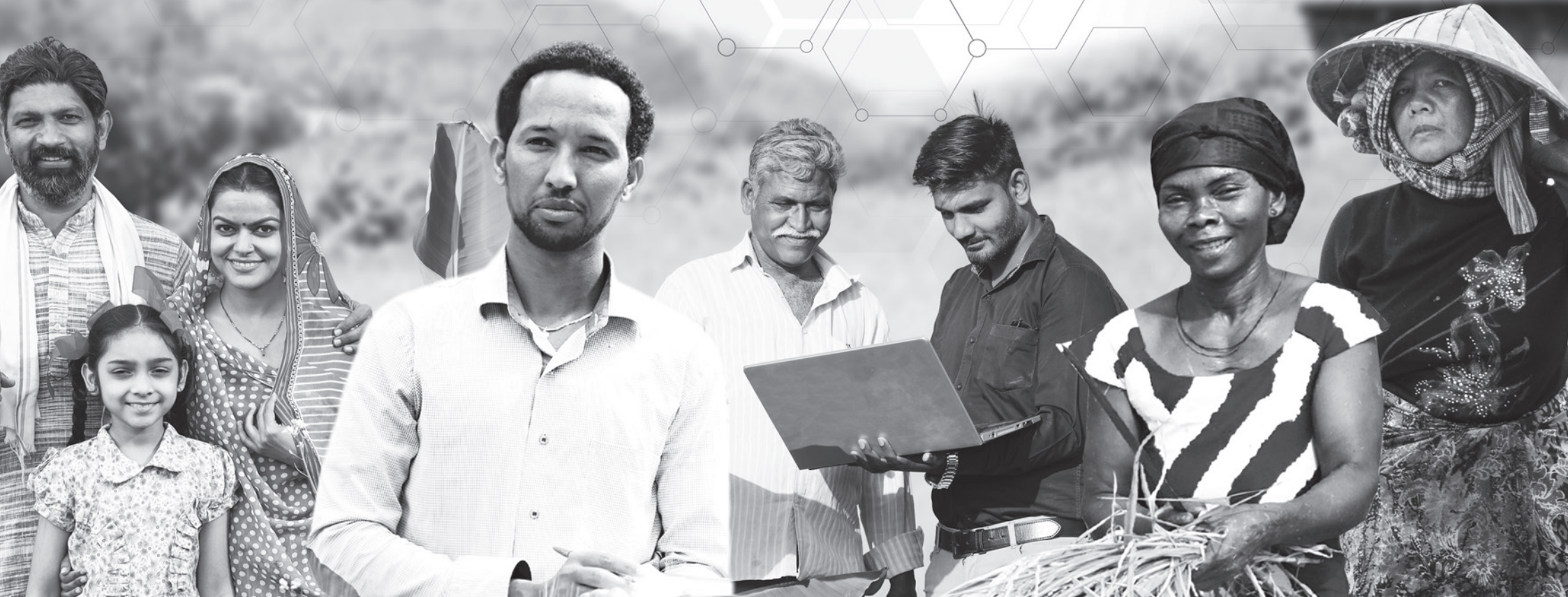




EXCELLENCE IN AGRONOMY  
ADAPT INTENSIFY GROW

# USE CASE Activity Review



# Accelerating Agronomy@Scale

## **The Problem**

Typical investments in agronomy R&D have not resulted in widespread yield improvements in smallholder farms.

## **Our Solutions**

We will modernize agronomy through Use Cases that respond to real demand from both public and private scaling partners and are backed by a globally organized and efficiently operated R&D community.

## **Why Our Solution is Better**

EiA's new model and research culture delivers agronomic gain (at scale) by aligning with stakeholder priorities that support improved productivity and profitability while also increasing resource use efficiencies, rehabilitating soil health, enhancing produce quality, and delivering climate change adaptation.

## **Our Traction**

EiA has attracted funding from more than 5 organizations that support international agricultural R&D and generated interest from at least 100 public and private research and scaling institutions.

## **Our long-term vision**

Our vision is to deliver agronomic gain for millions of smallholder farming households by 2030 in prioritized farming systems of the Global South.

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# I. Cohort I Use Case Portfolio Overview

Cohort I Use Cases (Incubation Phase) have been under implementation for just under 12 months. A progress review of these Use Case Activity Plans and incorporation of Scaling Readiness strategic recommendations was conducted with Use Case teams in two-hour virtual sessions.

A full review of the Use Case activity plans as measured against the agreed parameters contained in the 7-Step process and committed to by Use Case teams at the start of the Use Case. The review provided a status update on the development of the MVPs, data infrastructure, tool validation, and dissemination activities.

A total of 8 of the active Use Cases (Cohort I), have been assessed using the CGIAR Scaling Readiness protocol. Use Case teams had opportunity to give feedback on the strategic recommendations and how these would be incorporated into revised activity plans.

In attendance were Use Case leaders, their local agronomy teams, demand partners as well as TRANSFORM, DELIVER and Scaling Readiness teams.



