

# Progress on development of Africa Dryland Crops Improvement Network

Presented by:

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THE SECOND LEADERSHIP CONSULTATION MEETING

NARES - CGIAR - AIDE MEMOIRE

THURSDAY, OCTOBER 26TH, 2023, Marrakech, Morocco

## Dryland legumes and cereals – Update



# Consultation with NARES



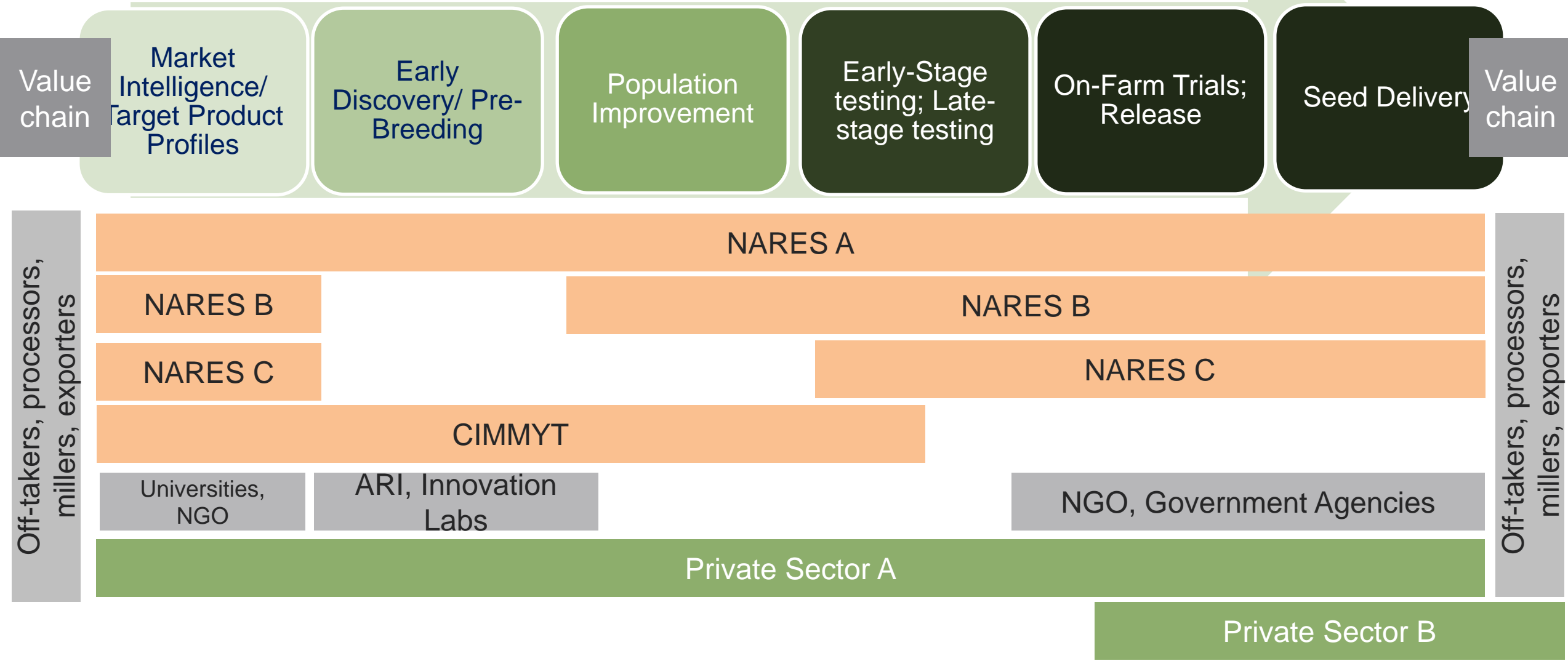
Consultation and advice from other networks – PABRA/ IAVAO



