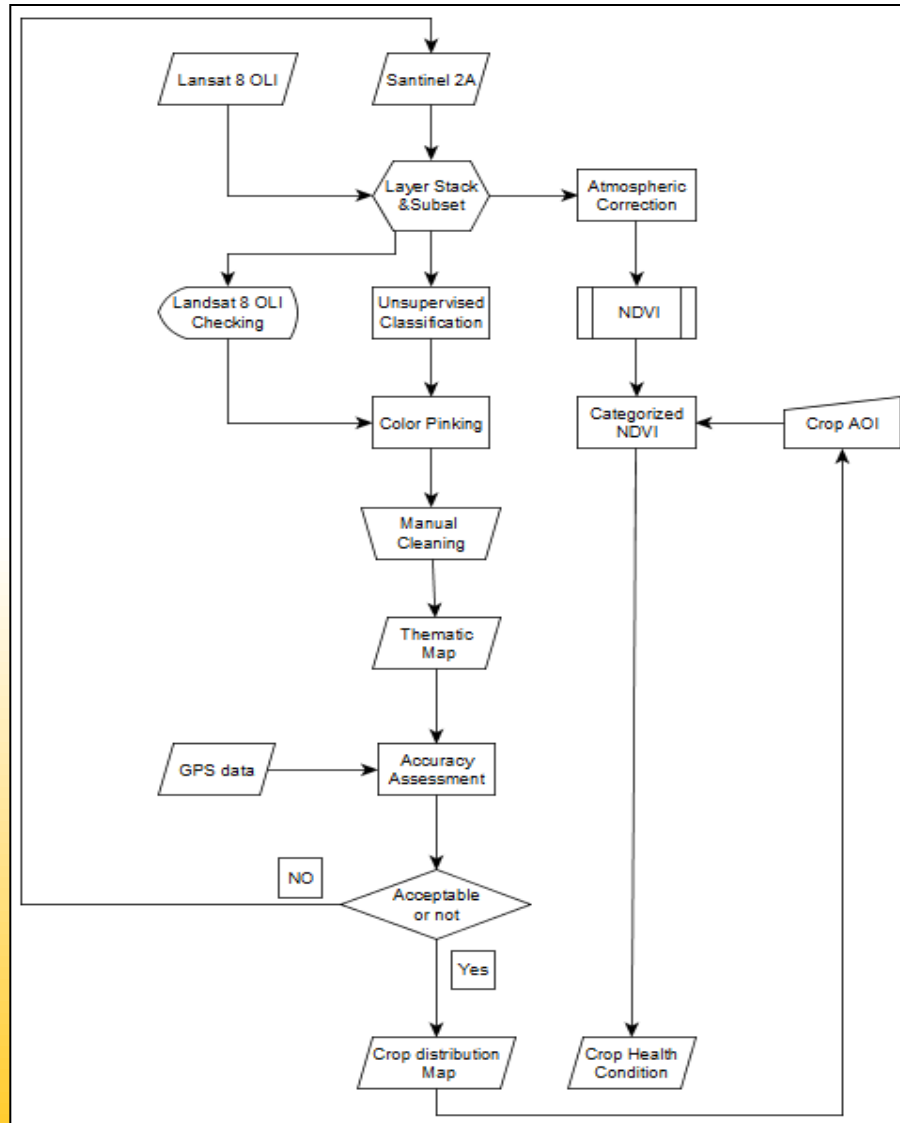


# Analysis

The analysis in this study can be summarized in:

