MONITORING OF CROP YIELD IN BORNUUR SOUM MONGOLIA USING LEAF AREA INDEX

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CONTENTS

- Background
- Objectives
- Study area
- Method and Data
- Results
- Conclusion
- Future research

BACKGROUND

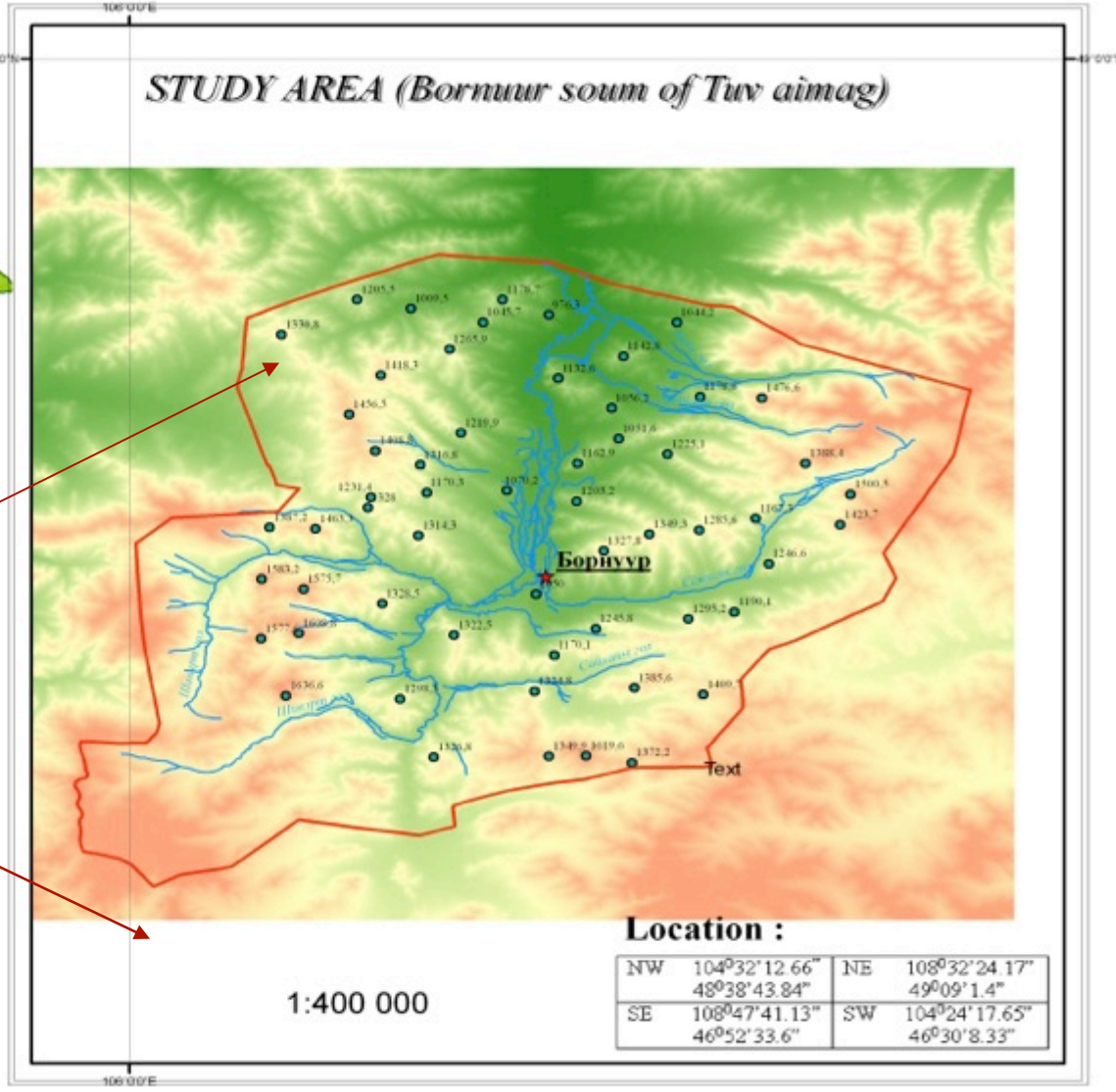
- Livestock and crop agriculture developing
- Abandoned field increased in past 20years
- Necessity of developing crop agriculture

OBJECTIVES

- To generate Leaf Area Index (LAI)
- To estimate agricultural yield production from Landsat image.
- To compare yield production from satellite data with ground measurements.

