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Accelerating Impacts of CGIAR Climate Research for Africa

Managing climate risks in cropping systems and designing resilient climate-smart farming systems for Senegal

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ANACIM

Introduction

- Agriculture in Senegal is largely subsistence, low input, labour intensive, and sensitive to the prevailing climate, and hence the country is vulnerable to food insecurity.

- Under the AICCRA project, the principal focus is to contribute to the **better resilience of production systems in the context of climate change.**
- a value chain-based prioritization process identified the production of millet, groundnuts, and cowpeas is being negatively affected by climate change due to soil degradation and poor weather conditions.
- limited access to agro-advisory services and good quality seed and other agricultural inputs as well as insufficient infrastructure

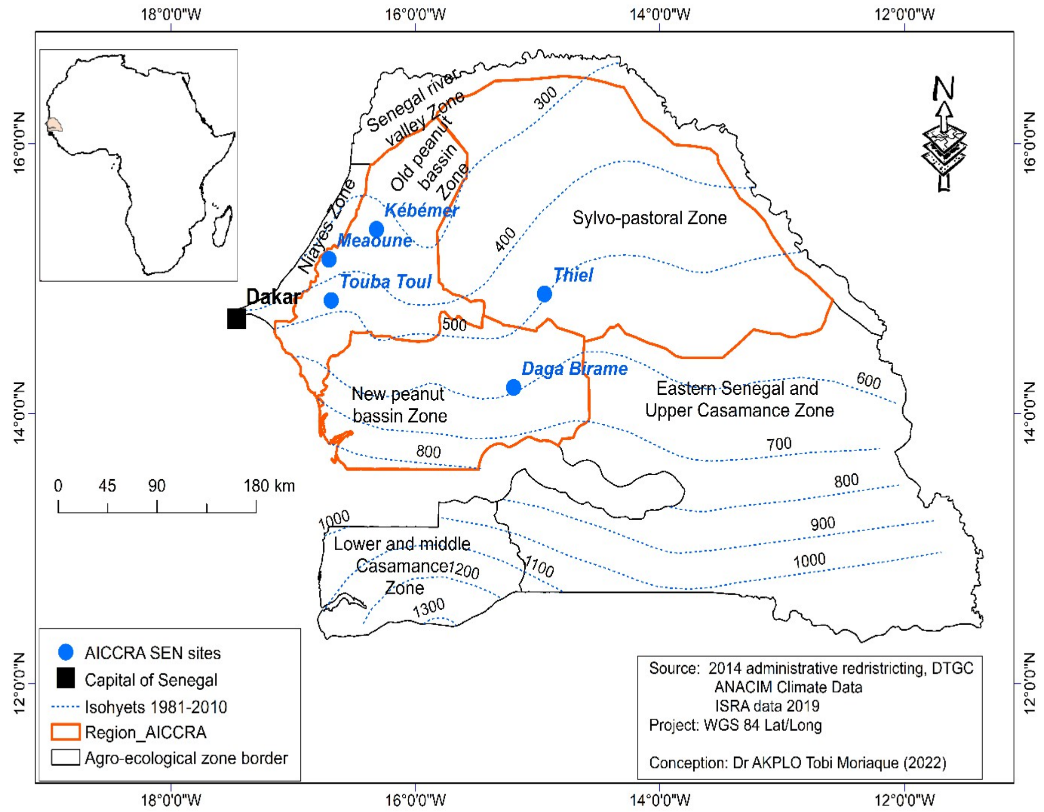
Objectives and justification for intervention areas

strengthen the capacity of
targeted partners and
key stakeholders

Dissemination of climate
information services (CIS)
to thousands of farmers
to improve their
decision-making