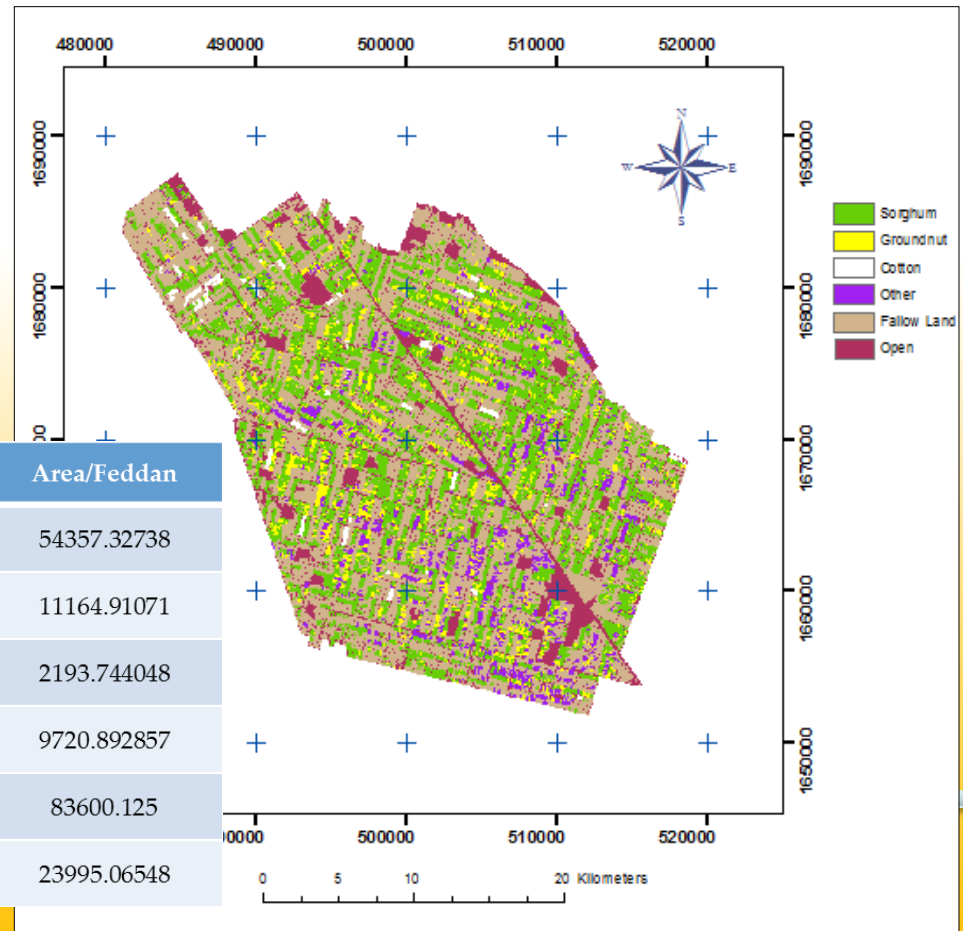
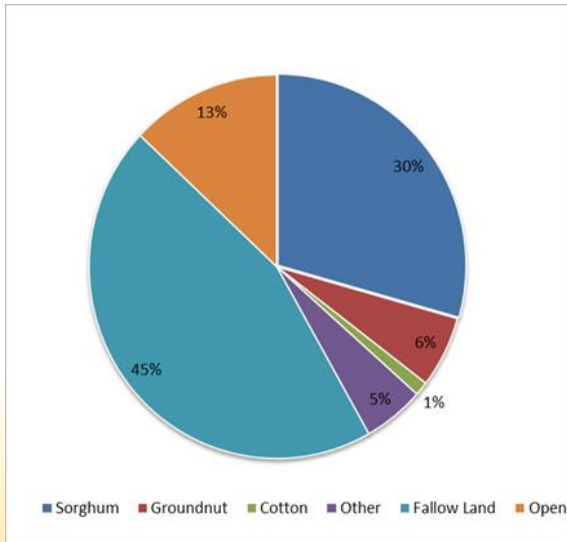
- preprocessing (Data preparation)
- processing (classification – color picking-NDVI)
- post processing (verification of result accuracy).