STUDY AREA


N
W
E
S
MONGOLIA
TUV AIMAG
Bornuur subprovince,
Tuv province


STUDY AREA (Bornuur soum of Tuv aimag)
Борнуур
Text
Location :
NW 104°32'12.66" 48°38'43.84"
NE 108°32'24.17" 49°09'1.4"
SE 108°47'41.13" 46°52'33.6"
SW 104°24'17.65" 46°30'8.33"
1:400 000

USED DATA

- The Landsat data (Path/Row: 132/026)
- Ground truth data (plot size 30x30m) 34 plots

SOFTWARES

- Arc GIS 9.1
- ENVI 4.4

METHODOLOGY

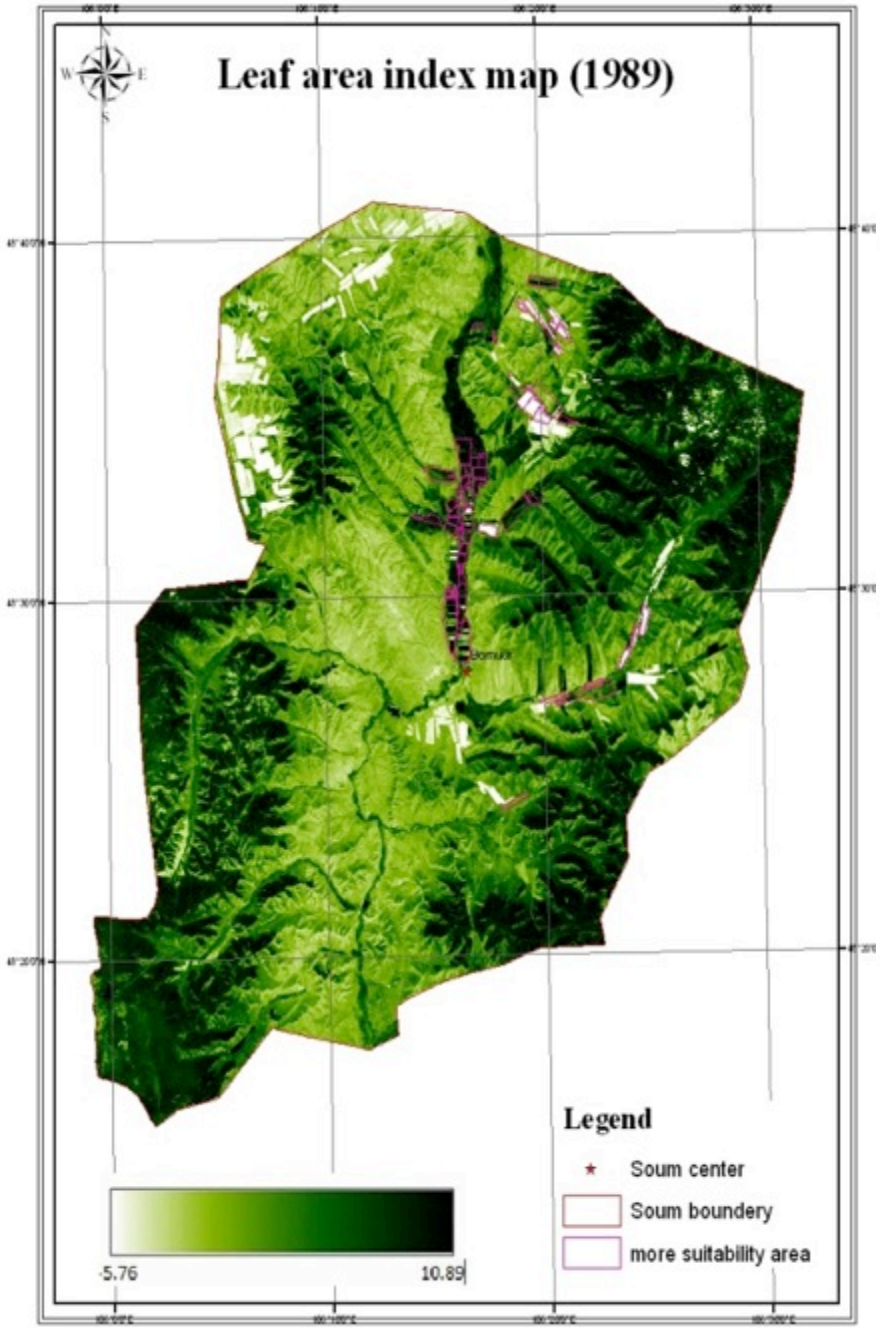
LAI = 12.29*(PETI) + 1.33

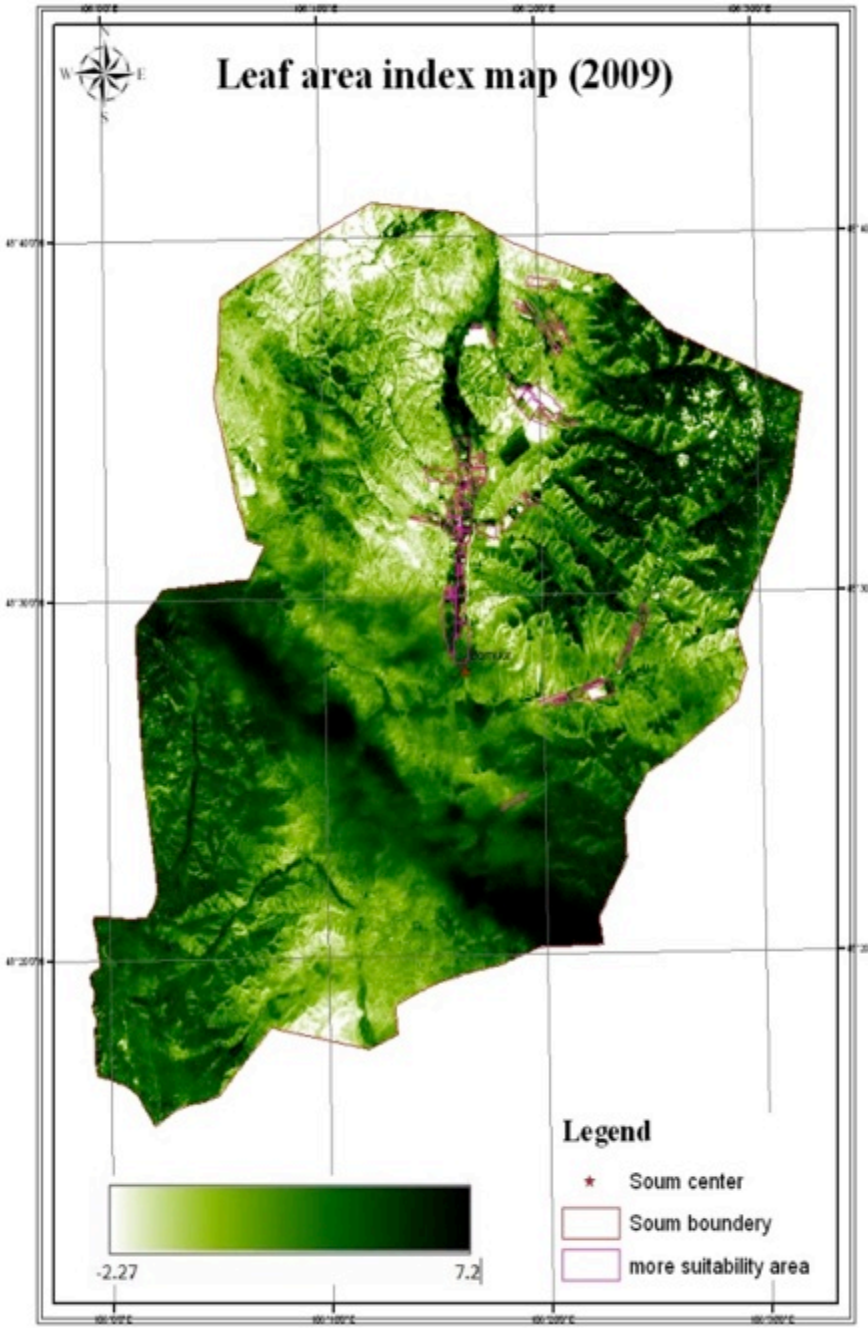
PETI is the Potential Evapotranspiration Index

PETI = [band 4 – band 5]/ [band 4 + band 5]

