The African Animal Breeding Network (AABNet)

Towards transforming the African livestock development outlook

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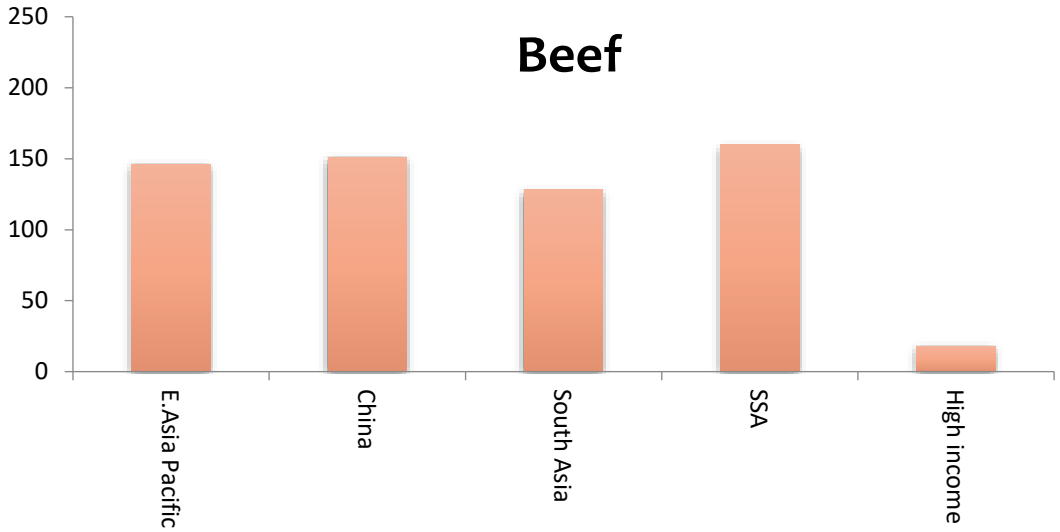