**Cropping calendar advisories for smallholder maize farmers and extension agents in the Guinea Savannah zone**



**Web-based advisory for in-season yield potential & water productivity of irrigated wheat-based systems**



**Co-development of digital solutions to deliver fertilizer and time of planting advice for rice, maize, and cassava**



**Smart farming systems at the local level: Sustainability assessment and targeted data-driven recommendations for smallholder farmers**





Co-development of targeted fertilizer advisory services to improve NUE, reduce cost and enhance productivity

Digital Green



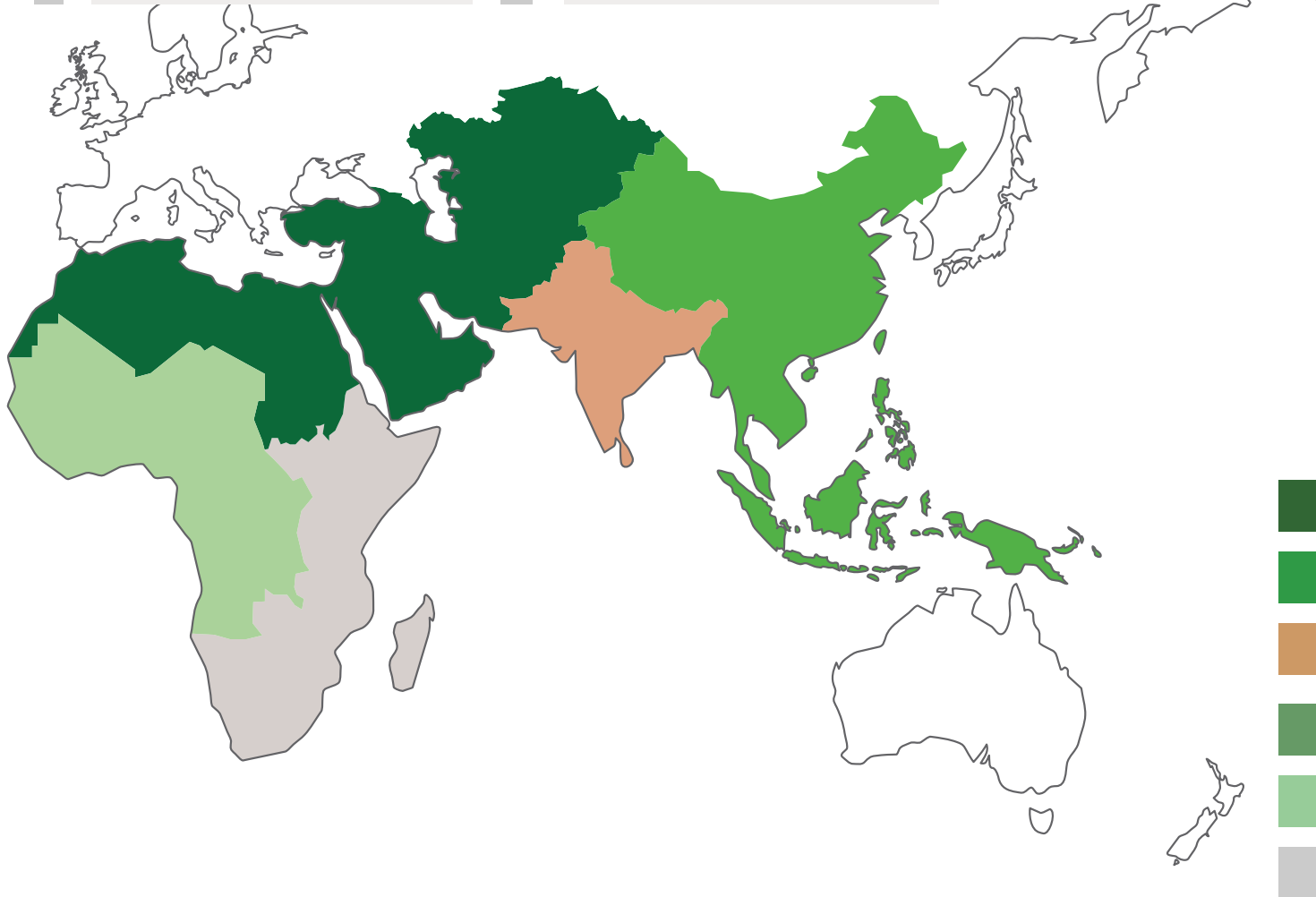
Co-development of agronomy and climate advisory tools for high yielding and high quality wheat production









Optimizing productivity, profitability and environmental sustainability using mechanized and precise direct-seeded rice



Managing time in the rice-based cropping systems of South Asia



-  Central West Asia & North Africa
-  South East Asia & Pacific
-  South Asia
-  Latin America & Caribbean
-  West & Central Africa
-  East & Southern Africa

A set of strategic recommendations were made which require consideration by the entire Use Case implementing teams. This includes the demand partner, participating CGIAR centres, and DELIVER & TRANSFORM representatives.



## USE CASE: DSRC Cambodia

### Partner Designation:



### Tool Category:



### Target Farming System:



### Crops:



### Demand Partner(s)



### CGIAR Centers



### MVP Development

Evidence-based collaboratively designed scaling strategy for mechanized DSR & locally tailored agronomy:

- Evidence-base for mechanized DSR & tailored agronomy
- Ex-post studies and business diagnostics of service providers inform ex-ante adoption analysis
- Developing digital solutions to drive service provision brokering through market dashboard with agronomy data
- Evidence-base for modifications & adaptation of mechanized DSR seeder

### Data & Tools

A. From selected survey and experiment datasets, processed the key variables and sent to GYGA team. **(90%)**

- Yield gap analysis on-going
- Meta-analysis study: measuring field size for robust estimation of farmer yields

B. Completed analysis from 2020 WS experiments (farmer diary data), Collected data from 2021 experiments [Kobo collect] **(80%)**

- C. Completed survey (N=473) from 3 provinces on adoption constraints, mDSR performance, practices and yield, for ex-post analysis [Surveybe] **(80%)**
- 34% non-users and 21% dis-adopters
  - Data being cleaned for factors affecting yield and profits
  - Complement: ASR implemented survey on adoption in Battambang

D. Completed 4 workshops on ADOPT tool **(100%)**

E. After service provider scoping survey (geolocation, service type), on-going business diagnostic survey of service providers [Kobo collect] **(30%)**

- ASR also interviewed service providers

### Prototype Development & Commitment

The Demand Partners are deploying and testing the technology.

