



# Ongoing research and development efforts in sheep genetic improvement (genetic gains)

EIAR/ATA/ICARDA Workshop on small ruminant breeding programs in Ethiopia  
Debre Birhan, 17-18 December, 2015

Workneh Ayalew

Ethiopian  **ATA**  
Agricultural Transformation Agency  
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# Outline


1. What do we mean by genetic improvement?
2. ATA deliverable on identifying livestock genetic gains priorities
3. Prioritized national sheep genetic gains activities
4. The agricultural commercialization clusters (ACC) initiative

# What do we mean by genetic improvement (genetic gain?) (a)

PHENOTYPE


ENVIRONMENT

GENOTYPE




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+6



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+14






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+10

# What do we mean by genetic improvement (genetic gain?) (b)

	PHENOTYPE	ENVIRONMENT	GENOTYPE
	+6	-10	
	+14	-9	
	+10	+20	

# What do we mean by genetic improvement (genetic gain?) (c)

	PHENOTYPE	ENVIRONMENT	GENOTYPE
	+6	-10	+16
	+14	-9	+5
	+10	+20	-10

## ATA deliverable: Develop national genetic gains priorities

### Milestones

1. Regional priority ACC livestock commodities identified and their needs for immediate genetic interventions identified
2. One national livestock genetic gains review workshop conducted and proceedings documented
3. An independent study completed on scoping an ICT based AI service delivery and tracking system
4. One national stakeholder consultation conducted on options for incentivizing the artificial insemination service and outcomes documented

# Objectives of the national genetic gains priorities workshop:

06 - 07 October 2015

1. Review the respective regional priorities
2. Consolidate the regional list into a national context, and
3. Identify immediate and medium-term action points and relate these into high level AGPII and GTPII deliverables.

## Criteria applied for setting the priorities

1. Relevance to the GTPII targets
2. Potential for scalability
3. Evidence base for rapid mobilization



# Prioritized sheep genetic gains activities: On-going community-based small ruminant genetic gains activities by Region

Region		Sheep		Goats
Tigray	1	Atsbi	1	Abergelle (Tigray)
	2	Begait	2	Begait
SNNP	3	Bonga	3	Woyto Guji/Konso
	4	Doyo-Gana	4	Fetele (?)
	5	Abera Gelade		
	6	Gumer		
	7	Gonjebe (?)		
Amhara	8	Menz	5	Abergelle (Amhara)
	9	Washera	6	Central highland (Gondar)
	10	Wollo Sheep		
Oromia	11	Horro	7	Central Highland (West Shoa)
	12	Central Highland (West Shoa)		

# Prioritized sheep genetic gains activities: On-going on-station genetic gains activities (pure breeding)

Regions		Sheep		Goats
Tigray	1	Begait (Humera ARC & Ranch)	1	Begait (Humera ARC & ranch)
SNNP	2	Bonga (Bonga ARC)	2	Woyto Guji/Konso
Amhara	3	Washara (Andasa ARC)	3	Abergelle (Sekota ARC)
	4	Menz (DB ARC; also at Amed Guyya)		
Oromia	6	Horro (BARC)	4	Arsi Bale Goat (Adami Tulu ARC)

## Prioritized sheep genetic gains activities: On-going genetic gains activities via crossbreeding

Regions		<b>Indigenous breed</b>	<b>Exotic improver breed</b>
Tigray	1	Atsbi sheep (MARC)	Dorper sheep
	2	Abergelle goats (MARC)	Boar goats
SNNP	3	Woyto-Guji/Konso (Jinka ARC)	Boar goats
	4	Doyo-Gana (Areka ARC)	Dorper sheep
Amhara	5	Menz (Amed Guyya & Debre Berhan)	Awassi, Dorper
	6	Central Highland goats (DARC at Ataye)	Boar goats
Oromia			

## Prioritized sheep genetic gains activities with national scope

- Oromia: Horro sheep CBM
- SNNP: Bonga sheep CBM
- Amhara: Menz sheep CBM
- Tigray: Begait sheep ONBS

# Prioritized sheep genetic gains activities with national scope: Oromia: Horro sheep CBM

- **Rationale:**

- Large population size (about 3 mil)
- Covers a large geographical area
- Kept by about 7 mil people
- Fast growth rate
- Prolific (20-50%)
- Great potential to improve off-take
- Detailed breeding objective in place
- Active breeding plan, but require optimization
- Breeders' coops established and certified

- **Lessons:** recording, enumerators, selection committee, etc.

