TA-6910 IND: Supporting Institutional Knowledge Development and Capacity Building for Planning of Innovative and Sustainable Projects and Programs - AgriStack Solution Architect Specialist (55311-001)

Date Published: **01-Jan-2023**   **Deadline of Submitting EOI:** **07-Jan-2023 11:59 PM Manila local time**

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| Profile | Terms of Reference | Cost Estimate |

Terms of Reference (Individual Consultant)

Expertise	**Solution Architect Specialist**	Consultant Source **National**
Expertise Group	**Information Systems**	TOR Keywords **Digital Agriculture, AgriStack**

Objective and Purpose of the Assignment

Agriculture in India along with its allied sectors is a significant contributor to India's Gross Domestic Product (GDP) and is also the largest livelihood provider. According to the Economic Survey 2020-21, GDP contribution by the agriculture sector is likely to be 19.9% in 2020-21, increasing from 17.8% recorded in 2019-20. Over the years, the government has taken major steps to aid and enhance the agriculture sector with proven farming technologies and supportive policies. The recent evolution of digital technology in farming will further accelerate growth by ensuring higher crop yields and enhance sustainability by reducing water consumption and the use of agrochemicals.

In September 2021, the Indian Government announced the initiation of the Digital Agriculture Mission 2021–2025, which aims to support and accelerate projects based on new technologies, like AI, block chain, remote sensing and GIS technology and use of drones and robots. Promoting rural development and food security is one of the priority operational areas for ADB's strategy 2030. ADB will support efforts to improve market connectivity and agricultural value chain linkages to help member countries increase agricultural productivity and food security by boosting farm and nonfarm incomes, promoting the adoption of advanced technologies and climate-smart agricultural practices, and supporting the improvement of natural resource management standards. As of April 2022, Asian Development Bank (ADB) has supported nearly 50 projects amounting to 2 billion USD across sectors of Agriculture, Natural Resources and Rural Development. ADB is actively promoting use of digital agriculture in its projects.

As one of the core ingredients of the Digital Agriculture Mission, a national 'Agri Stack' is being envisioned by the Indian government, which will act as a digital foundation to make it easier to bring various stakeholders together to improve agriculture in India and enable better outcomes and results for the farmers by using data and digital services. It is an effort to bring together high-quality data and to make this data easily available to the stakeholders that need it, so that they can create new services using the data. Evolved from the thinking of the InDEA 2.0 Architecture by MeitY, Agri Stack is being built by the Ministry of Agriculture & Farmers Welfare (MOAFW) in an open manner, with a federated structure – keeping States at the centre of the design, ensuring participatory and inclusive design to ensure the sector evolves collectively to help shape the next decade of agriculture in India.

The national Agri Stack aims to make it easier for farmers to get easier access to cheaper credit, higher-quality farm inputs, localised and specific advice, and more informed and convenient access to markets. Agri Stack also aims to make it easier for governments to plan and implement various farmer and agriculture focused benefit schemes.

The Agri Stack seeks to achieve the following broad objectives:-
●   Enable digitally driven agricultural ecosystem for the welfare of farmers
●   Create a set of databases, rules, governance structures and guidelines that enable the effective sharing of data pertaining to agriculture, across all stakeholders in the agriculture value-chain, nationwide
●   Build national digital infrastructure layer for the agriculture sector, following open-source technology for other digital applications, systems, portals and solutions to be integrated
●   Break silos and curate agriculture related data available with the Governments- State and Central departments, to be leveraged for farmers' benefit and for better governance in an authenticated, mandated and secured way
●   Build and maintain National level core registries, to act as a single source of truth pertaining to Farmers, Farm-plots and Crops Sown – aggregating these from States' registries
●   Create a digital farmer-centric ecosystem, to enable fair and improved access and choice
●   Simplify and consolidate farmers' access in agriculture related benefits/schemes delivery with quick identification and authentication of the farmers
●   Create data opportunities for scheme convergence between Ministries and State Governments to better serve the Indian Farmers

- Adopt collaborative and participatory approach with the States, by enabling them with relevant frameworks/reference applications (i.e., applications that the Centre will provide and which they can use or copy and adapt) and Standard Operating Procedures

ADB will engage a team of individual consultants to support Ministry of Agriculture and Farmer Welfare for Conceptualization, Design and Development of Proof of Concept (POC) for National Agri Stack under Digital Agri Mission. The team will comprise of (i) Product Design Specialist, (ii) Application Development Specialist, (iii) Solution Architecture Specialist, (iv) Digital Infrastructure Specialist, and (v) Implementation Delivery Specialist.

Scope of Work

The major scope of work under the assignment is Conceptualization, Design and Development of a POC for the initial version of a National Agri Stack and to prepare a working prototype of the National Agri Stack covering the Unified Farmer Service Interface (UFSI), and 3 core registries, i.e., Farmer Registry, Farmland Plot Registry (using geo-referenced village maps), and Crop Sown Registry.

The UFSI is a combination of standardised data schema, data, APIs and a consent layer that enables seamless interoperability of various public and private IT systems in the agriculture ecosystem across the country.