- **GDA** is leading the Cambodia component of FAO-DSR project
- **IRRI** provides technical insights and regional sharing of information (Use of Scaling Strategy)
- **ASR** is testing new units of Eli seeder from BB2C, new KPIs and shared protocol has been discussed
- Experiment has started for the dry season
- **CAVAC** has been continuing to raise the profile of mechanized DSR in Cambodia
- **Varied** seeder models currently commercialized or being tested.

### MVP Validation

Validation experiments have started.

- Joint experiments in Battambang and Prey Veng have been started to serve as a learning tool for farmers, to observe mDSR and for feedback on machine design.
- Activities for gender-informed design have also been incorporated.
- The team has incorporated the EiA shared protocol for minimal set of data collected.

### MVP Piloting

#### Activities to be implemented (Dec 2021-Jun 2022)

- Continue yield gap analysis, generate tailored recommendations, draft extension materials.
- Continue validation experiments and gender-related activities.
- Use service provider data, result from business diagnostic, ex-post survey analytics, agronomic trials, and extension materials to:
  - Build the dashboard.
  - Draft the scaling strategy.
  - Draft publications.



Name	Affiliation	Designation	EiA Role	Country
Donna Casimero	IRRI Core Team	Agronomist	Core Team	Philippines
Rica Flo	IRRI	Innovation Systems	DSRC Cambodia	Cambodia
Kong Kea	Department of Ag Cambodia	Director of Rice	DSRC Cambodia	Cambodia
Siyabusa Mkuhlani	Core Team	Data Scientist	Core Team	
Paula Shirk	AgriSmart (Brooklyn Bridge 2 Cambodia)	CEO	DSRC Cambodia	USA
Tim Krupnik	CIMMYT	Systems Agronomist	DSRC Cambodia	Bangladesh
Aminou Arouna	Africa Rice - EiA Core Team	Impact Assessment Economist	Core Team	Cote d'Ivoire
Sor Nguon , AGI	AgriSmart Innovation	MD	DSRC Cambodia	Cambodia
Murat Sartas - B	EiA Scaling Readiness	Innovation Scientist	Core Team	
Prakashan (IRRI)	IRRI	Agric Economist	DSRC Cambodia	India
Brendan Brown (CIMMYT)	CIMMYT	Social Scientist	DSRC Cambodia	Nepal

- First draft of meta-analysis paper completed.
- Evidence- based on mechanized DSR and spatially tailored agronomy.

### Scaling Activities

MVP is only one component of the broader mechanism type innovation (mDSR), but also encompasses other components.

Main bottleneck is **Equipment service workflow** (also identified to be crucial in ADOPT workshops)

**Recommendation** from Scaling Readiness Report:

- **Document** and share performance of equipment.
- **Test** various alternatives.
- **Outsource** the validation.

Aside from our planned targets for the MVP:

- Continue to **track** from commercially available

(and partner-developed) equipment. Experiment with ASR, PDAFF to test and compare performance (different equipment, different locations).

- **Document** performance feedback from farmers and service providers.
- **Share** with partners, extension staff and service providers.

Gender Integration:

- **Ensure benefits** to women, or prevent negative impacts.
- A **gender-informed re-design** of existing seeders alongside tailored agronomy.
- **Insights from women**, from survey (e.g. ex-post) and qualitative methods.
- Women's **willingness to pay**. The accessibility of the technology and service providers to women.
- **Feedback on the technologies and services** will

be integrated into the scaling strategy.





## USE CASE: Planting Date South Asia

### Partner Designation:



NARS Partner

### Tool Category:



Precision Farmer Advisory

### Target Farming System:



Rice - Wheat

### Crops:



Rice



Wheat

### Demand Partner(s)



### CGIAR Centers



International Maize and Wheat Improvement Center

## MVP Development

### MVP Design

'Convergence' platform led by JEEVIKA and BAU was accomplished (single window agro-advisory).

### Data & Tools

#### Data

All the data have been acquired except:

- Weather forecast information (need additional budget)
- Data on gender decisions is currently being collected

#### Tools

- **Arc GIS** for geospatial analytics.
- **DSSAT/APSIM** for crop simulation modelling.
- **R/STATA** software for spatial and other data analytics.
- **CAPI tools** for survey data collection (Kobo, Surveybe).

### Prototype Development & Commitment

Prototype developed on planting date for Rice-wheat system. Four criteria decision frameworks based on:

- Monsoon
- Irrigation
- Risk preference
- Varietal duration

### 24 scenarios created

- Initial prototype is developed. Presented and obtained demand Partners Commitments
- KPIs are integrated through RCT and field demonstrations.

### MVP Validation

Decision framework validation:

- **Ex ante** simulation using rich data on production, irrigation, weather, RS based information (crop phenology), gender, other socio-economic variables

etc.

- **Cross validation** with field data, experiment data (CSISA and other projects). Series of stakeholder workshops (JEEVIKA convergence platform) - 2 core meetings in a year.

### MVP Piloting

Field verification trials:

- Through the convergence platform (10 clusters, 100 farmers)
- **Test the planting date advisory** and validate on landscape through JEEVIKA's farmer network - 1,000 farmer plots (50% are women farmers).
- **RCT experiment** to test the impact of planting date advisory
- Survey of a list of farmers from JEEVIKA network (~1000 treatment + ~800 control).

