



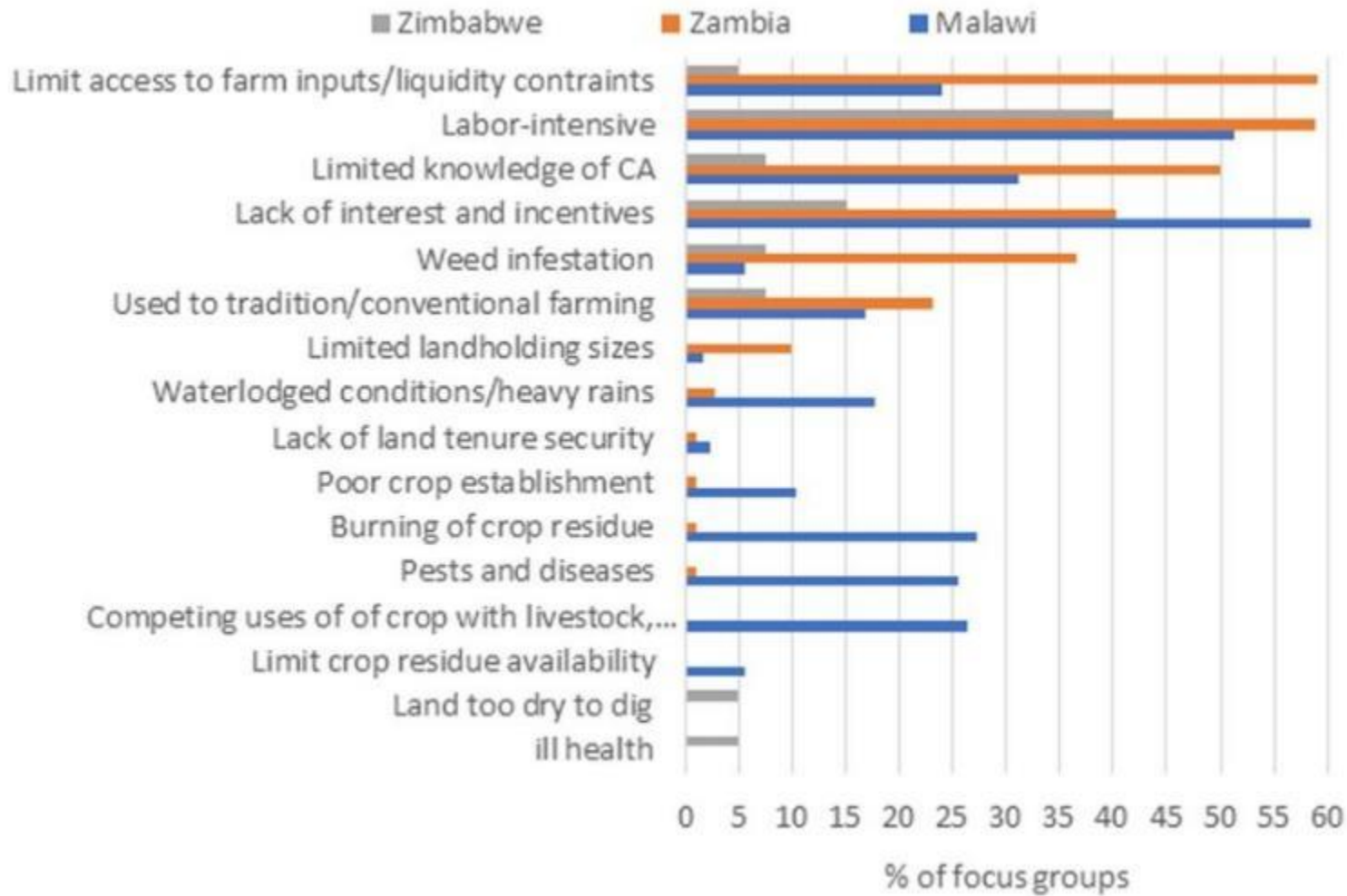
## Conservation agriculture on the move:

*A learning agenda through mechanization, digital extension, and service provider models*

CIMMYT's global work on scale-appropriate and sustainable mechanization CA & SAM



# Barriers to adoption of conservation agriculture



## Top barriers:

1. Labor-intensive
2. Limited knowledge
3. Access to inputs, incentives



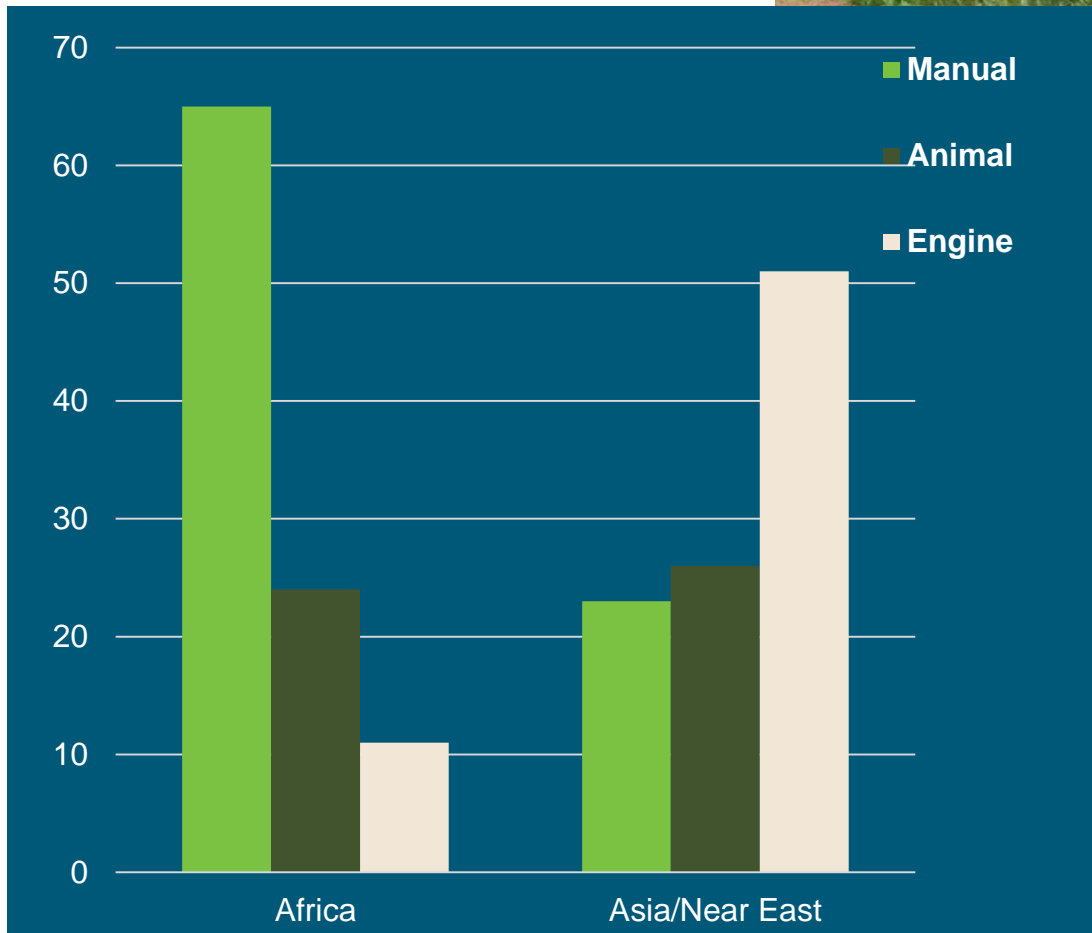
MECHANIZATION



DIGITAL EXTENSION



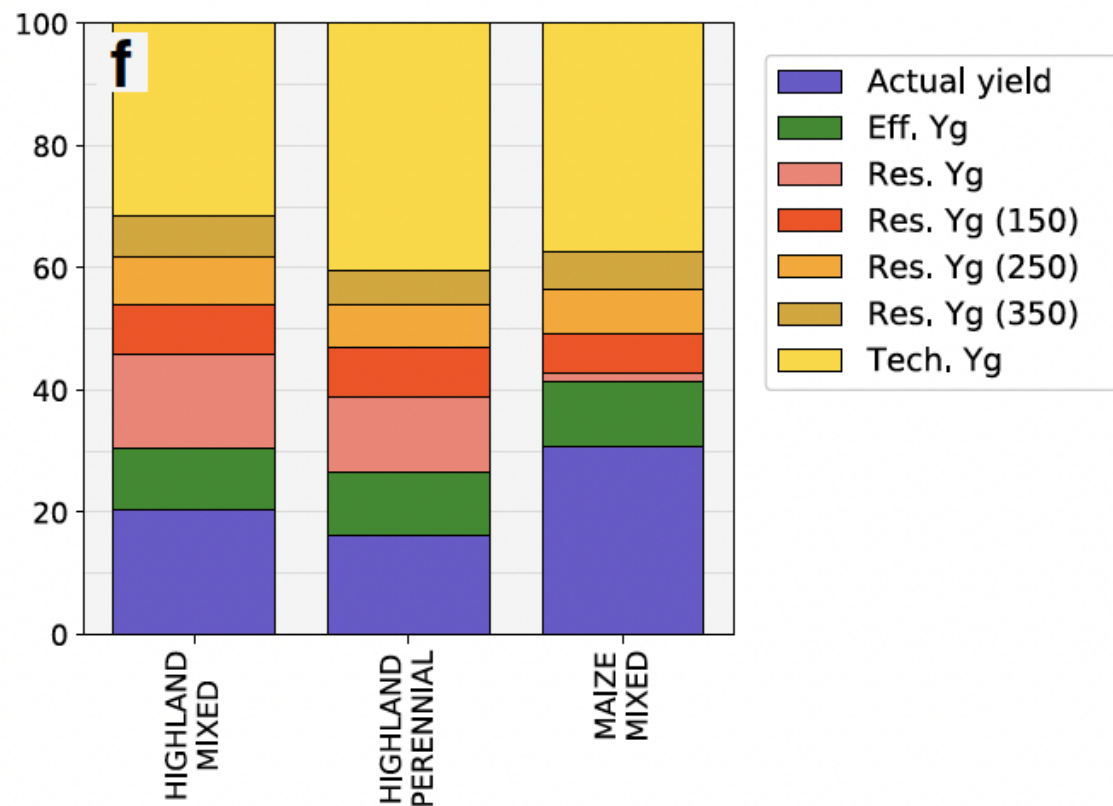
SERVICE MODEL



# Yield gap analysis: Mechanization is key



**Ex-ante analysis:** 60% of yield potential can be obtained with current genetics, if N input is increased & N efficiency ensured through **mechanization and timely weeding**



