



Cropping Intensity

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Bangladesh

Zilur Rahman

China

Jiyuan Liu

India

Saurabh Gogai

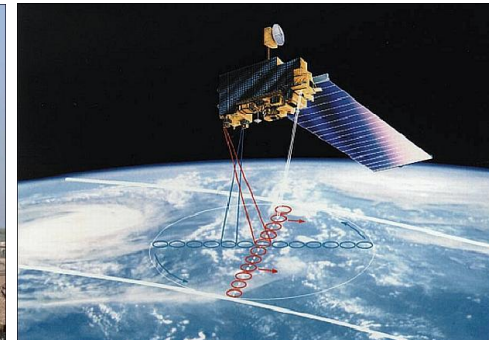
P.S. Roy

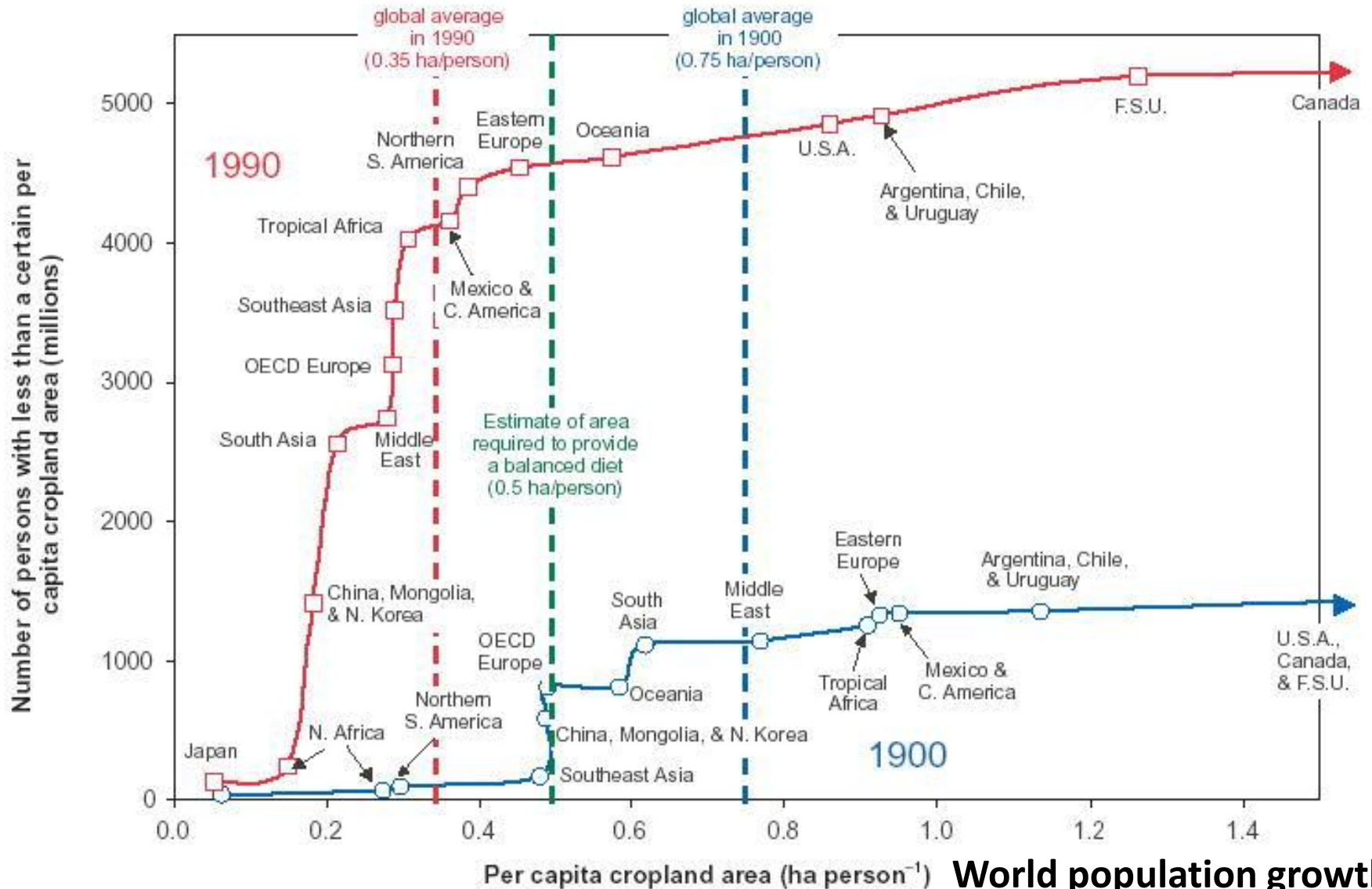
Indonesia

Ketut Wikantika

Thailand

Manzul Hazarika





World population growth

1.6 billion in 1900

5.3 billion in 1990