### Scaling Activities

- **Prototype** is being tested.
- **Convergence platform** led by JEEVIKA and BAU has wide network of farmers.
- **IFFCO (IKSL)** has well established infrastructure for largescale disseminating of advisories via SMS and IVR.

In the next period:

- Traveling seminars and harvest festivals will be conducted at the selected validation plots
- Feedbacks will be collected.
- The key results of household survey and validation trials will be reported.
- The feedback loop, and survey and field trial results will be used to make necessary adjustment in MVP prototype.
- These results will also be shared with Convergence Platform members for consensus development.
- Weather forecast data generation and integration to planting date algorithm for Dynamic advisory.
- Full scale deployment of advisory service will be

## Cohort I Use Case Annual Reviews Asia

Name	Affiliation	Designation	EiA Role	Country
Donna Casimero	IRRI Core Team	Agronomist	Core Team	Philippines
Bernard Vanlauwe	EiA Core Team	ORGANIZE Lead	Core Team	Kenya
Siyabusa Mkuhlani	EiA Core Team	Data Scientist	Core Team	Kenya
Anil Kumar	JEEViKA	Programme Manager	Use Case Support	India
Medha Devare	EiA Core Team	TRANSFORM Lead	Core Team	France
Aminou Arouna	Africa Rice - EiA Core Team	Impact Assessment Economist	Core Team	Cote d'Ivoire
Anton Urfels	CIMMYT	Water and Landscape Expert	Use Case Support	Nepal
Panneerselvam	CIMMYT	Agronomist	Use Case Support	India
Vikram Patil	IRRI	Agric Economist	Use Case Support	India
Virender Kumar	IRRI	Agronomist	Use Case Lead	India
Ram Kanwar Malik	CIMMYT	Rice-Wheat Systems Expert		India
Sugandha Munshi	IRRI	Gender Specialist	Use Case Support	India
Prakashan Veettil	IRRI	Agric Economist	Use Case Support	India
Murat Sartas	EIA Scaling Readiness	Innovation Scientist	Core Team	Turkey
Dr. R.K. Sohane, BAU	Bihar Agric University	Demand Partner	Demand Partner	India

planned.

### Scaling Readiness:

The team agreed with the recommendations to look at short term loop dynamics, improving gender sensitive agronomy decision making models, and optimization of the digital agro advisory and extension platform.

### Gender Integration:

- A meta review report/paper - in progress (gender inclusive agro-advisory services).
- Gender disaggregated data is being collected that

includes data on the involvement, influence, and benefits of different sexes.

- Gendered decisions are considered right from development of MVP to scaling (developing, testing, validating, feedback and scaling).
- Gender decision modules included in the survey - adapted version of WEIA, gendered access modules, labour, vignette, etc.
- Both male and female decision makers of the HHs are being interviewed.



## USE CASE: Ghana GAIP

### Partner Designation:



Agri-finance and Risk Mitigation Provider

### Tool Category:



Financial Risk Mitigation

### Target Farming System:



Cereal-Root Mixed



Rainfed System

### Crops:



Maize

### Demand Partner(s)



### CGIAR Centers



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## MVP Development

### MVP Design

Bundled Advisory Services Kits for Enabling Transformation Solutions in Agronomy (BASKETS-A)

### Data & Tools

#### Data

The team has a compilation of all the data sets that they are accessing and utilizing. In this regard they have been accessing data from Vandersat, WeatherImpact and also in conversations with Agrimetrics.

#### Tools

- **Arc GIS** for geospatial analytics.
- **DSSAT/APSIM** for crop simulation modelling.
- **R/STATA** software for spatial and other data analytics.
- **CAPI tools** for survey data collection (Kobo, Surveybe).
  - Sex disaggregated population data
  - Gender sensitive tool for overall sampling
  - Access to Weather Impact API algorithms

## Prototype Development & Commitment

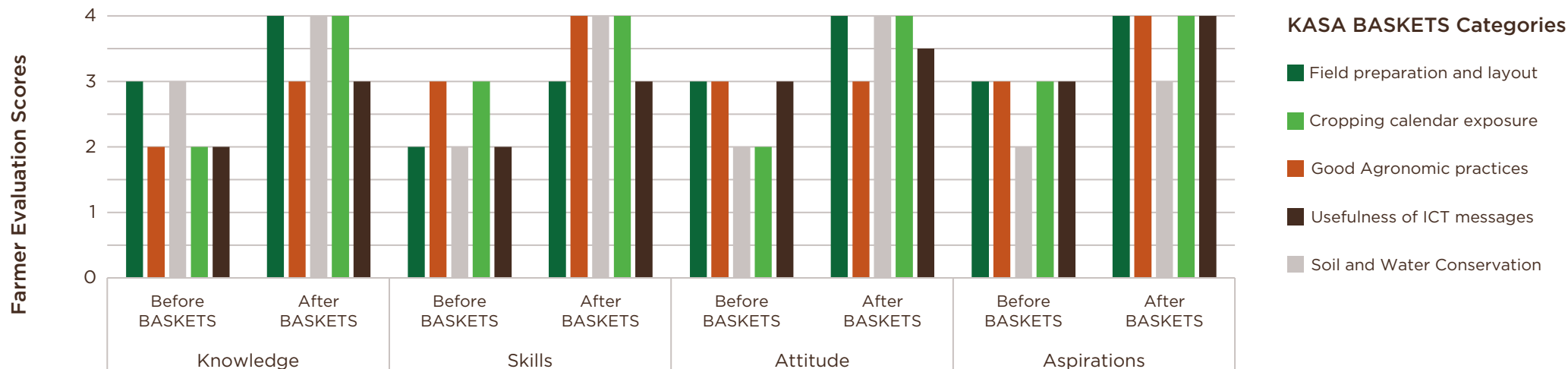
Team has incorporated the following KPIs:

- **Yield at field/plot level** (kg/ha/season)
- **Yield Variability** Changes (%)
- **Soil retention** at plot level (tons/ha/season)
- **Seasonal soil moisture** storage (mm/m)
- **Net income at plot level** (\$/kg/ha/season)
- **Input per ha** at plot level
- **Capacity to access** information. (Household)
- All the indicators are being **measured and modelled**.

