



Opportunities for improving dairy production in Burundi

Experience from the ILRI ADGG program

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Workshop on sustainable development of Burundi's dairy
sector - PRDAIGL
November 2, 2022

Statistics on Burundi

Human Population 2022: 12.8 million

Population growth rate: 2.7%

Number of small-scale farmers: 1.6 million

Cattle population 2020 (FAOSTAT): 628,000

Dairy cattle population?

Main breeds for dairy production: crossbreds

Average milk production per animal: 6 litres/day



Cattle production in Africa

- Population of indigenous animals whose performance and characteristics are not well documented
- Introduction of high producing exotic animals irrespective of prevailing environmental conditions
- Indiscriminate crossbreeding



Challenges to cattle production

- Small scale of production with high transaction costs.
- Climate change!
- Limited feeds available
- Endemic diseases
- Poor Infrastructure
- Lack of data and information systems to inform management decisions
- Weak institutions



Unfortunately, We move

This Animal



This Environment



To this

Animal



Environment



Forgetting that to change this....



To This....





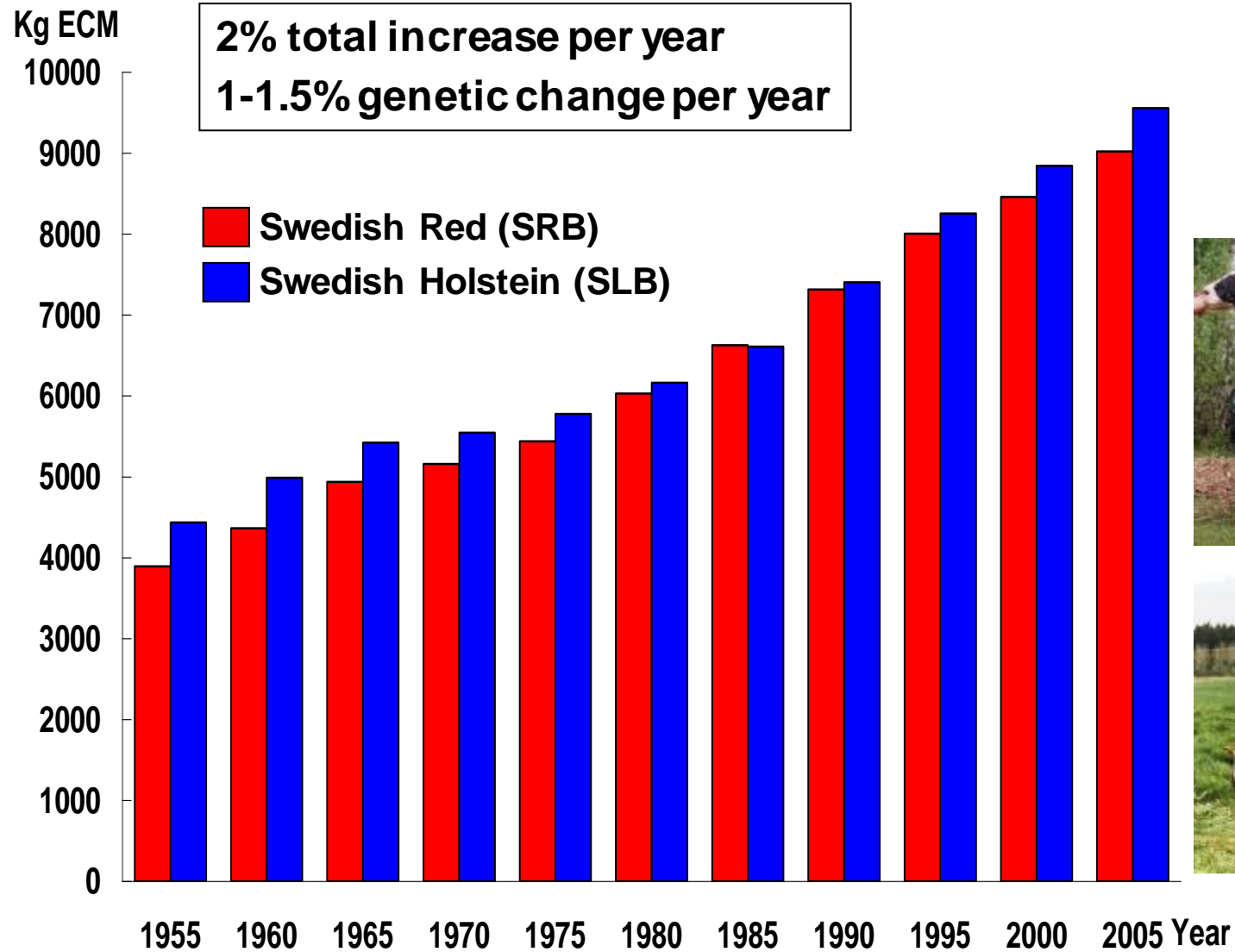
Or to change this....

