GLOBAL MONITORING FOR FOOD SECURITY IM SUDAN

GMFS 3

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World hunger

World Summit on Food Security

FAO, Rome 11.2009

- Mehr als **1 Milliarde Mensche** auf der Erde sind von Hunger betroffen

- Mehr als **30 Länder** haben Hungersnöte erfahren

- Die meisten von ihnen befinden sich in **Afrika**.

- **GMES**
  - – <u>G</u>lobal <u>M</u>onitoring for <u>E</u>nvironment and <u>S</u>ecurity
  - – Joint EC and ESA initiative

- **GMFS**
  - – <u>G</u>lobal <u>M</u>onitoring for <u>F</u>ood <u>S</u>ecurity
  - – is one of 10 projects in the GMES Service Element program of ESA
  - – 3 phases
    - 2003-2004: Startup, consolidation & definition
    - 2005-2009: Implementation, Up-scaling
    - 2010-2013: Implementation, Operationalisation

GMFS

(Global Monitoring for Food Security)

Projekteinordnung: ESA - Earth Watch GMES Services Element (GSE)

→ teilautomatisierte Klassifizierung von Ackerflächen

Ziel:
Prozessketten und Informationsdienste zur Ernährungssicherung aus Fernerkundungsdaten

Grundlage:
• Satellitendaten (Envisat MERIS & ASAR, SPOT, MODIS)
• Nationale Geodaten und Statistiken

Ertrag?

GMFS
Global Monitoring for Food Security

2005 – Crop condition

Courtesy of: Alejandra Mora-Vallejo, PhD Student Wageningen University
Tradeoff Analysis Project

Wachstums-bedingungen?

2006 – Crop condition

Courtesy of: Alejandra Mora-Vallejo, PhD Student Wageningen University
Tradeoff Analysis Project

GMFS
Global Monitoring for Food Security

Anbaufläche?

Saatbettbereitung nahe Addis Abeba, Juni 2006

GMFS Portfolio

Service	Product Name
Support to CFSAM	GMFS Support Kit for FAO/WFP CFSAM missions (SK)
Early warning	Vegetation Productivity Indicator (VPI)
	Fraction of Absorbed Photo synthetically Active radiation (fAPAR) / DMP
Agricultural mapping	Crop Emergence Period (CEP)
	Cultivated Area (CA)
	Extent of Cultivation (EoC)
	Agricultural Productivity (AP)
Crop Yield assessment	Crop Yield (CY)

GMFS
Global Monitoring for Food Security
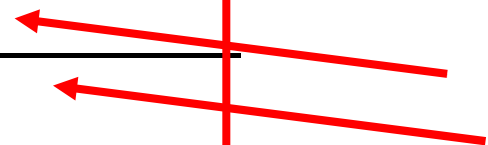
Agriculture & consumption in Sudan

Agriculture production in Sudan is largely depending on seasonal variability and depending upon intensity, duration and period of rains. Large areas in the central Sudan are depending on traditional rain fed agriculture with the cropping of Sorghum and Millet mainly for own consumption. This causes high vulnerability of a certain part of the Sudanese population. About 60% of the Sudanese population are living in rural areas with an average population density of 14-17 people per km².

In addition to this difficult aspect of agricultural production, the FMoAF declared, that statistical and monitoring frameworks are a difficult issue, since the infrastructure in the traditional rain fed areas is very low, the areas are enormous and the seasonal variations request from the population a high dynamic.

The set up of a robust monitoring scheme was initiated during the past decades with a number of attempts, upon which the FMoAF could elaborate a basis on how to usefully integrate Remote Sensing technologies in combination with ground observations.

However those failed due to political reasons in the past.

Recent elaborations from GMFS demonstrated a huge progress in monitoring cultivated areas.

But, and there the general difficulties to monitor the traditional rain fed areas crosses limitations of Remote Sensing, the electromagnetic characteristics of the tradition rain fed crops and the timely development over the crop season is hardly to distinguish from natural vegetation or fallow land vegetation.

Tests had been investigated to apply new generations of sensors, such as very high resolution radar and optical with certain improvements. But operationability could not be achieved due to the lack of product availability on the administrative reporting level.

The recent GMFS Agricultural Mapping processes must be adopted and enhanced with additional routines and more in depth context knowledge from Sudanese experts in order to better extract low intensity agriculture. In addition to the development and adaptation of existing algorithms a specific need is the successful integration of those into a strong logistical framework with the Sudanese partners in order to bring together the advanced knowledge to elaborate and apply mapping processes and the regional knowledge on contexts of the production types.
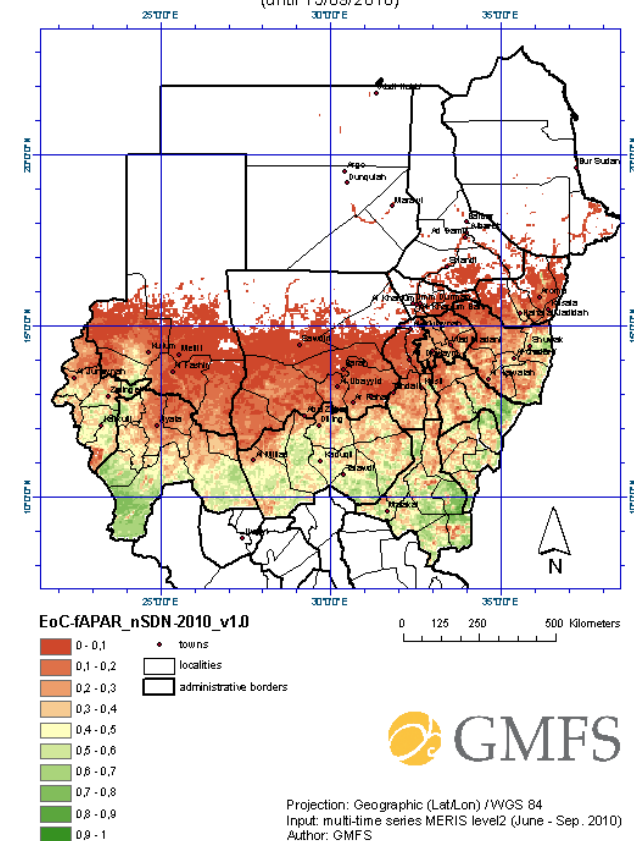
On basis of the ESA and third party mission sensor portfolio the established institutional collaboration network, which GMFS established during stage II can be bring together both aspects.
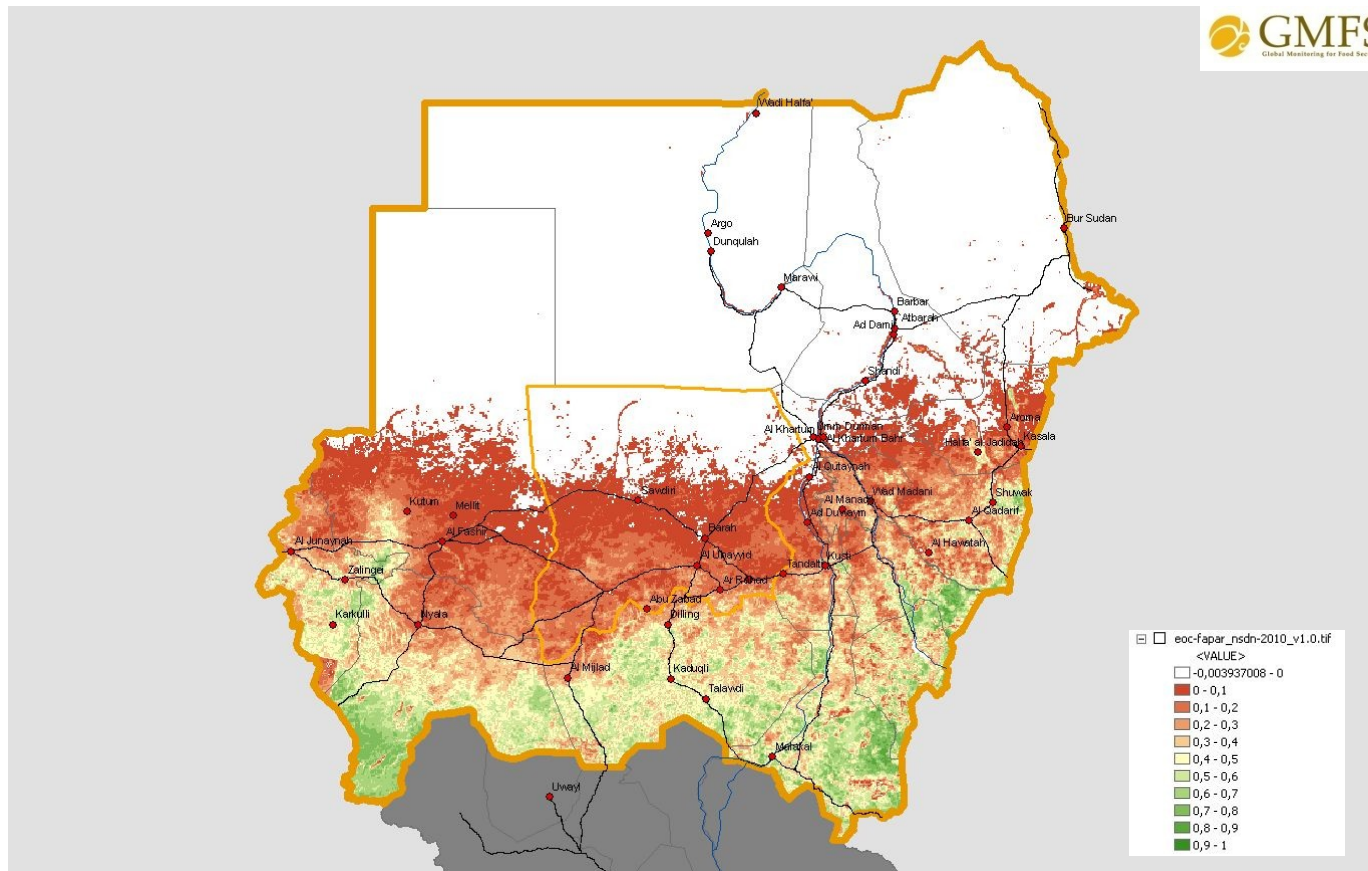
Indicative Cultivated Area Mask:

