ICIMOD

SECTION II – Terms of reference/scope of work

Background

ICIMOD is a regional intergovernmental learning and knowledge sharing centre serving the eight Regional Member Countries of the Hindu Kush Himalayan (HKH) region – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and is based in Kathmandu, Nepal. In Afghanistan, ICIMOD has been working in the area of capacity building, institutional strengthening, research and demonstration, and fostering regional cooperation. Through its [Climate Service Initiative](#), ICIMOD facilitates the implementation of the Global Framework for Climate Services (GFCS) within the HKH region. It brings together providers and users of climate information. The Initiative's approach is to strengthen the institutional and technical capacities of various stakeholders, particularly to improve the generation, processing, and use of climate services and co-develop appropriate solutions.

Agricultural advisories essentially deliver information on weather forecasts, crop seasons, good farming practices, local crops, agricultural market prices and arrivals, availability of fertilizers, electricity timings, early warning systems on disasters, education and upcoming training opportunities, prevention of plant and veterinary disease, and financing and insurance services. These advisories emerge from large network of partners including extension workers, agronomists, governmental systems, research institutes, universities, and extension services. In Nepal, a number of actors have recently started making efforts to enable farmers' access to such information.

Agriculture advisories in Nepal

The Nepal Agricultural Management Information System ([NAMIS](#)), under the Ministry of Agriculture and Livestock Development (MoAD), in collaboration with the Department of Hydrology and Meteorology (DHM) and Nepal Agricultural Research Council (NARC) has been providing the seven-day Agromet Advisory Bulletin (AAB) since 2015 for 25 pilot districts in Nepal. The bulletin includes a summary on weather, crops, livestock, tables on weather and agrometeorological parameters, current and past week weather information along with weather forecasts, information on pests and diseases, etc. so that farmers and stakeholders can make on-farm decisions to reduce the adverse impact of climate change and increase agriculture production for enhancing food security situation. The NAMIS Advisory is the first effort to demonstrate effective use of multidisciplinary knowledge integration for supporting farmers on in-season farming practices by communication through digital means. In its current form, the advisory process is highly centralized and based in the federal capital Kathmandu. It involves experts and deals with large and highly variable agriculture conditions across Nepal. The value of such processes can be substantially improved by taking this process into sub-national levels.

Agriculture extension system in Nepal

The agriculture extension system in Nepal is largely dominated by the public extension that has primarily the regular set of extension activities, trainings, and services. MoAD recently developed the Agriculture Development Strategy (ADS; 2015–2035) in addition to other key reforms and has highly advocated decentralized science, technology, education, and extension programmes (DSTEP). The ADS aims at reforms in structure, process, implementation, and coordination of research and extension in addition to other related programmes and institutions to help effectively promote demand-driven technology and services.

The Constitution of Nepal (2015) explicitly mentions that agricultural research would be the primary responsibility of the federal and provincial governments, while extension would be the responsibility of the provincial and local governments. In the new setup, an agriculture development division has been established within each local government office. Though farmers expected enhanced access to and better delivery of extension services, lack of clarity on the power, authority, and roles and responsibilities at different levels has adversely affected the reach and impact of extension service delivery.

Setting-up localized agriculture advisories in Chitwan

The localized advisory process relates to location-specific advice provided to the farmer from subject matter experts at the district and sub-district levels, with respect to their agriculture-related needs. The expert advice may be needed during the entire crop cycle in normal circumstances as well as during adverse climatic conditions like drought and floods. They may need advice regarding pest attacks, animal diseases, processing and marketing of their produce, etc. The expert advisory should be location specific and up-to-date.

This initiative proposes district-level local farmer-relevant advisory generation and dissemination process along with value additions from the use of ICT for in-season agronomic profiling, crop reporting, crop conditions monitoring, and data analytics.

Design and development of a digital agriculture advisory platform

This part of the document has been drafted to share understanding of the proposed solution and how it envisions technology to support the proposed digital agriculture advisory platform. These **terms of reference** aim to provide ICIMOD's requirements and expectations from a comprehensive technology solution, including software and training services among any other things that may be required. This document however by no means should be taken as an exhaustive scope of the project, and prospective private partners are encouraged to identify other relevant components that may be essential for effective functioning of the proposed solution.

Intended audience

The intended audience of these terms of reference include interested IT firms and technology partners to better understand requirements and expectations from the proposed IT solution as well as other stakeholders and comprehend how the technology will work within agriculture institutions.

Proposed IT solution

The proposed digital agriculture advisory platform will focus on integrating information on the following:

1. Farmer profiles, crop profiles, and visualization platform
2. Agriculture extension mobile app and data visualization platform
3. Data visualization platform