- **Shortcomings:** Institutionally not well internalized (OARI) – eg. permanently employing enumerators, not well linked with on-station flocks

# Prioritized sheep genetic gains activities with national scope: SNNP: Bonga sheep CBM

- **Rationale:**
  - Fairly large population size
  - Reared in 7 zones
  - Fast growth rate
  - Prolific (20-40%)
  - Great potential to improve off-take
  - Detailed breeding objective in place
  - Active breeding plan, but require optimization
  - Breeders coops established and certified, functioning well, price for breeding rams set (e.g. 100ETB/kg)
- **Lessons:** Institutionally not well internalized, recording, enumerators (permanently employed), selection committee, etc.
- **Shortcomings:** not linked with on-station flocks (but being addressed?)

# Prioritized sheep genetic gains activities with national scope:

## Amhara: Menz sheep CBM

- **Rationale:**
  - Large population size (more than 2 mil)
  - Large area of geographical coverage
  - Small body size, but responds to selection
  - Kept by about 3.5 mil people
  - Good adaptation to cold and degraded environments
  - Detailed breeding objective in place
  - Active breeding plan, but require optimization
  - Breeders coops established and certified
- **Lessons:** recording, enumerators, selection committee, etc. and fairly supported by DARC
- **Shortcomings:** Not well linked with on-station and ranch flocks and no permanently employed enumerators

# Prioritized sheep genetic gains activities with national scope: Tigray: Begait sheep ONBS

## Rationale:

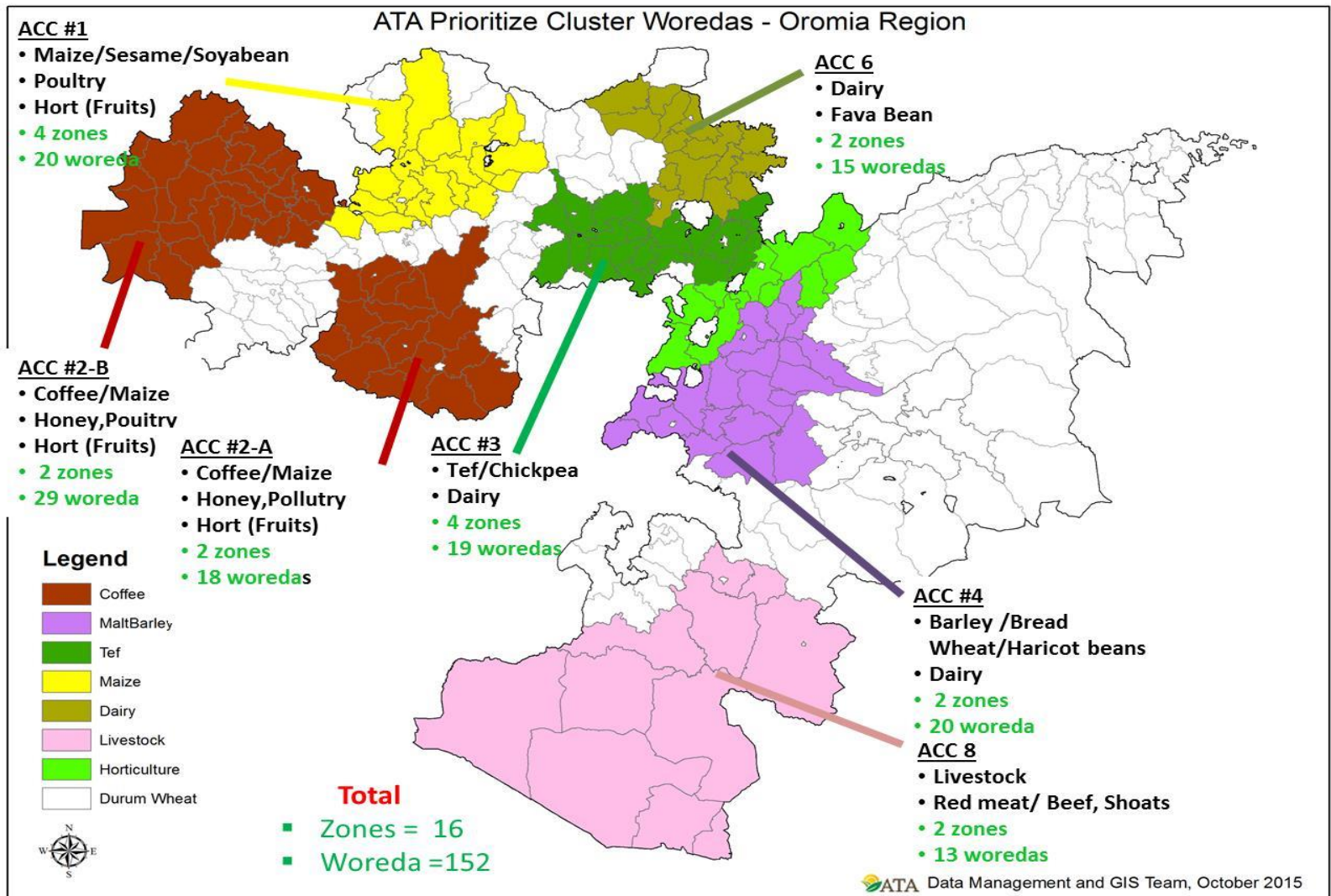
- Fairly large population
- Fast growth rate
- Large body size
- Prolific (about 50% twins and triplets)
- Responds to selection
- Good market access
- Breeding objective in place
- **Short comings:**
  - Informal market to be rationalized
  - Not well developed (at its early stage)