- Medium Resolution multi time series

- Inter seasonal indication upon growth activities

- Expected outputs
⇒ Technology Transfer of:
  - ⇒ Satellite acquisition planning and cataloguing
  - ⇒ Processing Chain to FMoAF Sudan
  - ⇒ Validation and product finishing procedures
⇒ MR Inter seasonal mask on country level

The **fAPAR** value shows the **fraction of the Absorbed photo synthetically Active Solar Radiation**, which represents the fraction of the solar energy which is absorbed by active vegetation. A value between < 0 and 0.3 for examples reflects the potential distribution of rain fed agriculture during the given period.

Indicative fAPAR in North Sudan Growing Season 2010 (until 15/09/2010)

EoC-fAPAR_nSDN-2010_v1.0

0 - 0,1	towns
0,1 - 0,2	localities
0,2 - 0,3	administrative borders
0,3 - 0,4	
0,4 - 0,5	
0,5 - 0,6	
0,6 - 0,7	
0,7 - 0,8	
0,8 - 0,9	
0,9 - 1	

0 125 250 500 Kilometers

GMFS

Projection: Geographic (Lat/Lon) / WGS 84
Input: multi-time series MERIS level2 (June - Sep. 2010)
Author: GMFS

GMFS fAPAR-EoC North Sudan 2010

GMFS fAPAR-EoC North Sudan 2005
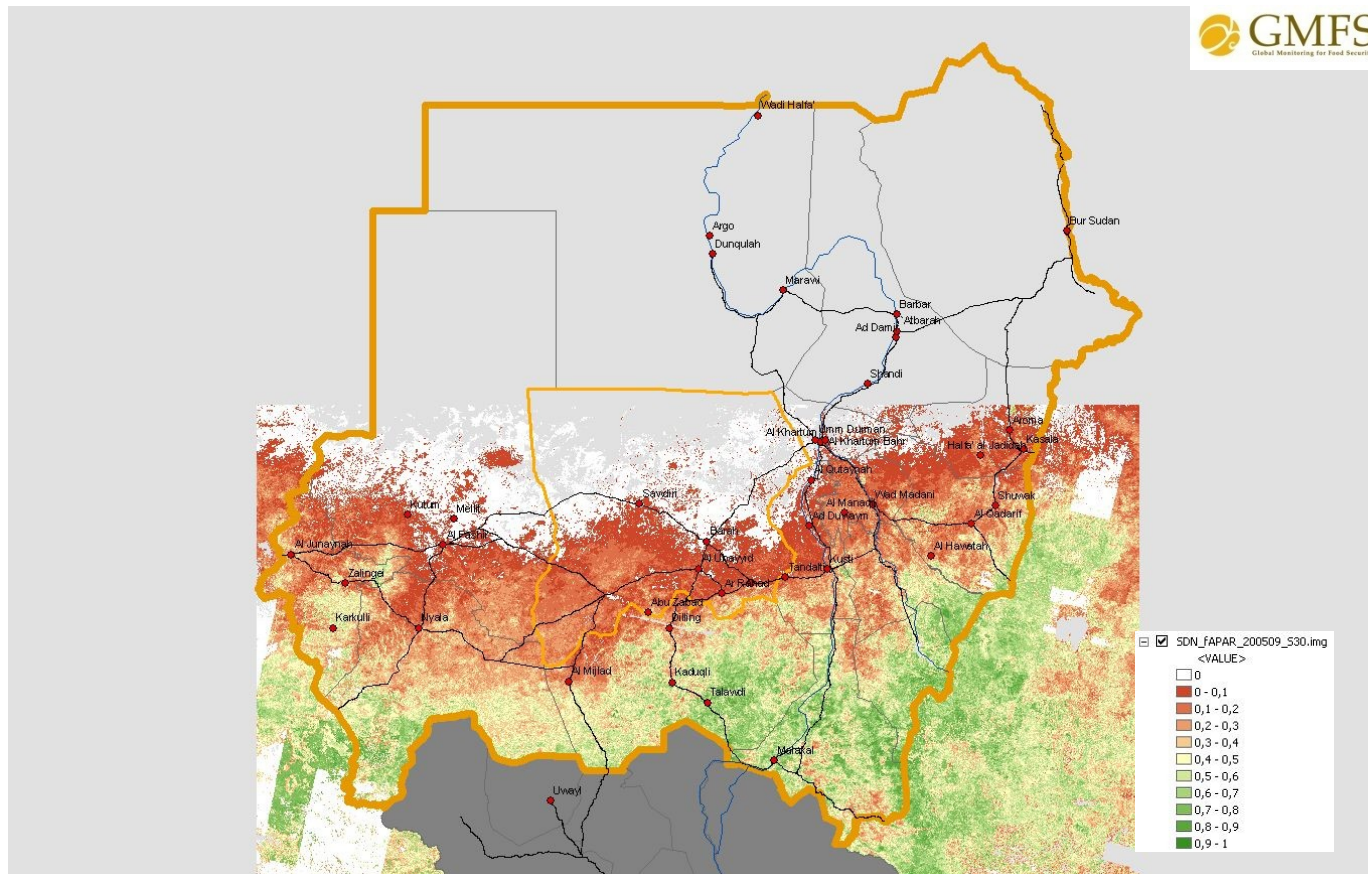
GMFS fAPAR-EoC North Kordofan 2010
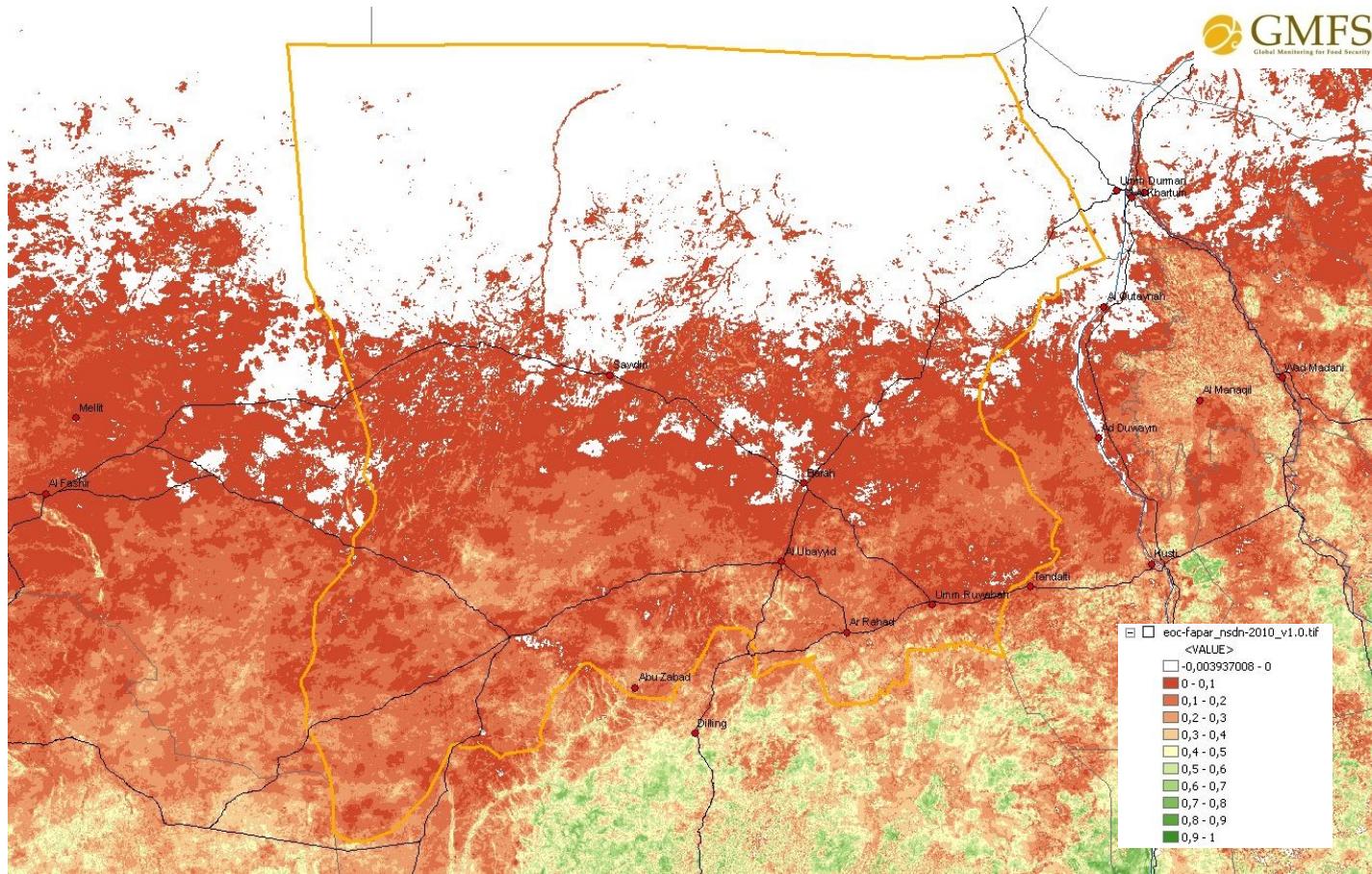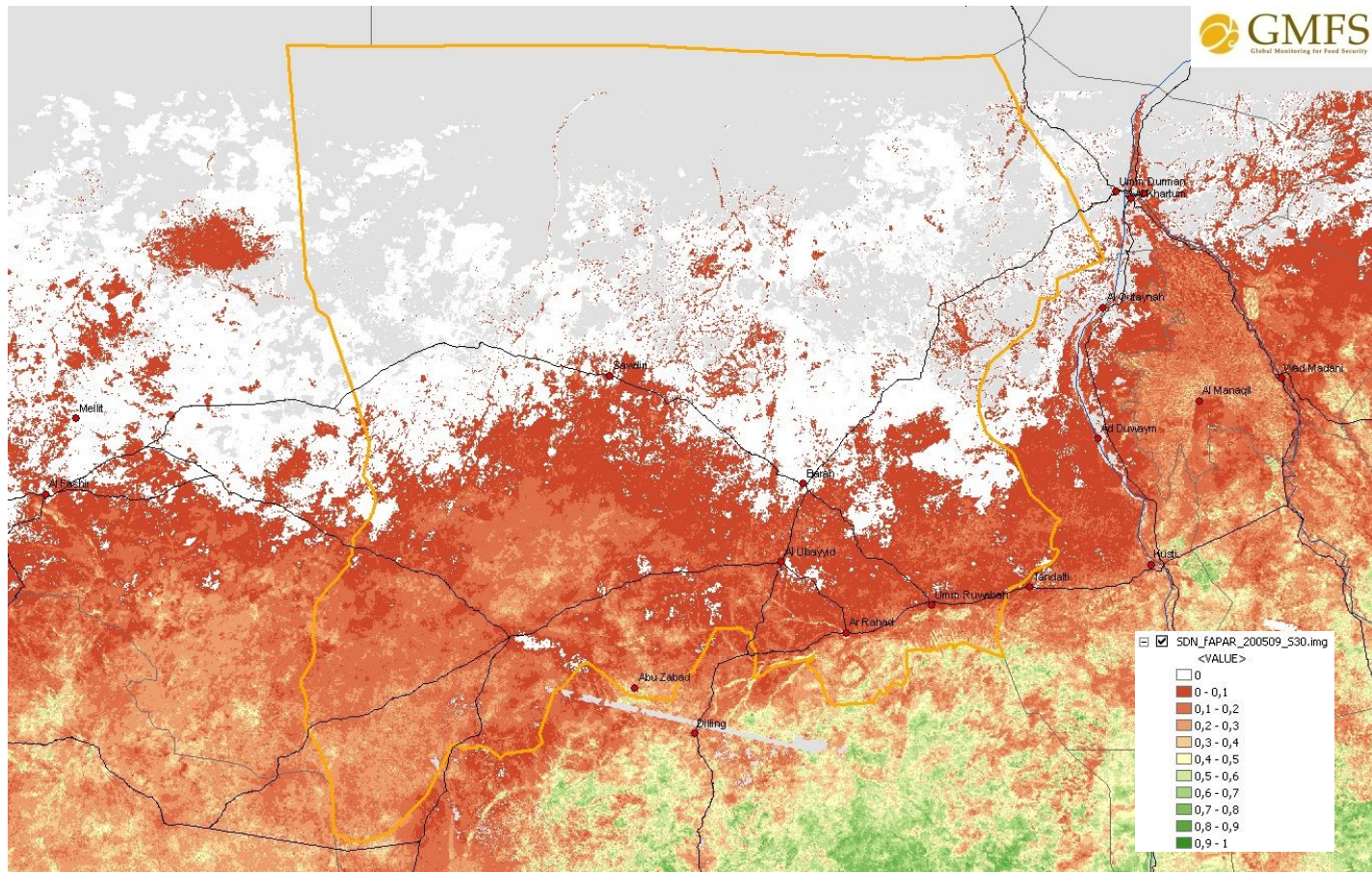
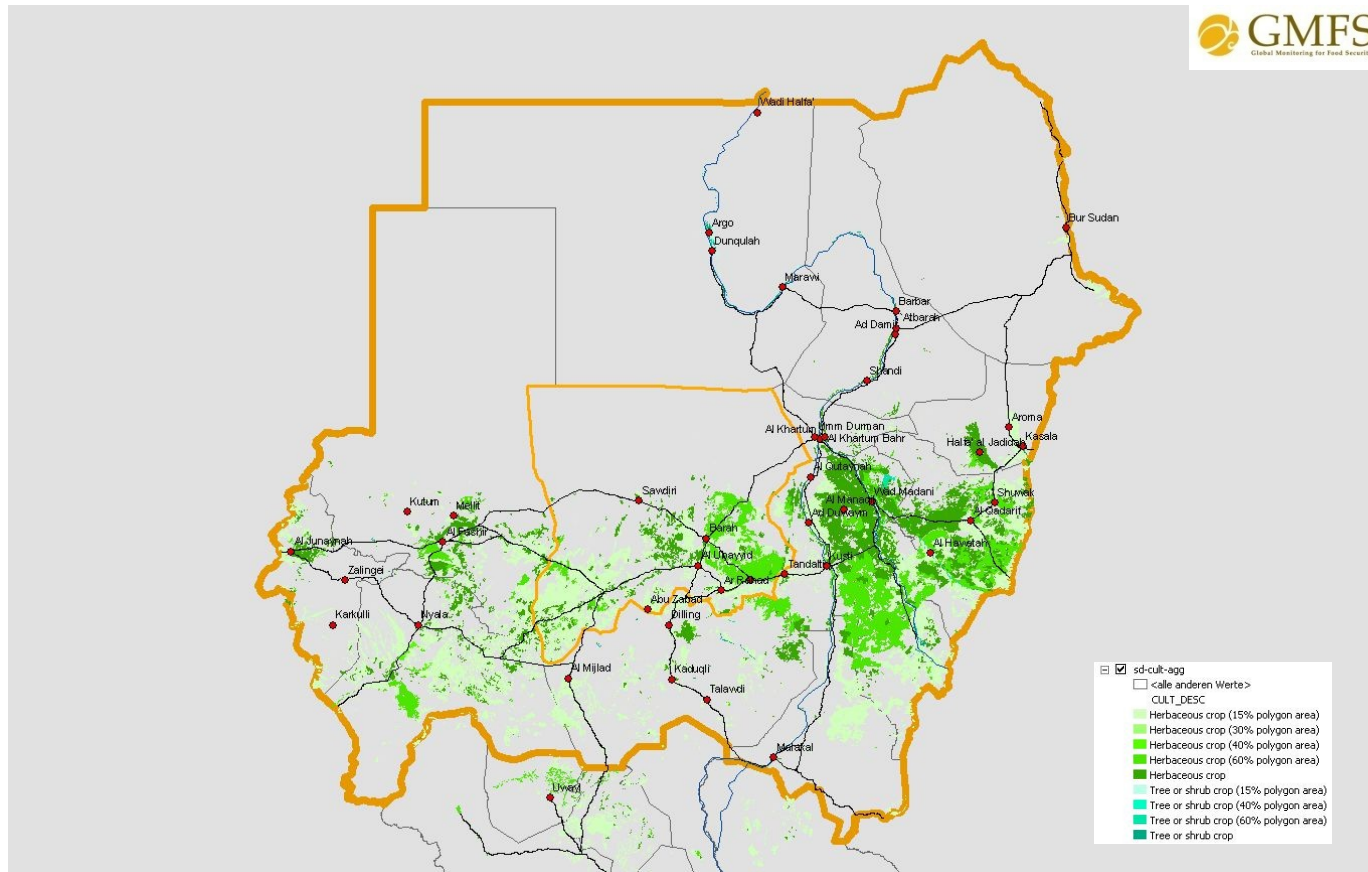# GMFS fAPAR-EoC North Kordofan 2005