## MVP Validation

Validation trials have been rolled out based on:

- **Transect studies** (with and without)
- **Targeting on KPIs:** Yield, yield variability, soil health and net income
- **KASA:** Knowledge attitude Skills and Aspirations
- **Access to Weather Impact** API algorithms
- **BASKETS-A** Dissemination
- **Front end** tool for web publishing
- **Back-end** for capturing user feedback (interactive)



Cohort I Use Case Annual Reviews Ghana GAIP					
Name	Affiliation	Designation	EiA Role	Country	
Meklit Chernet	EiA core team	Data scientist	Core Team	Kenya	
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Mandlenkosi Nkomo	EiA Core Team	DELIVER lead	Core Team	Kenya	
Sam Mathu	EiA Core Team	EiA Core Team	Core Team	Kenya	
Murat Sartas	EIA Scaling Readiness	Innovation Scientist	Core Team	Turkey	



## USE CASE: Digital Green Ethiopia

### Partner Designation:



Digital Platform Manager

### Tool Category:



Precision Farmer Advisory

### Target Farming System:



Highland Extensive Mixed

### Crops:



Wheat

### Demand Partner(s)

Digital Green

### CGIAR Centers



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### Use Case Activity Plan

### MVP Development

#### 3 Components

- Onset of rains and planting date
- Wheat Rust Surveillance
- Fertilizer Recommendation

#### Data & Tools

Soils/agronomy data ecosystem mapping showed that data are in the hands of different individuals and institutions.

In response to this, the team formed the Coalition of the Willing (CoW) which now includes over 100 members from an initial 30. This coalition has ensured that datasets across Ethiopia were made available in a collaborative manner.

As a result of these efforts the Ethiopian government has provided policy support to the CoW efforts.

This support has led to the release of some specific guidelines related to data collection, storage, sharing and usage, creating a good example of FAIRification at a national level.

National data sharing platforms have been created as a result.

#### Prototype Development & Commitment

Strengthened by the ability to acquire data and support from the government, the Use Case team has been able to build commitment from various stakeholders.

Prototypes for the 3 functionalities have been developed.

#### MVP Validation

The recommendations from the combined tools were validated jointly with Digital Green.

Four Woredas/districts were chosen in the three major regions. In Siyadebir district 5 Kebeles were chosen. In Basona district, 3 Kebeles were chosen. In Goba district

6 Kebeles, and in Lemo district 4 Kebeles.

The criteria were as follows:

- Major wheat growing areas
- Where Digital Green operates
- Diverse agroecological zones
- Accessibility
- Well-established partnerships

The validation exercise indicated that the EiA recommendations delivered better wheat yields:

Local practices: 4700 kg/ha

Extension: 4900 kg/ha

EiA: 5300 kg/ha

A national workshop is planned for May 2022.

#### MVP Piloting

Full piloting will be conducted in 2022, and preparations have been made for this process. The model of the pilot is shown below.

#### Scaling Activities

Once feedback is received from the pilot phase, it will be integrated into the prototype and additional piloting done until scale is achieved.

## Cohort I Use Case Annual Reviews Digital Green Ethiopia

Name	Affiliation	Designation	EiA Role	Country
Madonna Cassimero	IRRI	WP Lead ORGANISE	Core Team	Philippines
Eduardo Garcia Bendito	Core Team	Data Scientist _ TRANSFORM WP	Core Team	Kenya
Theresa Ampadu-Boakye	Core Team	MELIA Lead	Core Team	Kenya
Bernard Vanlauwe	Core Team	INITIATIVE Lead	Core Team	Kenya
Lulseged Desta	Alliance	Use Case Facilitator	Use Case Team	Ethiopia
Arega Alene	IITA	MELIA - Impact Assessment	MELIA	Malawi
Gizaw Desta	ICRISAT	Use Case Team	Use Case Team	Ethiopia
Murat Sartas	Scaling Readiness	Scaling Readiness Lead	Scaling Readiness	Turkey
Medha Devare	Core Team	WP Lead TRANSFORM	Core Team	France
Feyera Liben	participant	main	Demand Partner	Ethiopia
Kebede Ayele	participant	main	Demand Partner	Ethiopia
Meklit Tariku	Core Team	Data Scientist TRANSFORM	Core Team	France
Amsalu Tilaye	participant	main	Demand Partner	Ethiopia
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Siyabusa Mkuhlani	Core Team	Data Scientist - TRANSFORM	Core Team	Kenya
Sam Mathu	Core Team	Initiative Support	Core Team	Kenya
Tesfamicheal Wossen	Core Team	MELIA - Impact Assessment	MELIA	Kenya
Beza Bogale/Digital Green	Digital Green	Demand Partner		Ethiopia

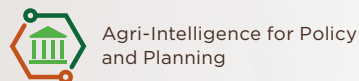
## USE CASE:

### Gvt LatAm (Mexico, Peru & Colombia)

#### Partner Designation:



#### Tool Category:



#### Target Farming System:



#### Crops:



#### Demand Partner(s)



#### CGIAR Centers



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## Data & Tools

Progress on acquisition of Data and Tools:

**MVP1:** Completed for the prototype – data collection for detailed agronomic data in Mexico, Peru and Colombia.

Working to add i) data management interface with data visualization options; ii) farmer interface with simpler agronomic forms and external site-specific information (e.g. developing a weather service that uses machine learning and the weather prediction to provide decision support to farmers)

**MVP2:** completed

## Prototype Development & Commitment

Prototype Development and Obtaining Demand and other Partner Commitments:

**MVP1:** Adjusted system for Peru and Colombia operational since beginning of 2021.

Peru partners: 15/11, CIP participated in meeting with Ministry of Agricultural Development and Irrigation and informed about Use Case.