# Key insights & outputs from consultation

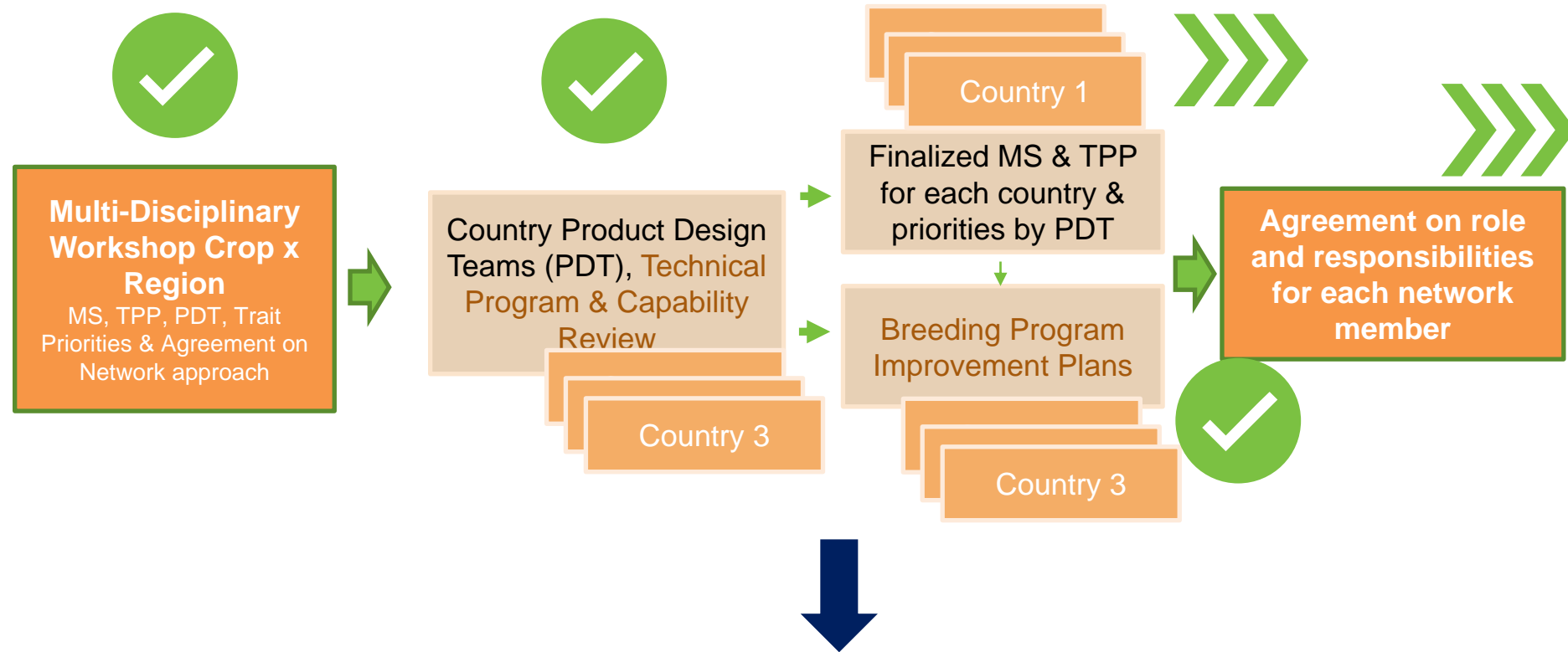
- More distributed model of crop improvement is required
  - More equitable sharing of the project's investments among partners
  - Partners did not like the idea of developing “one” center of excellence in the region; shared facilities among network members
  - Greater investment in crop breeding, through shared regional programs
- Renewed commitment to benefit ‘hard to reach,’ resource-poor farmers and consumers
  - Seed systems, choosing appropriate pathways to impact
- Senegal workshop: Proposed development of regional crop improvement network with governance structure
  - Multiple options were proposed; most favored was by the region
  - Multiple models of partnership between CG-NARES were discussed – “Bish” model, “Geoff” Morris Model, “Harish” Model → Each were good, had some lacunas

# Complimentary role of network partners at various stages of cultivar development pathway: Leverage strengths



This changes by crop & region; understanding of this is critical for developing effective partnerships

