Technical Proposal EWS

Shine Way and ALPROF (Joint Venture)

Development of a climate, weather and agriculture early warning service and delivery of information smallholder farmers - **Tender No: KRT-0099**

Ministry of Agriculture ②

Metrological Authority ①

Daily Bull API

Emergency Bull

Monthly Bull API ③

Seasonal Bull API

EWS Data Manipulation ④

SMS Gateway ⑤

⑥

⑦
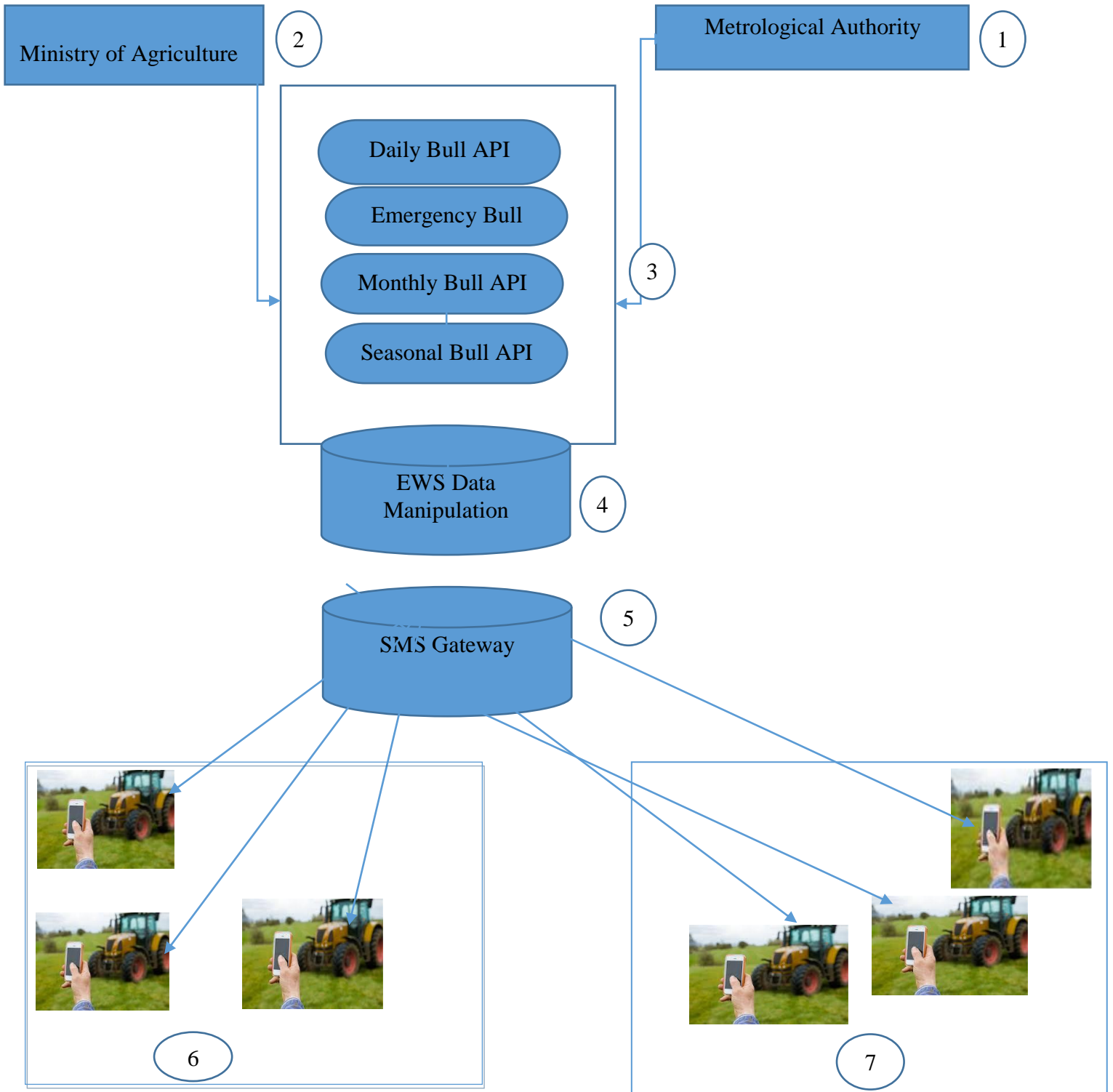
Shape Reference :

1- The Metrological Authority is the first arm in the process of educating farmers, as it will provide us with all meteorological data so that we can communicate and use it to enlighten farmers and help them take appropriate decisions.