To This....



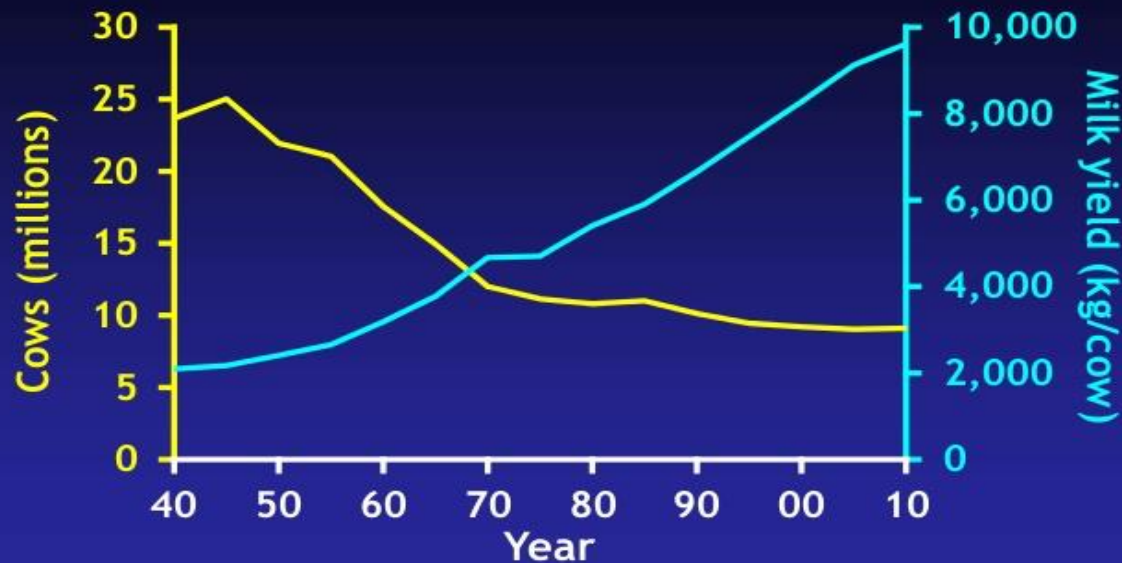
Took Time and Effort

Annual milk yield for SRB & SLB cows 1955-2005



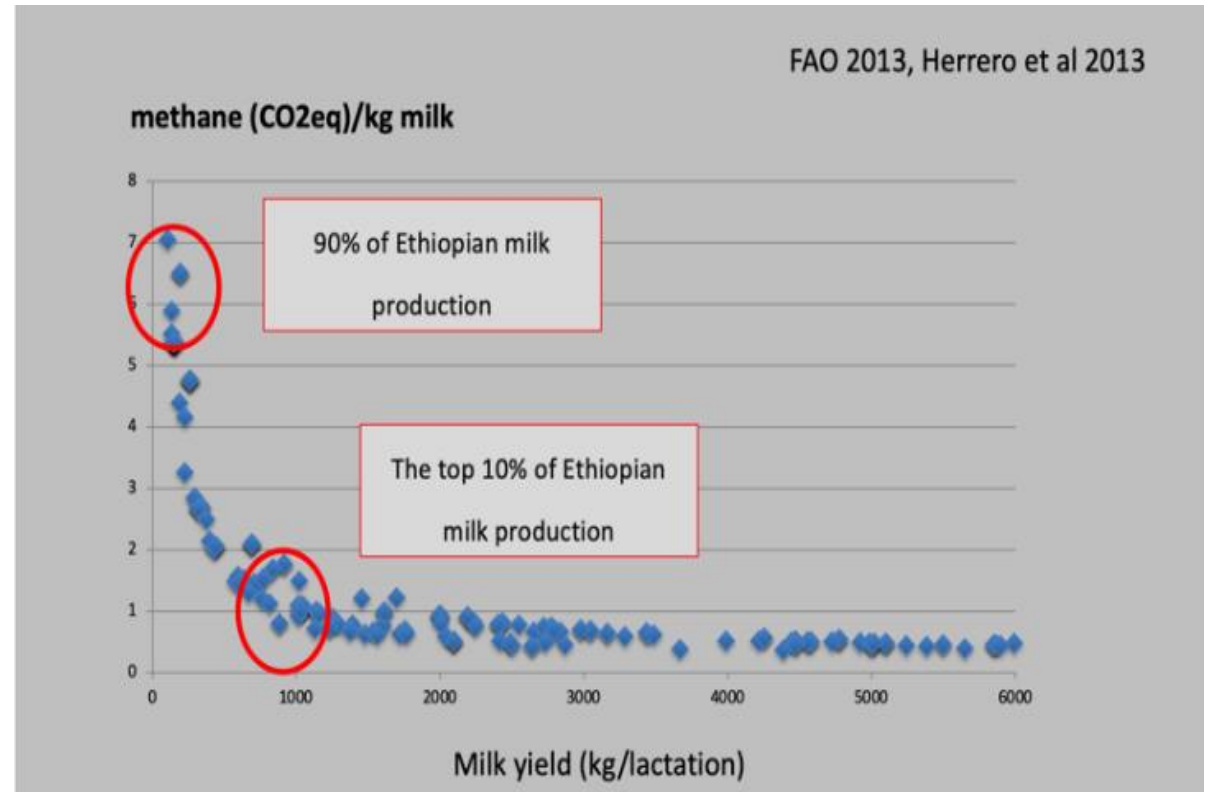
Consequences of low production levels

U.S. dairy population and milk yield



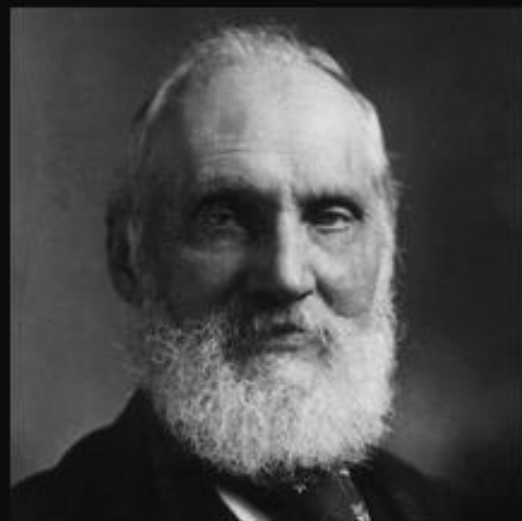
Embrapa Gado de Leite, Juiz de Fora, MG, Brasil 10 September 2014 (2)

Cole



Methane emission per kilogram of milk is about 4 times higher in the top herds than in herds that produce an average of 2000 kg of milk

How can we change the current status?



If you can not measure it, you
can not improve it.