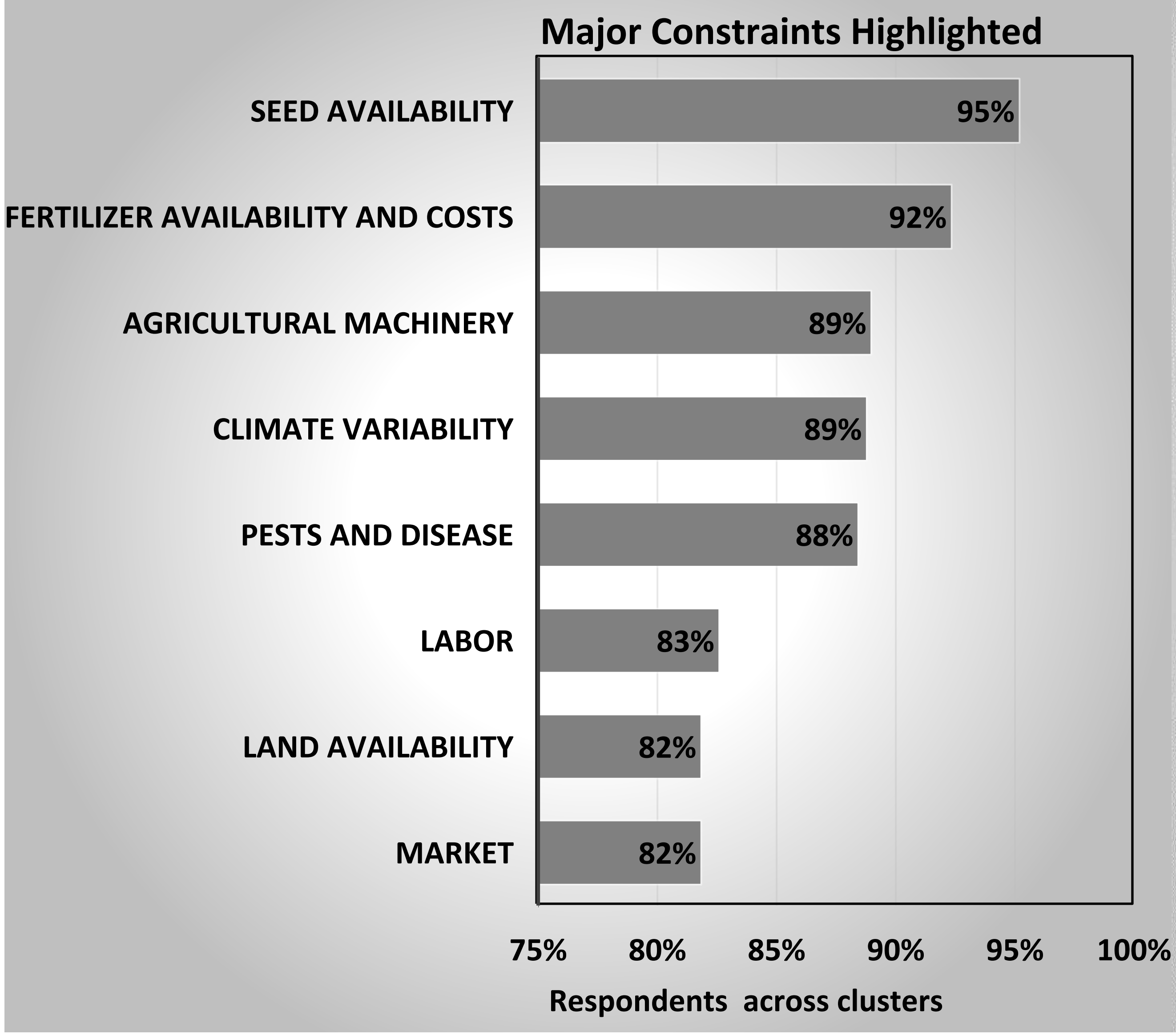
Development of public-priv
partnership business mode
for the dissemination of C