The UFSI is envisaged to play the following role:
- Act as a centrally standardised set of APIs and registry schemas in the agri ecosystem (like the eKYC and demoAuth APIs for Aadhaar)
- Enables Registration of the Farmers, Farmland Plots, and Crops Sown
- Provides standardised master data sets for agricultural data such as crops, seeds, pesticides, fertlisers, etc. – which need to be standardised nationwide
- Enables Registration of Service Providers, public and private
- Acts as a Repository of all the applicable standards, API's and formats

The UFSI and Agri Stack will enable authorised service providers to build use-cases using the Agri Stack Registries and APIs, thereby accelerating and making it easier for such providers to get access to ground and field-level data that today is difficult to obtain.

The team will be required to:
- Assist / simulate 3 states running different state level implementations of the 3 core registries to interoperate / synchronise with the Central Registries using a UFSI (Universal Farmer Service Interface) as an interoperable data-exchange layer.
- Build an API layer to provide access to the external world via a consent-driven architecture to the three core registries.
- Demonstrate a POC journey from the Central Agri Stack Portal to access the 3 core Registries (Farmer, Farmland Plot, and Crop) of the Central Agri Stack
- Demonstrate consent models for sharing Farmer data with authorised service providers
- Demonstrate the process of authorising service providers on an IT / API Sandbox with sample data from 3 States

The team is expected to carry out the activities, including but not limited to, existing solution study, gap analysis, conceptualization and designing covering the below:
- Setting up of the central Agri-Stack registries (Farmer, Farmland Plot, and Crop Sown) & associate databases with appropriate levels of integrity and security, and processes for updating and managing the registries
- Setting up of a UFSI (Universal Farmer Service Interface) data bridge between 3 simulated/real state registries/state sandboxes [Readiness of the States will not be the responsibility of the Consultants]
- Setting up of a consent layer to enable explicit consent-based access to data
- Setting up of an API layer to enable access to Digital Channels and External Partnership integrations
- Setting up of a reference Digital Channel (Web) to enable registration and query of data served by the Agri-Stack as approved by the consent manager
- Setting up consent layer to enable consented data fetch from various ecosystem participants

Detailed Tasks and/or Expected Output

The Solution Architect specialist shall support the team and will be responsible for:
- Support Team leader for development of Proof of Concept Development for National Agri Stack.
- Select and deploy appropriate open-source technologies suitable for a national level architecture for Agri Stack, including for the UFSI, and the Registries, as well as the Consent Layer and other components.
- Deploy the required APIs onto an API sandbox.
- Ensure that the various open source technologies interoperate with each other.
- Be responsible for infrastructure sizing of the production environment and share an infra architecture / pre-requisites to transition the release into production seamlessly.
- Drive the performance engineering and tuning of the architecture by ensuring designed architecture is for scale and devising plans to run load tests in the target environment post POC launch.
- Complete the system integration and enable the interoperability of the various APIs.
- Create solution architecture documentation for the deployment and infra architecture and ensuring the entire solution implementation and all integrations done follow the logic as per design construct.

Specialists Key inputs in Deliverables:
(i)Inception Report   :   High Level Solution Architecture Document
(ii)Interim Report   : Detailed Deployment and Infra Architecture Document including Interoperability
Guidelines and Specifications for UFSI.
(iii)Draft Final Report   : Detailed Integration guide for multiple states and further enhancements to
the architecture to ensure seamless scale-up of integration with multiple states.
(iv)Final Report   : End-state developer documentation for production APIs use via the API
gateway sandbox.

Minimum Qualification Requirements

The Solution Architect specialist shall have Bachelor's degree in Engineering or Computer Science or
Information Technology, and Post-graduate degree in Engineering or Computer Science or Systems Software
or an MBA/ MCA or MBA/ MCA equivalent. The specialist should have 15 years of experience in development,
testing and maintenance of application software along with application, network and system security,
project management, Disaster Recovery Site Management, Capacity planning and IT management for digital
products/solutions or digital transformational projects around India stack for enterprises or government
clients in India. Work experience should include India's Identity Stack including Aadhaar Authentication
and e-KYC, e-Sign, etc..

Minimum General Experience **15 Years**
Minimum Specific Experience (relevant to assignment) **15 Years**
Regional/Country Experience ◉ **Required**   ○ **Desired**   ○ **Not Required**

Deliverables

Details	Name	Type	Estimated Submission Date
⊞ Show	Inception Report	Report	24-Feb-2023
⊞ Show	Interim Report	Report	14-Apr-2023
⊞ Show	Draft Final Report	Report	16-Jun-2023
⊞ Show	Final Report	Final Report	15-Jan-2024

Schedule and Places of Assignment (chronological and inclusive of travel)

Schedule Type ◉ **Continuous**   ○ **Intermittent**
Max. Working Days/Week   Home Office **5**   Field **6**

City and Country	Working Days	Estimated Start Date	Estimated End Date	Other Details (use if place selected is Others)
Home Office, Other	5	30-Jan-2023	12-Feb-2023	
Other City, India	2	13-Feb-2023	15-Feb-2023	Delhi and Other cities in India
Home Office, Other	35	16-Feb-2023	10-Apr-2023	
Other City, India	6	11-Apr-2023	17-Apr-2023	Delhi and Other cities in India
Home Office, Other	25	18-Apr-2023	06-Sep-2023	
Other City, India	2	07-Sep-2023	09-Sep-2023	Delhi and Other cities in India
Home Office, Other	13	10-Sep-2023	30-Jan-2024	
Total	**88**			

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