# Flow Chart



# Results and discussion

- The first map shows Crop Distribution

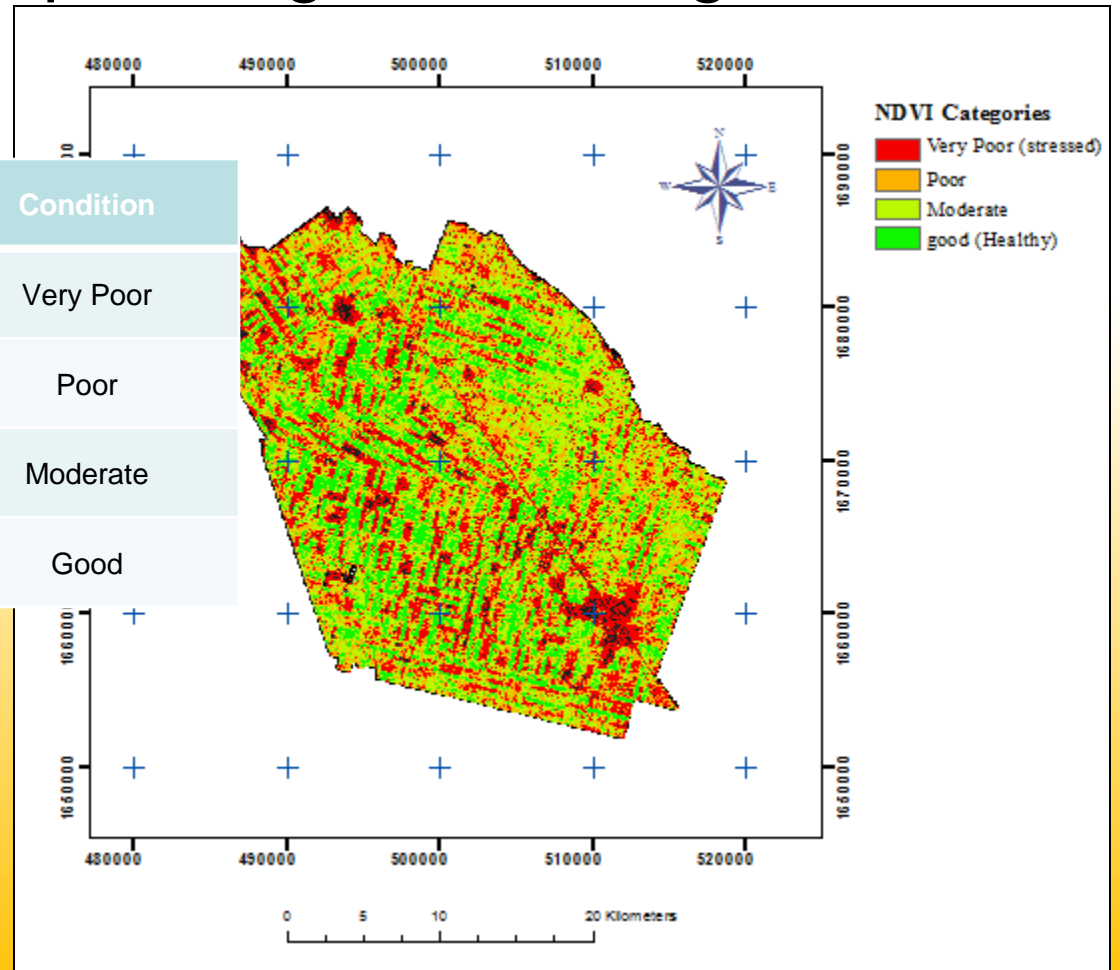


Crop Type	Histogram	Area/SqKm	Area/Feddan
Sorghum	9132031	228300,775	54357.32738
Groundnut	1875705	46892,625	11164.91071
Cotton	368549	9213,725	2193.744048
Other Crop	1633110	40827,750	9720.892857
Fallow Land	14044821	351120,525	83600.125
Open	4031171	100779,275	23995.06548

# Results and discussion

- The second map shows the health condition map for main crops categorized using NDVI

Area/SQM	Area/Feddan	Condition
3503800	834.238	Very Poor
16545800	3939.476	Poor
123112500	29312.5	Moderate
141495500	33689.404	Good



# Conclusion

- The result of the study leads to the following conclusions:
  - Sentinel-2A data is suitable for large area crop mapping especially Groundnut, cotton and Sorghum and identification of their extent.
  - It is suitable for distinguishing some crops from another based on Phonological cycle and Spectral signatures.
  - NDVI can be used for crop condition assessment.

# Acknowledgement

I would like to express my deepest appreciation to all those who provided me the possibility to complete this study. A special gratitude I give to my project supervisor Dr. Mustafa Yousif, who guided me with full effort and whose contribution in stimulating suggestions and encouragement, led me to carry out the study. Last but not least, many thanks go to the staff members of Faculty of Geographical and Environmental Sciences and to my entire colleague; I have to appreciate their kind support.

May GOD bless them all!!

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