# Operationalization of a crop improvement network for Dryland Crops in Africa



- Greater regional alignment & understanding of dryland crops partner status and their needs (market segmentation, capacity building, etc.)
- Several Opportunities identified to leverage country member capacities, expertise and germplasm for whole network (e.g., GRD, Uganda; Pathology- Burkina Faso)

# Countries program & facilities assessment

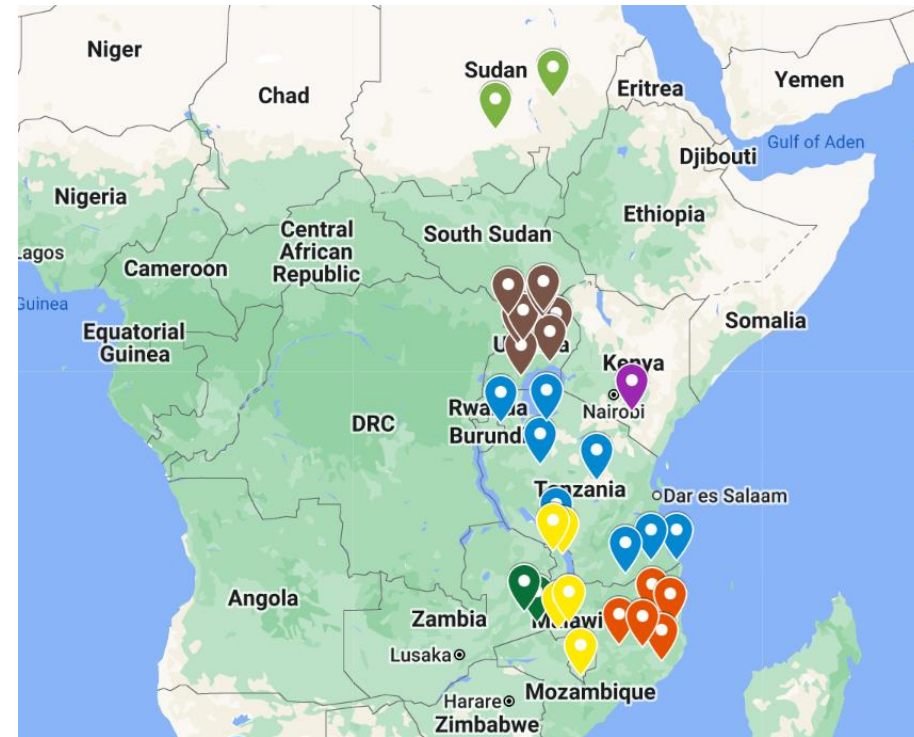
Peer-to-peer assessment (CG & NARES Breeder)

- Current level of breeding, pre-breeding & testing efforts at each country level by crops
- Staffing & their expertise to run breeding activities
- Infrastructure and facilities available to support in-country and network breeding activities
- Documented - Improvement plans
- Establishment of current base level and aspiration of NARES