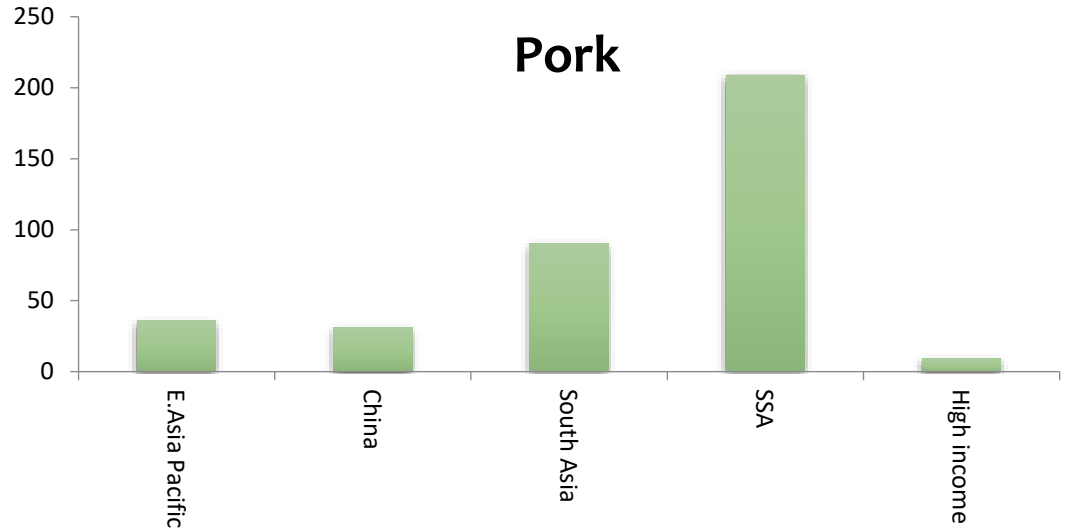
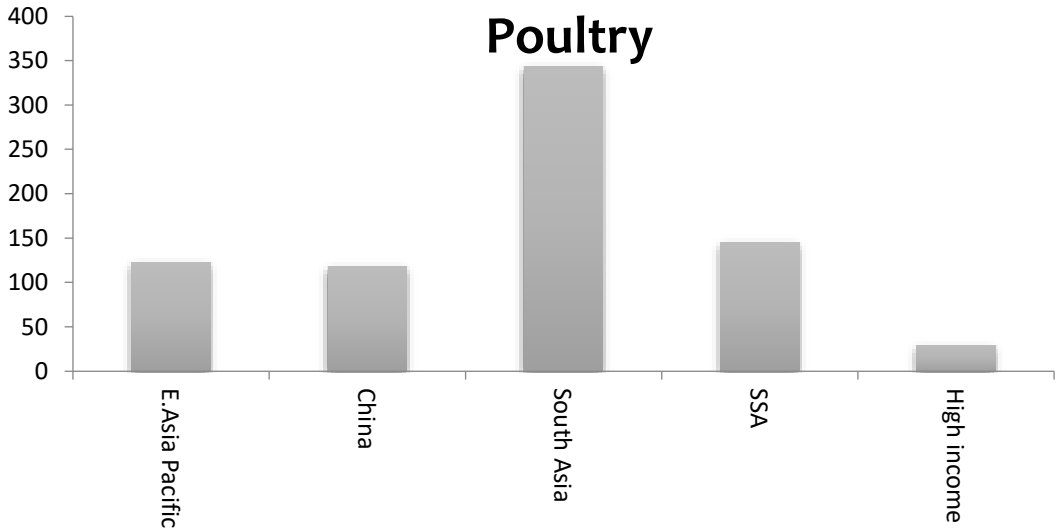
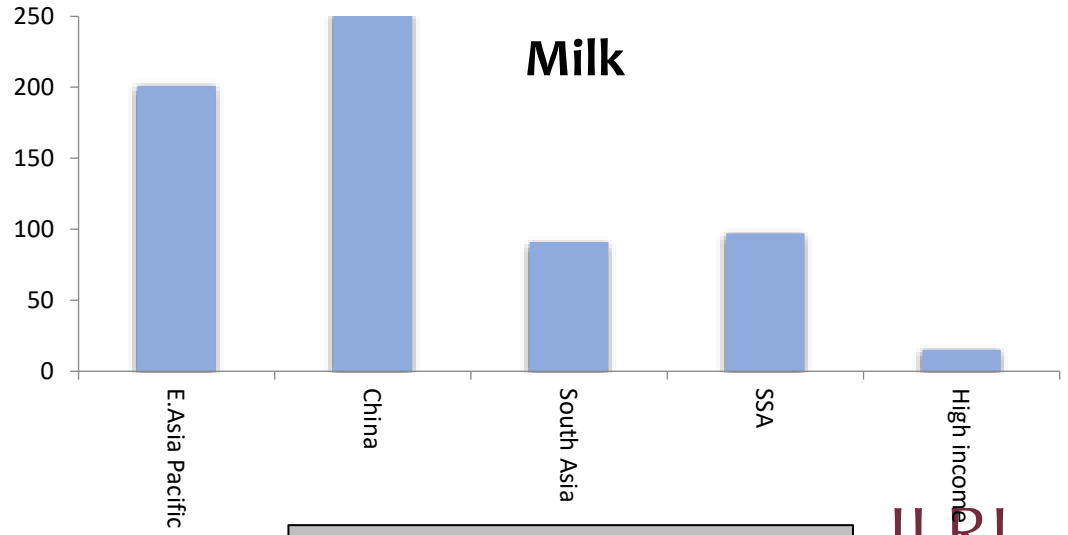
* *Centre for Tropical Livestock Genetics and Health,*
The Roslin Institute, The University of Edinburgh, UK