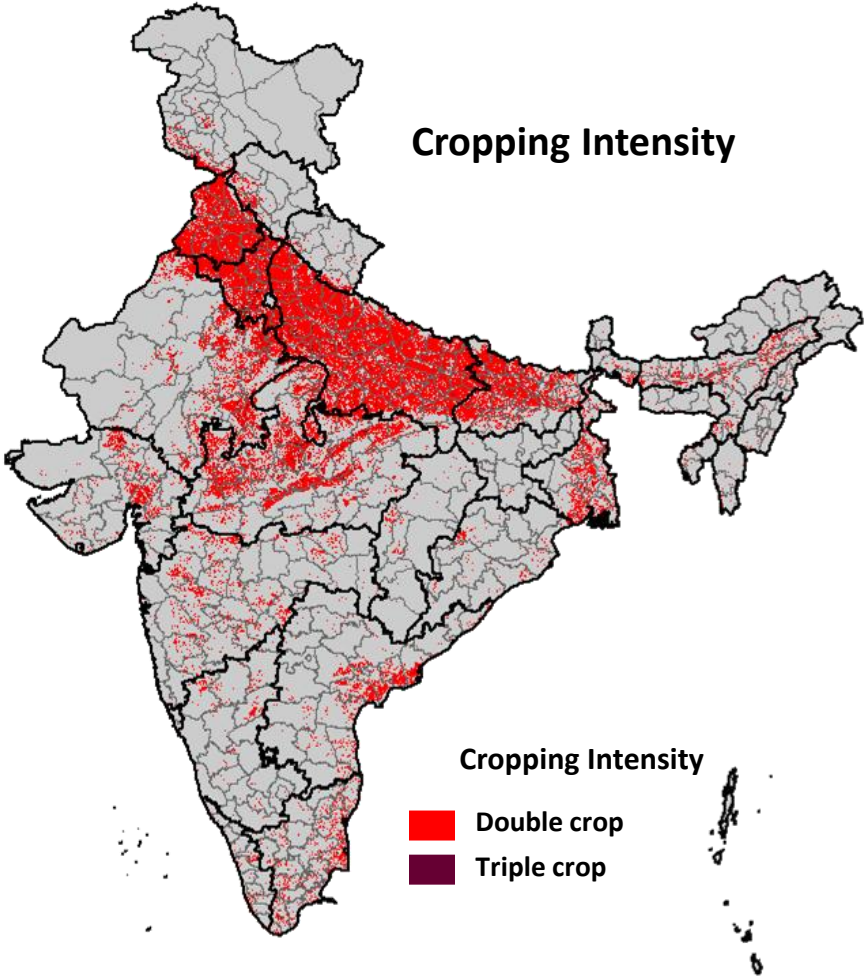
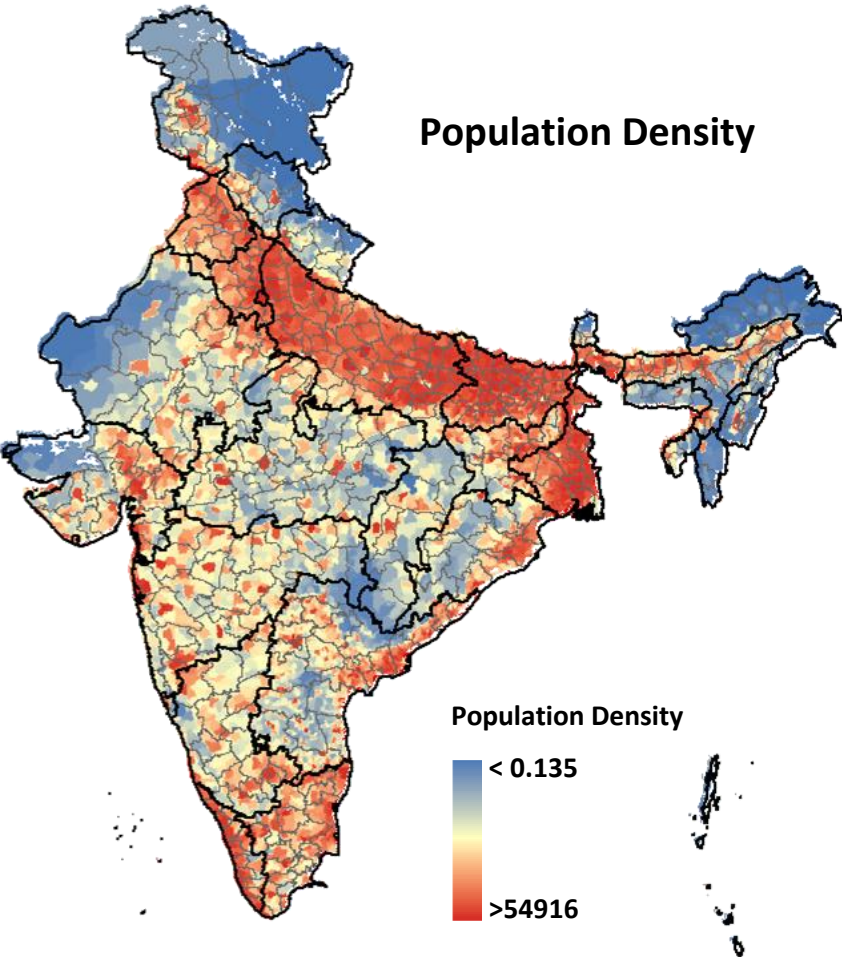
7.0 billion in 2011

9.3 billion in 2050*

Per capita cropland area

From Ramankutty et al. 2002, *Ambio*, 31(3)

Agricultural intensification to meet the need of rising population



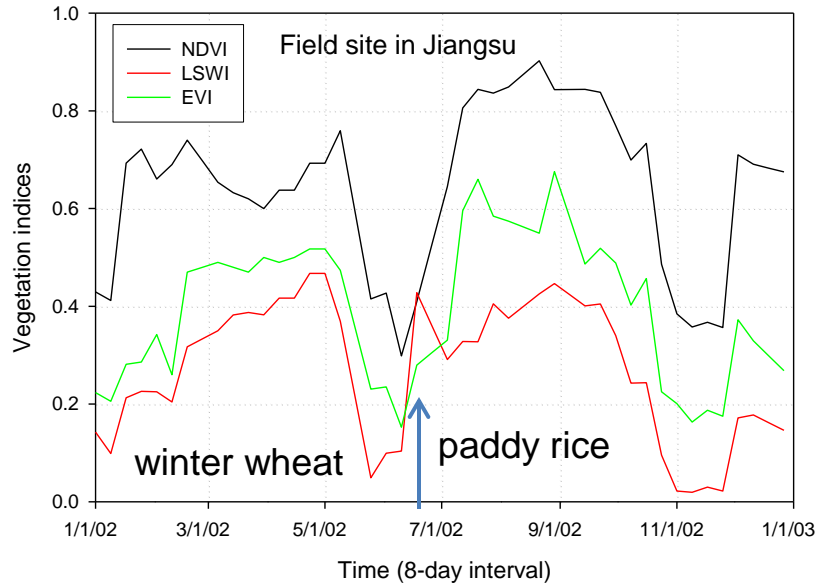
Algorithm development for cropping intensity