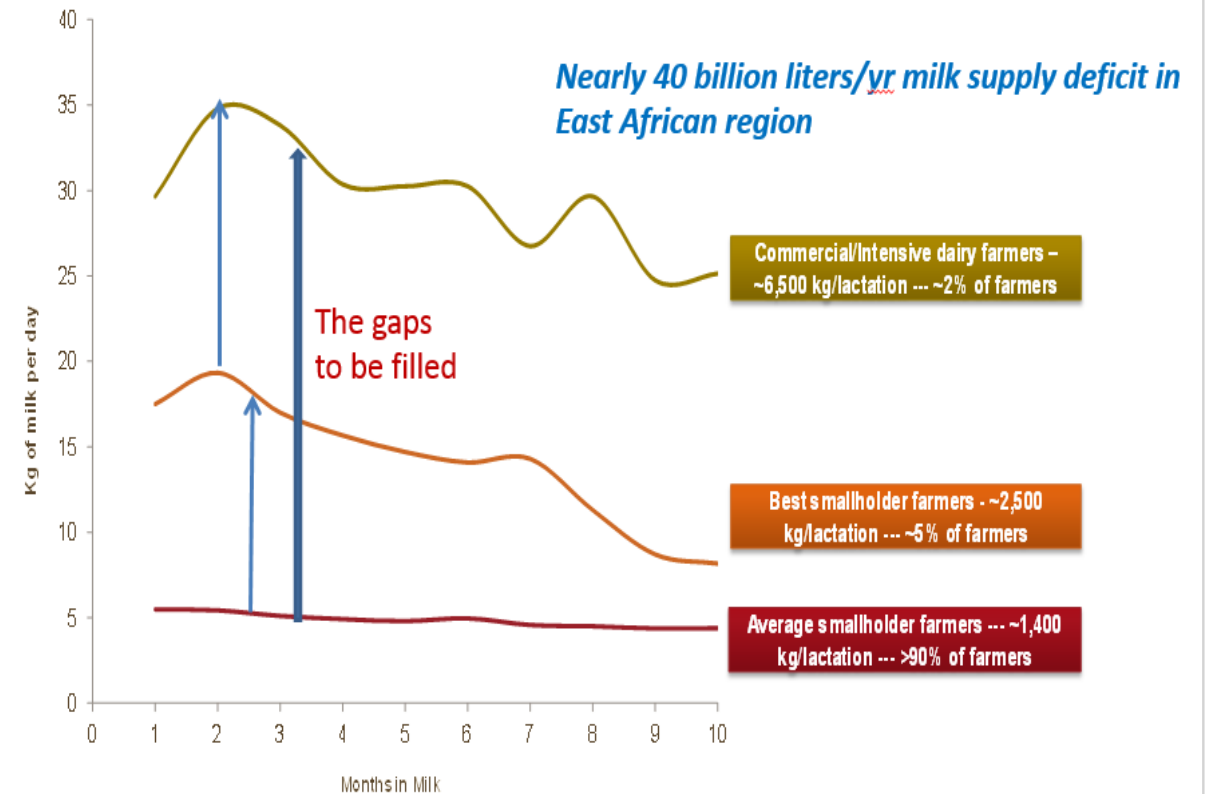
~ Lord Kelvin

AZ QUOTES

Challenges facing dairy producers in Africa

- Farmers do not have access to productive and adapted livestock **seedstock** that **best suit** their production systems
- Access to various **services and inputs** is **inadequate**, hence gains in productivity in one generation cannot be sustained in the next one
- Farmers have very limited **access to information** to enable them extract optimum benefits for their dairy enterprises
- No systematic and sustainable **breeding or selection** taking place

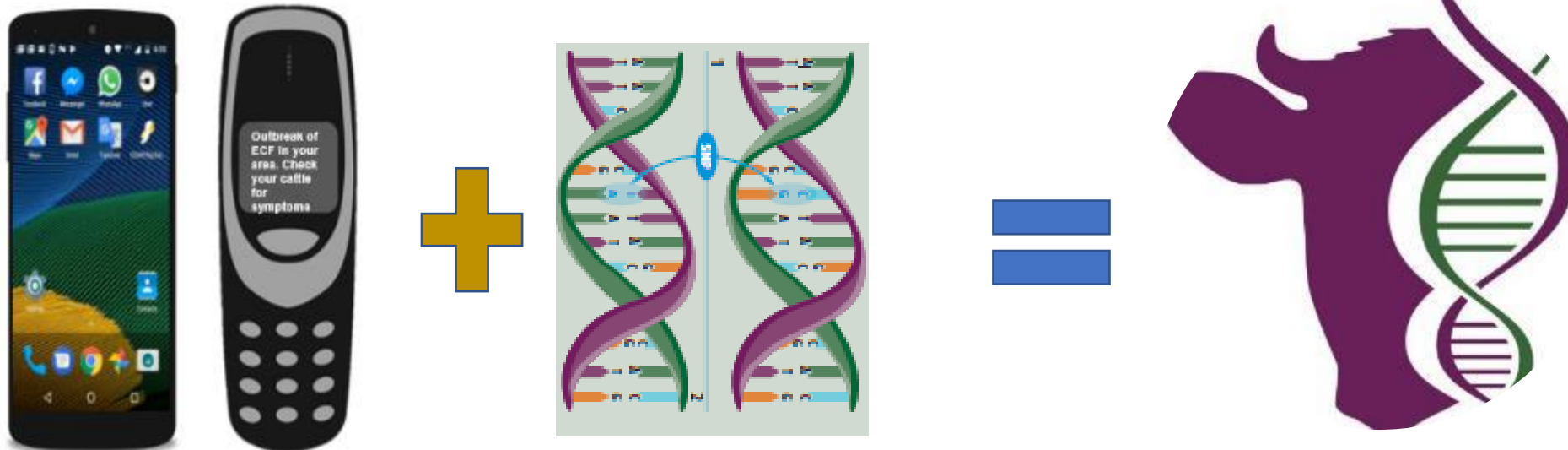
Huge differences in productivity by dairy animals in the different farming systems



