This project is partially funded by the European Commission Seventh Framework Programme. The project reflects only the author’s views and the Community is not liable for any use that may be made of the information contained herein.
MALAREO is a EU FP7 collaborative project

- Project duration: 2 years
- Project start: 01/02/2011
- Project Partners:
  - EUROSENSE (EUR, coordinator) - Belgium
  - Medical Research Council (MRC) – South-Africa
  - National Malaria Control Program Swaziland (MCPS) – Swaziland
  - Remote Sensing Solutions (RSS) – Germany
  - University of Kwazulu-Natal (UKZN) – South-Africa
  - Swiss Tropical and Public Health Institute (Swiss TPH) – Switzerland

- Project End-users:
  - (National) Malaria Control Programmes in project working area (South-Africa, Swaziland and Mozambique)
Malaria facts & maps

- Estimated deaths from malaria/1000 population (2006)

• Factors determining malaria distribution

- Human Population habitats
- Vector habitats
- Climate
- Health control
Malaria is a major cause of morbidity and mortality.
- 6 million in 2007 -> 4 million in 2009
- Indoor Residual Spraying

Malaria elimination towards 2015
- 0.007 local cases per 1000 pop
- Facing imported cases
- Indoor Residual Spraying

Study area

- Malaria in pre-elimination stage
- Only in eastern provinces KwaZulu-Natal, Limpopo and Mpumalanga
- Indoor Residual Spraying
Objectives & workflow

1. Identification of GIS and EO requirements
2. EO monitoring solutions
3. Basic GIS and EO capacity building
4. Advanced GIS and EO capacity building
Results

Identification of GIS/EO requirements

- End-user survey at MCP’s shows a lack of expert knowledge

Available skills in GIS, EO and Statistics of all participants of the user survey
Results

Identification of GIS/EO requirements

• Users perception on importance of EO products for malaria vector control as identified during the survey
Results

EO Monitoring Solutions

User Requirements → EO Feasibility

EO Data Requirements

- **VHR Data**
  - Household Map
  - Water Body Map
  - Image Base Map
  - Land Cover Map
  - Water Body Map
  - Distance to Water
  - Vegetation Indices
  - Population Map
  - Land Cover Change Map

- **HR Data**
  - MODIS, AVHRR, ASTER

- **Additional Data**
  - Malaria Incidence
  - Malaria Prevalence
  - Breeding site Probability Map

**Geo-Eye, Inc. (2010), provided by E-GEOS S.p.A., under GSC-DA.**

**RapidEye (2011), provided under EC/ESA GSC-DA.**
• Both application types have different requirements in terms of EO data, image analysis approach and updating period
Results
EO Monitoring Solutions

- 25,000 km² RapidEye is acquired
- Acquisition date October – November 2011
Results

VHR Household Mapping

• **Automated detection**
Results
VHR Household Mapping

- VHR Household Mapping
- Manual digitizing
Results

VHR Household Mapping
Results
Land Cover Mapping

Land Cover Classes

- Standing open water
- Flowing open water
- Settlement/Infrastructure
- Large-scale agriculture
- Wetland
- Bare Soil/Rock
- Bush-/Shrubland
- Grassland/Savanna
- Forest/Woodland
Results

Land Cover Mapping

RapidEye 09/10/2011

Land Cover Classification

Legend
- Forest/Woodland
- Bushland
- Grassland
- Agriculture
- Bare Soil/Rock
- Water
- Settlement/Infrastructure
- Roads
- Cloud/Cloudshadow

RapidEye (2011), provided under EC/ESA GSC-DA
Results

Water Body Map
Results

Distance-to-water map

Legend:
- MALAREO study area
- Flowing Water
- Standing Water
- Distance to inland water [m]
  - High: 5000
  - Low: 0

Cartographic Information:
- Map scale: 1:1,700,000
- Projection: UTM zone 36 South
- Datum: WGS '84

Framework:
- Data sources: (c) RapidEye (2011), provided under EC/FSA GSC-DA.
- Spatial resolution: 5 m
- Created: September 2012
- Produced by: RSS GmbH
- Produced for: MALAREO project
- Reference: www.malareo.eu
- Contact: info@rsgmbh.de
• **MALAREO Map Book** contains all map products

**MALAREO Map Book**

Exploring the spatial dimension of malaria and its explaining environmental factors in Southern Africa by Earth Observation
Results

GIS/EO capacity building

• 3 Workshop planned
• Capacity building in 3 areas

- **GIS**
  - Introductory GIS
  - Advanced GIS

- **Remote Sensing**
  - Introductory Remote Sensing
  - Advanced Remote Sensing

- **Spatial statistics**
  - Basic exploratory analysis
  - Introduction Bayesian statistics
Next steps

• MALAREO ends in January 2013
  – 1 workshop to organize
  – Population map, areas at risk, ... still ongoing

• Following project: GMES4Health
Thank you!

More information?

Clotilde.de.montpellier@eurosense.com
http://www.malareo.eu