1-crop per year

2-crop per year

3-crop per year

Dynamics of winter wheat and paddy rice fields in Nanjing, Jiangsu, China



(c) 7/3/99 2-weeks after rice transplanting

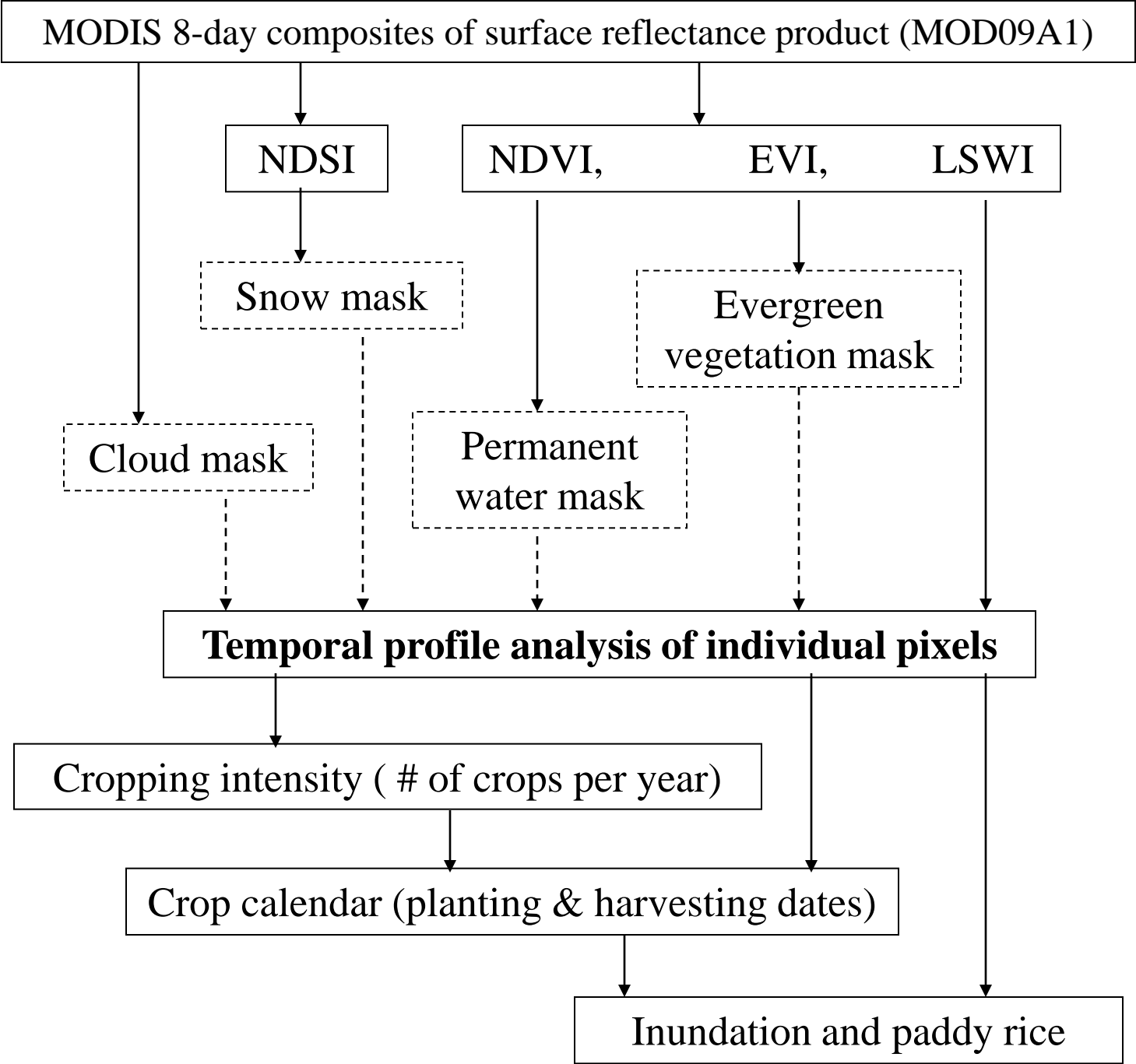


(b) 6/11/99 rice field preparation