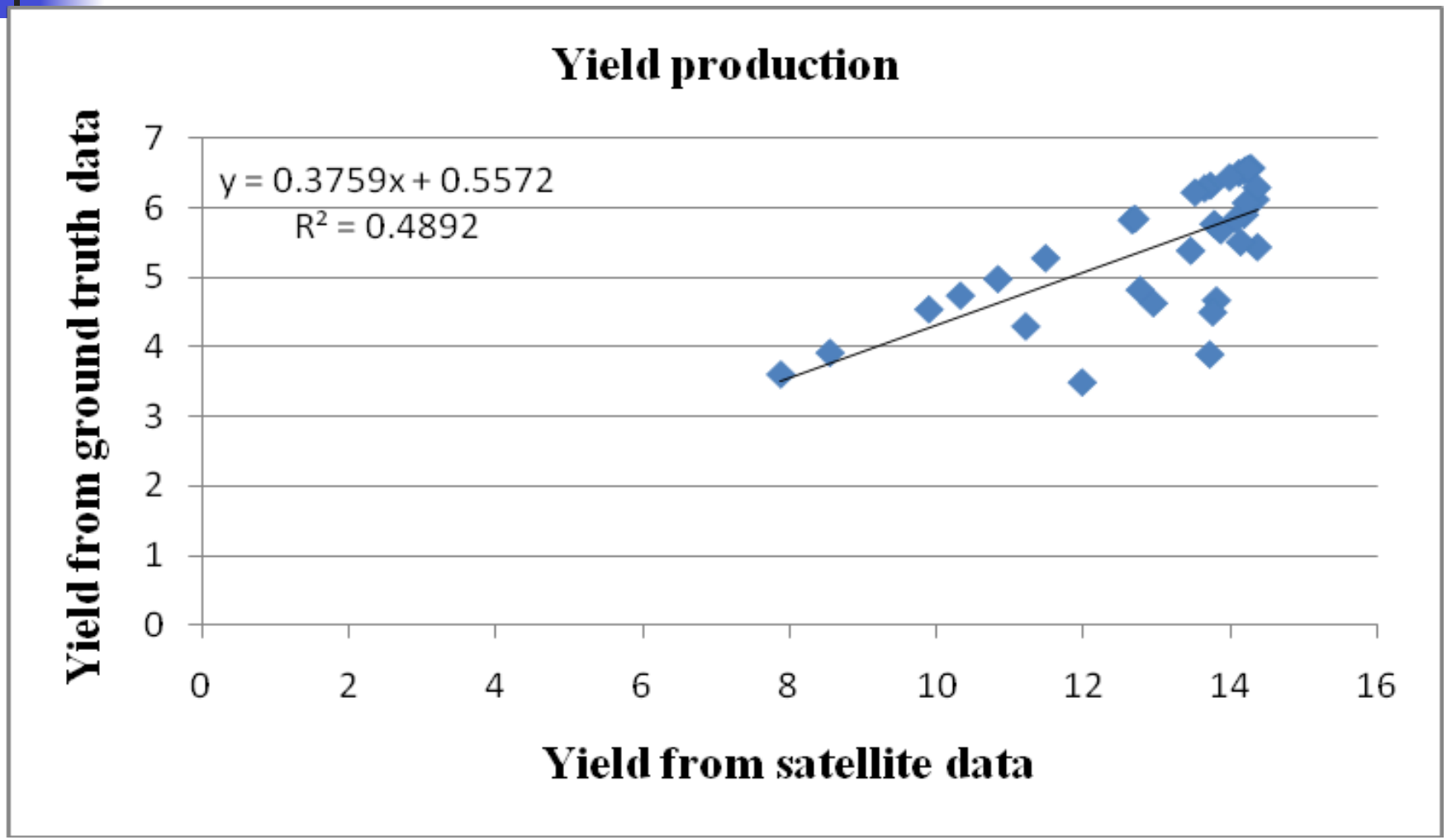
$$2Yield = 6.46(1 - 2.7^{-0.35Temp.}) + 8.01(1 - 2.7^{-1.32LAI})$$

Methodology was used from (Mc Donnel, 2006), (Mohamed Aboel Ghar, 2004) to estimate yield production.


Leaf area index map (1989)
Legend
Soum center
Soum boundery
more suitability area
-5.76
10.89


Leaf area index map (2009)
Legend
Soum center
Soum boundery
more suitability area
-2.27
7.2

RESULTS


Yield production
Yield from ground truth data
y = 0.3759x + 0.5572
R² = 0.4892
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12
14
16
Yield from satellite data

Conclusion

- Positive relationship between ground truth data and yield production from satellite data
- Required to add number of field samples

Future research

- Application of Remote Sensing/GIS for cropland suitability and crop yield production

Acknowledgement

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Thank you for your attention