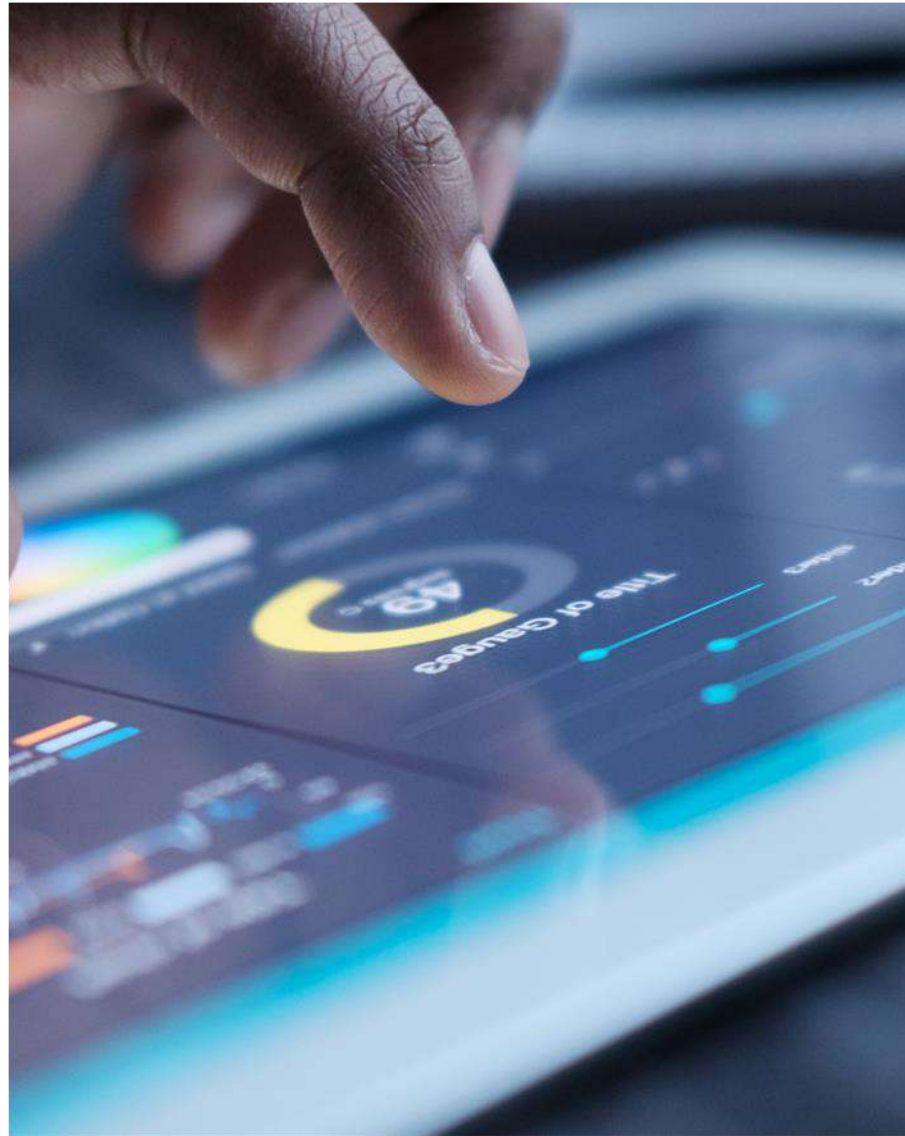




# Inclusive Digital Agriculture Transformation (IDAT) in Sri Lanka



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# 1. Contours of the Inclusive Digital Agri Transformation Strategy

The Government of Sri Lanka has embraced the need for the adoption of digital technologies to enhance the quality of life of its citizens by creating a digitally inclusive Sri Lanka. As agriculture sector remains most vital in the Sri Lankan economic and social context, and has been prioritized for growth, development, and sustainability, the Government of Sri Lanka continues to develop and adapt technological innovations for the agriculture sector to ensure that digital agriculture becomes a more productive contributor to the economy.

