



GARBAL: An EO-powered Call Centre for Farmers and Herders in the Sahel

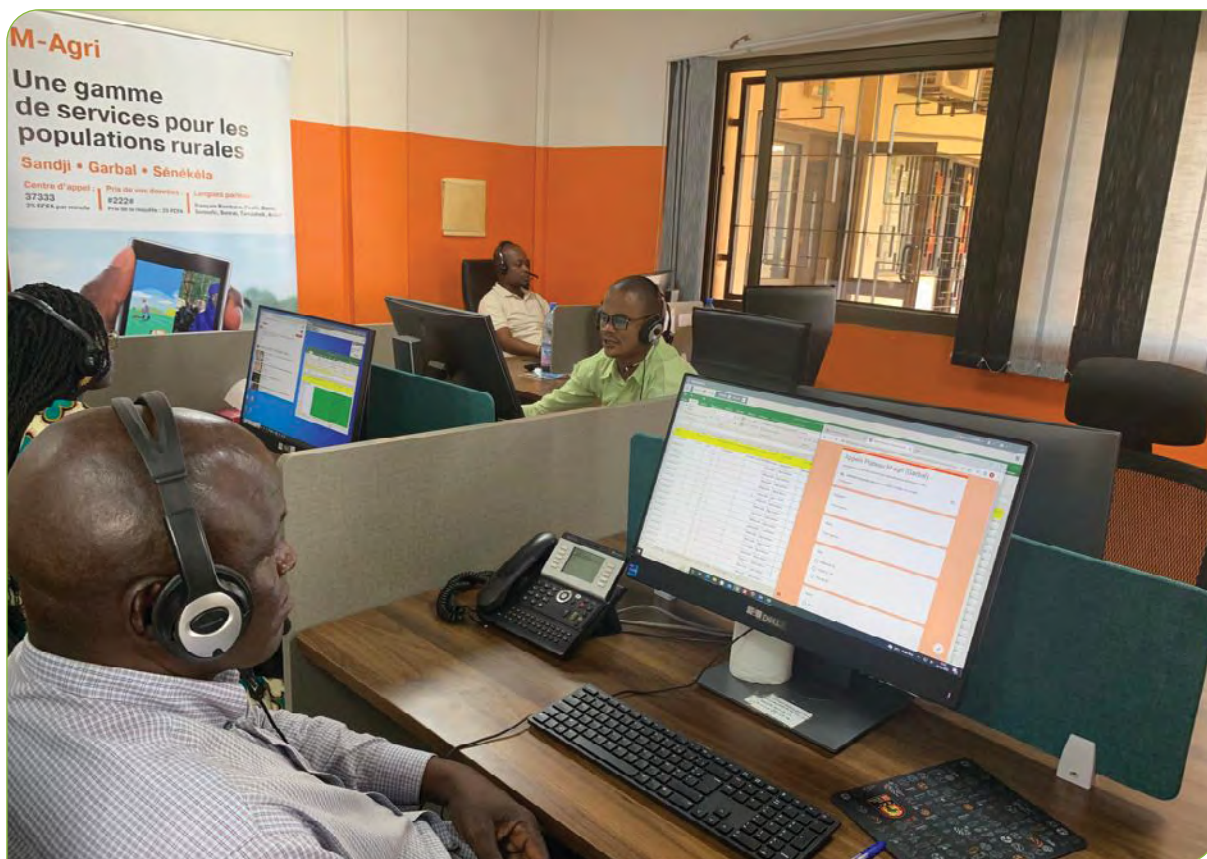
Summary

GARBAL is a specialised call center service that bridges the digital divide for farmers and pastoralists across Mali, Niger, and Burkina Faso by transforming complex Earth Observation (EO) data into actionable advice. By integrating satellite imagery on vegetation and water, weather forecasts, and real-time ground data on market prices and cattle concentrations the service provides localised insights via a simple phone call. Operating in 9 local languages, GARBAL allows users without smartphones or internet access to receive precise “scripts” from call center agents regarding pasture availability, water points, and

