Open-source GIS and early warning for nomadic herders

Alex Merkovic-Orenstein
West Africa Disaster Risk Reduction Advisor
Action Against Hunger

www.sigsahel.info
Pastoral Surveillance

www.sigsahel.info
Pastoral Early Warning System

Remote Sensing → PEWS → Pastoral Communities

Field Data → PEWS → Humanitarian Actors

How to engage non-traditional users?

How to tailor products for different decision-makers?

How to work in data-poor environments?

Data collection needs to be cheap, fast and flexible
1- Biomass Monitoring

Biomass: Kilograms of Dry Matter per hectare.
- Dry matter: Above-ground plant mass without water content.

End of the rainy season (July-Oct) to measure full production of biomass
- Offers a prediction on incoming dry season conditions

Used as a proxy for measuring pasture resources.

Datasets
- Production
- Anomaly (vs mean)
- Anomaly Standard Deviation
- Long term trend (1998-2016)
- Vulnerability Index (recursive indicator that looks for recurring droughts)
Anomalie de la production de Biomasse au 01 Octobre 2016

DMP - Tilemsi, Gao, Mali

Millions of Kg

DMP
Trend

Negative Biomass Production Trend 1998-2016 (Kg/Ha/Year)
2- Monitoring Surface Water

Can be done during the dry season!
Unlike Biomass measurement
How does it work?

PROBA-V

Virtual Server

BIOGENERATOR + HYDROGENERATOR Algorithms

Automatic TIFF Files created for each year or season

Copernicus FTP: Dekadal images
- NDVI
- DMP
- SWB

Automated FTP Pull

Rinse and Repeat
Field Data - For everything you can’t see from space

SMS/IVR

Weekly Surveys

• Pasture Availability
• Water Availability
• Terms of Trade
• Animal Diseases
• Brush Fires

Transhumant Movements

• Seasonal Workshops

SMS  IVR

PostGIS/Geoserver
Web Map
QGIS
CSV

Surveillance Field Sites - Weekly Collection

www.sigsahel.info
How it works – Field Data

Respondents
- Niger
- Burkina Faso
- Mali

Use for preparing stocks and planning interventions:
- livestock, cash, food distribution

Monthly Report for each country

Audience: Livestock ministries, UN, NGO

ODK handset

SMS

PostGIS on Virtual Server

QGIS

SMS

Field Agent with ODK handset

www.sigsahel.info
GeoSahel.info

Established protocol for creating vector or raster data in QGIS

Upload to Geoserver
- FTP
- QGIS Plugin

WMS/WFS

WebGISPublisher/your preferred web map
Reaching the herders

- Project STAMP- Sustainable Technology Access for Malian Pastoralists
- Pilot project in Gao, Mali
- Pastoral call center providing data on surface water availability, pasture, market prices

Well, our beautiful Proba-V data says it’s pretty good. So your cows should be nice and fat there.

Hey, man! How’s the pasture/water in Tilemsi?

Call placed to call center

Data on pastoral resources

Server hosting
Biogenerator + other processing applications

PROBA V + METEOSAT

NDVI
DMP
SWB

Call Center (ORANGE)

Field Data

Tassaght
(pastoral organization)
Lessons learned

Keep the data chain short and simple

Never ignore the power of qualitative data in a GIS setting

Balance spatial and temporal resolution in imagery.
- 10m Sentinel imagery looks nice but doesn’t always help if you only get one usable image every month

Automate whatever you can, but expect partners to prefer manual solutions
- EG: partners may prefer treating their data in excel and creating shapefiles manually
Thank you for your attention

AMERKOVIC@WA.ACFSPAIN.ORG

www.sigsahel.info