2- The Ministry of Agriculture is the second arm in the process of educating farmers, as it will provide us with all agricultural data so that we can communicate it and use it to enlighten farmers and help them take appropriate decisions.

3- **API's:**

The main role of the API is the method of linking the above bodies with the Early Warning System (EWS), where it pulls the data in an automated way as shown below :

- **Daily Bull API :** The API will pull data daily to provide the EWS. with new data and clarify changes that can occur daily.

- **Emergency Bull API:** The API will fire when there is a sudden change in the weather to provide the system with any emergency data that can affect farmers' decisions.

- **Monthly Bull API** : The API will pull monthly data to provide the EWS with new data and clarify changes will occurs on upcoming Month .

- **Seasonal Bull API** : The API will pull the seasonal data to provide EWS with new data and clarify the changes that will occur in the next season so that the farmer can determine the appropriate type of cultivation for the next season based on the evidence given to him.

4- **EWS Data Manipulation**: EWS will collect the data that comes from the above interfaces and distribute it according to the categories and regions of the farmers and then divide it into time units to send it to the SMS gateway according to the time specified for each message.

5- **SMS Gateway Feature Highlights :**

- Create a direct connectivity with Telecom companies through SMPP protocol.
- Multiple SMSC activated and routable
- Send SMS to single mobile phone
- Send SMS broadcasted to a group of mobile phones, or SMS bulk
- Integrate SMS server with internal systems through API.
- Integrate SMS server with internal systems through Database.
- Create different levels of sending SMS priorities
- Capable of handling large amount of SMS
- SMS command, execute server side shell script using SMS
- SMS custom, forward incoming SMS to custom apps, locally or hosted on external URL

- SMS poll, manage polling system using SMS, export output in graph, JSON and other formats.
- Supports simulation gateway for testing incoming and outgoing SMS
- Supports multiple active SMSC
- Route outgoing SMS by prefix
- Route outgoing SMS per user
- Web-services for sending SMS, retrieving delivery reports, checking credits and more
- Long SMS support, length of text is configurable
- SMS credit system per account
- Time zone settings
- Web-based interface

SMS Gateway Optional Features:

- Android app for CMS.
- Multi-language user interface (English, Arabic).
- Receive private SMS to Inbox and forward it to email (mobile2web) and user's mobile phone
- Provides SMS to email and email to SMS by polling mailbox
- Forward single SMS from mobile to a group of mobile phones
- SMS autoreply, for easy autoreplying formatted incoming SMS
- SMS board, forward received SMS to email, export output in JSON and a few other formats
- Blacklist, stop-list and firewall plugin for SMS services protections
- Create your own features, tools, themes and gateway modules as a plugin.

6- South Kordofan State Farmers : (targeted localities Habila, Dilling, Kudugli and Alrief Alshagri) for pilot and scale up phases.
7- Blue Nile state (targeted localities are Damazin, Tadamon and Roseries) for pilot phase only.

Other optional features :

- **Optional :** Crop Monitoring

Optional : RunningSnail MD-088P Emergency Weather AM/FM Solar Powered Wind up Radio with LED Flashlight, 2000mAh Power Bank for Phone and SOS Alarm and weather Alarm through DSP chip .

RunningSnail's Solar Crank Emergency Weather Radio

Emergencies often occur unexpectedly and natural disasters sometimes strike without any warning signs. The least we could do is to be prepared by having important emergency supplies readily available, making a plan for yourself and your loved ones, and being informed.