Colombia partners: FENALCE is committed to migrate data from previous system (SIRIA) to e-Agrology, but there were issues with institutional agreements and data sharing consent. First version of dataset to be migrated currently under revision of FENALCE.

**MVP2:** completed first version of roadmap (delivered in S2)

## MVP Validation

Prototype Validation:

**MVP1:** Mexico analysis: database curation almost completed; first analyses done

Peru: 7/9, CIP meeting with partners to provide the

first analysis of the data collected. Distinguished most critical potato varieties grown by farmers and analyzed principal factors that damage potatoes and essential innovations adopted by farmers.

Colombia: FENALCE processing data that are being migrated

**MVP2:** circulated first version of roadmap and received feedback. Also received feedback on implemented processes by demand partners.

## MVP Piloting

**MVP1:**

- On track in Mexico and Peru
- Some delays in Colombia due to institutional agreements and data sharing consent, but issues have been solved.

**MVP2:** pilots completed – roadmap sent to design team

## Scaling Activities

Ready to Scale Version, Scaling Strategy:

**MVP1:** Constantly improving e-Agrology and adding new functionality. Also developed version in English for Bihar that will be piloted (bilateral funding).

**MVP2:** Only design is pending, so will be ready in December or January.

CIMMYT has received requests from several countries (e.g. Kenya, Pakistan) to work on IASIs. Implementation is pending (and dependent on funding).

Will share roadmap so others could also implement.

## Cohort I Use Case Annual Reviews - Government LatAm

Name	Affiliation	Designation	EiA Role	Country
Daniel Jimenez	Alliance	Use Case Team	Use Case Team	
Eduardo Bendito	Core Team	Data Scientist - TRANSFORM	Core Team	Kenya
Theresa Ampadu-Boakye	Core Team	MELIA	Core Team	Kenya
Siyabusa Mkuhlani	Core Team	Data Scientist - TRANSFORM	Core Team	Kenya
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Sam Mathu	Core Team	Core Team Coordination	Core Team	Kenya
Andrea Gardeazabal	CIMMYT	Use Case Team	Use Case Team	
Juan Camilo Rivera	Alliance	Use Case Team	Use Case Team	
Murat SARTAS (Ph.D.)	Scaling Readiness	Scaling Readiness	Scaling Readiness	Turkey
Julian Ramirez-Villegas	Alliance	Use Case Team	Use Case Team	





## USE CASE: Fertilizer Ethiopia

### Partner Designation:



### Tool Category:



### Target Farming System:



### Crops:



### Demand Partner(s)



### CGIAR Centers



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### Use Case Activity Plan



### MVP Development

**MVP1:** (Site specific fertilizer recommendation): extension agents at Kebele level and lead farmers

**MVP2:** (Fertilizer recommendation domain): Woreda decision makers and subject matter specialists

**Target Areas:** 15 pilot districts in 4 regions

**Farming Systems:** Dry and wet rainfed and mixed highland

**Content:** Site specific fertilizer recommendation for wheat, teff, sorghum.

**Fertilizer recommendation:** Clusters/domain

### Data & Tools

- 10650+ on-farm plot dataset at 25+ districts (2014-2020)
- IFPRI Dataverse OA platform: <https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/ZXH0R8>

## Cohort I Use Case Annual Reviews Fertilizer Ethiopia

Name	Affiliation	Designation	EiA Role	Country
Madonna Cassimero	IRRI	WP ORGANISE	WP Lead, ORGANISE	Philippines
Aminou Arouna	Africa Rioe	MELIA - RCTs	RCTs Coordinator	Cote d'Ivoire
Eduardo Bendito	Core Team	Core Team - TRANSFORM	Data Scientist -TRANSFORM	Kenya
Theresa Ampadu-Boakye	Core Team	MELIA LEAD	MELIA LEAD	Kenya
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Siyabusa Mkuhlani	Core Team	Core Team - TRANSFORM	Data Scientist -TRANSFORM	Kenya
Gizaw Desta	ICRISAT	Use Case Facilitator	Use Case Facilitator	Ethiopia
Murat Sartas	Scaling Readiness	Scaling Readiness	Scaling Readiness	Turkey
Kazuki Saito	Africa Rioe	CoP Lead - KPIs	CoP Lead - KPI	Japan
Meklit Chernet	Core Team	Core Team - TRANSFORM	Data Scientist -TRANSFORM	Kenya
Ram Dhulipala	ILRI	CoP Data Analytics	Data Scientist -TRANSFORM	
Mandlenkosi Nkomo	Core Team	WP Lead DELIVER	WP Lead, DELIVER	Kenya
Anthony Whitbread	ICRISAT	Focal point	Focal Point	Tanzania
Sam Mathu	Core Team	Core Team Support	Core Team Support	Kenya

### Prototype Development & Commitment

Strengthened by the ability to acquire data and support from the government, the Use Case team has been able to build commitment from various stakeholders.

Prototypes for the 3 functionalities have been developed.