# GN ESA: Network Infrastructure for Phenotyping of critical TPP traits

32 sites identified for Regional Testing

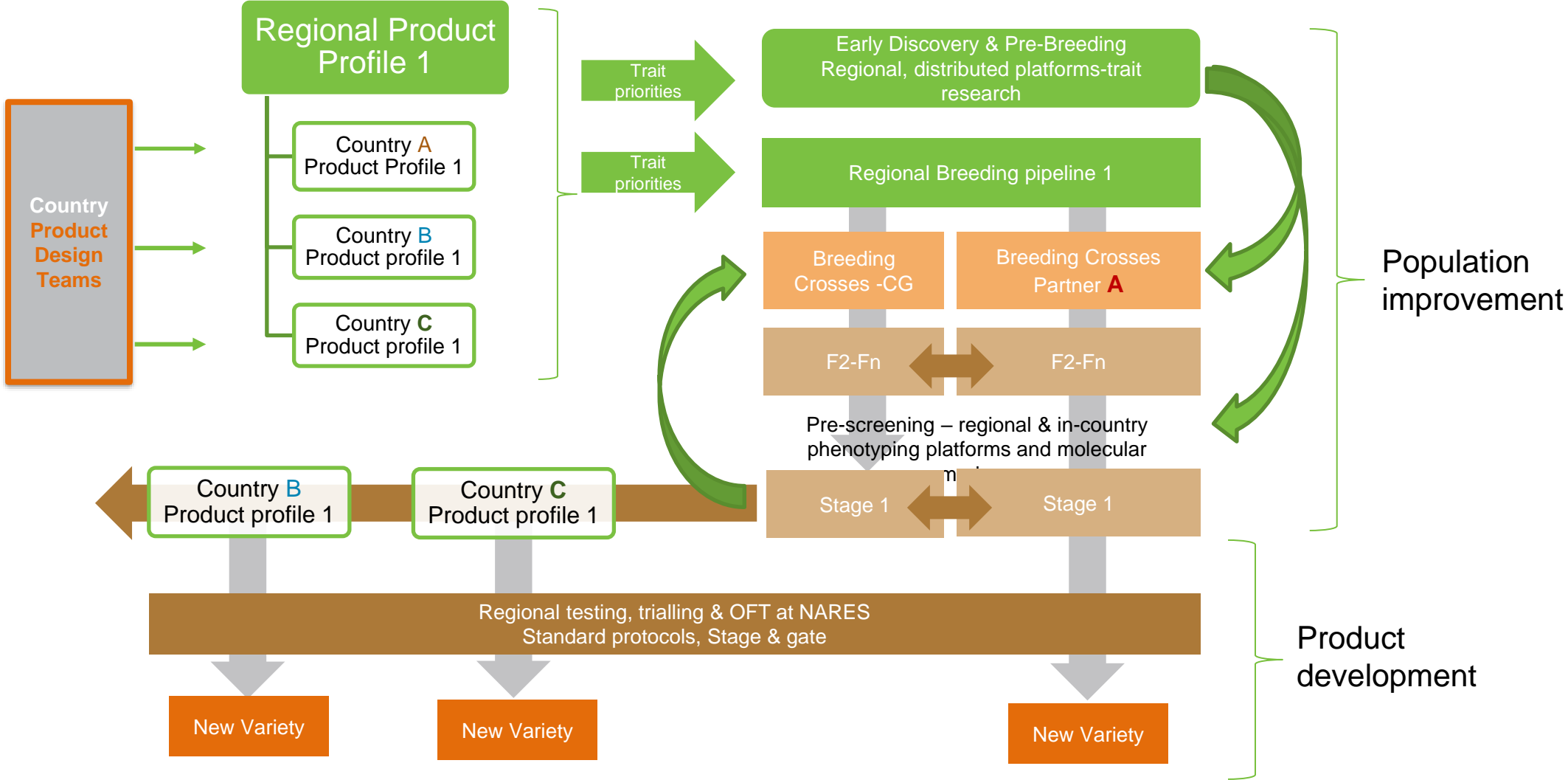
SN	Trait	Phenotyping Hub
1	Groundnut Rosette	Serere, Uganda; Nampula, Mozambique
2	Early Leaf Spot	Msekera, Zambia; Chitedze, Malawi
3	Late Leaf Spot	Msekera, Zambia; Chitedze, Malawi
4	Rust	Naliendele, Tanzania
5	Drought Tolerance	El Obeid, Sudan; Kiboko, Kenya
6	Aspergillus	Kiboko, Kenya



- CtEH Proposal: \$830k proposal was accepted to upgrade network infrastructure based on:
  - Reviews of Current Station Infrastructure & Equipment
  - Identification of Phenotyping hubs for regional priority traits



# Shared breeding pipeline of network partners: Example schematic for one breeding pipeline



# Update from WCA Pearl Millet NARES-CG Workgroup

Maryam Dawud, Pearl Millet Breeder

LCRI, Nigeria

# SUMMARY –Progress on developing NARES-CG Regional Pearl Millet Crop Improvement Program for WCA



Regional Pearl Millet Workgroup consist of 8 WCA countries  
Key theme: Co-designing, Co-developing, and Co-implementing