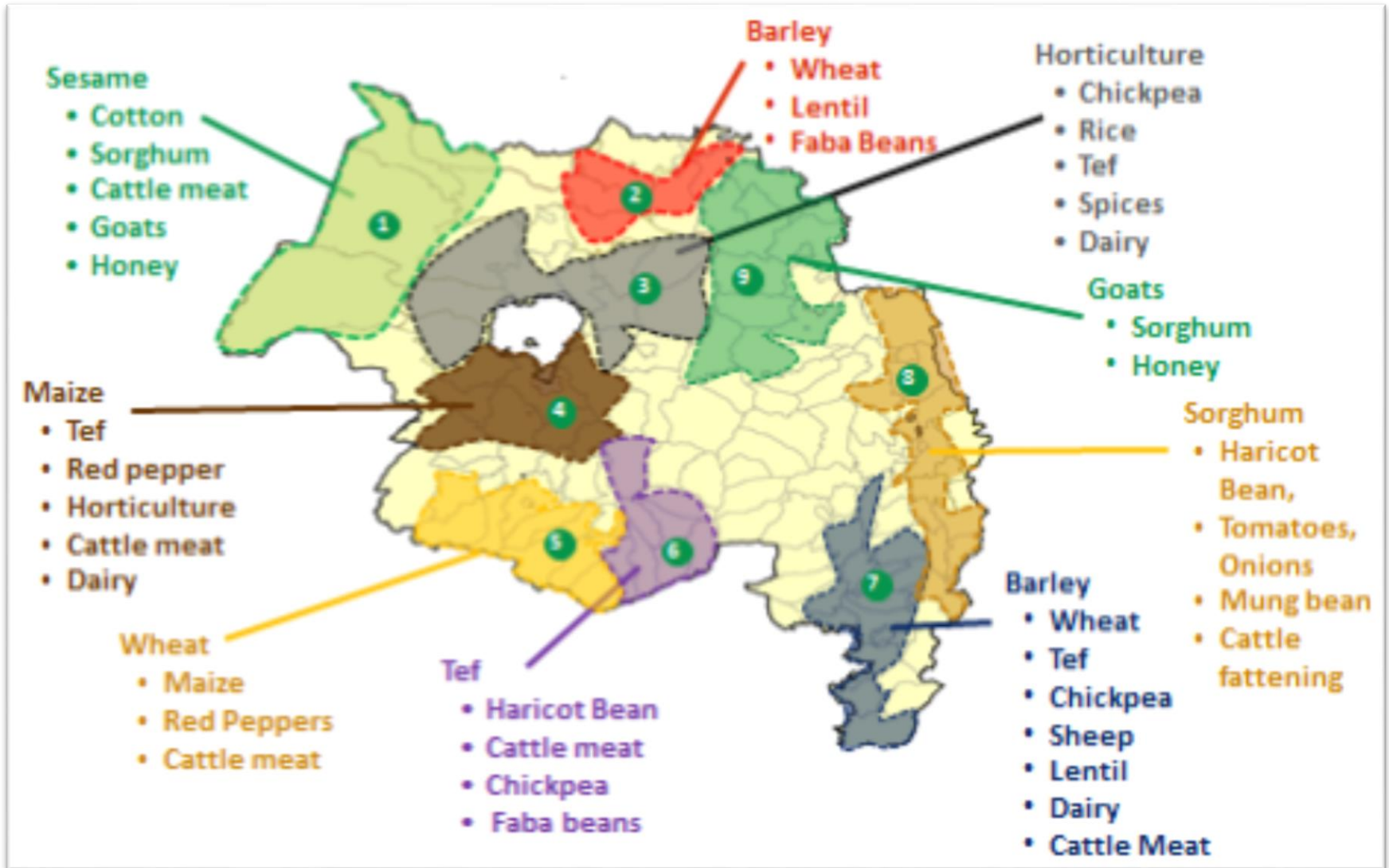
## Priorities: needs for technical backstopping to assure success