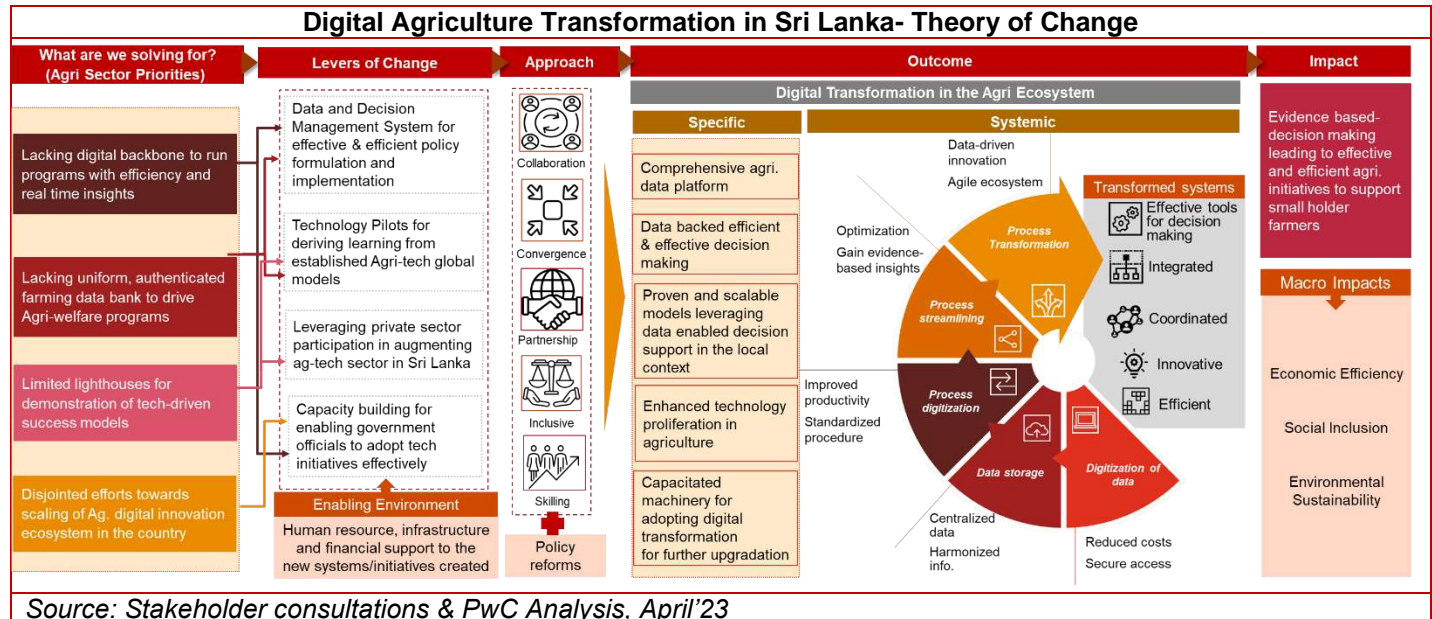
## 1.1. Strategic Vision

**Vision:** Empower Government to access unified Agri- data for unlocking opportunities for Agri-development and increasing efficiency and transparency across value chains through digital interventions.

## 1.2. Objective of the strategy

- To aid data-enabled decision-making to facilitate execution of policies, programs, and schemes targeted towards food security
- To improve resource efficiency including land, water, agri. Inputs and climate risk resilience across agriculture lifecycle
- To stimulate greater investments for improved digital infrastructure, digital literacy, and provisioning of digital services such as credit, insurance, advisory, post-harvest management, etc.
- To enhance capacities across the agriculture value-chain towards technology usage and its proliferation
- To introduce agriculture technologies for enhancing yield and improving water management, fertilizer applications and improving the soil conditions
- To promote adoption of standards for interoperability, and exchange of information within the agri. ecosystem while ensuring data quality, validity, privacy, and security
- To adopt affordable innovations and established digital agriculture global models for modernizing agriculture practices and strengthen climate risk resilience

## 1.3. Theory of Change for the strategy



Source: Stakeholder consultations & PwC Analysis, April'23

Evidence and data-based decision making by policy makers is critical for enhancing income of farmers, protecting the agriculture from impacts of climate change, and driving suitable technology adoption in Agriculture, which will further, pave the way for holistic agri. ecosystem digital transformation. Therefore, with the aim to enable such a data-based decision making by policy makers which leads to a sustainable and inclusive Agricultural prosperity in Sri Lanka, an Inclusive Digital Agriculture Transformation strategy is envisaged which builds on following key levers of change:

**This strategy builds on the key levers of change:**

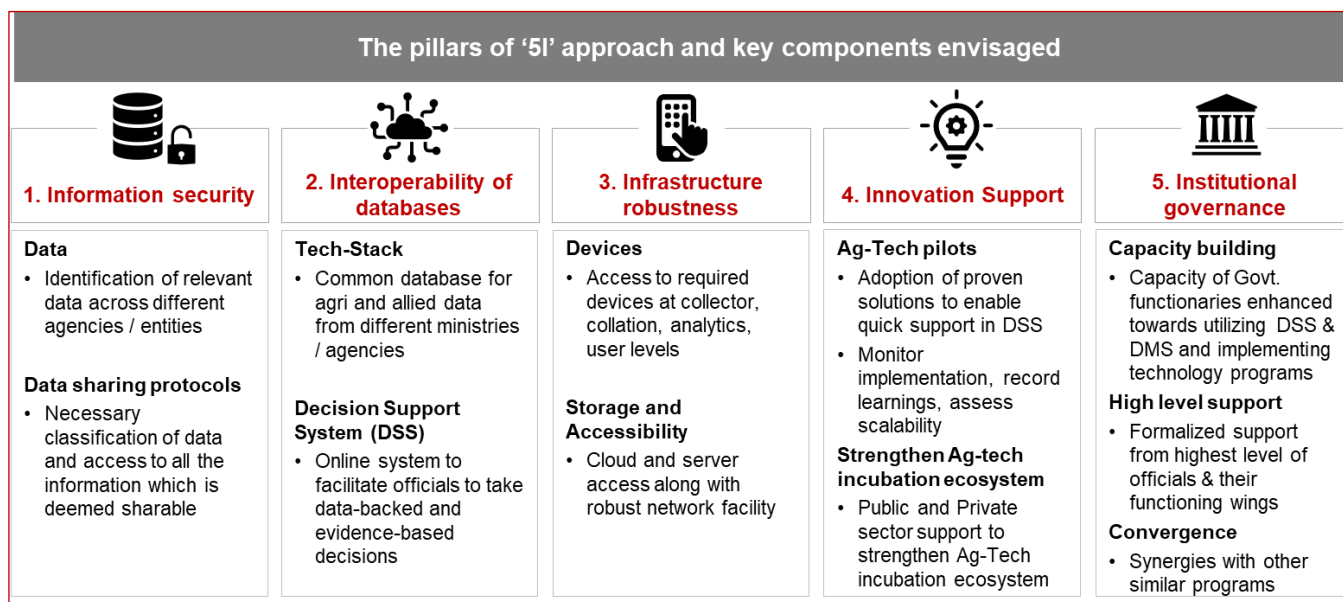
- Design & develop a robust 'Data and Decision Management System'
- Introducing 'Ag-data Technology Pilots' to demonstrate early solutioning
- Strengthening the 'Ag tech incubation ecosystem' for ensuring technology outreach
- Capacity building of government functionaries for technology proliferation



The above-mentioned levers of change are complementary to each other and act as integral enabler for the digital transformation of the agri sector in Sri Lanka. Further, to achieve the intended impact for digital transformation at scale, the suggested levers need to be supported by **strong digital infrastructure and business ecosystem** that will act as enablers for a well-functioning digital agriculture ecosystem. A theory of change has been presented above showcasing how the interventions will work and achieve the envisaged objectives and impacts in the intended areas.

## 2. Roadmap for Inclusive Digital Agri Transformation

Implementation of the IDAT strategy will follow a '5-I' approach for covering the components identified as drivers for the envisaged digital transformation in a cohesive manner. And the implementation mechanism will focus on the same which has been presented below and elaborated further in this section:



### 2.1 Information security

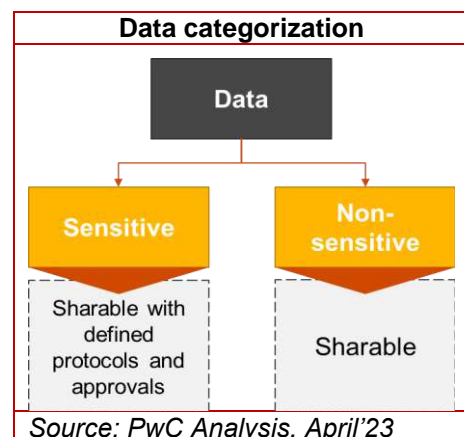
Static and unsynchronized data with limited analysis and absence of robust data quality assurance mechanism limit the opportunities of synergies amongst various ministries. Hence, identification of data being collected, and mechanism adopted for collection (through consultation with all relevant stakeholders) is critical, followed by categorization for shareability based upon its sensitivity, granularity, criticality, and ownership/data origination. In line with the categorization of data prescribed in National Data Sharing Policy and under the light of Sri Lanka Government Information Classification Framework (SLGICF), data will be then classified as Shareable and Non-shareable.