(d) 9/6/99 rice plant heading





Implementation of the algorithm for cropping intensity

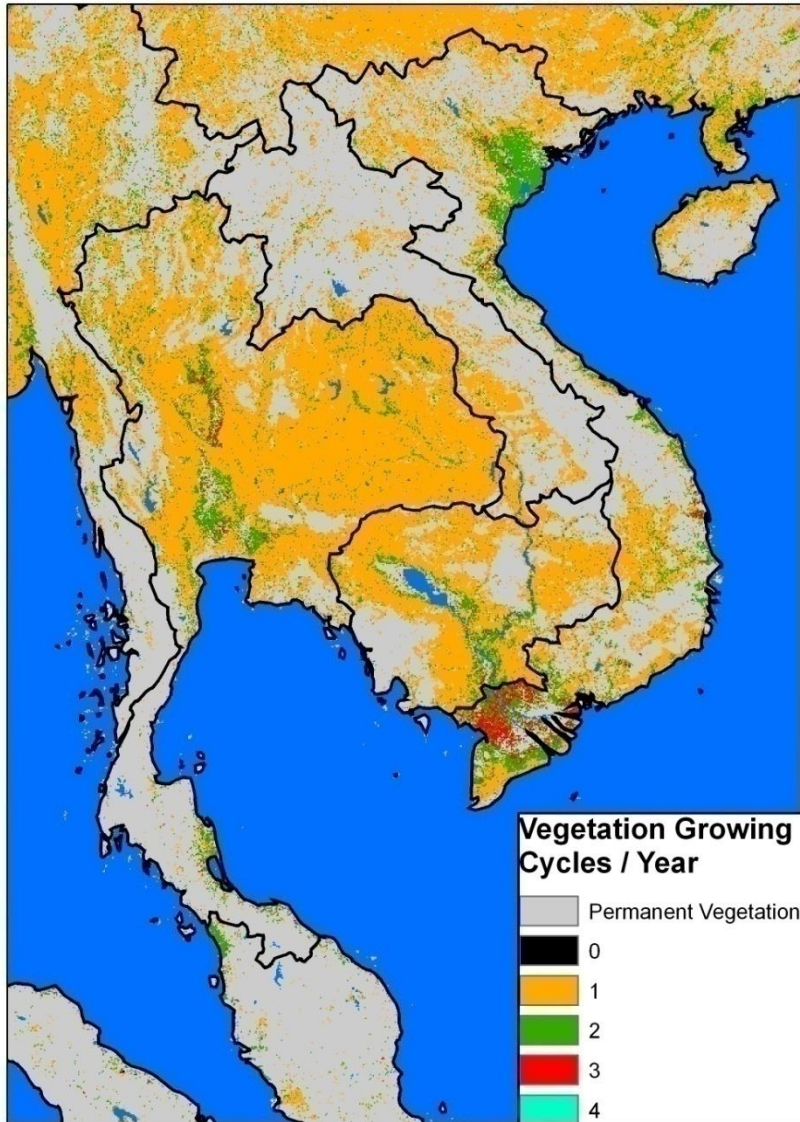
-- Asia

1-crop per year

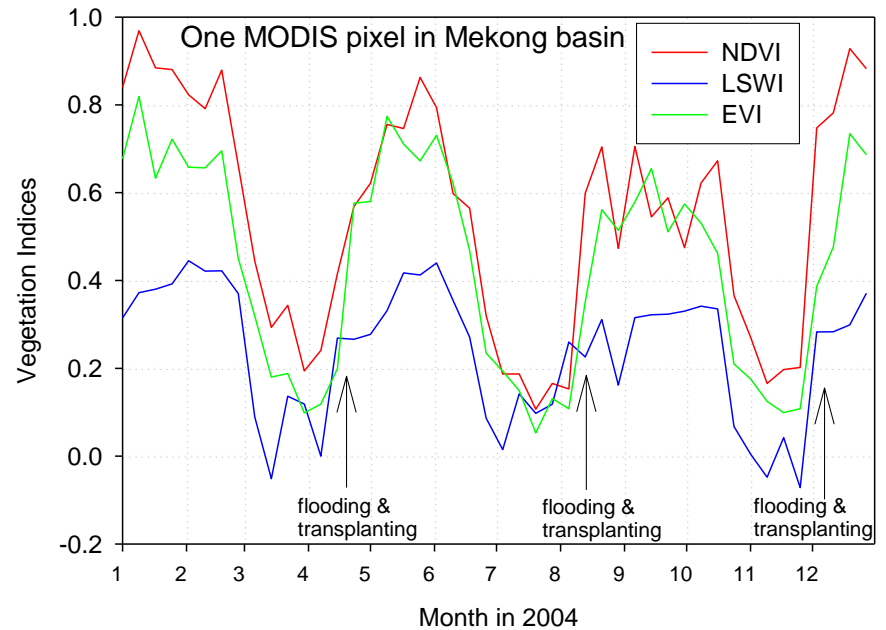
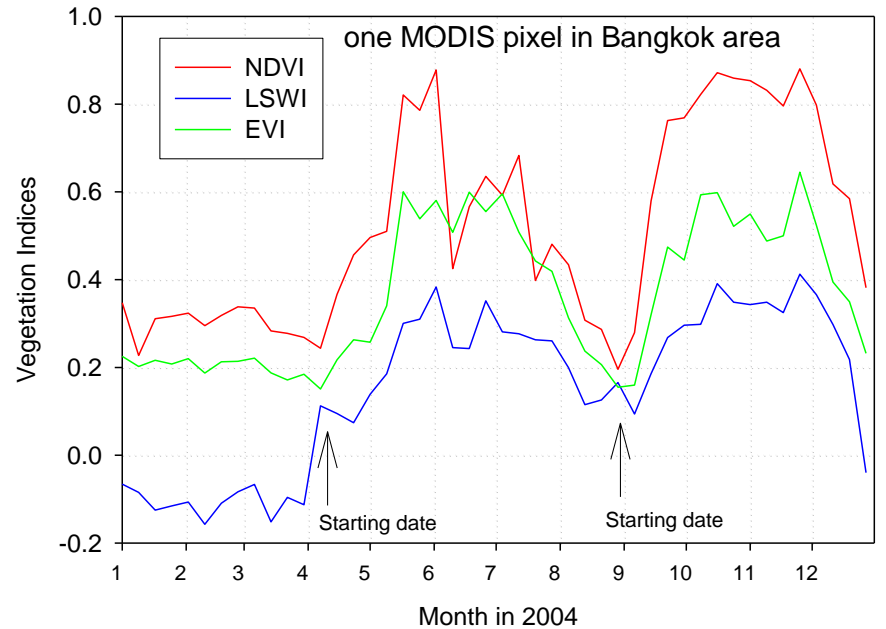
2-crops per year