GMFS fAPAR-EoC North Kordofan 2010
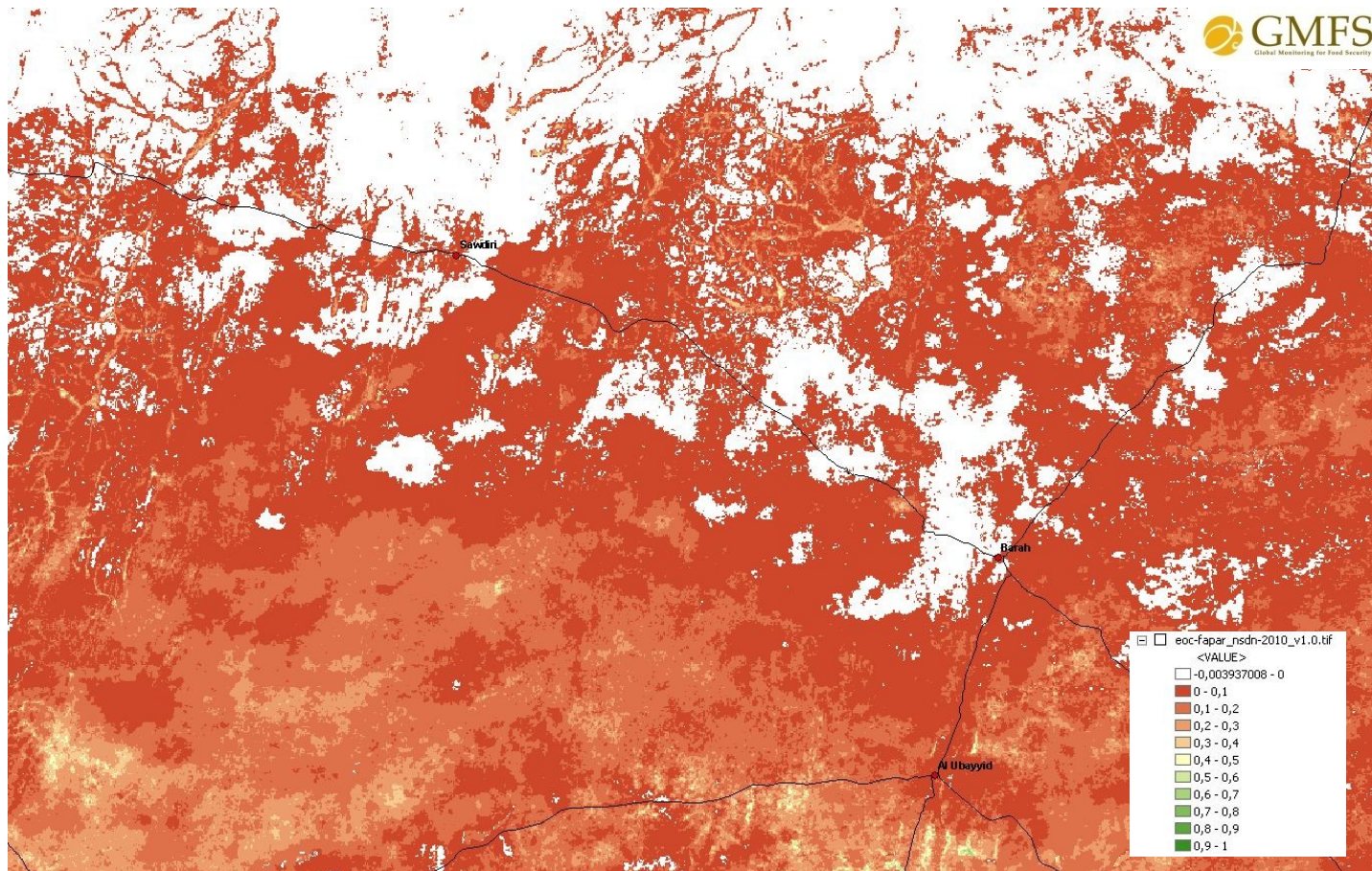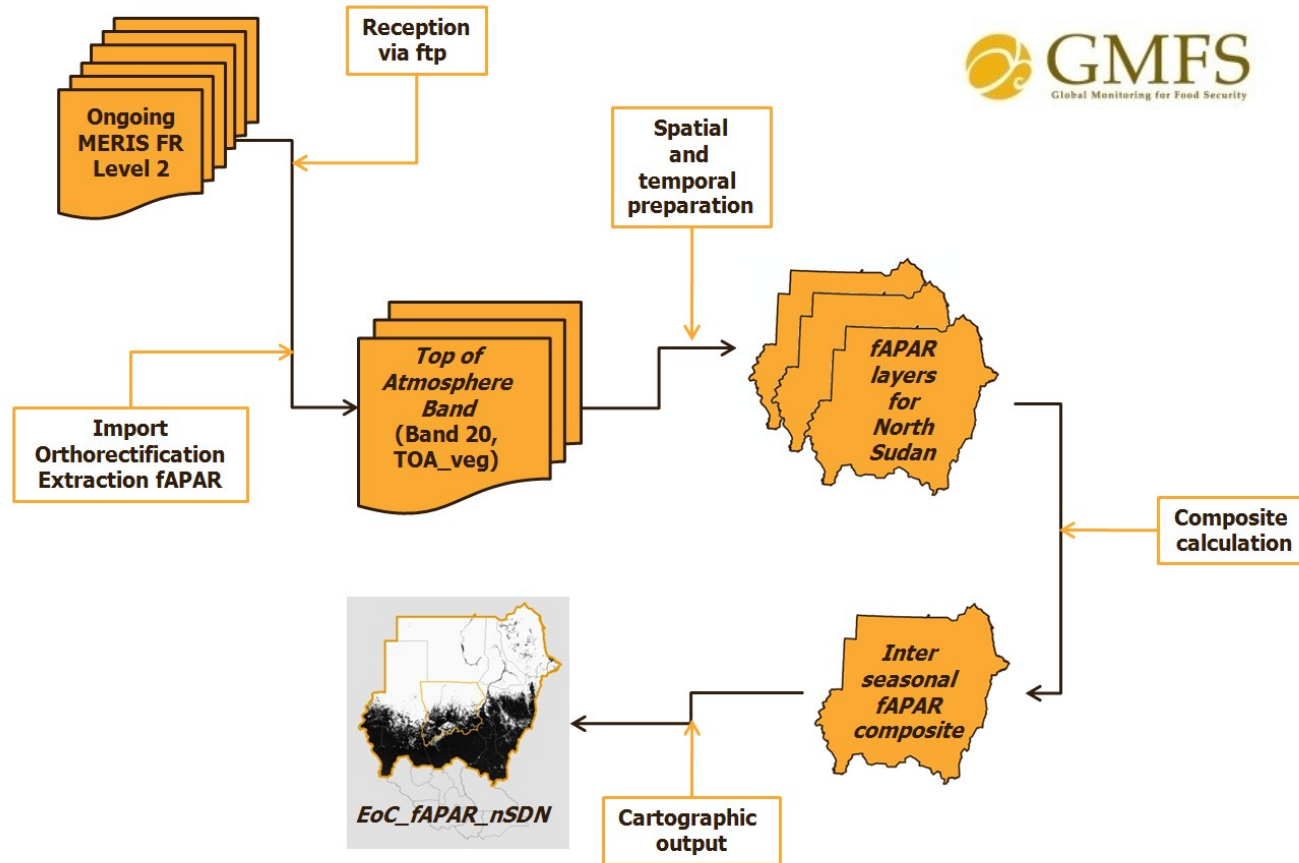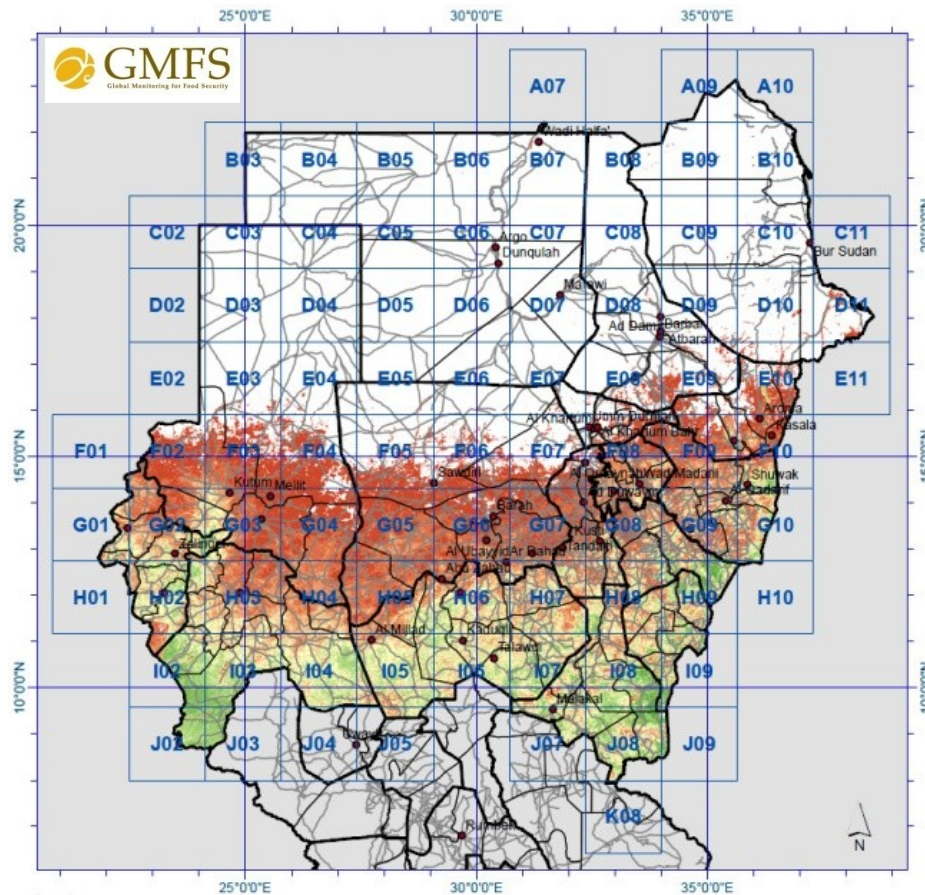