RunningSnail's weather radio provides you with tools to use in emergency and non-emergency environments, which comes integrated with a 1W LED flashlight with zoom, an SOS alarm, a 2000mAh power bank, 2 LED lights, radio broadcasts access, and 3 power options to provide emergency power.

System Installed in:

- Electronic Banking Service (EBS).
- Telemedia Ltd .
- Financial Investment Bank.

Shine Way and Sudan Metrological Authority signed MOU and established project committee from all parties to exchange weather data automatically .

Data collection Tools :1-Vaisala Automatic Weather Station - AWS : enables modern, high-quality surface weather observation networks anywhere in the world.

It is a comprehensive measurement, communication, and data monitoring solution that makes modern observation networks easy to create, manage, and maintain over a long lifespan. With sensors, equipment, and analysis conveniently bundled, the AWS makes surface observation networks easy to create and manage. Enhanced by the open-design Vaisala Data Management Unit .
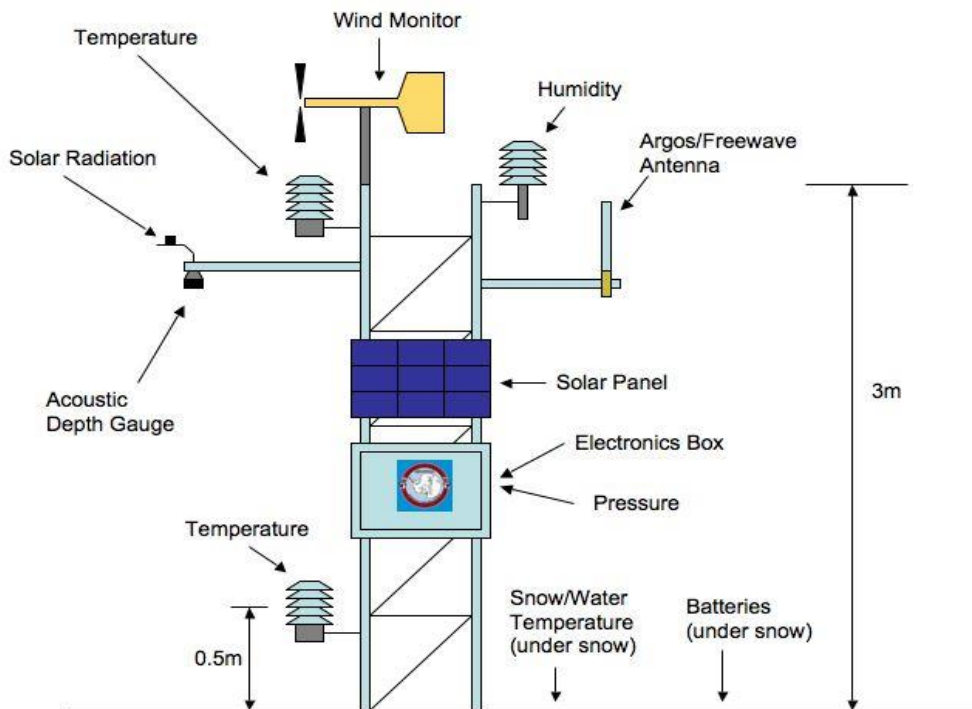
***2- Meteosat Satellite :*** *Meteosat Second Generation (MSG) provides images of the full Earth disc, and data for weather forecasts.*

In geostationary orbit 36,000 km above the equator, the Meteosat satellites — Meteosat-8, -9, -10 and -11 — currently operate over Europe, Africa and the Indian Ocean.

EUMETSAT has been monitoring the weather and climate from space for more than 35 years, providing data crucial for the protection of life and property. EUMETSAT's Meteosat and Metop satellites provide vital observations for weather forecasting.