Silva et al., 2021

# Mechanization around the global south



**From Bangladesh to Africa:  
Catalyzing inclusive  
mechanization to reach  
>10,000 in Zimbabwe alone**



**Bottleneck  
analysis &  
enabling  
environment**



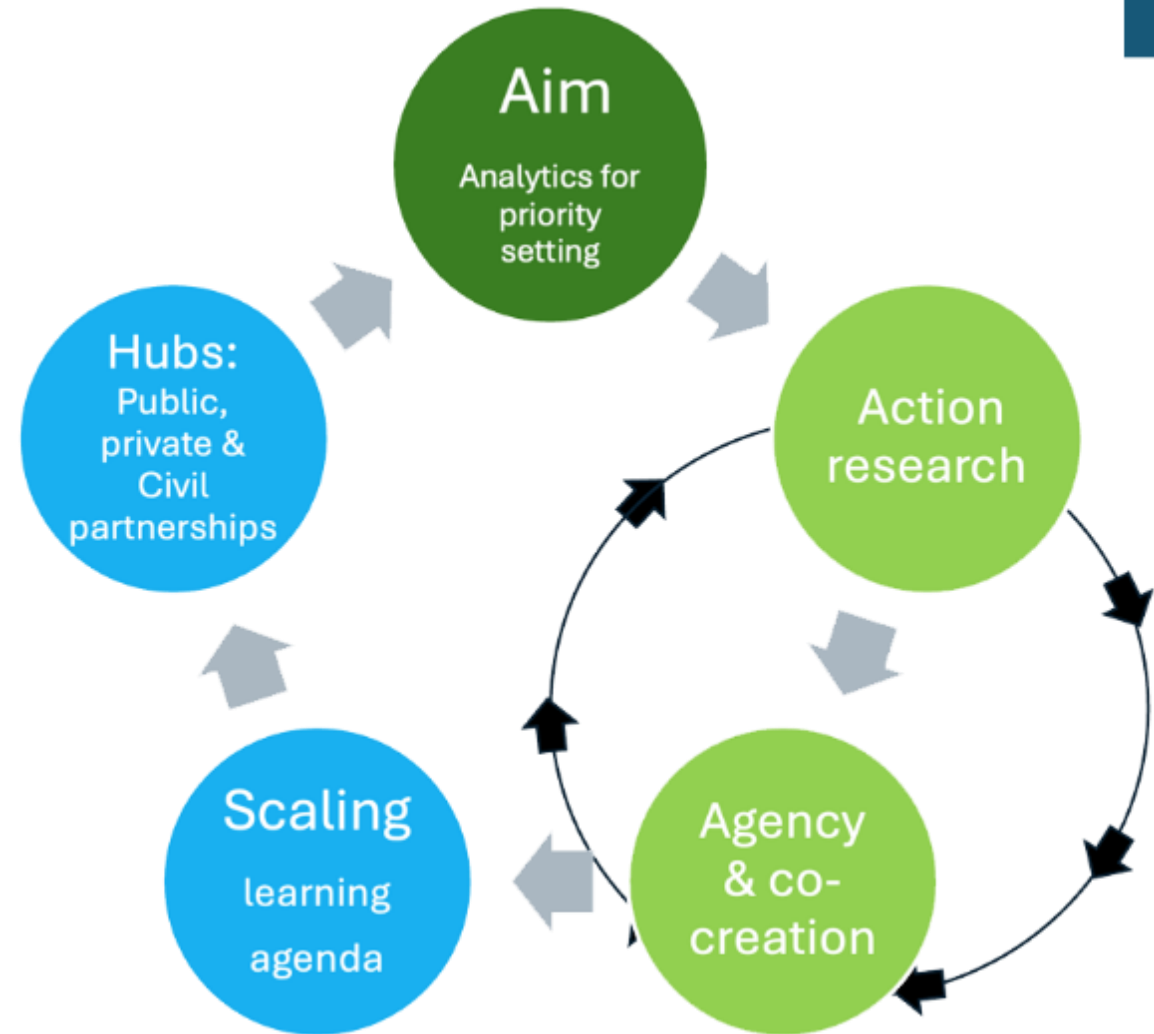
**Integrated approach:  
Finance, manufac.  
capacity,  
spare parts & supply  
chains**