The sensitive data will be shared for the Tech-Stack and DSS basis written agreement / understanding between the ministries. ICTA being the apex agency for driving the digital transformation of the country will undertake the said classification with support from the IDAT strategy implementation team. Further, Government of Sri Lanka has developed Lanka Interoperability Framework (LIFe), a set of open standards to ensure the interoperability in government information systems, will guide the government organization to share and exchange information. National Data sharing policy for Sri Lanka and the protocols in the Strategy document will provide direction for the sharing of data between the various ministries and other stakeholders.

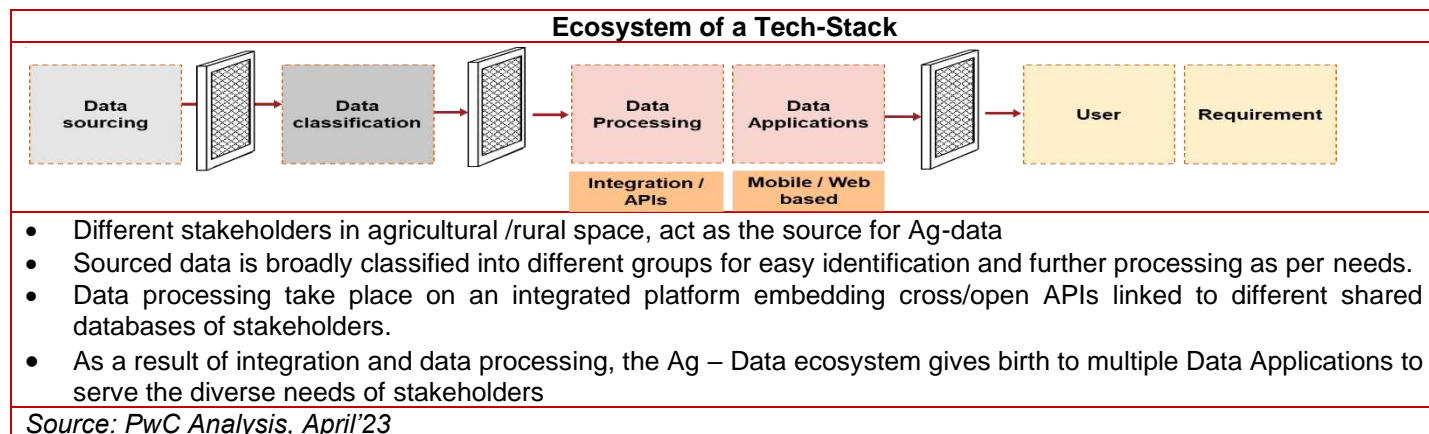
### 2.2 Interoperability of databases

To help build a sustainable & digital platform to effectively cater to the agri value chain requirements, a Data Management (Tech-Stack), and a Decision Support System (DSS) will be created that integrates data from various government schemes and project to enable evidence-based decision making both at policy and monitoring level.

#### Tech-Stack and Decision Support System (DSS)



Tech-Stack, a database (with adequate individual privacy protection) that covers Farm, Farmer, and Crop level data along with scheme and other related convergence information would help to integrate different ministries and in future other related stakeholders (private players, farmers, academia, etc.). The different datasets from multiple resources will be combined, classified, processed, and integrated to form a digital environment, a Tech-Stack and the same is presented below, which highlights the processes and interactions normally taking place:



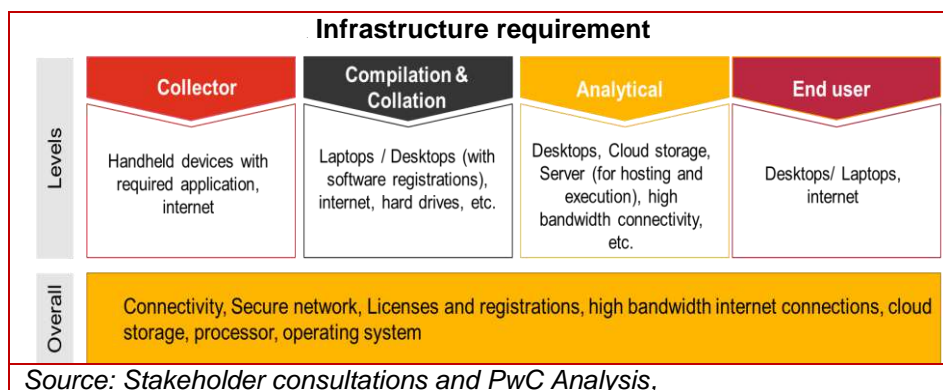
In the strategy implementation period, the data sharing and access to the same will be limited to the government stakeholders. However, the Tech-Stack to be developed will be future ready for operating as an open and public database for private players, financial institutions, academia, farmers, etc. Through Tech-Stack integration of different datasets (through APIs and other possible options) will be undertaken followed by stakeholder specific data analytics algorithms & visualizations i.e., a Decision Support System. The DSS will leverage upon the existing data sets / data bases in order to provide a comprehensive view of multiple ministries, departments, schemes and services at one-place. The end result would be in the form of a dashboard which shows the relevant information to the users through an intuitive and easy to use platform. The DSS through multiple dashboards will aid the department(s) in regular monitoring and review of processes / schemes, data driven planning and preparation, effective root cause analyses to identify intervention areas and measure the impact of actions taken as well.