Source: Ojano et al., 2014

What is the African Genetic Gain Program about ?

Addressing the challenges
facing small holder livestock (dairy) systems
through **innovative** application
of **ICT** and **genomic technology**



About ADGG continued....

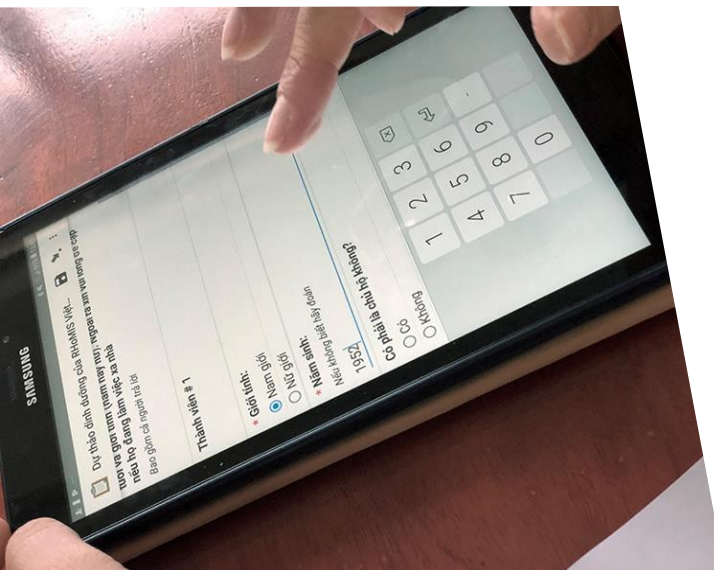


ADGG 's vision is to see that African smallholder dairy farmers are continuously accessing more productive dairy genetics, breeding and farmer education services and other related input services enabling their farming enterprises to be profitable and competitive .

ADGG is designed to address key challenges facing the smallholder dairy systems through innovative use of genomics and digital information technology

ADGG's work includes developing breeding values, to drive national breeding schemes, using performance data collected in the farmer production environments

ADGG works in collaboration with key actors: Farmer organizations, Research institutions, National Livestock seed regulators, National Agricultural Research and Extension Systems



ADGG approach



Identify Genotypes adapted to local agro-ecology

- Target appropriate genotypes to the agro-ecology
- Use young bulls with a focus on production & adaptation
- Local feed/fodder resource use efficiency

Establish national data management platforms

- Digital platforms for on-farm performance tracking
- Decision-support and Farmer-to-Farmer performance benchmarking
- Smart use of records & genomics tools for selection and AI service delivery

Adapted, and Genetically superior "seed" animals for local production systems

Economically and Environmentally relevant Traits

- Milk Yield
- Milk composition
- Weight
- Reproductive Performance
- Heat tolerance
- Survival rates
- Lactation persistency
- Mastitis incidences
- Disease tolerance
- Methane emission
- Adaptability Indices