3-crops per year

Global Mapping of Croplands



Cropping Intensity map in 2004



Implementation of the algorithm for cropping intensity

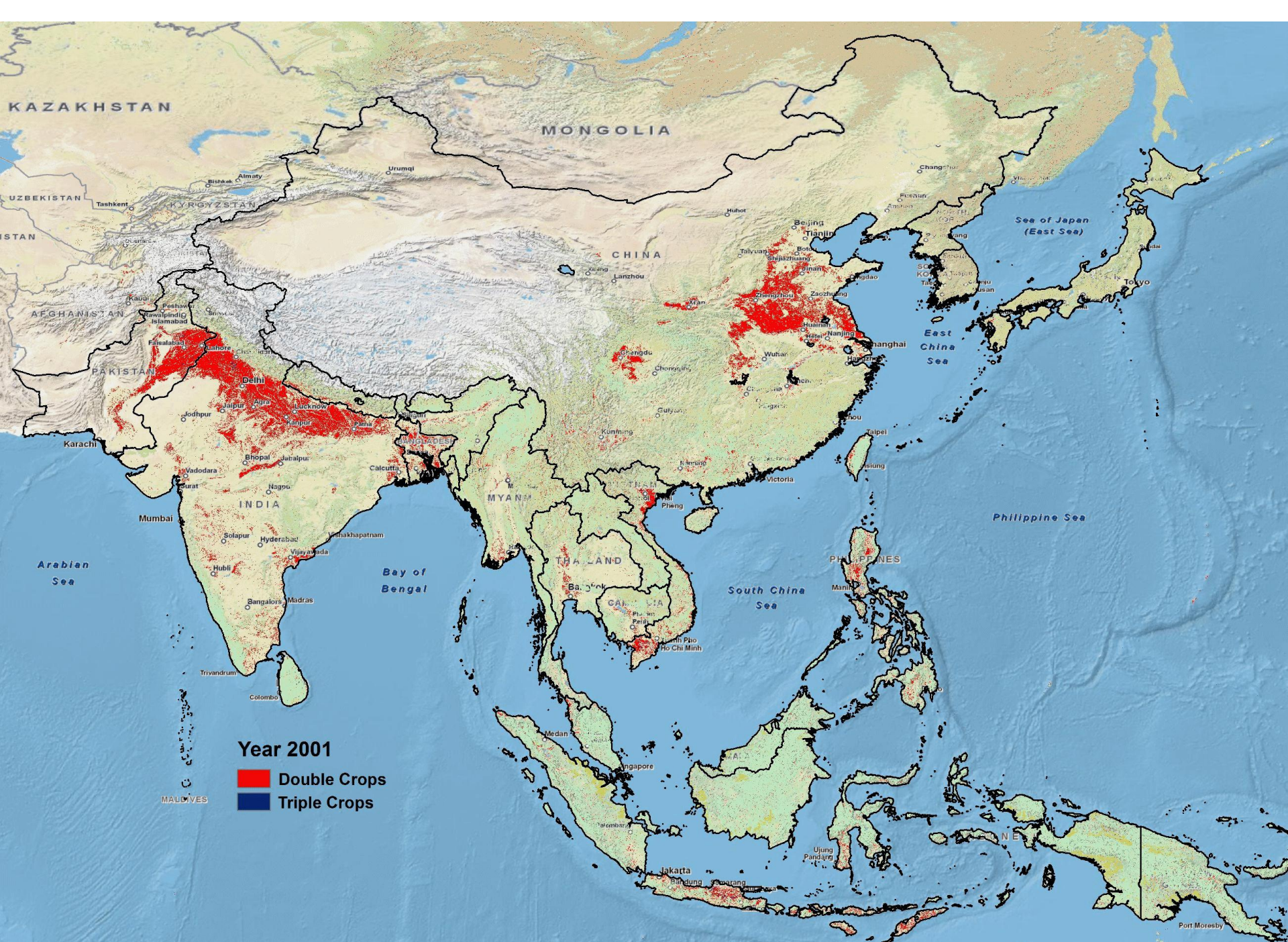
-- Asia

-- multiple years, e.g., 2001 – 2010

1-crop per year

2-crop per year

3-crop per year



Implementation of the algorithm for cropping intensity

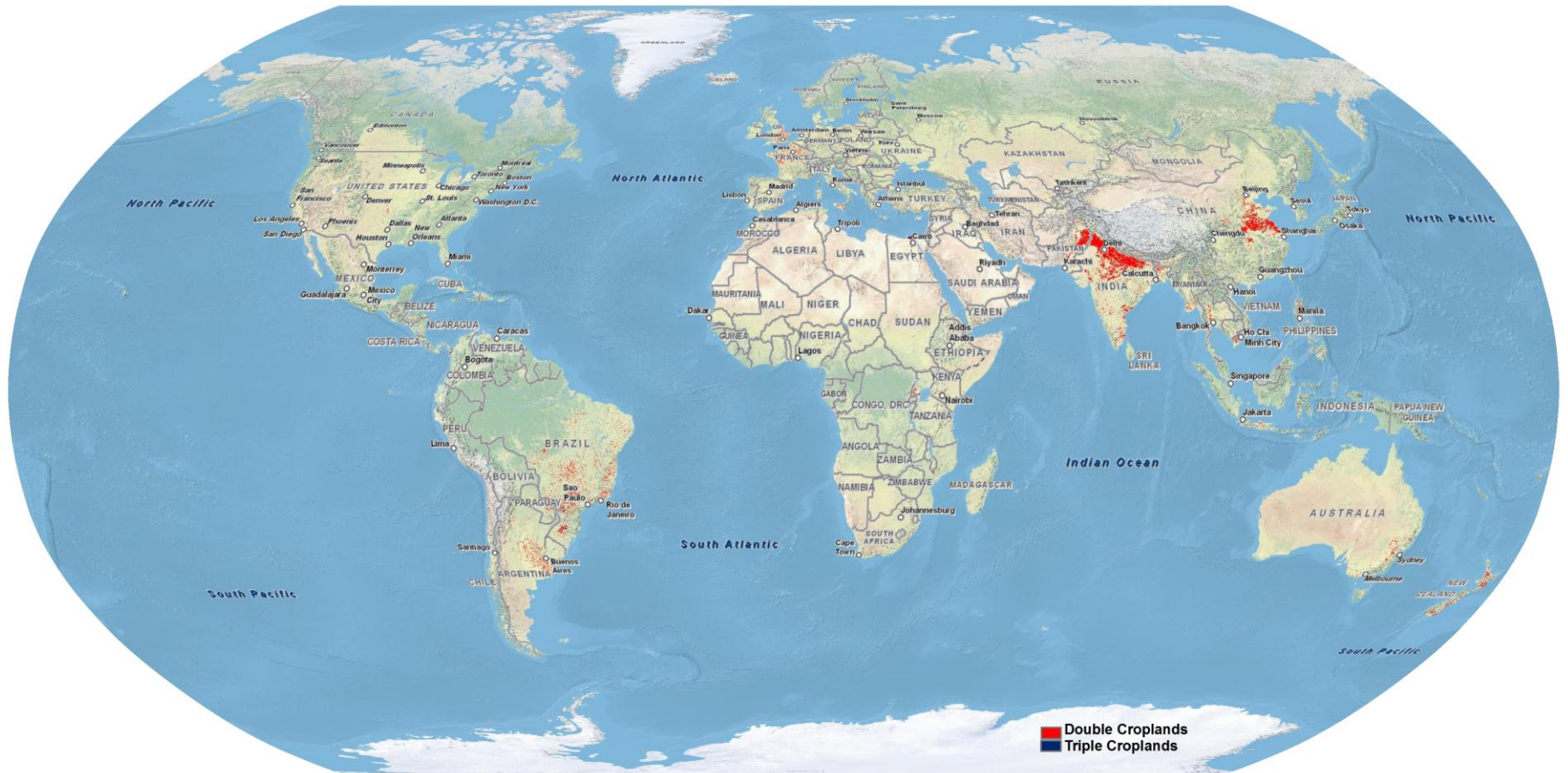
-- **The globe**

1-crop per year

2-crop per year

3-crop per year

Global Multiple-Cropping Croplands in 2010



1st version (as of October 4, 2011).

Many problems – calendar year (North Hemisphere versus South Hemisphere), monsoon, Savanna vegetation, summer drought-affected grassland vegetation

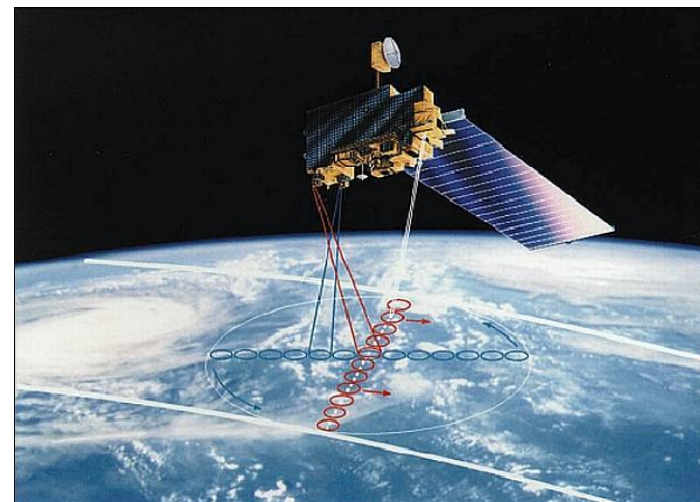
Challenging issues in agriculture mapping and monitoring