### End Users of DSS

- i. **President’s Office:** Comprehensive view of the progress across the country across all the planned outcomes for key agriculture sector related ministries
- ii. **Ministry / Department officials**
  - a) **Ministry heads:** To review the performance of the department across key priority areas, schemes and at all levels of administrative functioning with the primary objective to design policy and budgetary decisions.
  - b) **Department heads:** To review the functioning of the departments across all administrative regions to provide implementation, monitoring and planning support.
  - c) **Province & District level officers:** To understand the progress of the on-ground initiatives and to precisely drill down to identify areas of improvement in their districts and provinces.

### 2.3 Infrastructure Robustness

Digital transformation of any sector is reliant on data, with data quality and accuracy being critical factors and hence the same is required to develop the Tech-Stack and Decision Support System. Presently in Government of Sri Lanka, more specifically the concerned Ministries the methodology adopted for data collection is traditional i.e., predominantly manual in nature (through subjective descriptions / information, paper-based formats being filled by ground level personnel



of respective Departments / agencies, which then is converted into digital formats. Digitalization of the data collection methodology is also required to ensure uniform, accurate and sanitized data reaches the Tech-Stack leading to fruitful

results. Further, a robust collection of required hardware with necessary accompaniments are necessary for the Tech-Stack and DSS to be developed and be functional as well.

## 2.4 Innovation support

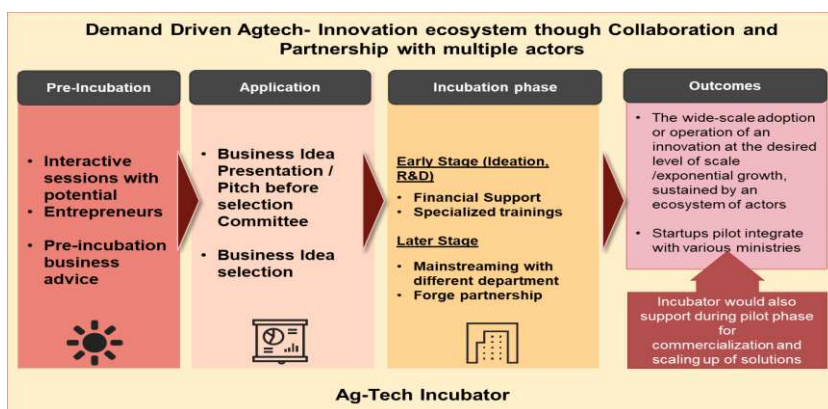
### a) Strengthening the Ag-Tech Incubation ecosystem

The creation of a competitive indigenous agri-tech sector demands an effective innovation and entrepreneurship ecosystem that enables the start-up and growth of innovative enterprises. The incubator shall extend support to ag-tech based start-ups in the areas of fostering local technological capacity, testing proof of concept in the real-world scenario, channelize investments in collaboration with private sector and international development agencies. Incubators provide a mechanism for technology transfer, promote the concept of growth through innovation and application of technology, support economic development strategies for small business development, and encourage growth from within local economies. To achieve the same, the ag-tech incubator will transition the incubated technologies to related agriculture research institutions, universities, and agencies after extending incubation support for 3 years.

### b) Deriving learning from established Agri-tech Global Models

Substantial investments have been made globally in the agriculture technology domain through data enabled decision support systems at the government level and digital farming services at the smallholder farmer's level. Piloting select agri-tech innovations is an effectual approach and acts as a precursor to assess the on-ground efficacy of these technological interventions including: the economic viability, the risk involved, the resources required to adopt the technology, the local availability of inputs, and mechanisms for realizing the benefits of technologies in the local context.

In the current context, the top-most priority for Sri Lanka is to ensure food security while also taking care of the foreign exchange reserves with the country. Therefore, it is logical to pilot successful technologies such as precision agriculture, site-specific nutrient management, and selection of climate-resilient rice varieties etc., to increase resource efficiency in paddy cultivation. Additionally, with increasing importance of sanitary and phytosanitary standards in international agricultural trade due to growing food safety concerns, and contribution of Tea in terms of foreign exchange earnings and employment generation, successful interventions around traceability may provide opportunities for greater market access and higher prices for the certified products.