% growth in demand for livestock products to 2030









Courtesy of ILRI

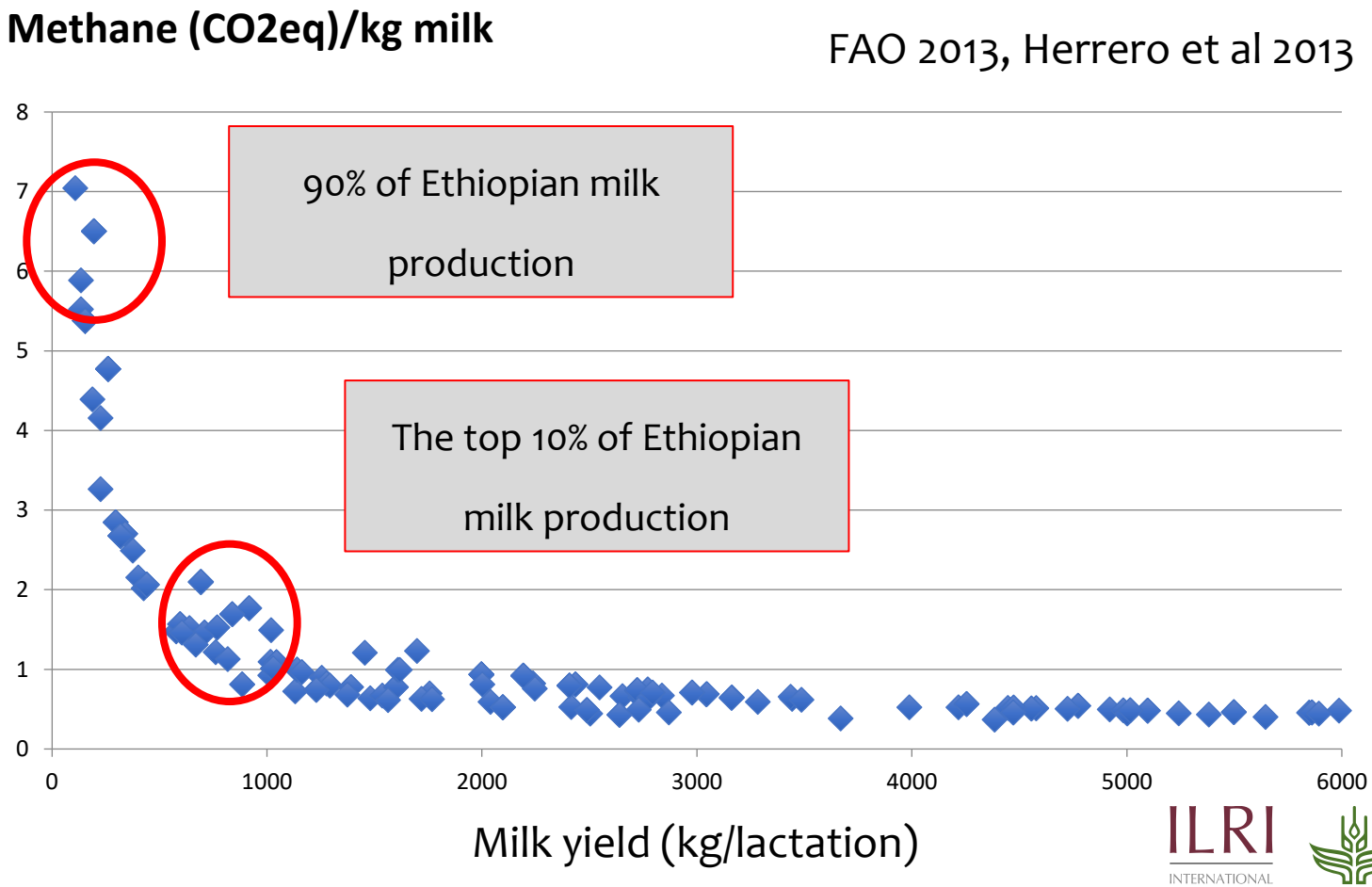
Increases not because of overconsumption!
OECD average 2018 = 69 kg/capita meat
SSA average 2018 = 10 kg/capita meat

How to meet this demand by 2030?

Reduced environmental footprint

Improved performance rapidly reduces green house gas production intensity

1. Selection and breeding for more productive & lower CH4 producing ruminants
2. Vaccines to reduce CH4 production in the rumen
3. Anaerobic processes to capture biogas