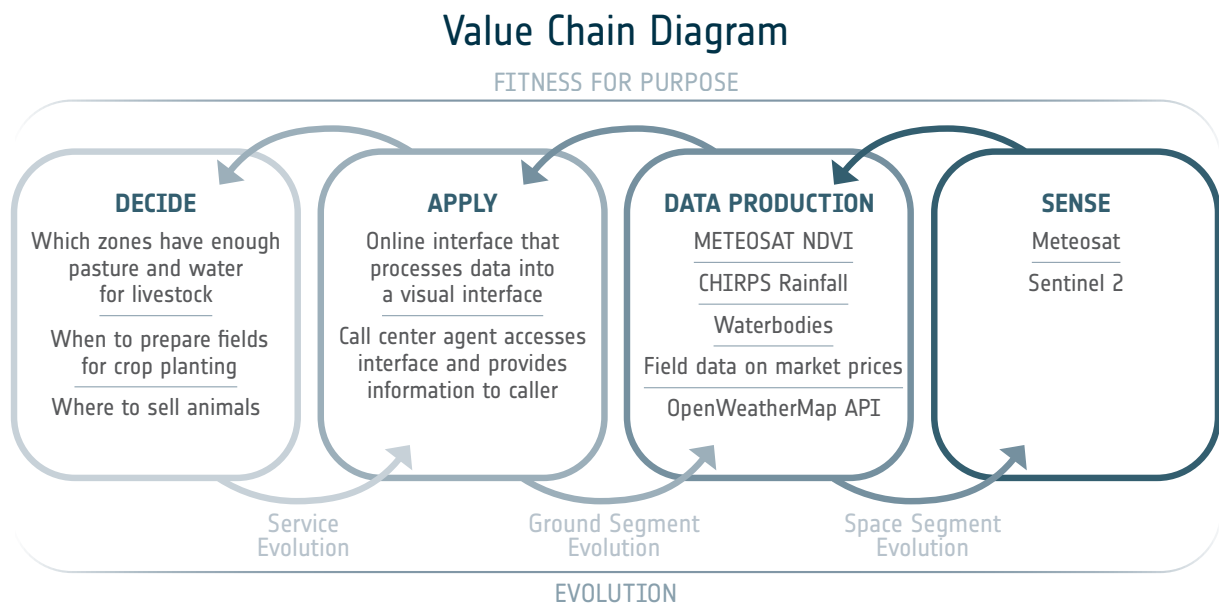
weather forecasts, effectively turning sophisticated space-based data into a practical tool for daily decision-making in the Sahel.

Decision-Making Context and Needs

“If you can predict when the rainy season will start,” opined Amadou, “it will help us decide our planting schedule.” He was one of a group of 30 farmers and livestock herders who had crowded under a shade tree in Houndé, Burkina Faso, to attend our focus group on using remote sensing data for local agriculture. “And if a satellite can



Attribution: Gaoussou Dao



show me where last month's rain fell," mused a herder, "I will know where to pasture my sheep." Incongruously, given the myriad of other issues facing the community, all anyone wanted to talk about was satellites.

Similar to many drylands across the world, transhumant movements in the West African Sahel are determined by a diverse array of factors including pasture availability, rainfall, access to water, market conditions and security. Timely and reliable information on these factors is critical for pastoralists for making decisions on

mobility. Endogenous information systems exist within pastoral communities to relay much of this information, however they are often reliant on the physical presence of an interlocutor such as a scout who seeks out pasture conditions which brings risks associated with timeliness and insecurity. Regular data on natural conditions like pasture and water have become increasingly available to the spatial community through the growth of open access satellite imagery and open source GIS software. However, few channels exist to transmit this information to pastoral communities.



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Earth Observation Data Products and Information

This focus group was one of dozens conducted over the past decade for GARBAL, a call center operating in Mali, Niger and Burkina Faso since 2015 that uses EO data to provide decision insights to farmers and herders in the area. These discussions were how we defined our indicators and prioritised datastreams. Thanks to GARBAL, farmers and herders can access the full benefits of EO imagery with a simple phone call, no computer or smartphone needed. Often fielding more than one million calls per year, the service provides live information on pasture availability, surface water and rainfall to any caller via an interface accessed by a call center agent. The information is provided in 9 languages and in many places GARBAL is the *only* source of localised weather forecasts and agrometeorological data.

