OPEN SOURCE GEOPROCESSING TOOLS AND METEOROLOGICAL SATELLITE DATA FOR CROP RISK ZONES MONITORING IN SUB-SAHARAN AFRICA

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THE SAHELIAN REGION

15,000,000

AVG. ANNUAL PRECIPITATIONS
250-600 MM

RAIN FED SUBSISTENCE AGRICULTURE

MAIN CROPS
- MILLET
- SORGHUM
- GROUNDNUT
- COWPEA

RAINY SEASON
70 - 90 dd

HIGH INTER-ANNUAL PRECIPITATION VARIABILITY
FOOD SECURITY
In the Sahelian Region
EARLY WARNING SYSTEMS AND FOOD SECURITY

01  FAMINE 1984-1985

02  EARLY WARNING SYSTEMS

03  MONITOR FOOD INSECURITY

04  FOOD CRISIS PREVENTION AND MANAGEMENT

NATIONAL AND REGIONAL LEVEL

COHERENT AND TIMELY INFORMATION
THE CROP RISK ZONE MODEL

For Sahelian Countries

INPUT

OUTPUT
CRZM INPUT

- Daily Cumulated Rainfall Estimate Images (MPE)
- Daily Cumulated Precipitation Forecast (GFS)
- Daily PET (Potential Evapotranspiration)
- Average start of growing season
- Average end of growing season
- Soil Water Capacity
- Agronomic data: phenological phases, crop cycle length, cultural coefficient - Kc
1. Installation module:
   • Date of crop installation
   • Date of sowing failures
   • Date of re-sowing condition
   • Actual vs. Average crop installation anomalies
   • Actual vs. last year crop installation anomalies

2. Monitoring module:
   • Phenological stage
   • Crop water satisfaction level
   • Soil water availability

3. Forecast module:
   • Sowing advices
   • Seeding successful prediction
   • Crop water status prediction
OS GEOPROCESSING TOOLS
CRZ MODEL

MODULES COMPOSED BY:

• Initialization processes
• Iteration of functions for crop simulation processes

TOOLS:
PostGIS library built-in PostgreSQL
PL/pgSQL
SYSTEM ARCHITECTURE

- GeoDatabase
  - Postgres SQL PostGIS
  - Specific servelets ETL procedures for data loading

- Backend beans/procedure (J2EE)
- WebGIS Application View & Query Data

- CRZ MODEL
- USER INTERFACE

- Satellite Data Providers
- Download RS Rainfall images chains

- SYSTEM OUTPUTS Maps and Reports
WEB SERVICES

GeoDB (PostgreSQL - PostGIS)

Administrative Units Vector Boundaries (regions, provinces, etc.)

Requested Image (installation phases, sowing failure, ...)

Classification rules and legend information

ST_asRaster

ST_AsColorMap

ST_GDALRaster

ST_Overlay

JAX-WS Rest Services

Classified PNG

GeoTIFF with original values

4Crop Web Interface
WEB APPLICATION
### RESULTS

**4Crop Multipurpose Tool**

<table>
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<th>Mode</th>
<th>Scope</th>
<th>Action</th>
<th>Users</th>
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<td>Predictive</td>
<td>Sowing advice</td>
<td>Planning field work reduce sowing failure</td>
<td>Farmers extension services</td>
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<td>CROP status prediction</td>
<td>CROP risk zones monitoring</td>
<td>National &amp; regional EWSs</td>
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<td>Diagnostic</td>
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<td>CROP risk zones identification</td>
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**Logos and Logotypes**

- Consiglio Nazionale delle Ricerche
- Istituto di Biometeorologia
- GFDRR

**Logos and Logotypes**

- Global Facility for Disaster Reduction and Recovery
- Nat/Reg Networks for Food Crisis Prevention
CONCLUSIONS

**PRECISE INFORMATION**

Improve planning, the decision-making process and response measures of various stakeholders.

**OPEN SOURCE**

OS Solutions contribute to improve capacity building of local institutions in prevention and response policies to food crises.

**ACCESSIBILITY**

Web application increases the accessibility of accurate drought risk information for different stakeholders.

**CLIMATE SERVICES**

Contribute to the setting-up of distributed climate services, allowing access and sharing of climate information through web services and standard protocols.

**USER NEEDS**

Specific advice for end users at different decision-making levels, bridging the gap between available technology and local users' needs.
THANK YOU

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