# Defined Regional MS and TPP – Proposed Sharing of Breeding Pipeline

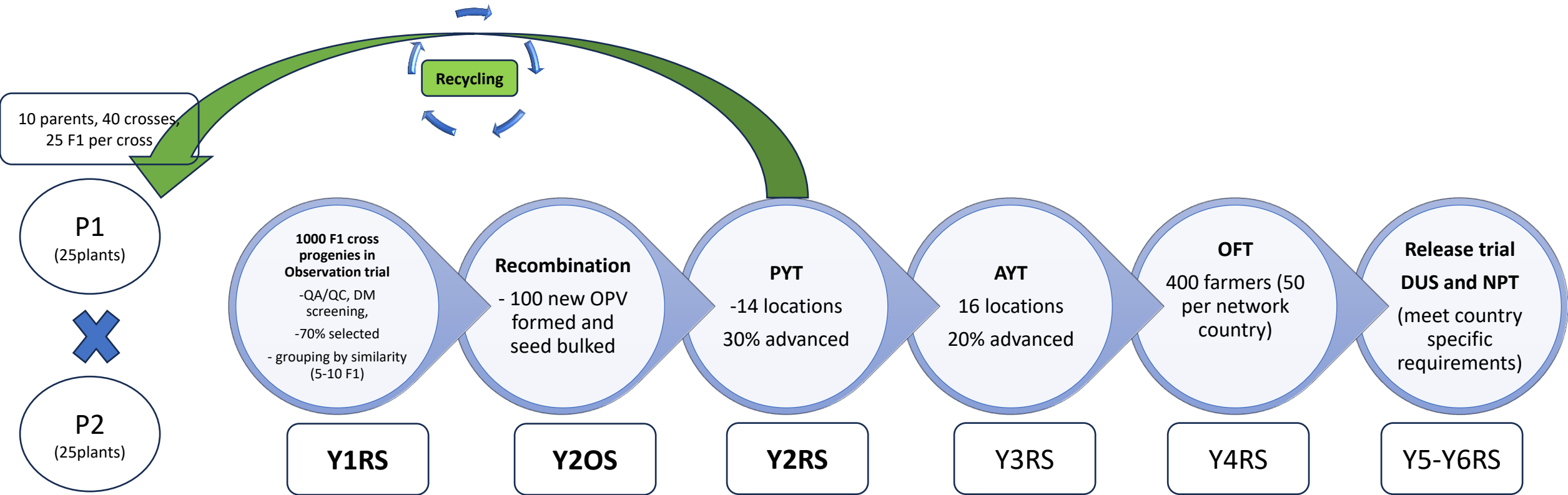
MS #	Market Segment Description	MS code	Total (ha)	CIMMYT	Nigeria	Burkina Faso	Mali	Ghana	Togo	Senegal	Niger	Chad	Regional MS Priority
					Level 1; Tier 3B	Level 1; tier 2B	Level 1; Tier 4A	Level2; Tier 4B	Self LI&LMI; Tier 5	Level 1; Tier 3B	Level 1; Tier 4	level 1; tier 5	
MS 1	Short duration dual purpose pearl millet OPVs adapted to Sahelian zone for food and food processing	SD-O	8,728,590	0.5 BP1		0.25 BP1				0.25 BP1			1
MS 2	Medium duration pearl millet OPVs adapted to Sudanian zone for food and food processing	MD-O	4,303,147	0.5 BP2	0.5 BP2								2
MS 5	Late maturing pearl millet OPVs adapted to lowland Sudanian zone for food and food processing	LM-O-LL	442585										
MS 3	Medium duration Pearl millet hybrids for better endowed Sudan environments for food and food processing	MD-H	350,134	0.75 BP3		0.25 BP3							3
MS 4	Short duration Pearl millet hybrids for better endowed sahel environments for food and food processing	SD-H	126,489										
MS 6	Late maturing pearl millet OPVs adapted to High land northern guinea zone for food and food processing	LM-O-HL	40000										