Conceptual framework

To support the district level agriculture advisory committee, a digital agriculture advisory platform will be established by linking weather and climate data with local agriculture practices and data analysis to enable agriculture experts to translate scientific data into the accessible agriculture advisory. The advisories will help crop cultivators to plan land preparation, sowing, and other agricultural operations (Figure 1).
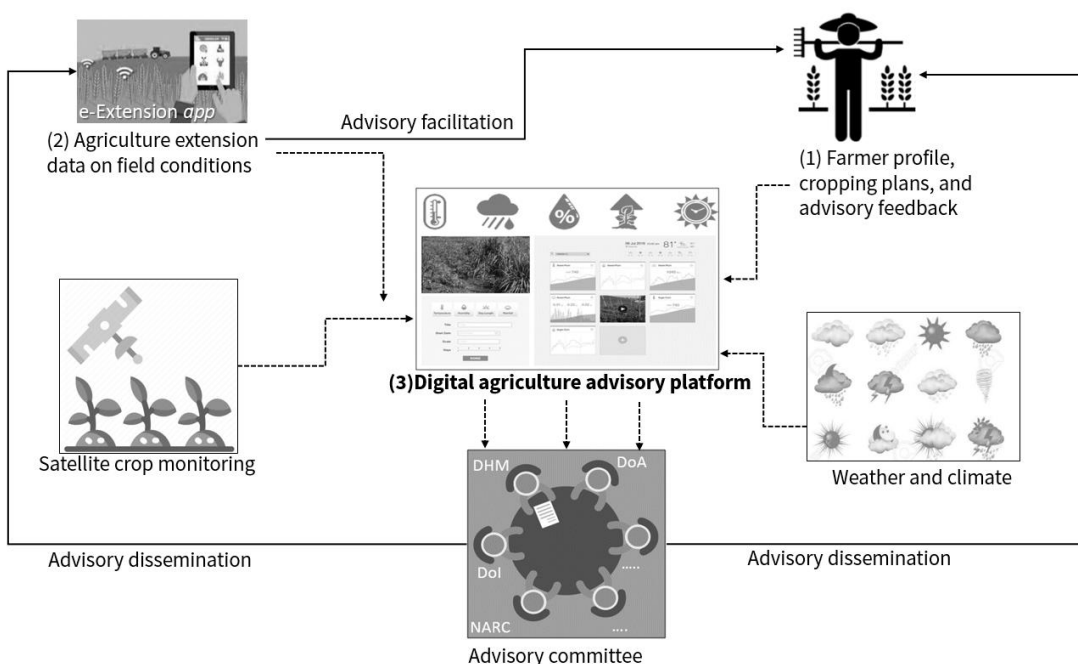

Figure 1: Conceptual diagram of localized agriculture advisory process and three key components of this RFP

The three components to be developed under this RFP are described below:

Farmer profiles, crop profiles, and visualization platform

Farmers can register for the service by filling a physical form with the district agriculture departments or through internet/mobile interfaces. In addition to collecting basic information about geographical location, land holding, etc., farmers also specify up to eight crops/agriculture related activities for obtaining information or advice. The database will be linked to advisory development process. The dashboard will support sending SMS in local language and the officials who are registered as users can send SMS through various options by selecting mobile numbers from the database, or from an Excel or CSV file.

FARMERS' DATABASE

Capturing farmer's details (such as contact details, landholding, types of crops grown, financial status and needs, and required inputs) is of utmost importance to understand, plan, and provide the required services to the farmers. Farmers' information would help in tracking the current status of farmers, which would help in equipping the farmer with right knowledge and tools for decision making and planning activities.

The farmers' database will be created for capturing their details. To get a comprehensive overview of farmers, the information can be classified in two parts:

- o Part I: Static information: It caters to details related to farmers, which are not likely to change with every agricultural season like personal details, address details, contact details, occupation details, farm/ land details, irrigation infrastructure owned, identification details, markets accessed, family dependents, crop cycles, and equipment.

- o Part II: Dynamic information: It caters to details related to farming that change with every agricultural season like seed types, variety, seed quantity, fertilizers/ pesticides details, crops produced, quantity produced, expenditure, income, and crop insurance details.

DATA VISUALIZATION PLATFORM

An open source web based platform for analysis and visualization of farmers' data.

Agriculture extension mobile app and data visualization platform

MOBILE APP

This part of the work includes the development of an Android application along with associated data analysis/visualization/management system.

The mobile app will primarily be designed to enable field extension staff to capture field activities into the digital system mainly related to the following:

- Pest scouting and warnings
- Monitoring of agricultural inputs
- Soil sampling and testing

- Crop reporting
- Farmer advisory services

The up-to-date database of reported activities will be used as a means to understand the ground situation and help advisory committee in proposing ground relevant solutions in their advisories.

DATA VISUALIZATION PLATFORM

Farmers' database and Agriculture-Extension app data will be accessible on the Agriculture Advisory Dashboard to be developed in the form of data visualization and analysis platform. In this component, innovative use of data analytics and visualization is highly encouraged.

Information integration and data analytics dashboard

This part of work mainly consists of integration of information from component 1.2 and 2.2 in a user friendly and interactive single dashboard.

Tools and platforms

The application will be developed using stable open source software. This will ease the mobility of application and can be transferred to any organization having proper hardware infrastructure. In the process of selected development and deploying platforms, higher priority will be assigned to the open source platforms.

Coordination

A focal person from the ICIMOD geospatial information technology team will be assigned to guide and test the system (technically) during the development period. The focal person will coordinate with the IT firm on the following tasks:

- Database design and workflow mechanism
- Layout design with consultation from the entire team
- Test the system in development platform (e.g. test within ICIMOD)
- Deploy the system to the client end
- Build the capacity of the client and potential users
- Develop proper hands-on documents for training purpose
- Manual preparation and application installations

As ICIMOD implements an open data policy, all finalized software code and design documents must be handed over to ICIMOD and concerned partner organizations on completion of the project. The contractor will provide troubleshooting services for six months after the completion of the system.