GMFS fAPAR-EoC North Kordofan 2005
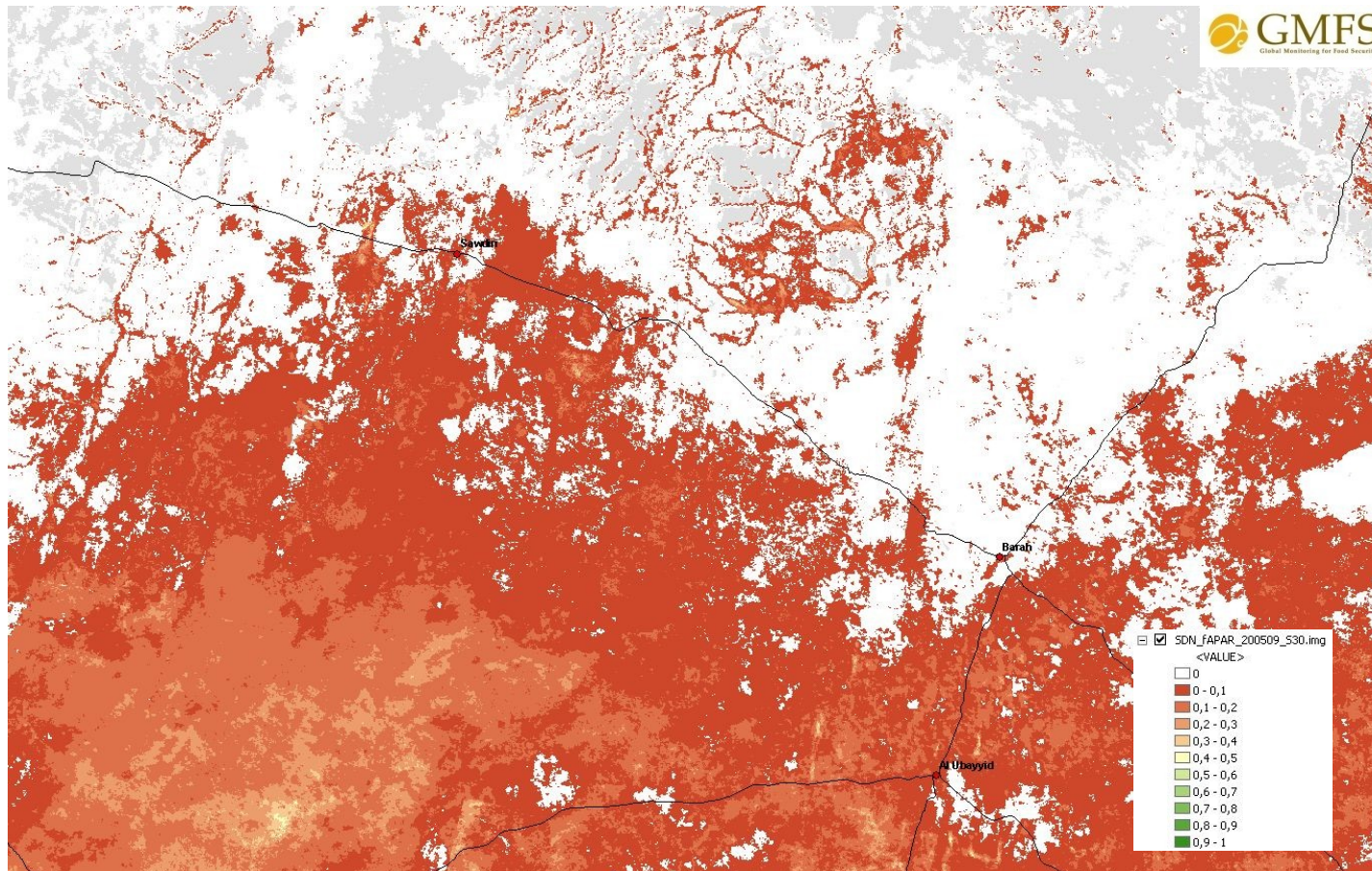
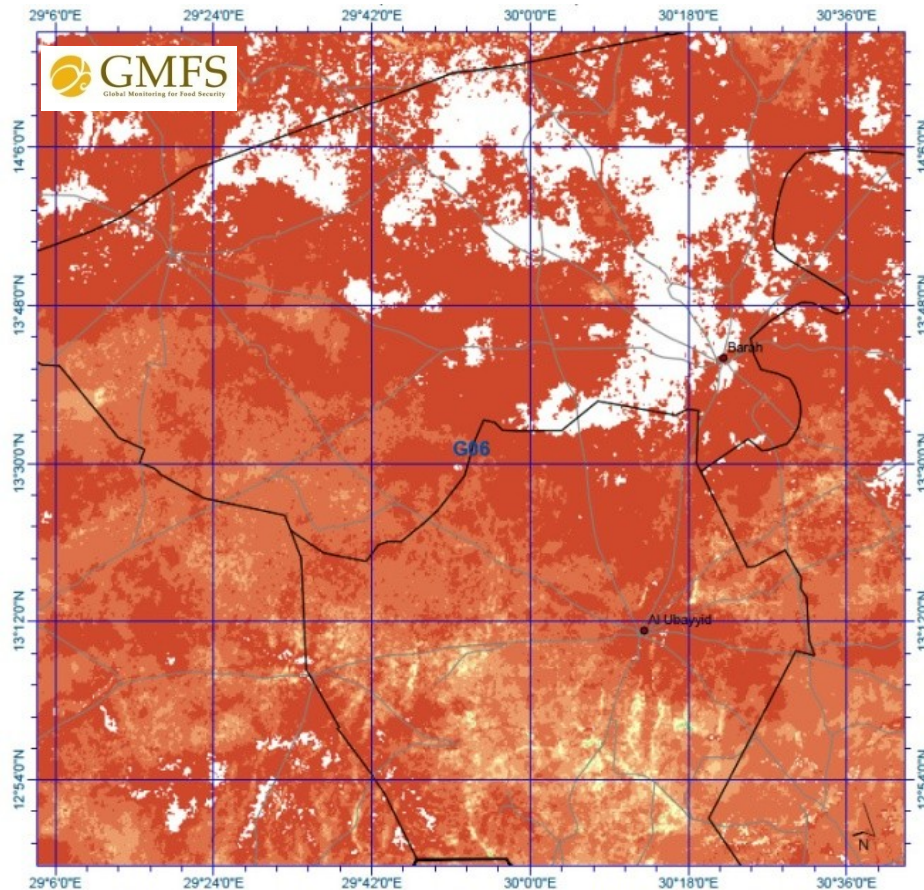# FAO AFRICOVER SUDAN 2000