6 Market identified in total across 8 WCA countries

3 Market segments identified across countries as regional Priority MS.

Population development for the 3 TPP shared between 3 Network countries and CIMMYT

# Breeding scheme optimization pearl millet development



- NARES-CG Teams, together co-designed this breeding schema for Pearl Millet OPV Breeding Pipeline with feedback from QG & other breeding expertise
- Plan is to implement this schema by all network breeders (previous slide)

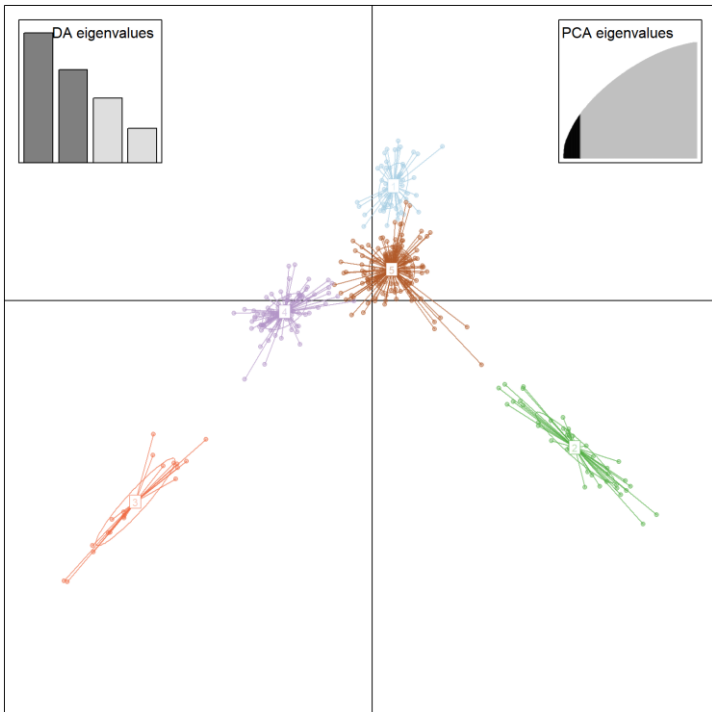


# Network level shared infrastructure and facilities (e.g. biotic and abiotic trait screening)

Cap Dev Approach	Trait	List potential location/s for screening	Current capacity/status at the proposed locations
Regional	Drought	Senegal, Niger	Senegal (yes, some capacities exist upgrades are planned)
Regional	Downy mildew	Mali, Nigeria, Burkina Faso	Burkina Faso (greenhouse – upgrades are planned), Mali and Nigeria sick plot nursery
Regional	Striga	To be discussed	
Regional	Low P	Senegal, Togo	
Distributed	Hotspot downy mildew screening	per country	All
Distributed	Striga field	Ghana	
Distributed	Low P	One location per country for yield trial (part of trial location)	All

# WCA Pearl Millet Workgroup is already working together: Rainy Season 2023

Breeding program	Providing country	Origine of parents	# of lines
INERA	Burkina Faso	Burkina Faso	226
IER	Mali	Mali	30
INRAN	Niger	Niger	167
LCRI	Nigeria	Nigeria	131
ISRA	Senegal	Senegal	198
INERA	Burkina Faso	ICRISAT	21
<b>Total</b>			<b>752</b>



- 752 inbred lines were genotyped with DArT Seq. the data will be used to initiate crosses for Heterotic grouping

- 68 frequently used parents in the different workgroup countries program were genotyped with QA/QC markers for line purity check

- 39 pearl trailing locations mapped and described across the 8 workgroup country

- 50 elite OPV lines contributed by the different countries and tested in all the 8 workgroup countries in 12 location in 2023 raining season = 10 to 15 founder lines will be selected

## Purpose:

Founder lines identification for regional and national breeding programs – OPV & Hybrids