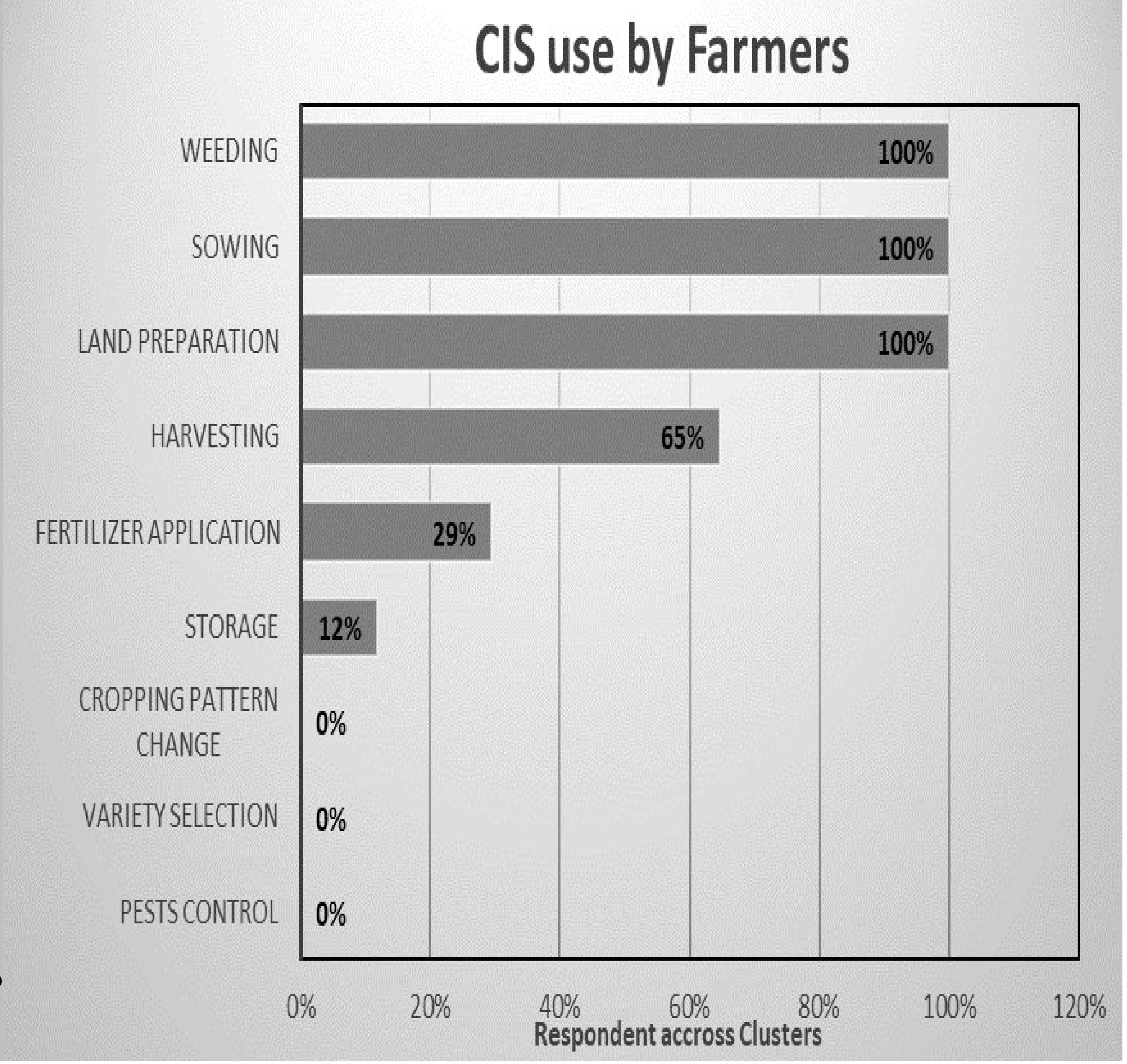
Large-scale diffusion of
validated and uptake of
best bet CSA innovations
option in dry cereal system



- Strengthened former Project achievement in Méoune (Tivaoune) and Daga Birame (Kaffrine) by CCAFS
- **Extends the knowledge to Thiel (Louga region) which is the transition between the peanut basin and sylvo-pastoral zone.**
- ✓ **Need to carry out actions research that provides solutions to climatic risks.**