### c) Leveraging private sector participation in augmenting ag-tech sector in Sri Lanka

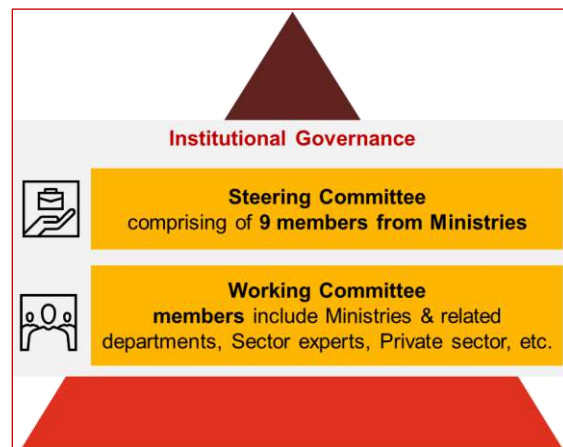
With increasing number of initiatives being taken in agricultural technology advancement by the private sector, the need is to open the agriculture ecosystem further by ensuring larger participation from the private sector through more Public-Private Partnerships (PPPs) and industry-research institution relationships. Such collaborations may facilitate solving data challenges and build repositories that can act as a common point for information generation and utilization. Encouraging start-up culture and conducting technology experiments while studying existing agricultural technologies in the other parts of the world would be of paramount importance for the development of efficient farming practices locally. Digital businesses operating in the agriculture sector present a unique opportunity for the country to nurture, and promote innovation and entrepreneurship, scale Micro, Small and Medium Enterprises (MSMEs), enhance market access, integrate marginalized populations and regions, increase resource efficiency, and generate more (and better) employment opportunities.

## 2.5 Institutional governance

### a) Governance structure for IDAT Strategy

To enable effective cooperation, leverage digital technologies relevant to the sector, and provide the digital backbone for evidence-based decision making a vibrant governance structure shall be instituted bringing-in various agri. ecosystem players together

**Steering Committee:** To provide overall strategic directions and support operationalization of Inclusive Digital Agriculture Transformation strategy, a **steering committee has been constituted with representation from 7 key ministries (Ministry of Agriculture, Ministry of Irrigation, Ministry of Plantation, Ministry of Fisheries, Ministry of Land, Ministry of Home affairs, Ministry of Technology and Ministry of Public Administration, Provincial Councils and Local Government)** of the Sri Lankan government. Further, a collaborative understanding has also been formalized with sign off among the mentioned seven ministries to cooperate in knowledge sharing, co-convening, co-funding of key initiatives, while providing overall governance support through existing and new mechanisms.



**Working Committee:** In addition to the Steering Committee, the institutional governance structure will also have a Working Committee with representation from relevant Ministries, related departments, Sector experts, Private sector, etc. The Working Committee shall work under the guidance of Steering Committee and will be responsible for executive management of the strategy components.

### b) Capacity Enhancement

Efforts are required to enhance capacities of the government officials amongst key stakeholders towards widespread adoption of digital technologies while also safeguarding utilization of the DSS & actualize the objectives of DMS. Therefore, it is pertinent to have a capacity enhancement plan as rapid technology advancements needs quick understanding and adoption. **For the data & decision management system, the government officials at all the levels would require awareness and training** on the tools developed, how to use the same whether for data collection or for analytics / reports or other actionable steps at their ends. The **capacity building will be done in a phased manner** depending on the DSS adoption trajectory.

Further, a forward-looking plan that focuses not only on skilling the existing workforce but also prepares the newcomers in the sector to understand, appreciate and utilize the digital agriculture technologies need to be placed. Hence, linkages with academic institutions, universities, and businesses need to be in place to encourage and sponsor such capacity enhancements. In this context, the conceptual model as defined under the “Digital Government Competency Framework” developed by Information & Communication Technology Agency (ICTA) of Sri Lanka will help in assessing the current requirements, identifying the capacity gaps at all the governance levels and facilitate skill enhancement as per the workspace requirements. For this component the existing initiatives / schemes of respective ministries will be leveraged to ensure ownership, efficient utilization of resources and impactful adoption of the modules.