Defining heterotic pool strategy for hybrid pearl millet

# Pearl millet WCA: Key messages

- We are experiencing improved capacity development matching needs of breeding – Human and infrastructure
- Access to cutting-edge technologies
- Breeding modernization of NARES programs due to shared responsibilities
- Access to global network – connecting with experts in various fields
- Improved research funding to NARES programs (based on their role in network)

# Leveraging synergies across Dryland Crops partners

- Implementing this strategy across all dryland crops in Africa requires coordination, governance and monitoring
- Consultation meeting in Senegal (Feb 2022) and network members meeting in Ghana (Jan 2023)
  - Recommended to form two regional dryland crop improvement network with governance structure (steering committee)
  - Steering Committee will provide overall oversight to functioning of these networks and monitor performance of network members

## - Africa Dryland Crop Improvement Network (ADCIN) -

\*This name is chosen through the recent poll of 200+ members of NARES and CGIAR  
Development of logo and website work is in progress

# Africa Dryland Crop Improvement Network Structure

## Workgroups

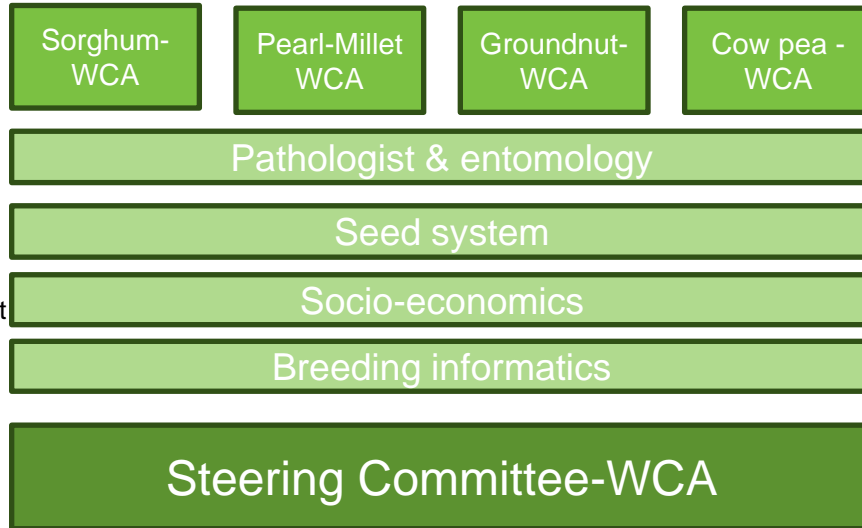
- Crop Priorities

## Technical teams

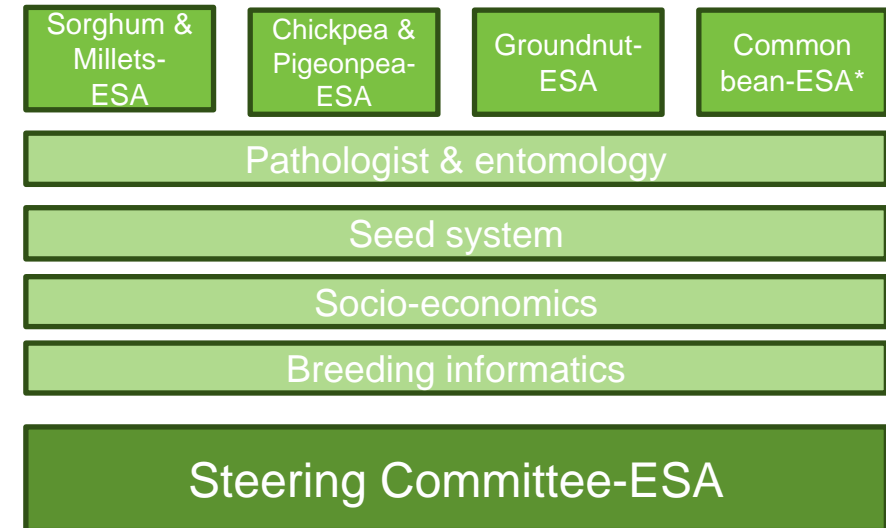
- Harmonization/ Technical support

Network coordination,  
Steer regional needs

### WCA Dryland Crop Improvement Network



### ESA Dryland Crop Improvement Network



**Africa Dryland Crop Improvement Network** of 17 Countries of 200+ Scientists

\* Linkages with PABRA



# Regional Steering Committees



## Purpose of SC

1. Support crop workgroups and technical teams on priority work areas, capacity building and infrastructure development.
2. Build sustainability of the networks and workgroups by engaging and advocating with stakeholders, fundraising, and building institutional capacity of the networks.