- Institutionalization + national coordination + breeding policy
- Optimization
  - Multi-trait selection
  - Incorporating dam selection
  - Breeding scheme (+ strengthen recording system + genetic evaluation)
- Linking with research centers /ranch
- Capacity building to coops members (training, health supplies, etc.)
- Market linkages
- Fattening and marketing of non-selected animals + feeds & feeding
- Suitability mapping (eg. Bonga, Horro, etc)
- Capacity building :
  - Ranches
  - infrastructures at nucleus breeding centers
  - See options on reproductive biotech tools (AI, MOET)

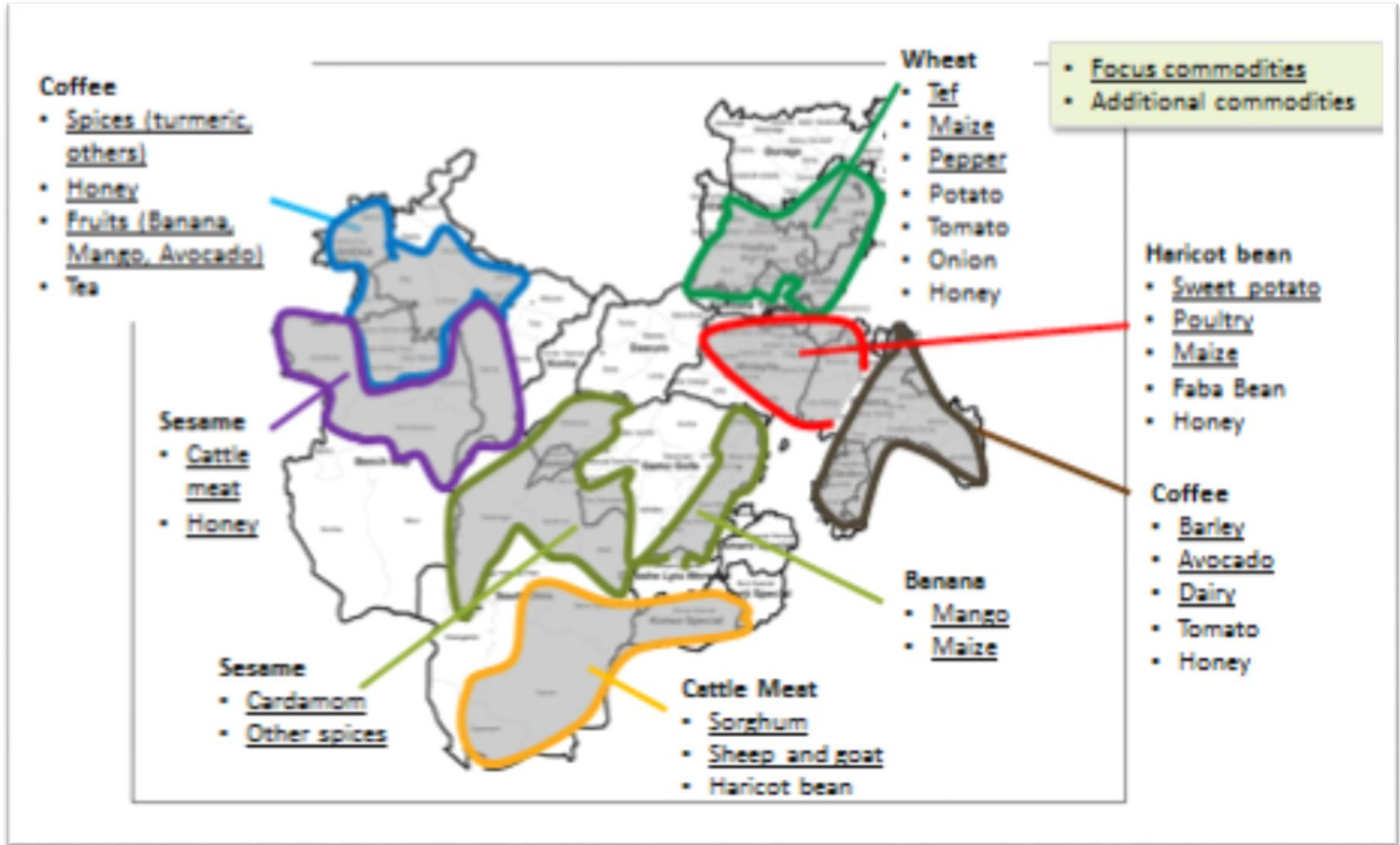
# ACC: Oromia – 9 clusters



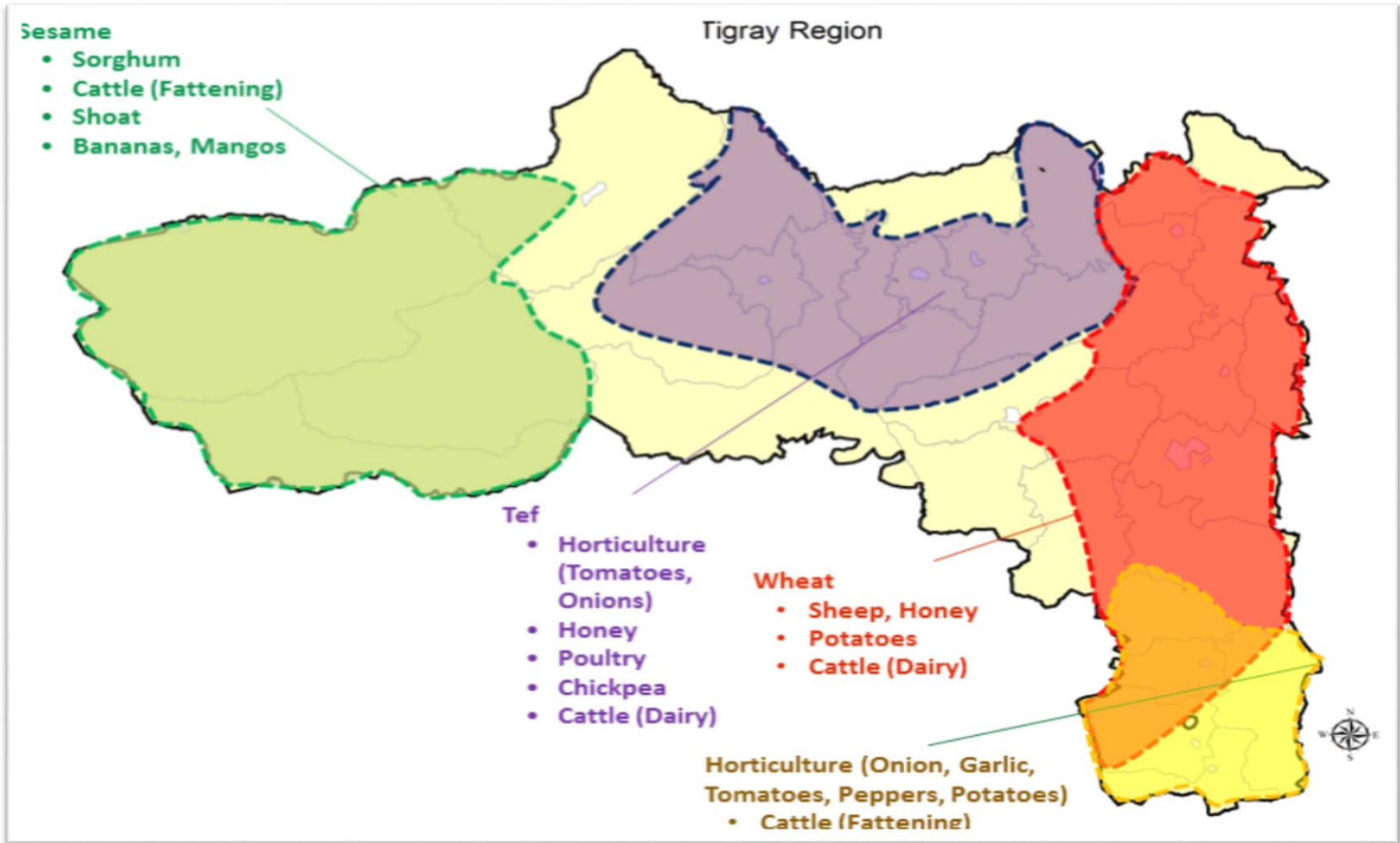
# ACC: Amhara – 9 clusters



# ACC: SNNP – 8 clusters



# ACC: Tigray – Four clusters





**Innovations to help our country grow**