### c) Convergence and Complementation

In line with the evidence supporting multisectoral and multilevel convergent approaches, this strategy targets to build partnerships and alliances to pursue common goals for true strategic transformation of digital agriculture. Currently, there are a number of programs that are being implemented in the similar space of agriculture development with technology being one of the key areas. In continuation of the existing synergies between the government agencies, it is critical to engage with private actors for enhanced adoption and better sector-specific application. Efforts are required to consciously discover areas of synergy so that the resources are utilized with optimum efficiency in a cash strapped nation. The strategy encourages to adopt, adapt and/ or add existing institutional structures rather than establishing new ones. Convergence and complementation synergies can be achieved across the programming cycle.

### d) Incorporating a Gender intentional approach

One of the key aspects for realizing the true objectives of digital agriculture transformation is to steer the process of digitization to be inclusive as an attempt to address the existing gender disparities in the agriculture sector. In the current context, women have less access and control over resources, much less involved in commercial agriculture and medium-scale industries. Moreover, women lack visibility in agriculture as the contribution made by women to agricultural value chains and subsistence agriculture has not been quantified. There is a lack of gender-disaggregated information to determine gender gaps in the agriculture and rural sectors which is the starting point for incorporating gender inclusivity in the entire gamut of digital agriculture transformation.



### 3. Implementation of the IDAT Strategy

The IDAT strategy will be implemented in a tenure of three years (2023 – 2026) with the components elaborated in the above sub-section in a sequential manner. An indicative implementation plan for these has been presented below:

	Short term	Medium term	Long term	
<b>Timeline</b>	<ul style="list-style-type: none"> <li><b>Data sharing protocols</b></li> <li>Formulation and formalization of the data sharing protocols for the Tech-Stack and DSS</li> <li><b>Technology pilots</b></li> <li>Initiation of implementation of shortlisted technology pilot</li> </ul> <p>Year 1</p>	<ul style="list-style-type: none"> <li><b>Tech-Stack and DSS</b></li> <li>Development of Tech-Stack and DSS</li> <li><b>Capacity building</b></li> <li>Enhancing capacity of government officials / personnel for adopting Tech-Stack and DSS</li> <li><b>Strengthen Ag-tech incubation ecosystem</b></li> <li>Operationalizing the Ag-Tech incubator @ ICTA with support of private sector</li> </ul> <p>Year 2</p>	<ul style="list-style-type: none"> <li><b>Interoperability of databases</b></li> <li>Through Tech-Stack and DSS exchange of data between different ministries / depts</li> <li><b>Convergence</b></li> <li>Collaboration of efforts with other projects / initiatives in the similar domain</li> </ul> <p>Year 3</p>	
<b>Operations</b>	<b>Bill &amp; Melinda Gates Foundation</b> Strategic, guiding and financial support for the IDAT strategy formulation & implementation	<b>ICTA</b> Nodal agency from GoSL for IDAT strategy formulation and implementation facilitation	<b>Government of Sri Lanka</b> Owner and direct end beneficiary of the IDAT strategy	<b>IDAT project team</b> Facilitate the implementation of the components identified in IDAT strategy
<b>Fund</b>	<b>Bill &amp; Melinda Gates Foundation</b> Financial support for the identified components under IDAT strategy through implementing team	<b>Government of Sri Lanka</b> Infrastructure, hardware, operational support from existing schemes/ initiatives	<b>Private players</b> Financial support in strengthening Ag-Tech incubator for potential incubatees	<b>IDAs</b> Leveraging support from multilateral / bilateral programs for complementing Foundation support
<b>Monitoring</b>	Periodic overall and component specific reporting by the implementing team	Regular meetings of the formulated committees to review progress, give directions and course correctional measures	Project MIS with component specific activities with fixed responsibilities for tracking the timelines and progress	Assessment of progress through Result-based framework to track the defined indicators for each component

To ensure smooth implementation of the strategy, there is need to bring together various stakeholders within the agriculture value chain with defined roles and responsibilities:

IDAT Strategy Responsibility Matrix						
#	Priority Tasks	Govt.	IDAs	Pvt. Sector	Academia	ICTA
1.	Availability of infrastructure (handheld devices with required applications, servers, etc.)	✓	✓	✓		
2.	Network connectivity and affordability	✓		✓		
3.	Provide actual data while ensuring quality and validity	✓		✓		
4.	Adopt data sharing protocols for timely sharing of data	✓	✓	✓		
5.	Embed information and data into existing monitoring systems at the district, province, and national level	✓				
6.	Appoint nodal officers in each district / province for smooth execution of the project activities	✓				
7.	Provide existing infrastructures and initiatives for capacity building activities	✓	✓		✓	
8.	Support in conducting seminars, workshops, training, and upskilling programs for officials in the concerned departments	✓	✓	✓	✓	✓
9.	Provide necessary facilities to conduct pilots and deployment activities	✓	✓	✓	✓	✓
10.	Extend incubation support (infrastructure, training, etc.) to select start-ups in the agri-technology domain	✓		✓	✓	✓
11.	Provide financial support for grounding and sustaining incubation activities	✓		✓		
12.	Ensure strong convergence by design with ongoing digital agri. programs to reduce duplication of efforts		✓			✓