The Meteosat satellites are in geostationary orbit 36,000km above the Earth. They provide imagery for the early detection of fast-developing severe weather (nowcasting), weather forecasting and climate monitoring.
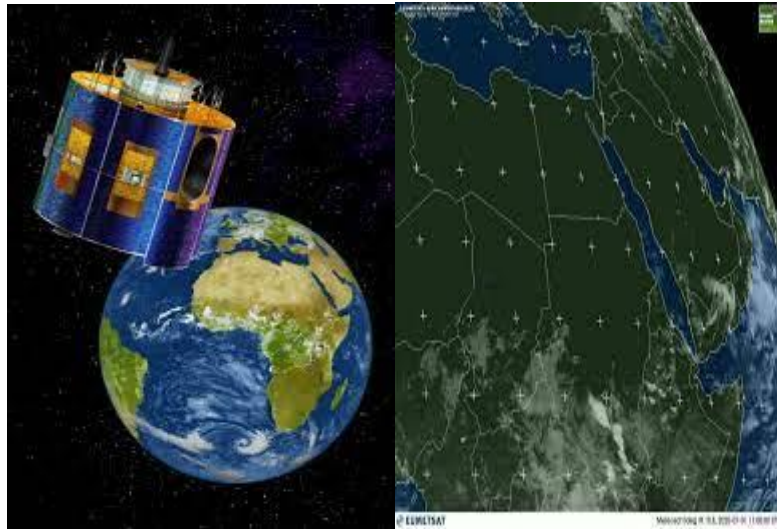
Early Warnings. According the the WMO, "The primary objective of a warning system is to empower individuals and communities to respond timely and appropriately to the hazards in order
to reduce the risk of death, injury, property loss and damage. Warnings need to get the message across and stimulate those at risk to take action." In order to do this, one needs to collect and analyze data, package and distribute early warnings, build appropriate processes and response matrixes to allow fast delivery, and share relevant information with stakeholders and actors to ensure people know what do to when bad weather hits.

Forecasts. Short-term forecasts and long-term outlooks can all benefit end users. The packaging,
distribution and messaging is going to depend on the end-user, the information provided and the final goal of sharing that information

Supportive Communications and Advocacy. This is a softer piece of the equation. The goal is to build political support, foster understanding of the importance of SUDAN METROLOGICAL AUTHORITY, early warnings and climate information, share best practices, actively engage community actors and brand ambassadors, and build the value proposition being offered by SUDAN METROLOGICAL AUTHORITY.

Coordination. Coordination between agencies is key. SUDAN METROLOGICAL AUTHORITY are often the generators of early warnings and weather and climate-related communications. However, SUDAN METROLOGICAL AUTHORITY need to work with partner agencies, ministries, the media and more to ensure effective distribution and action based on climate information and early warnings.

Small-scale farmers can easily be reached by mobile phones such as 'feature phones'. These basic phones also allow location to be determined and weather information to be downscaled.

System can be developed for many features such as mobile application for smart phones for localities agriculture unit managers .

	Benefits	Limiting factors
SMS – Short Message Service	Available on all mobile phones. Cheap technology.	No more than 160 characters. Users need to be literate.
USSD – Unstructured Supplementary Service Data*	Available on feature phones. Interaction with users is possible.	Users need to be literate. Each interaction has a cost.
IVR – Interactive Voice Response**	Available on feature phones. Interaction with users is possible. Accessible for illiterate users.	More expensive than text messages.
Mobile Apps - for smartphones	Almost unlimited information and intuitive visualisations possible. Full interaction with users.	Low levels of smartphone ownership in rural Africa. Mobile data is expensive.

*) Interactive text messaging service between a computer and a farmer.
**) A telephone service allowing a farmer to talk to and receive spoken answers from a computer.

Figure 1: Feature phone with a localised weather forecast for the next week.

Table 1. Benefits and limiting factors of mobile solutions for providing weather information in rural Africa.

Seasonal planning and monitoring :

In addition to forecasts, knowledge on fields' current status and the weather in the upcoming season is highly valuable to small-scale farmers. Satellite measurements can be used to monitor local weather and the crop status .