### MVP Validation

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A national workshop is planned for May 2022.

### MVP Piloting

Full piloting will be conducted in 2022, and preparations have been made for this process. The model of the pilot is shown below.

### Scaling Activities

Once feedback is received from the pilot phase, it will be integrated into the prototype and additional piloting done until scale is achieved.



## USE CASE: SAA Nigeria

### Partner Designation:



Farmer Supporting NGO

### Tool Category:



Precision Farmer Advisory

### Target Farming System:



Cereal Root Crop Mixed

### Crops:



Rice



Cassava



Maize

### Demand Partner(s)



### CGIAR Centers



Transforming African Agriculture



AfricaRice

## MVP Development

### MVP Design

Status Update:

- User Groups: EAs and farmers
- Target Areas: initially, Benue, Kaduna, Kano and Kogi, to be scaled to other states for which the 3 individual tools are validated
- Farming Systems: small holder farmers in mixed upland/lowland environments with substantial rice/maize cassava farming
- Information Needs: recommendation domains for the 3 tools (AKILIMO, RiceAdvice, NE), weather/rainfall data for Nigeria to develop planting windows advice
- Delivery Format: chatbot
- Gender Integration: MVP to be used by female and male farmers; youth will probably have an advantage. This might also be exploited in training and assistance in accessing the chatbot at the community base.

### Data & Tools

#### Data

- Fertilizer Recommendation (FR) – component (fertilizer investment prioritization): done
- Planting window: rain data, soil grids (depending on approach)
- Variety choice: list of varieties and key characteristics for all crops

GAP: to be compiled but should be available.

#### Tools

- FIP – available but review required
- Planting window: need to decide on approach (rain fall pattern or modelling; models could be CERES Maize and OYRYZA; would need workshop with technical use case team and Transform
- Environmental clustering of target area: tool available from Transform but clustering still

pending

## Prototype Development & Commitment

### Prototype

- R script available
- ODK demo for Benue available
- Survey data available to have dry run for FIP with farm data (this is no validation)
- First validation of key technical components (FR/FIP) ongoing

### Current KPI Focus

- Yield
- Profit
- Nutrient use efficiency

For second season validations, additional KPIs could be considered. Depends on the type of required validation (we might need Nutrient Omission Trials...)

### FIP Concept & Prototype 1

#### Concept of FIP:

- Combination of the 3 fertilizer recommendation tools (NE, RiceAdvice, AKILIMO)
- Optimizes fertilizer investment across the three commodities for planting in the same season

#### Data requirements by crop and target field:

- Fertilizer: type, cost and amounts to be applied
- Expected produce price
- Current yield under current (common) practice
- Field size
- Risk attitude
- Agronomy/management: varieties, planting time, planting density, crop establishment method, application of organic inputs
- Investment frame for fertilizers if available

#### Data requirements from the individual tools:

## Cohort I Use Case Annual Reviews SAA Nigeriaw

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Murat Sartas	Scaling Readiness	Scaling Readiness	Scaling Readiness	Turkey

- Reference yield (AKILIMO, NE) at state, LGA or lower resolution level
- Site specific yield response at state, LGA or lower resolution level
- Target yield levels at state, LGA (RiceAdvice, NE)

### Prioritization logic:

- Look-up fertilizer requirements for each crop from

the individual tools(NE, RiceAvice, AKILIMO)

- Consider different target yield per crop = different fertilizer rates
- Consider different types of fertilizers for every target yield,
- Investment on individual or group of crops should not exceed the total investmentcapacity
- For every crop and target yield, identify the

cheapest fertilizers

- If a famer requests advice for example for rice and maize, allocatethe maximum investment to the most profitable crop and make sure minimum amount is invested on the least profitable crop.
- Predicted yield responses to fertilizer are estimated against a predicted reference yield
  - We use predicted zero fertilizer yields as



- reference in our current version of FIP
- Challenge: not clear whether the predicted zero fertilizer yield for rice are applicable

Survey data collected, dry run thru the R script is pending.

the FIP logic, but need a full analysis of data first (February/March for the cereals)

**Advice content of FIP:**

- Per crop how much of which fertilizer to apply
- Time of application with split strategy
- Cost of fertilizer
- Expected yield
- Expected profit

**MVP Validation**

**FR – FIP Validations:**

- Prioritization of the fertilizer investment across crops
  - how often does our tool recommend a different distribution of fertilizer investment from farmer’s practice?

**FR – FIP:**

- Predicted yield response to fertilizer – comparing the yield response of a farmer’s choice fertilizer level against an assigned fertilizer level from field and predicted data.
  - First season of validations planted, and first trials harvested
  - Mimicking the FIP tool in this created too much variability, thus a very rough mimic of a farmer choice approach
  - Insights from trial monitoring and first data suggest that a second season of technical validation is required. May include adjustment in

**Planting window:**

- Yet to be developed and decided

**MVP Piloting**

Current plan is to collect UX feedback on an ODK version for the next wet season with the SAA-Islamic Development Bank project in Kano

**Scaling Activities**

**Scaling Strategy:** using SAA’s frame of farmer learning platforms; we are planning for an in-person workshop to strategize the e-component and integration of additional partners.