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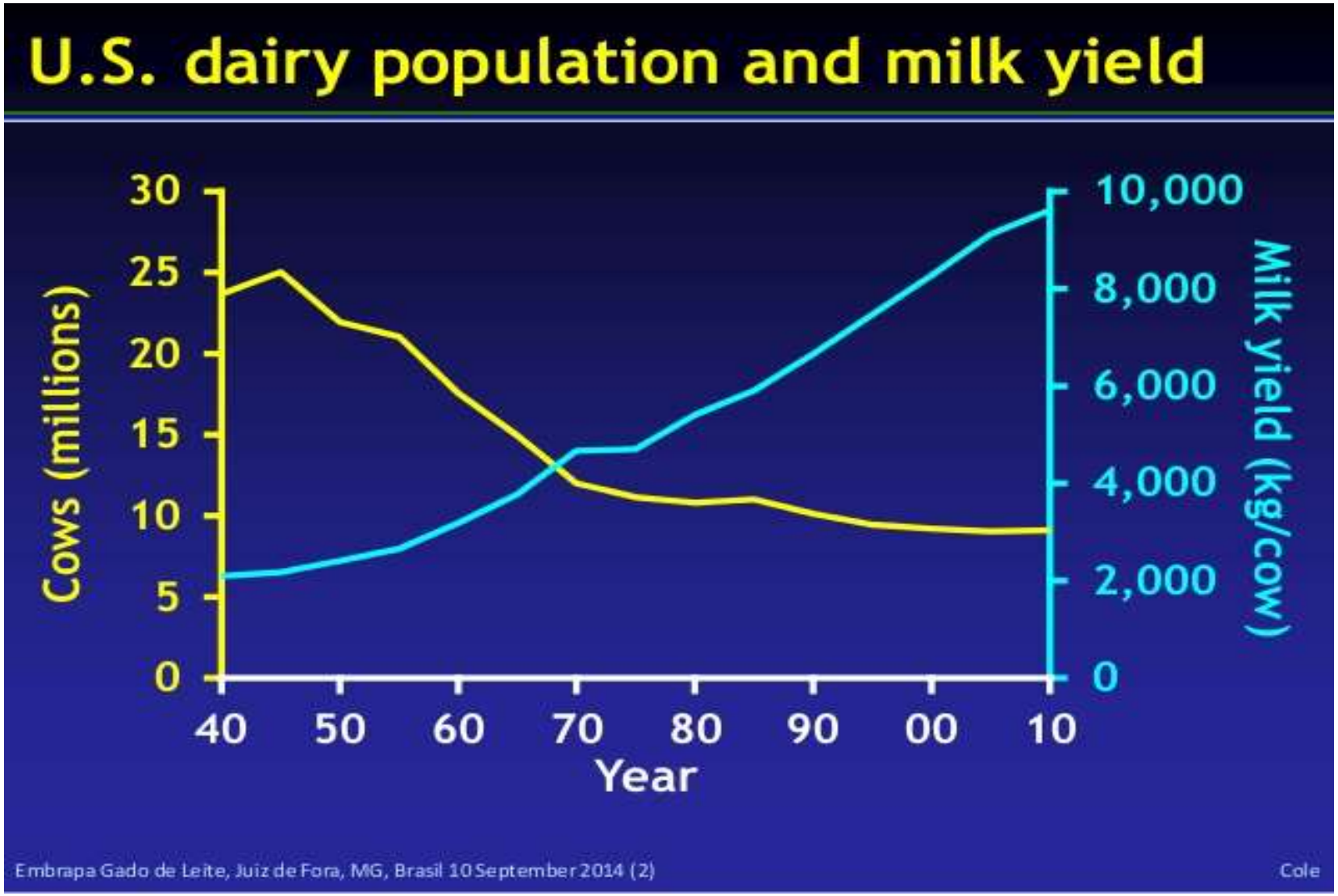
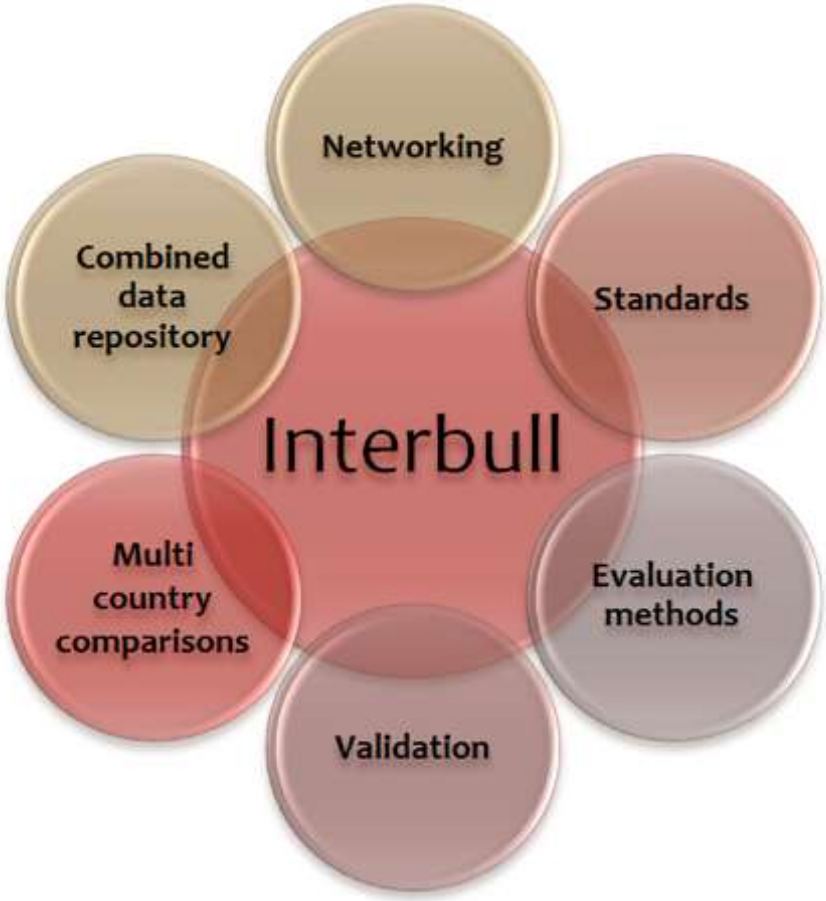