Farmers’ Perception via Focus Group Discussion (FGD)





Farmers’ Perception via Focus Group Discussion (FGD)

Crop/ Cluster	Dagua Birame		Thiel		Méouane	
	Without Fertilizer Yield	With Fertilizer Yield	Without Fertilizer Yield	With Fertilizer Yield	Without Fertilizer Yield	With Fertilizer Yield
	kg/ha		kg/ha		kg/ha	
Groundnut	680	1570	670	1480	460	932
Pearl millet	240	1710	520	1560	300	1152
Maize	500	1950	550	1640	-	-
Sorghum	200	800	-	-	-	-
Cowpea			350		200	560

Coping with climate risk – tactical?

- **Cropping systems must be smart, and** contributes to climate change **adaptation** by sustainably increasing **productivity & resilience**
  - In-season adjustment of inputs or target output
  - Risk-reducing measures - Crop insurance, climate knowledge
  - Forward selling, contracts,
  - Application of IoT's (Internet of things – connected sensors, drones)

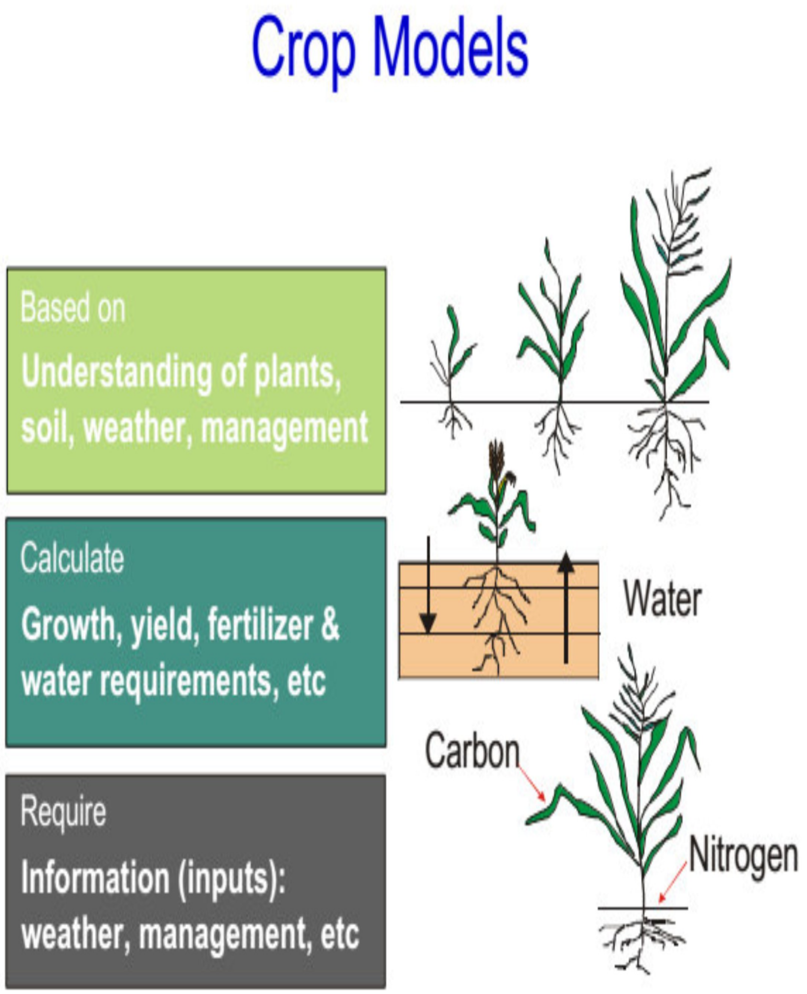
Coping with climate risk – strategic?