Out-season
- Yield Storage
- Erosion Prevention
- Land Preparation

Pre-season
- Planning Land Preparation
- Start Rainy Season for Sowing
- Planning Crop Varieties

End-season
- Crop Protection
- Planning Labor Work
- Optimal Harvesting Weather

In-season
- Crop Protection
- Pest & Disease prevention
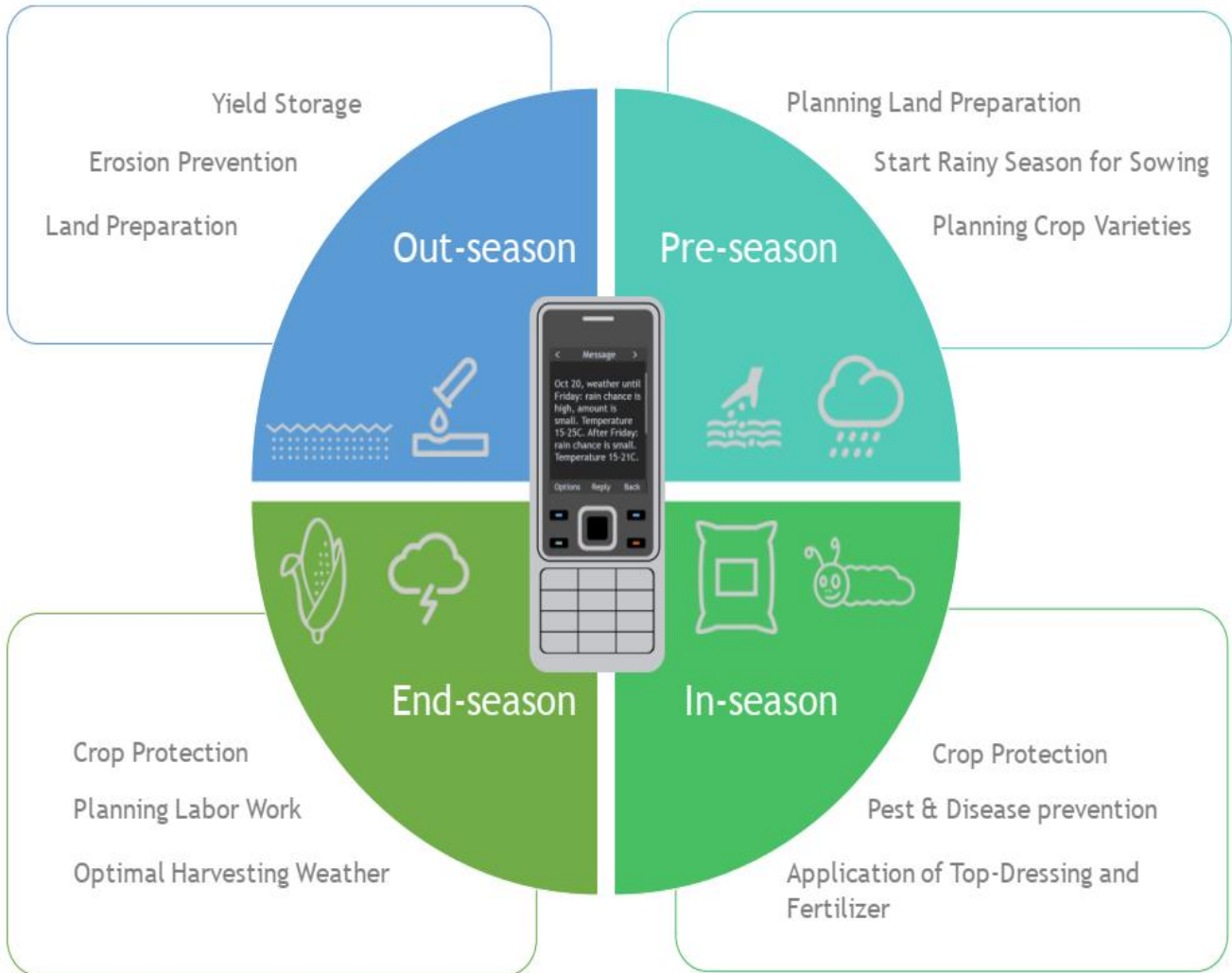- Application of Top-Dressing and Fertilizer

Figure 2: Farm-management schedules and actions related to weather help to optimise farmers' productivity.