A real opportunity to initiate a system to support similar gain in Africa over time !

https://www.slideshare.net/jbcole/genetic-improvement-programs-for-us-dairy-cattle

Livestock contribute to the SDGs (at least directly to 8 of the 17 goals)

The challenge: Limited success in animal breeding (genetic improvement) in Africa

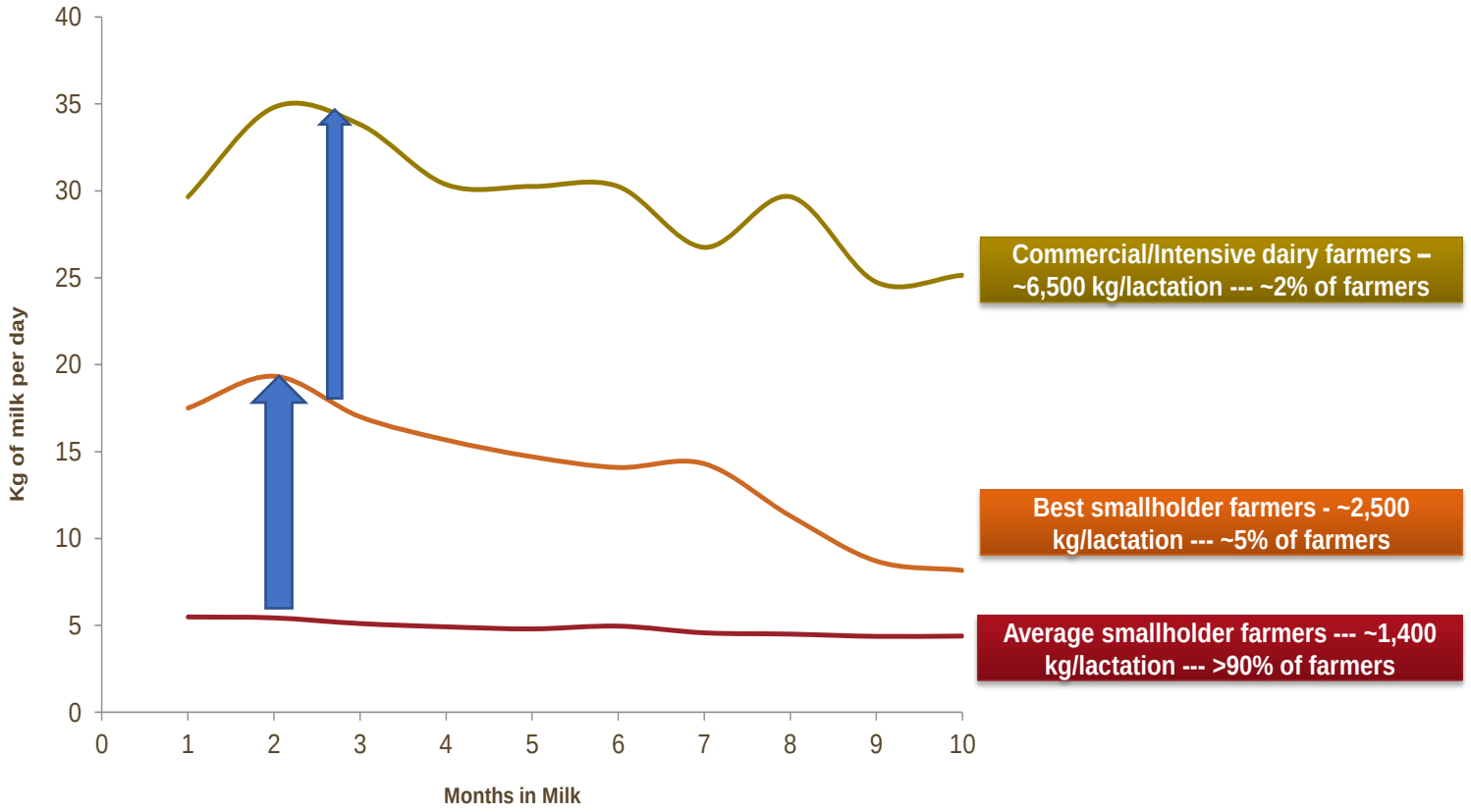


Opportunities: A growing list of success stories on genetic gains in African livestock

Challenges facing smallholder dairy systems & the consequences

- Little or no systematic and sustainable breeding programs exist
- Limited access to the dairy genetics or breed types/choices that best suit the different production systems
- Inadequate access to various services and inputs, hence no sustained productivity gains
- Access to information or farmer education and training services lacking so can't improve herd productivity and system profitability.