## USE CASE: Gvt Egypt

### Partner Designation:



NARS Partner

### Tool Category:



Precision Farmer  
Advisory



Agri-Intelligence for  
Policy and Planning

### Target Farming System:



Irrigated Wheat System/Mechanized  
raised bed technology

### Crops:



Maize



Beans

### Demand Partner(s)



### CGIAR Centers



## MVP Development

### User Groups:

Selected Farmers  
Farmer Cooperatives

### Target Areas:

Five governorates: Assuit, Sharkia, Beni Suef, Menia, and  
Kafr-Elsheik

### Farming Systems:

- Irrigated Wheat System
- Mechanized Raised bed technology
- Crop rotation with Rec PoP

### Information Needs:

Information on recommended PoP for field level  
interventions

### Delivery Format:

Tables, documents, maps, database

### Gender Integration:

Women participation in all levels

## Data & Tools

### Data and Tools for the MVP:

- About 1200 Soil samples from 10 governorate are collected and analysed.
- Additional soil sample data are being analyzed in the lab for the 5 study area governorate.
- The current farming practices is available by field survey for field level.
- The recommended package of practices is available for wheat and faba bean, for country and regional level.
- Updated GeoAgro pro field data collection with recommended package of practices

### Agronomic Package of Practices (POP):

- Standard agronomic advisories for wheat and faba

bean, is collected and organized to collate with spatial data base

- Additional data on the Pest and Disease also collected as part of the recommended package of practices
- These datasets are much finer level @center level as compared to previous data at governorate level.

### Data sources:

- Ministry of Agriculture and Land Reclamation
- Committee of Agricultural Pesticides 2020
- Reports

### Geospatial Database:

- Egypt boundary 4 administrative levels, as GIS shapefiles.
- Land cover for Egypt from Copernicus Global Land Service as raster data
- Location of metrological weather stations in Egypt as a shapefile.
- Soil map of Egypt for the year 1975

### Geotagged Photos

- GeoAgro pro App based geotagged photos covering areas in 4 selected governorates cultivated with (Wheat, Alfalfa, Faba beans, Potatoes, onion, Grapes, Sugar cane and some Intercropping fields.
- Additional Data and Streamlining

### Area Yield and Production Datasets:

- Area, yield and production of seasonal winter crop for 2019, as Excel document
- Area, yield and production of seasonal summer crop for 2019, as PDF document
- Area, yield and production for wheat from 2012 to 2019, as Excel document
- Area, yield and production for Faba beans from 2017 to 2019, as Excel document
- The data is on Egypt governorate level



- Some time the apps shut down suddenly
- The mobile was out of battery
- Additional information was gathered in separate form
- few farmers was not cooperating in providing the data

### MVP Validation

Validation trials have been rolled out based on:

- Transect studies (with and without)
- Targeting on KPIs: Yield, yield variability, soil health and net income
- KASA: Knowledge attitude Skills and Aspirations
- Access to Weather Impact API algorithms
- BASKETS-A Dissemination
- Front end tool for web publishing
- Back-end for capturing user feedback (interactive)

### MVP Piloting

Progress on Piloting:

Validate and fine-tune the MVP solution with selected 500+ farmers spread over the governorates

Plus additional 1000+ smallholder farmers in 2021

Season 1 data collected

Season 2 data planned

### Scaling Activities

Scaling Strategy:

- Scale-up MVP solution to over 5,000 in 2022 and 15,000 by 2023
- The potential impact with a tailor-made package of practices leads to saving irrigation water by at least 20%, Increase the yield by 25%, increase resource use efficiency by 25%, reduce farming cost by at least 20%, reduce seed rate by 50% and increase water productivity by at least 25%, and increase crop diversity compared to conventional agriculture.

- Crop area for wheat and for Faba bean for each center of Egypt governorates for the year 2017, 2018 and 2019.

Excel document

**This set of data on Egypt country level. Climate data:**

- Daily climate data for Asute abnoub meteorological station from 2009 to 2018
- Daily climatic data from 2000 to 2015 and daily climatic data from 2010 to 2020 for Sakha weather station, as Excel documents.

Monthly climate data for AZ Zankaloun Research weather station from 2018 to 2020, as Excel document

### Prototype Development & Commitment

Several issues while testing the application at farmers and extension levels at the field conditions:

These datasets are at Egypt center level, GIS formats

### Additional Data and Streamlining

**Cost and net return:**

Publisher: Economic Affairs Sector

- Cost and net return for winter crops 2019, as Excel document
- Cost and net return for wheat from 2017 to 2019, as Excel document
- Cost and net return for Faba beans 2017 to 2019, as

## Cohort I Use Case Annual Reviews Government Egypt

Name	Affiliation	Designation	EiA Role	Country
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## **EiA's 2024 Targets**

- Establishment of at least 20 public and private scaling/demand partnerships that will pilot gender and youth-responsive agronomic solutions targeting at least one million farmers.
- At least 75% of research and scaling partners sharing common open and FAIR data, tools, and analytics to support the co-creation of locally relevant agronomic solutions at scale.
- Collaboration with at least 5 Advanced Research Institutes and 10 National Agricultural Research Systems to address key knowledge gaps in the agronomy at scale research area.
- Decisions on key aspects of EiA's expanding agronomy-at-scale research portfolio collectively made by CGIAR agronomists and scaling partners based on common learning and objectively obtained information.

## **EiA 2030's R&D agenda**

- Sustaining soil productivity: Delivering food, nutrition, and ecosystem services
- Integrative water strategies: Managing risks and boosting yield potential within ecosystem limits
- Out of the weeds: Addressing weed threats through global goods
- Tools of the trade: Operationalizing scale-appropriate mechanization for smallholder agriculture
- Diversification for reduced risk: Enabling farm enterprise transitions while minimizing trade-offs
- Internal efficiencies: Prioritization, targeting, and intervention design and lean innovation cycles

## **Demand-Driven Delivery Models**

- Demand partner (public or private)
- Active extension network
- Support partners specific solution (minimum viable product)
- Co-creation process
- Turnkey solution for scaling



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