# Mechanization lessons:

## Agile systems science supports adaptation and adoption

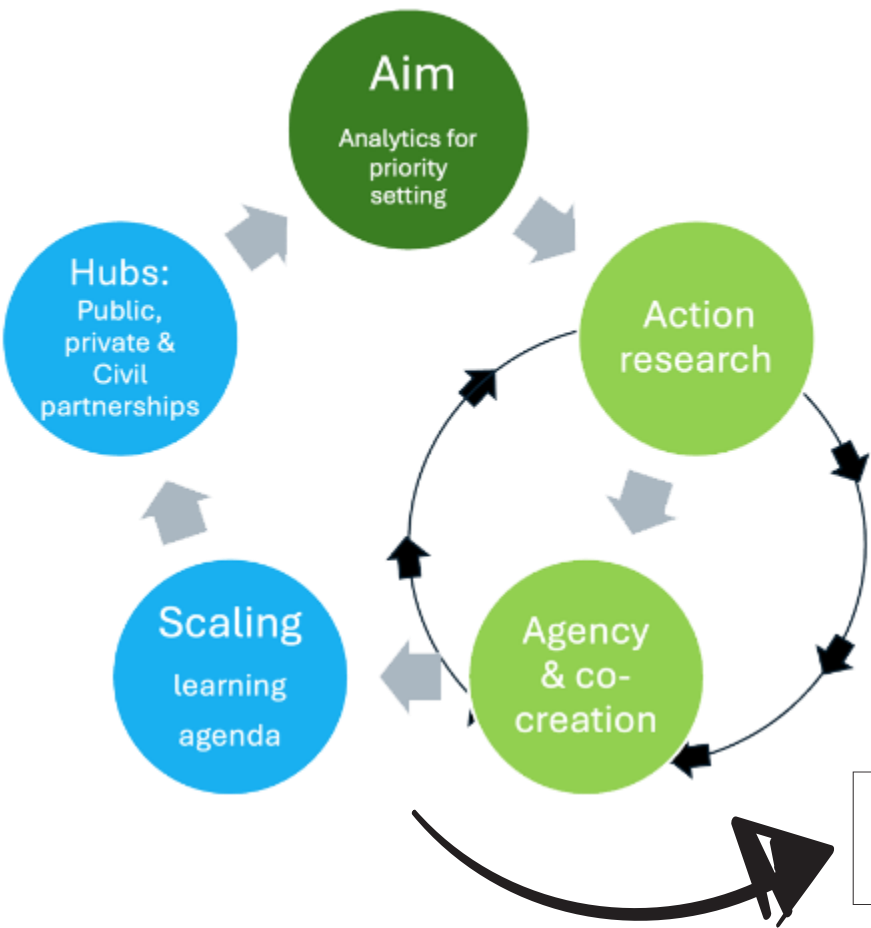


1. Priority setting at different scales
2. Participatory action research for iterative co-design and evaluation to generate options: **Plan** together, **Act** together, **Iteratively learn** and **Scale out**.
3. Innovation systems and scaling for dissemination of options generated: Hub catalyzed business models, extension advisors and village based advisors



# Mechanization lessons:

“Best performing technology” is not always the most “scalable”



Strong USAID partnership in South Asia boosts machine service and small-scale irrigation rollout.



CIMMYT's MasAgro in Mexico: 40+ machine prototypes streamline farming from land prep to harvest



ACIAR-backed study assesses two-wheel tractor bundles in East Africa.



GIZ, FAO, CIMMYT and collaborators support 15-country network to advance mechanization efforts in Africa and Asia.

## What does impact look like?

- Scale appropriate (0.25 - 2 ha)
- Efficient energy/lab
- Agronomic precision
- Versatile & multipurpose
- Low fuel consumpti
- Rural employe
- Profits for all
- Knowledge system
- Risk for job
- Risk for monopolie
- Waste manageme

# Digital extension lessons:

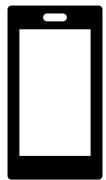
## How to scale knowledge? Local learning agenda is key!



*Conservation agriculture is knowledge intensive, builds on local adaptive capacity*



**Partnerships:** Provide farmers with best bet options through harmonized recommendations



**Decision guides:** Integrated knowledge, accessing data, improve quality of local information



**Local agency:** a learning agenda facilitated through farmer networks with phone access: text reminders for time-sensitive management



# Small-scale mechanization: service provider models needed

- Can reduce drudgery associated with diversification activities by 55% (e.g., plant two crops with a direct seeder)
- Easier to achieve no-till (equipment more affordable and accessible e.g., ripper, basin digger)
- Reduces operational costs by up to 65%
- Machinery can be adapted to suit diversification & no-till strategies
  - farmers improvise
  - 2-wheel tractors can fit within crop strips
- Service models key (farmers as service providers)



*Farmer who improvised a ripper for 4-row strips*

# Keys to improved soil health for smiles in a drought



MECHANIZATION



DIGITAL  
EXTENSION



SERVICE MODEL