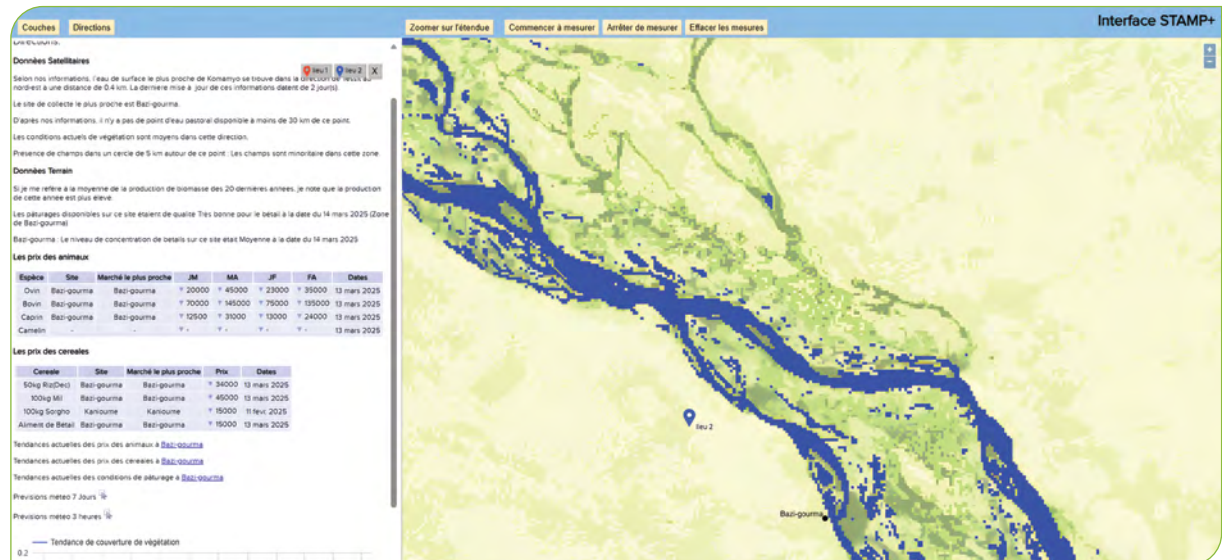
GARBAL is run through a consortium coordinated by the NGO SNV whereas the call center is managed by the Telecom provider, ORANGE in Mali and Burkina Faso and Airtel in Niger. Field data on livestock and markets are collected by producer organisations (part of the RBM Network) and static datasets on pastoral

infrastructure are provided by government agencies in Mali and Burkina Faso. The data platform is run by Hoefsloot Spatial Solutions, a Dutch geospatial company.

Underlying Observations and Data Sources

GARBAL offers callers a variety of data from Earth observation and field sources, blending satellite imagery with traditional knowledge systems. Field data is collected and treated through pastoral networks, relying on traditional information systems for assessing pasture quality and herd concentration. Information from dozens of sites is collected on market prices, cattle concentration and pasture quality is collected on a weekly basis, processed and displayed in an interactive dashboard for the call center agent.

Earth observation imagery is collected and processed into a number of indices, notably: the Normalised Difference Vegetation Index (NDVI), Dry Matter Productivity (DMP) and Small Water Bodies (SWB) from a number of different satellites including Sentinel 2, and PROBA-V. These images, collected on a dekadal basis, allow for a near-real-time image of pasture



and water availability, which are likewise displayed alongside the field data in the dashboard. The dashboard offers both a map and a textual output or a “script” providing an analysis of the latest data (biomass conditions, distance to the nearest water point) listed in the table to help guide the call center agent during their discussion with the caller. Information from government databases are also included, allowing the caller to know where to find

veterinary services and ground water sources. Testing with call center operators has shown that the large volumes of calls received often prevents agents from being able to carefully analyze maps or graphical outputs. As a result, the textual outputs of the service, which provide basic analysis of the data in a “dialog box” tend to be used more often than maps by the call center agents.



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CATEGORY	DATA TYPE	METHOD/SOURCE
Biomass	NDVI, DMP	<i>Satellite:</i> METEOSAT, Sentinel-2
Water	SWB	<i>Satellite:</i> Sentinel 2
Pastoral Infrastructure	Wells, vaccination parks, veterinary posts, markets	Government databases
Market prices	Livestock, cereals, animal feed	Field data collection
Transhumance	Cattle concentration, cropland cover	Field data collection
Agro-meteorological	Weather forecasts, planting conditions	Weather services, long-term regional projections
Extension services	Agricultural & planting advice; animal health	Digitized technical manuals and technical expert consultations
Weather Forecasts	3-Hourly and Daily forecasts of temperature, wind and rainfall	OpenWeatherMap API

Impacts

Financial Savings: Herders traditionally rely on “scouts” to physically travel and verify pasture conditions, a practice that is both expensive and dangerous due to regional insecurity. GARBAL provides a digital alternative, allowing households to save significant funds and time by planning transhumance routes based on verified satellite data.

Optimized Market Decisions: By feeding live price data for livestock and cereals into the agent interface, the service enables herders to strategically choose which markets to visit. This reduces unnecessary travel with livestock and ensures higher profit margins for producers.

Hyper-Localized Weather Access: Through the integration of the OpenWeatherMap API across a database of every village in all three countries, GARBAL provides the only fully localized weather service available to these communities. This has become the most utilized feature, allowing for precise daily planning that was previously impossible.

Democratization of Seasonal Data: Annual seasonal forecasts produced by national meteorological services are typically trapped in inaccessible PDF reports. GARBAL digitizes these maps and forecasts, making critical climate outlooks available to users without internet access for the first time.

Scale and Accessibility: With over one million calls per year, the service proves that a voice-based, low-tech delivery model is the most effective way to scale the benefits of Earth Observation to hundreds of thousands of rural users who are most vulnerable to climate variability.



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FURTHER INFORMATION AND CONTACTS

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