EoC_fAPAR Sudan process chain

GMFS3 Indicative fAPAR - North Sudan (1:1.000.000)

Map series overview based on GMFS3 Indicative fAPAR in North Sudan.

GMFS3 Indicative fAPAR - North Sudan (1:1.000.000)

Single map at scale
1:1.000.000 out of
GMFS3 Indicative fAPAR
map series.

Saatbettbereitung nahe Addis Abeba, Juni 2006. C. Haub, EFTAS

GMFS Agricultural Mapping in Sudan (WP3220)

Cultivated Area CuA:

- Multi scale processing chain
  - Standardized Pre Processing (PrP)
  - Sequential context based multi temporal & time series classification algorithms (Main Processing – MP)
  - Comprehensive Post Processing (PoP)
  - Integrated into Software interface (e.g. ALIS)
  - Systematic training
  - Interoperable with existing algorithms
  - Integrating local expertises and existing information

- Expected outputs
⇒ Technology Transfer of:
  - ⇒ Satellite acquisition planning and cataloguing
  - ⇒ Processing Chain to FMoAF Sudan
  - ⇒ Validation and product finishing procedures
⇒ HR Crop Masks on state level
⇒ MR pre harvest Crop Masks (annual)
⇒ recent HR Satellite image mosaic on state level
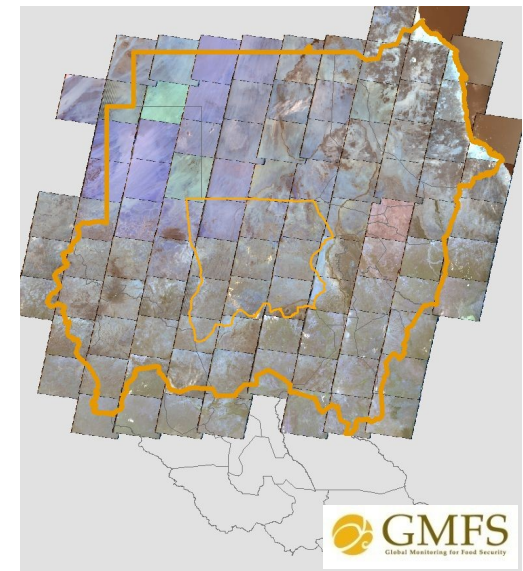
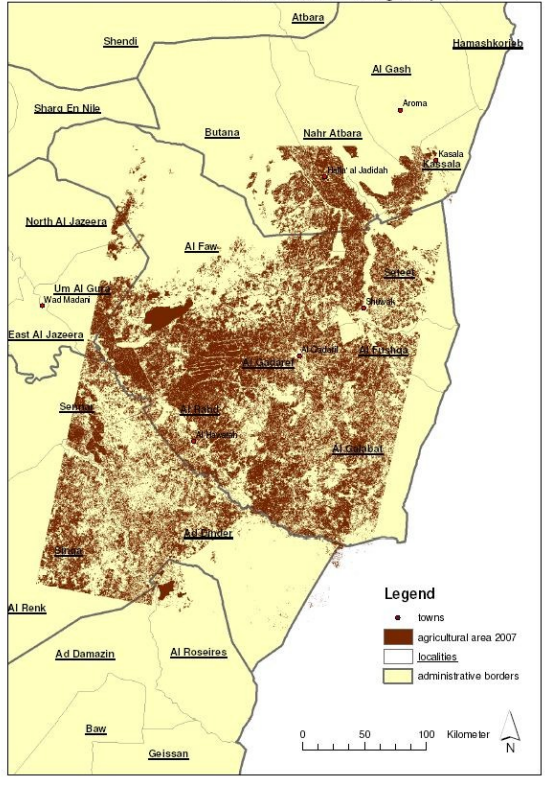# GMFS Cultivated Area (CA): CA products for DAW, KOR, GED in 2007

CA-DAW - Cultivated Area for the 2007 growing season - based on remote sensing analysis
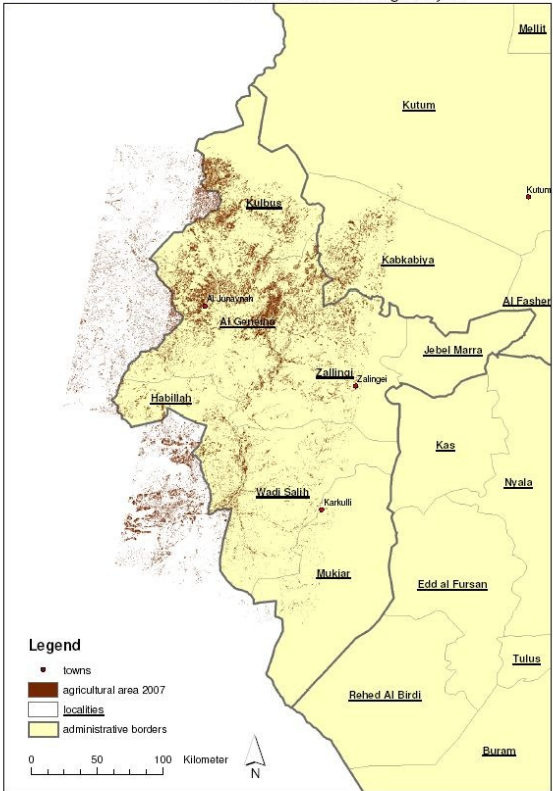
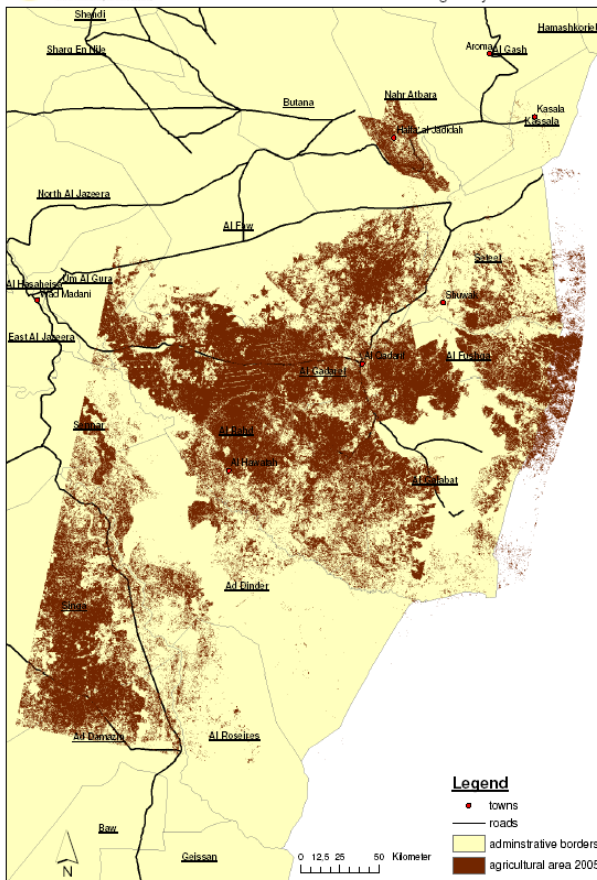CA-KOR - Cultivated Area for the 2007 growing season - based on remote sensing analysis
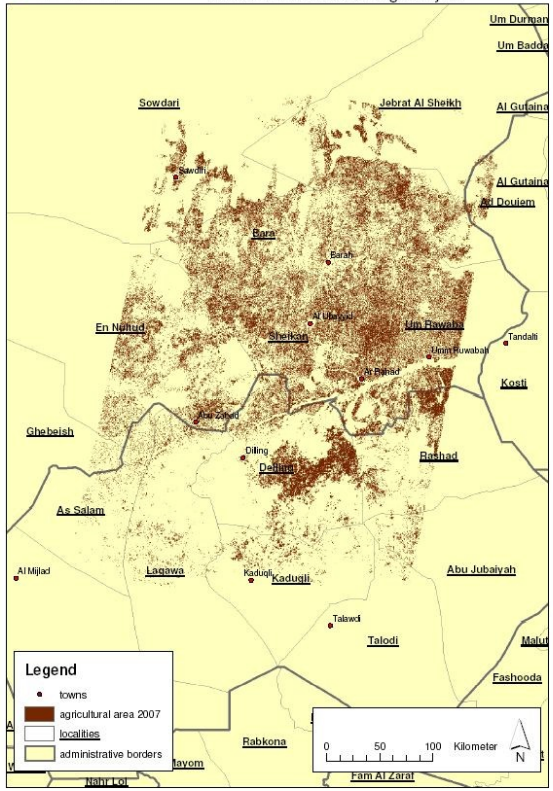
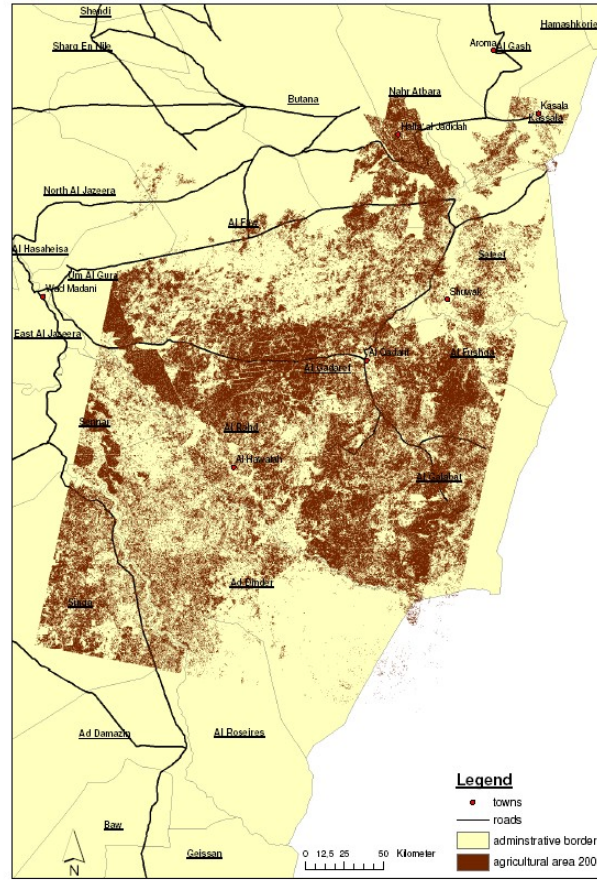CA-GED - Cultivated Area for the 2007 growing season - based on remote sensing analysis