- Selection of crop types and varieties
- Timing of planting
- Re-designing farming systems
  - Historical and future climate analyses and modelled scenario analysis
  - Co-design of the farm system for resilience and market opportunities
  - Infrastructure and institutions to enhance adaptive capacity

Our approach…..

- To combine crop model simulation and field experimentation to evaluate crop response to ***variable climate risks*** (e.g. rainfall amount and distribution), **management practices** (e.g. planting date, fertilization strategies, population etc.), and **soil types** that will inform decisions on appropriate **CSA packages and seasonal *yield forecasting.***

- Thus, implementing participatory research and extension approach (PREA) – to accelerate the adoption of CSA & CIS dissemination towards climate risks management.



Integrating CSA & CIS

Brief Description: CSA packages deployed supported with seasonal yield forecasting.

Application domain: 2 AEZ piloted-Decision support tool to evaluate crop response to *variable climate risks & farm* management practices that will inform decisions on appropriate CSA packages as well seasonal *yield forecasting.*

Result: 108 demonstration plots in 18 villages combining pearl millet and groundnut cultivars with ISFM approach – 3 Technology parks to promote adapted improved varieties of millet, groundnut, and cowpea compared to local variety as well as different production techniques

Enabling conditions for further scaling/uptake- via organized farmers' field days across the clusters

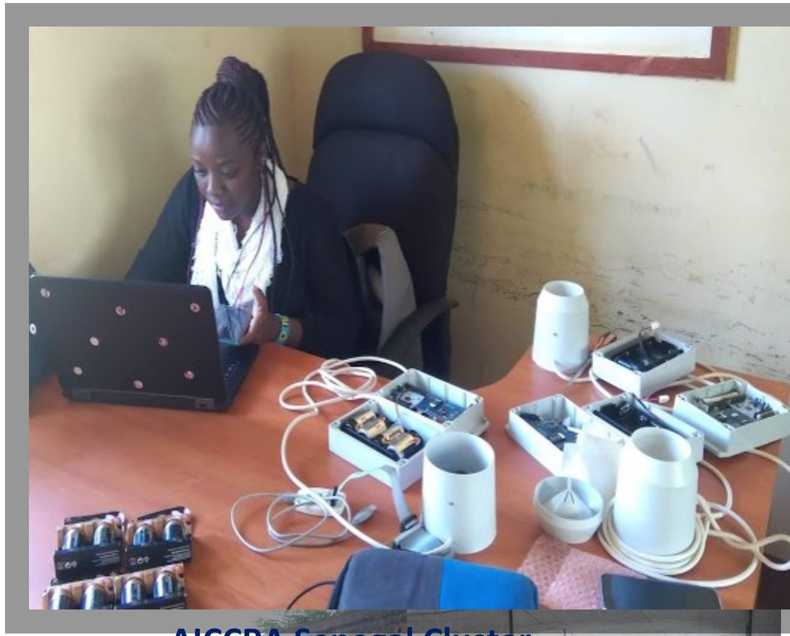
Deployment of AgCelerant IoT and manual rain gauge to reduce basis risk, validate downscaled data and support CSA

Kenya

Nigeria

agCelerant IoT rain gauge
("farmer rain gauge 2.0")

- **2022 pilot:** 8 *agCelerant* IoT automatic alongside 20 manual rain gauges have been deployed to 20 communities across three clusters
- Supporting CSA advisories on planting dates and farming activities based on in-season rainfall forecasts being implemented by ICRISAT and CERAAS
- Validation from existing infrastructure, downscaled climate data (with ANACIM)
- Immediate beneficiaries are the farmers and thereafter serve as a source of information to insurance companies