Calibration and validation of cropland mapping

Rapid and dynamic mapping of croplands

-- Community remote sensing approach

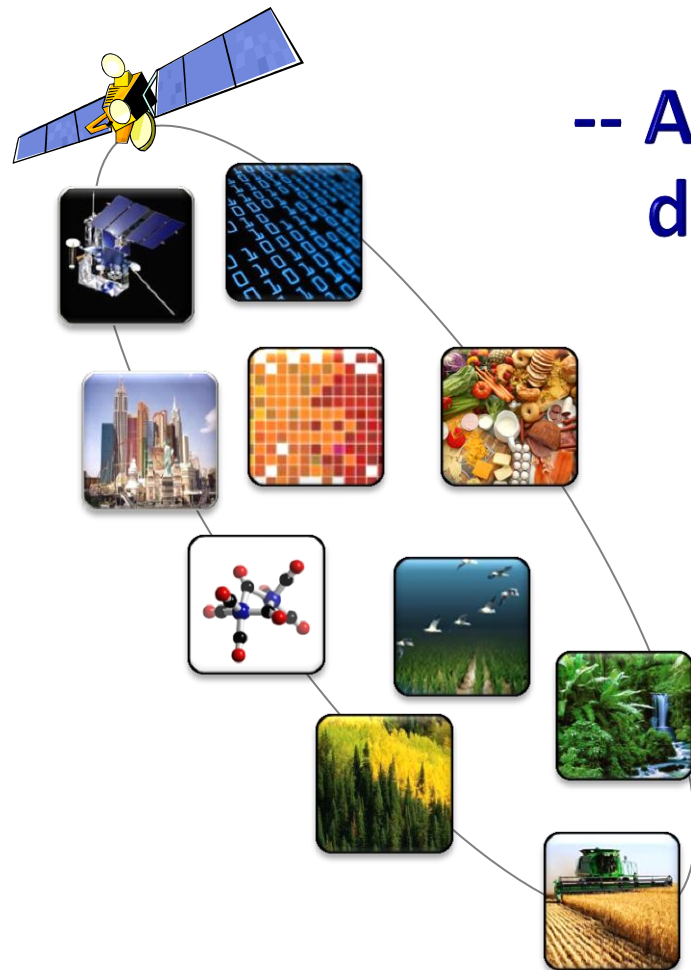




The Field-Photo Library

-- A community- and citizen- science data portal to share and archive geo-referenced field photos

www.eomf.ou.edu/photos

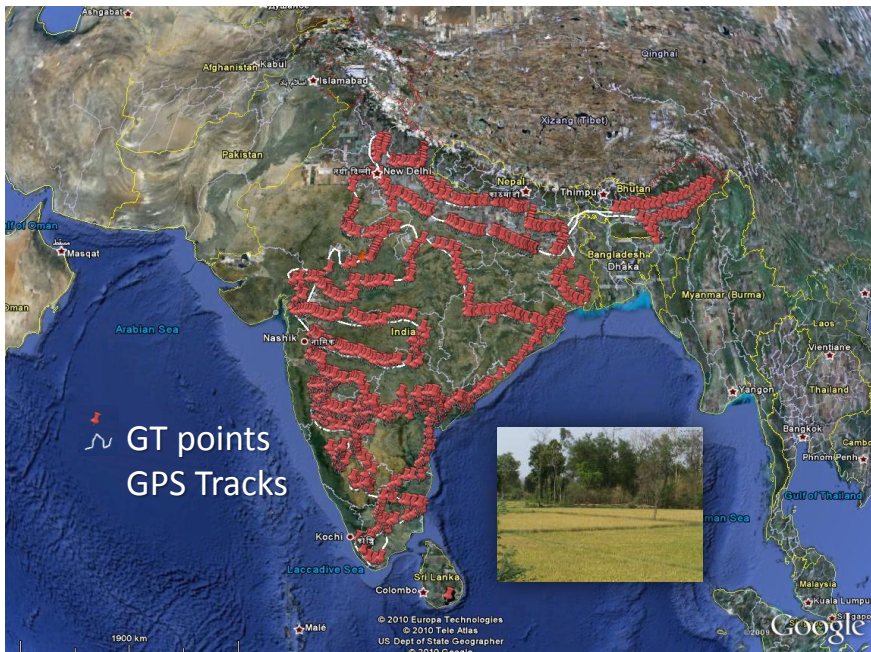


The Field-Photo Library at the University of Oklahoma

(<http://www.eomf.ou.edu/photos>)

It archives and shares geo-tagged field photos for wildlife, habitats, land use and land cover changes in the world.

GPS-based camera and cellphone



Global Geo-Referenced Field Photo Library - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.eomf.ou.edu/photos/map.php?longmin=&longmax=&latmin

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Longitude min: Longitude max: From: Categories: Countries:

 Jan 1 1990 All All

Latitude min: Latitude max: To: Users: Geographical:

 Sep 26 2010 All All

Search by keywords:

Submit

Transferring data from vmap0.tiles.osgeo.org...

The Field-Photo Library at the University of Oklahoma

(<http://www.eomf.ou.edu/photos>)

Users can upload geo-tagged field photos, and classify photos by predefined land cover types (IGBP), and write additional information for photos. User can also download photos and thematic databases (e.g., land cover types).

The screenshot shows the 'Photo Edit' page for a photo titled '58R1A_Irrigated_SW_Rice_FS_SC_1a.JPG'. The page includes a header with the site logo and navigation menu. The main content area displays the photo, its date taken (2006-08-03), and various metadata fields for editing. The 'Category' dropdown menu is open, showing a list of land cover types with 'Croplands' selected. The 'Description' field contains the text 'Rice'.

Earth Observation and Modeling Earth Observation and Modeling

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http://www.eomf.ou.edu/photos/index.php?a=edit&photo=58

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Photo Edit: 58R1A_Irrigated_SW_Rice_FS_SC_1a.JPG



Date taken: 2006-08-03

Longitude: Decimal degrees.

Latitude: Decimal degrees.

Altitude: Meters.

Direction: Cardinal direction. (i.e. NNE)

Status: Deleted Public Private

Category:

Savannas
Grasslands
Permanent Wetlands
Croplands
Urban and Built-Up
Cropland/Natural Vegetation Mosaic
Permanent Snow and Ice
Barren or Sparsely Vegetated
Unclassified
Plantations
Orchards
Water Bodies
Evergreen Needleleaf Forest
Evergreen Broadleaf Forest
Deciduous Needleleaf Forest
Deciduous Broadleaf Forest
Mixed Forest
Closed Shrublands
Open Shrublands
Woody Savannas

Description:

The screenshot shows the 'Upload' page of the Earth Observation and Modeling website. It features a header with the site logo and navigation menu. The main content area includes a welcome message, navigation links, and an upload section with five file input fields and a submit button. A note indicates the total upload limit is 650MB, with a recommendation to not exceed 100MB at a time.

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http://www.eomf.ou.edu/photos/upload.php

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Upload

Please upload individual files or a zip file of images (png, jpeg, gif):

Note that total upload limit is set at 650MB, but it is recommended you do not upload more than 100MB at the time.

The default setting for photos is public, do you want to change it to private?