Figure 1: Realized lactation curves of improved (crossbred or higher) dairy cows achieved by different farmer types in Kenya



ADGG African Dairy Genetic Gains More productive and profitable dairy cows

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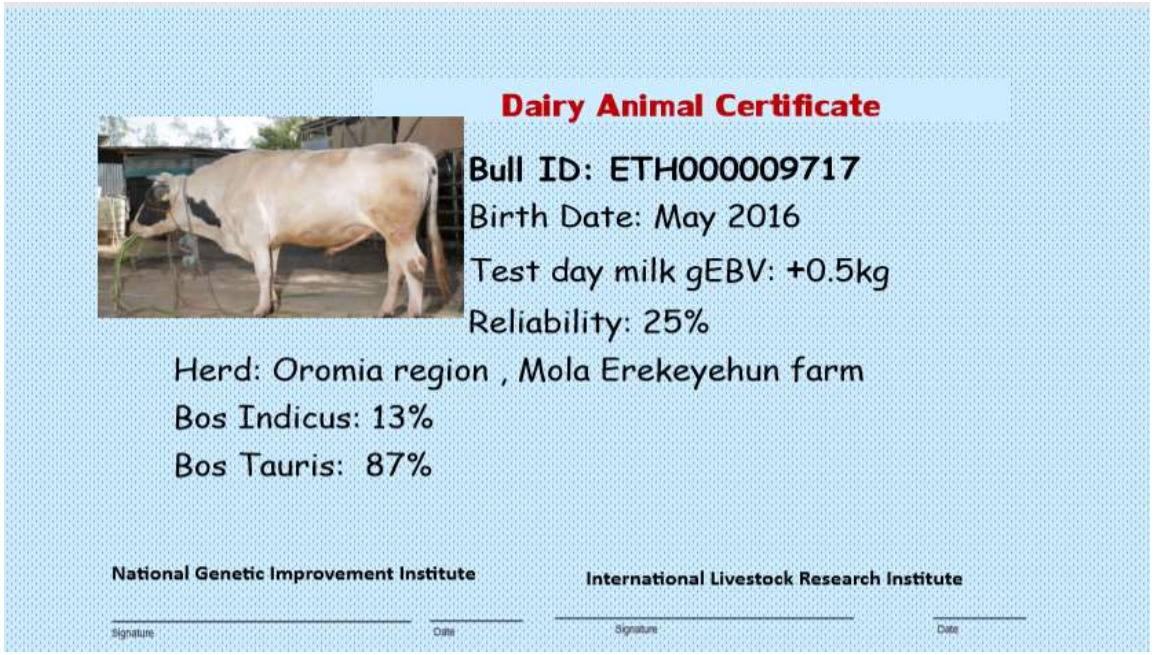
Opportunity 1: Innovative application of ICT & Genomic technologies