## WCA – Dryland Crops Improvement Network – Steering Committee members

Sr. No.	Name	Organization	Crop	Gender	Country	Discipline
1	Richard Oteng-Frimpong	CSIR-SARI	Groundnut	Male	Ghana	Breeding
2	Sanusi Gaya	BUK	Multicrop	Male	Nigeria	Seed Systems
3	Maryam Abba Dawud	LCRI	Pearl millet	Female	Nigeria	Breeding
4	Edward Martey	CSIR-SARI	Multicrop	Male	Ghana	Socio-economics
5	Elizabeth Zida	INERA	Multicrop	Female	Burkina Faso	Pathology
6	Eveline Compaore	INERA	Multicrop	Female	Burkina Faso	Gender/Socio-economics
7	Ibrahima Sarr	ISRA-CNRA	Multicrop	Male	Senegal	Entomology
8	Abdoulaye Diallo	IER	Sorghum	Male	Mali	Breeding
9	Sory Diallo	IER	Cowpea	Male	Mali	Breeding
10	Aissata Yahaya Mamadou	INRAN	Sorghum	Female	Niger	Breeding
11	Daniel Fonseca	CIRAD-CERAAS	Groundnut	Male	Senegal	Genomics
12	Harish Gandhi	CIMMYT	Multicrop	Male	Regional	Breeding
13	Baloua Nebie	CIMMYT	Multicrop	Male	Regional	Breeding
14	Ousmane Boukar	IITA	Cowpea	Male	Regional	Breeding

**\*Similar committee is formed for ESA**

**Represents institutions, crops, disciplines, countries; balanced for gender**

# Regional Steering Committees

## Officials for each SC

- Chair
- Vice-chair
- General Secretary
- Finance Secretary (only WCA)

## Subcommittees

- Cap-dev (human & infrastructure)
- Finance
- Monitoring, Evaluation and Learning
- Network sustainability and fundraising

## Key Responsibilities of Steering Committees

- Develop and implement a Human capacity development plan for the network
- Develop and implement an infrastructure development plan for the network (country assessment to serve as guide)
- Management of budget for above activities (for 2023 ~400K USD budget provided to each SC)
- MEL, Review of performance of network partners, Networking, Policy advocacy, Fundraising – Network sustainability
- Dispute resolution among network members

# 2023 Key Activities of SC

## Budget managed for SC

- ~400,000 USD **per region** for 2023
- expected to increase up to 600,000 USD **per region** for 2024

## Each SC agreed

- 60% of budget for infrastructure development and
- 40% for human capacity development
- Only for those project that benefits region and it's agenda

## Key Planned Activities of SC for 2023

- Finalize ToR for SC
- Develop bylaws for “Africa Dryland Crop Improvement Network”
- Develop Request for Proposal to distribute budget to crop workgroups or technical teams & evaluate proposals and distribute funds
- Raise awareness about Network and its mandate

# Key Summary

- Development of strong partnership and network will require greater understanding of partners strengths and weaknesses;
- Decentralization of decision making through Steering Committees is new and novel approach
- Africa Dryland Crops Improvement Networks will develop fit-for-purpose capacities of NARES - matching to their priorities and role in network
  - Shared regional pipeline, shared facilities for managed stress screening → targeted human and infrastructure capacity
- Over longer run success of this approach will allow us to develop “system-level” (NARES and CG) capacity for crop improvement research & development
- Improved System-level capacities will ensure each country has food & nutritional security, and means to manage climate change effects & other shocks in agile and localized manner





Thank you for  
your interest!





## Extra Slides