AICCRA Senegal Cluster

9 Automatic IoT raingauges installed

20 manual raingauges installed

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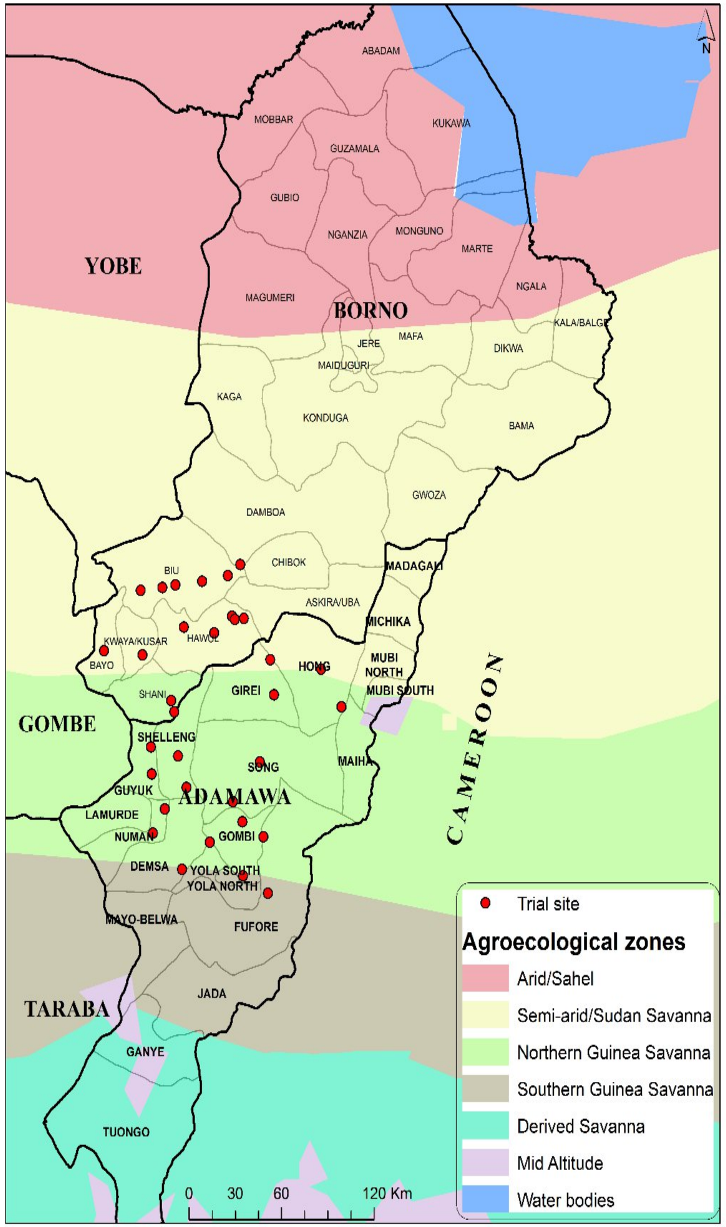
Previous Examples……

Matching crop varieties to agro-ecological zones in Northern Nigeria to determine optimal planting windows **toward reducing climatic risk due to crop failure and early terminal drought**

Crop	Target AEZ	Cultivar	Optimum Planting window	Simulated yield (kg/ha)
Pearl Millet	Sudan Savanna	JIRANI	June 5 and 30	2425-2935
		SOSATC88		2322-2832
		SUPERSOSAT		2083-2552
	Northern Guinea Savanna	JIRANI		2268-2893
		SOSATC88		2327 -2917
		SUPERSOSAT		2089 - 2641
Groundnut	Sudan Savanna	SAMNUT-23	June 15 and Jul 10	1457 - 1798
		SAMNUT-24		1060 -1200
		SAMNUT-25		1191 -1452
		SAMNUT-26		1119 -1399
	Northern Guinea Savanna	SAMNUT-23	May 25 and June 30	1395 -1580
		SAMNUT-24		992 -1023
		SAMNUT-25		1129 -1263
		SAMNUT-26		1082 - 1246



Akinseye *et al.*, (2020)

Thank you for listening

Questions I would like to discuss.

- How can crop-modeling studies inform policies in supporting the development of climate resilience in the cropping systems?

- How does the impact of management on the climate resilience of cropping systems change when information about farm and farmer socio-economic characteristics is included in crop modeling studies?