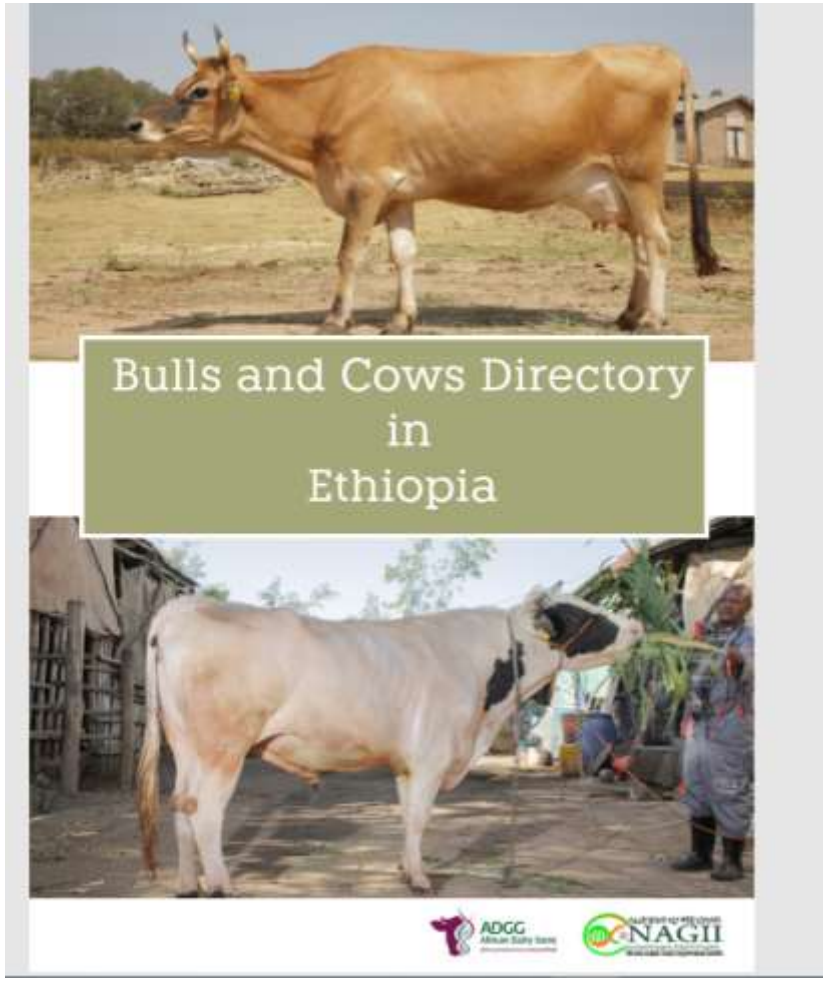
1. To establish National Dairy Performance Recording Centers (DPRCs) for herd and cow data collection, synthesis, genetic evaluation and timely farmer-feedbacks
2. To develop & pilot an ICT platform (FFIP) to capture herd, cow level & other related data & link it to DPRCs (*feeds back key related herd/cow summaries, dairy extension & market info. etc.).*
3. To develop genomic chip for breed composition determination & related bull certification systems, esp. for crossbred bulls

ADGG
African Dairy Genetic Gains
More productive and profitable dairy cows

Breeding value prediction pipelines developed

Records	Ethiopia	Tanzania	Kenya	Total
No of farms	72,095	34,732	26,766	**133,593**
No of cows	113,280	67,825	131,229	**312,334**





https://africadgg.files.wordpress.com/2020/08/adgg-tzn-index-2020.pdf

https://portal.adgg.ilri.org/sites/default/files/ADGG_ETH_BULLCOW_sel_GUIDE_2020.pdf

Opportunity 2: Community Based Breeding Programs provide an appropriate framework for sustainable breed development and conservation in Malawi