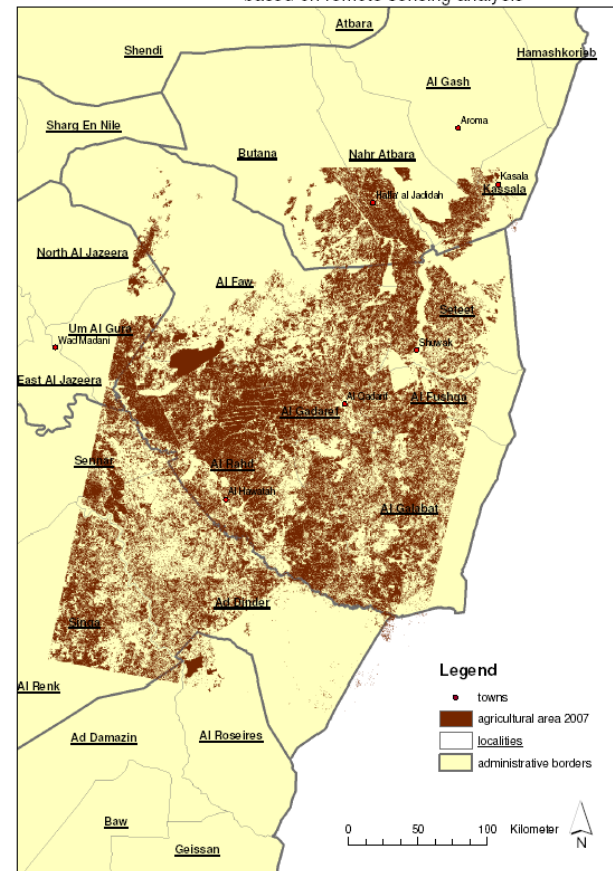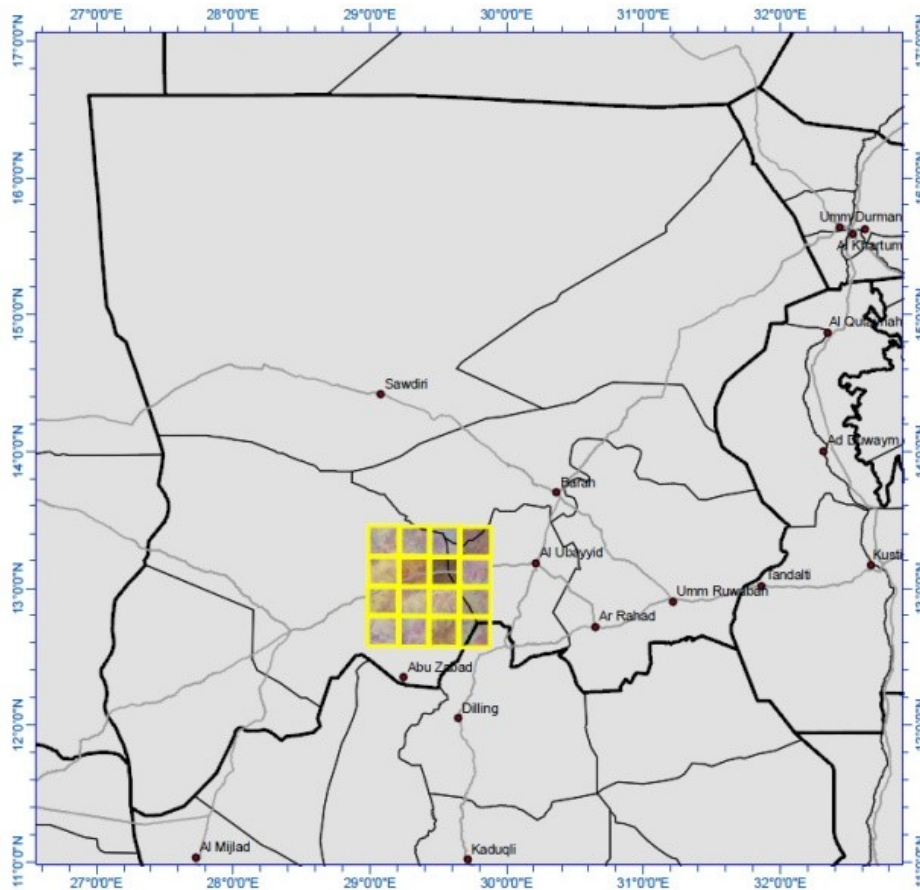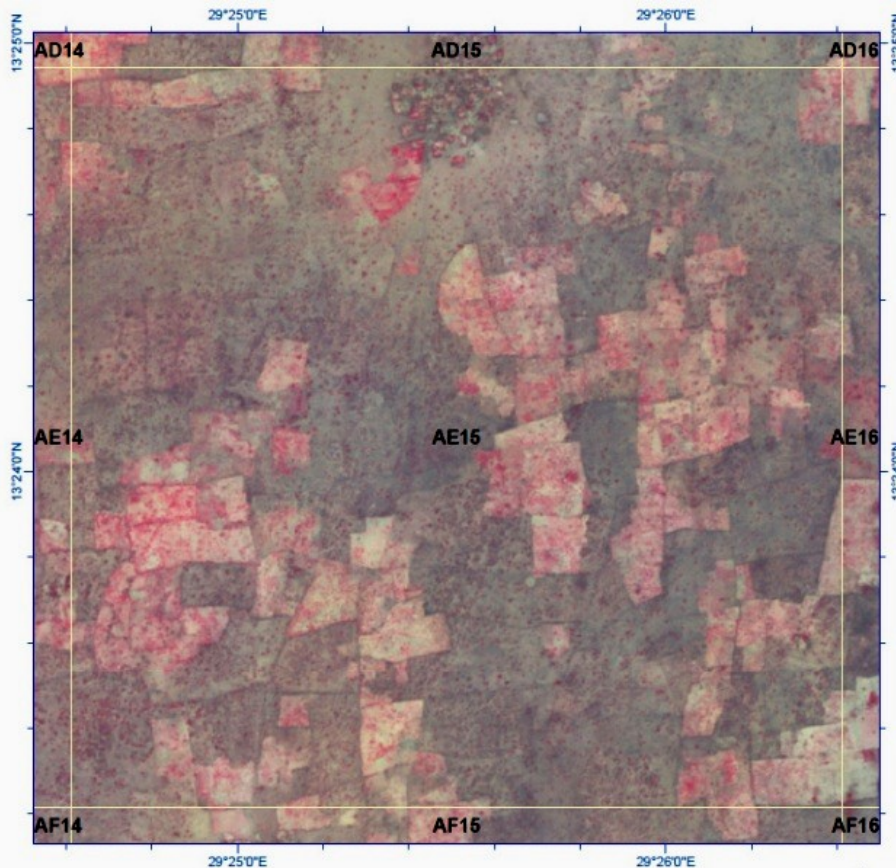# Jahresvergleich der Ackerflächen in Gedaref, Sudan zw. 2005 - 2007

RapidEye coverage – AOI over North Kordofan (1:15.000)

RapidEye data for a test site in North Kordofan acquired from Oct. 17th-22nd 2010.

RapidEye coverage – AOI over North Kordofan (1:15.000)

RapidEye data for a test site in North Kordofan at scale 1:15.000 (acquired from Oct. 17th-22nd 2010).

Haben Sie Fragen?