IDAT Strategy Responsibility Matrix						
#	Priority Tasks	Govt.	IDAs	Pvt. Sector	Academia	ICTA
13.	Effective academia-industry relationship for transfer of knowledge and innovation			✓	✓	
14.	Committed inclination towards gender inclusion	✓	✓	✓	✓	✓
15.	Plan for and participate in Steering Committee meetings and other related meetings of the project	✓				✓
16.	Review project progress and facilitate project operations by providing financial, managerial, and administrative resources	✓				✓

**Govt.:**

- Ministry of Agriculture and related institutions
- Ministry of Irrigation and related institutions including Sri Lanka Mahaweli Authority
- Ministry of Fisheries and related institutions
- Ministry of Plantation Industries and related institutions
- Ministry of Lands and related institutions
- Ministry of Public Administration, Home Affairs, Provincial Councils and Local Government and related institutions
- Ministry of Technology and related institutions

**International Development Agencies (IDAs):** World Bank, Asian Development Bank, FAO, USAID, International Water Management Institute, GIZ, etc.

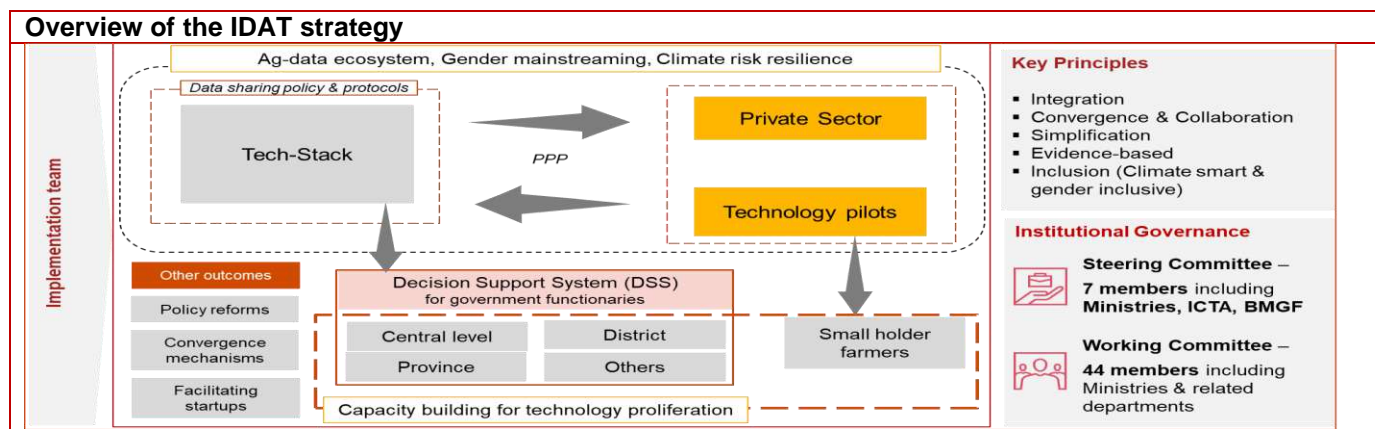
**Private Sector:** Telecom companies, companies operational across the Agri value chain, Agri-tech companies, etc.

**Academia:** University of Peradeniya, University of Sabaragamuwa, etc.

**Information Communication Technology Agency (ICTA)**

Further, to de-risk the IDAT strategy implementation, risk factors across different aspects of the implementation have been identified and due mitigation measures have been formulated as well.

An inclusive approach in supporting all the above-mentioned components of the programme would ensure a meaningful transition towards the envisaged goals. An overview of the IDAT strategy is presented below:



Although the strategy identifies five key components for implementation, but the nature of these is such that their implementation will have a catalytic effect in the digitalization of the agriculture sector of Sri Lanka by creating a conducive and receptive environment. Further, the inbuilt collaborative and convergence principles will lead to additional initiatives from government / private sector / academia / financial institutions coming into implementation. This will result in more positive outcomes reaching the small and marginal farmers relating to ag-advisory, better market access, credit support, entrepreneurship, technology adoption, etc.