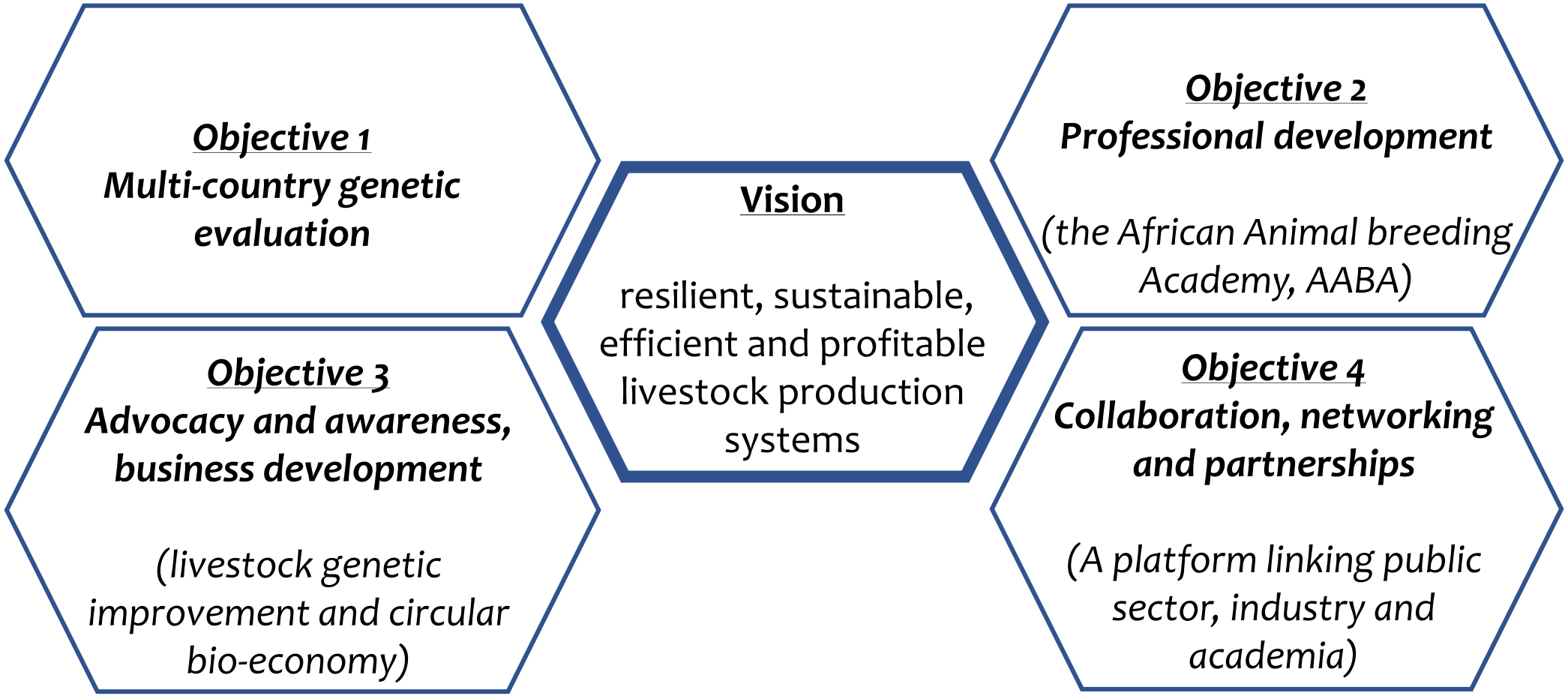
CBBP Programs in Malawi	Support	Areas	Focus		
Goats breed improvement	USDA ARC AGIN	North, Center, South	Within breed buck selection	Integrate science and community knowledge	Training to mitigate inbreeding
Beef commercialization	Nyama World, a private meat retail company	North	Crossbreeding Bonsmara with Malawi Zebu	Smallholder beef commercialization	Nyama World as buyer of weaners
Smallholder chicken commercialization	InCIP, iLINOVA and FOM	Central Malawi	Local chicken development	Promote business in village chickens	

CBBP output from kids born after first selection

MSc Theses by Mussa (2019 and Kaunda (2020)

Goats	Selected	Non-selected	Difference	%
Birth weight, kg	2.5	2.4	0.10	4.17
2-month weight, kg	8.5	6.9	1.60	23.19
4-month weight, kg	13.4	11.7	1.70	14.53
Dressing %	45.26	39.36	5.90	14.99

AABNet


Objective 1
Multi-country genetic evaluation
Vision
resilient, sustainable, efficient and profitable livestock production systems
Objective 2
Professional development
(the African Animal breeding Academy, AABA)
Objective 3
Advocacy and awareness, business development
(livestock genetic improvement and circular bio-economy)
Objective 4
Collaboration, networking and partnerships
(A platform linking public sector, industry and academia)

Across country genetic evaluation

Genetic parameters	Kenya (s.e)	South Africa (s.e)	Joint (s.e)
h^2 of MY	0.13 (0.10)	0.18 (0.01)	0.21 (0.01)
h^2 of CI	0.04 (0.06)	0.04 (0.01)	0.05 (0.007)
h^2 of AFC	0.24 (0.03)	0.44 (0.05)	0.46 (0.01)
R^2 of MY	0.13 (0.05)	0.40 (0.003)	0.43 (0.005)
Genetic correlation MY-AFC	-0.53 (0.24)	-0.12 (0.10)	-0.15 (0.09)
Genetic correlation MY-CI	0.79 (0.72)	0.60 (0.05)	0.58 (0.05)

n = 66,000 records

- Earlier study has shown that African countries would benefit from joint genetic evaluation
- Appropriate genetic evaluation models need to be developed and utilised
- More data and participation are required to bring impact to scale

Source: Opoola et al. 2018

The current state of play:
building on a relevant foundation

Survey: Livestock data recording, genetic improvement infrastructure, human capacity and potential for multi-country collaborations of the African livestock sector

Key observations for consideration:

1. Very diverse livestock breeds reported in Africa (large and small ruminants, pigs, poultry and other avian species, horses, camel, non-conventional livestock …)
2. Human capacity, national animal identification and ranking systems in Africa
3. Available livestock data, ownerships and some genetic evaluation methods schemes
4. Prospect for across country livestock genetic evaluation

Houaga I, Mrode R & others

A growing network to deliver the AABNet objectives

Thank you

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