File 1:

File 2:

File 3:

File 4:

File 5:

Link geo-tagged photos with MODIS time series data for land use dynamics

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http://www.eomf.ou.edu/photos/query.php?longmin=&longmax=

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Welcome, you are **Guest**

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Search by coordinates: Longitude min: Longitude max:
 Latitude min: Latitude max:

Search by date: From: Jan 1 1990 To: Jun 5 2011


Search by metadata: Categories: All Users: All

Search by region: Countries: All Geographical: All


Search by keywords:

Photos found: 1611 ... Page: 1 Items per page: 24


[Check All](#) | [Uncheck All](#)




Date taken: 2006-07-07
68.857 °E, 40.3854 °N
Category: Croplands
MODIS time series data: [View](#)




Date taken: 2005-05-07
68.8595 °E, 40.3838 °N
Category: Croplands
MODIS time series data: [View](#)




Date taken: 2006-08-03
68.8574 °E, 40.3904 °N
Category: Croplands
MODIS time series data: [View](#)




Date taken: 2006-08-03
68.8563 °E, 40.3896 °N
Category: Croplands
MODIS time series data: [View](#)




Date taken: 2006-08-03
68.8574 °E, 40.3905 °N
Category: Croplands
MODIS time series data: [View](#)



Date taken: 2006-08-03
68.8565 °E, 40.3906 °N
Category: Croplands
MODIS time series data: [View](#)



Date taken: 2006-08-03
68.8565 °E, 40.3905 °N
Category: Croplands
MODIS time series data: [View](#)



Date taken: 2007-05-25
116.7586 °E, 28.9063 °N
Category: Croplands
MODIS time series data: [View](#)

Earth Observation and Modeling Data Visualization

Rooms & Rate... Maui Villa... Earth Obs... Earth ... Earth Obs... The Natio... Earth Sci...

http://www.eomf.ou.edu/visualization/graph-mod09a1-2007-28.7

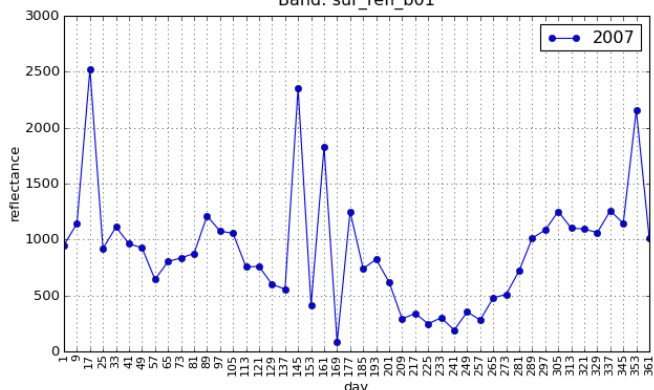
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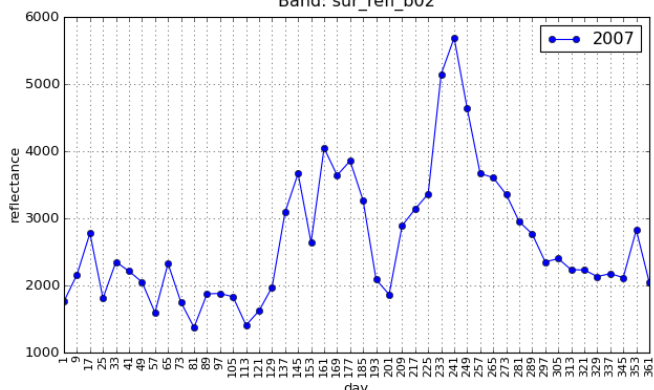
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Latitude: 28.791766666667
 Longitude: 116.08361666667
 Modis: mod09a1
 Tile: h28v06
 Year: 2007
 Cell (row, column): 289, 414
 The scaling factor of the seven spectral bands: 10,000

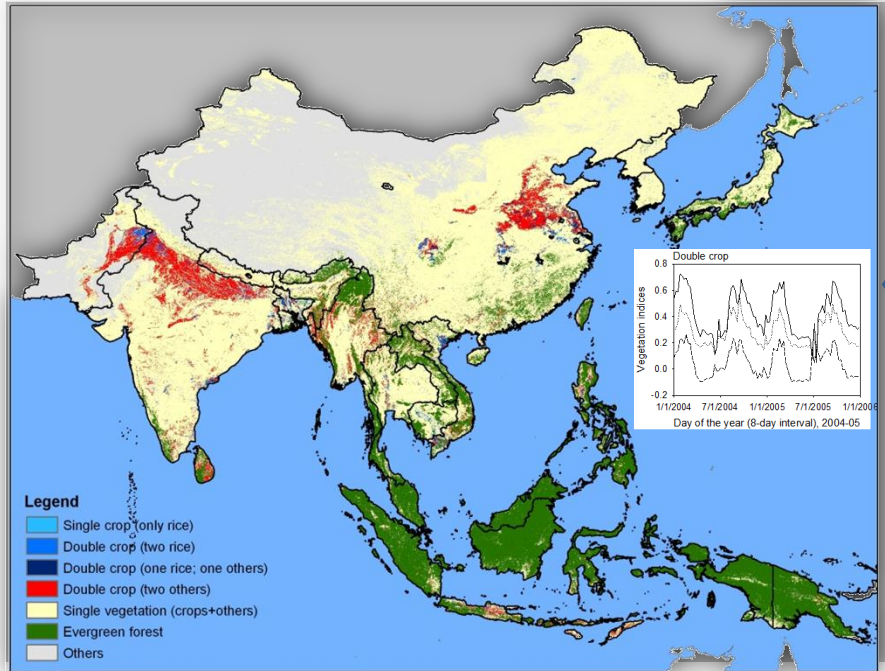
Band: sur_refl_b01



Band: sur_refl_b02



2011-06-29
115.0004 OE
8.423 OS
View: NNE
462m altitude.



http://www.eomf.ou.edu/photos/map.php?a=user&info=xiao2007

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Search by coordinates: Longitude min: Longitude max: From: Jan 1 1990 To: Jul 24 2011

Search by metadata: Categories: All Users: All

Search by region: Countries: All Geographical: All

Search by keywords:

15487 photos

A world map showing the locations of 15,487 photos. The map is color-coded by country and includes labels for major countries and regions. Orange circles of varying sizes are overlaid on the map, indicating the locations of the photos. The circles are largest in the United States, China, and India, and smaller in other regions. The map includes a legend, a scale bar, and a compass rose.

72.07031, 66.65208

Field-Photo library is used to support rapid and dynamic mapping of land use & land cover

Challenging issues in agriculture mapping and monitoring

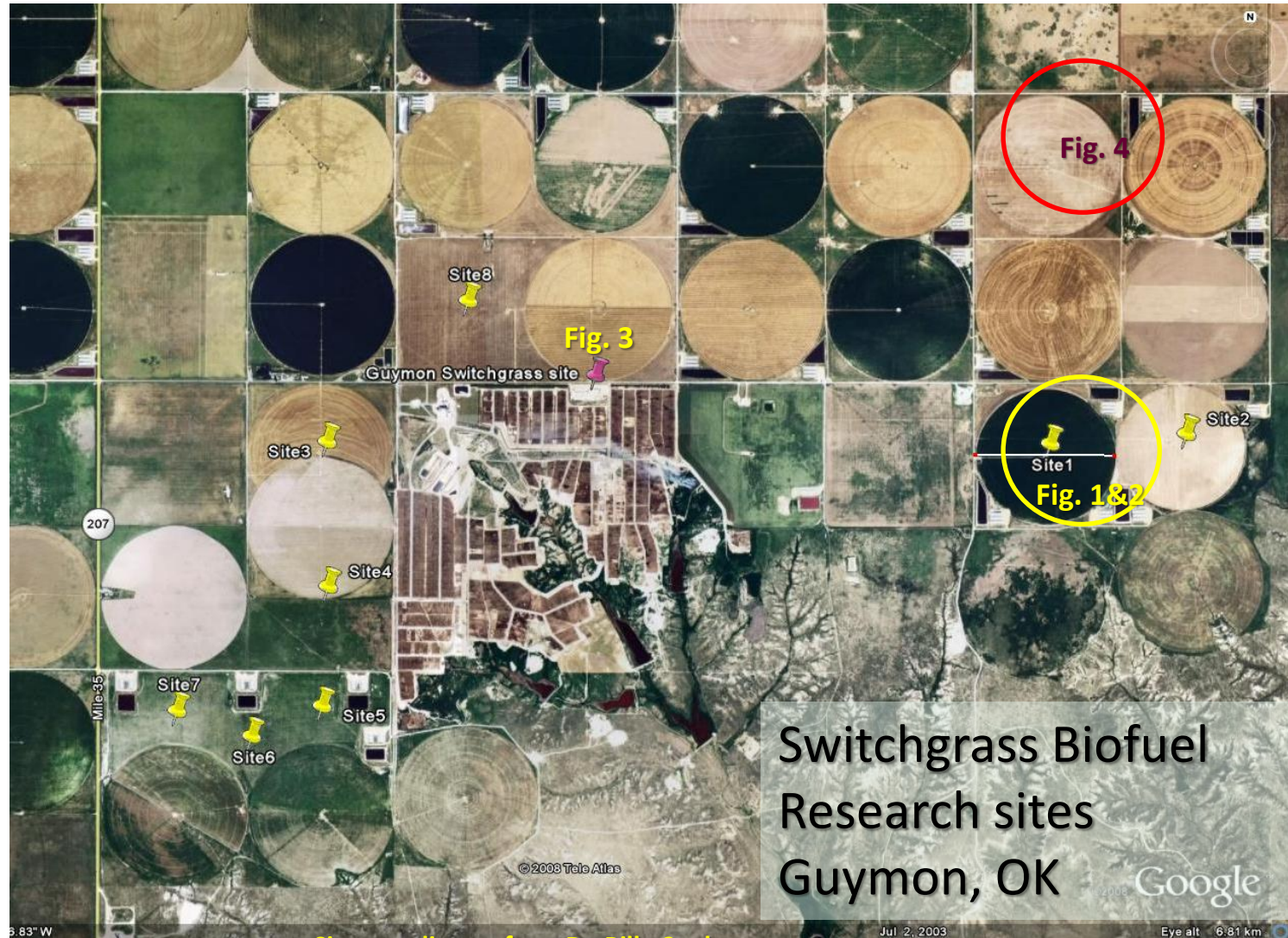


Biofuel feedstock production and cropland intensification

Challenging issues in agriculture mapping and monitoring



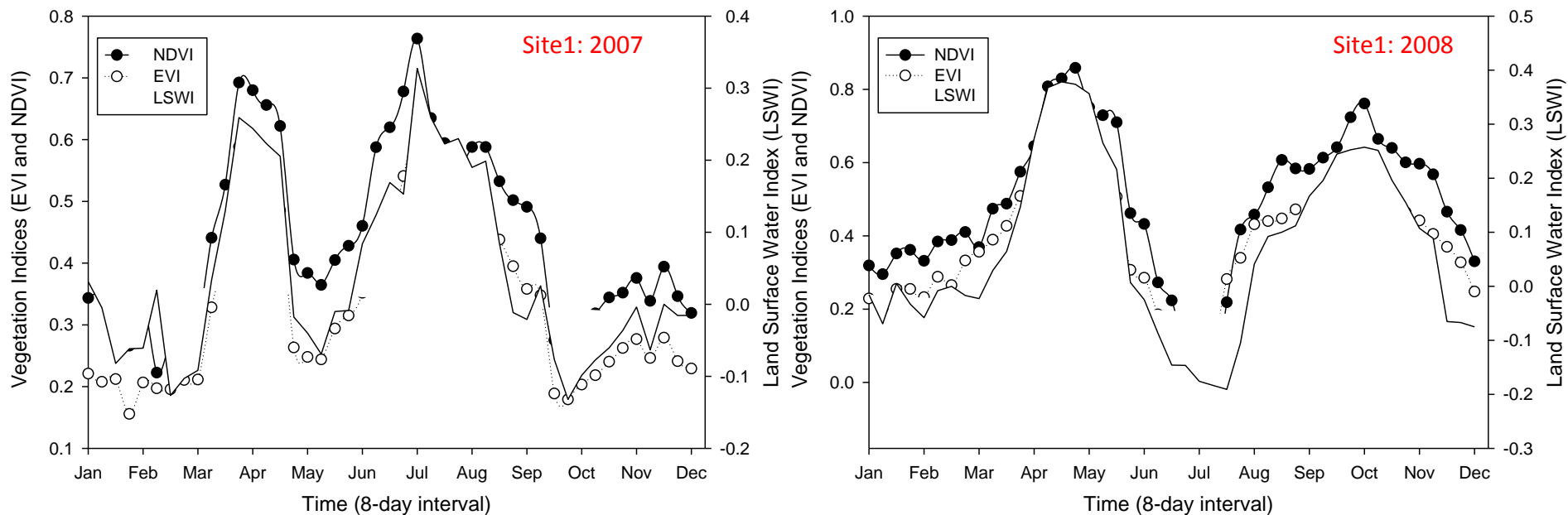
Dynamics of cropland and biofuel feedstock cultivation



Site coordinates from Dr. Billy Cook

Case study

Will biofuel feedstock production change land surface phenology and cultivation intensity in Southern Great Plains, USA?



Vegetation indices (NDVI, EVI and LSWI) from 8-day MODIS images (MOD09A1) at the experimental site #1, switchgrass biofuel research sites, Guymon, Oklahoma.

Challenging issues in agriculture mapping and monitoring



Cropland gross and net primary production,

biogeochemical cycle

water use (irrigation, ET)

Disease ecology

Quantify gross primary production of maize and soybean in USA

A rotation of maize field and soybean field over two years is common agricultural practice in USA. The VPM model was applied to estimate GPP of maize and soybean. Figures below show a case study in the Rosemount G21 site, Minnesota (Soybean in 2004, maize in 2005, and soybean in 2006).