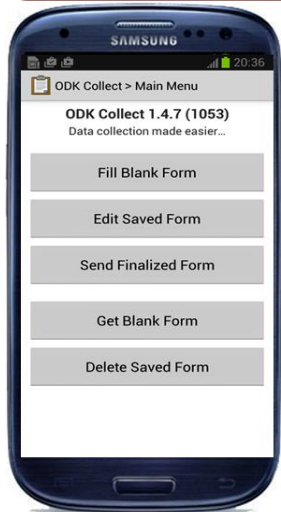
Accelerate on-farm genetic gains



The ADGG Platform

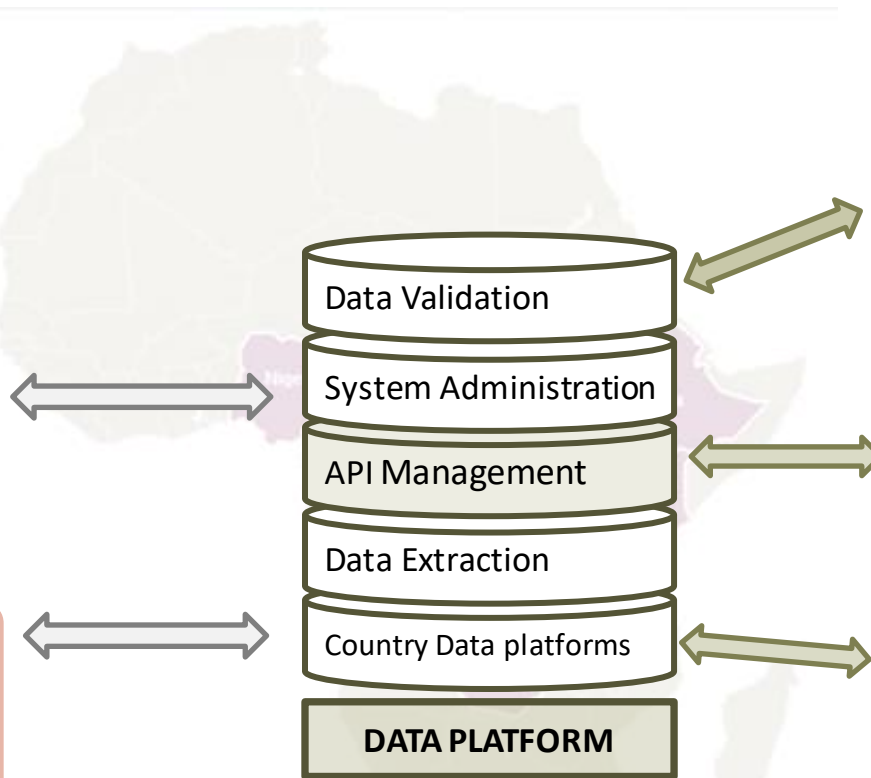
An agile, robust, flexible & scalable system

- Farming systems characteristics
- Characteristics of dairy animals on farms
- Monitor animal performance
- Monitor use of technologies (eg Artificial Insemination, vaccination)
- Service providers



Data capture

Data Feedback systems



Analytics

- Customized data summaries
- Genomic evaluation
- Customized indexes for animal selection

E-Learning tools

- Managing reproduction
- Managing calves at different stages
- Using livestock data for decisions
- Managing animal health

Other data bases

- i-Cow
- Interherd +

Phone-based tools & Apps

Medium and large-scale farm data capture

Sign in

Email address

Password

Remember me

LOGIN

[Don't have an account?](#) [Forgot Password?](#)

Animal Listing

Selected Category: All

Reg Date	ID	Tag	Name	Heed	Sex	Type	DOB	Breed	Breed Comp
2021-03-08	354021	F0108-00	MREMBO JNR	DCRS	FEMALE	Female Calf	2019-12-31	Holstein	
2021-03-08	340421	F0108	MREMBO	DCRS	FEMALE	Heifer	2009-08-06	Holstein	
2021-03-01	354020	KE-TEST-200-JNR-02	KE-TEST-200-JNR-02		FEMALE	Female Calf	2021-03-01	Holstein	
2021-03-01	354019	KE-TEST-200-JNR-01	KE-TEST-200-JNR-01		MALE	Male Calf	2021-03-01	Holstein	
2021-03-01	353995	KE-EDIT-1000	Edited One Alive	DCRS	MALE	Male Calf	2021-02-21	Tarime	Pure bred

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NEW WEIGHT & GROWTH RECORD - MREMBO(F0108)

Weight Date *
dd / mm / yyyy

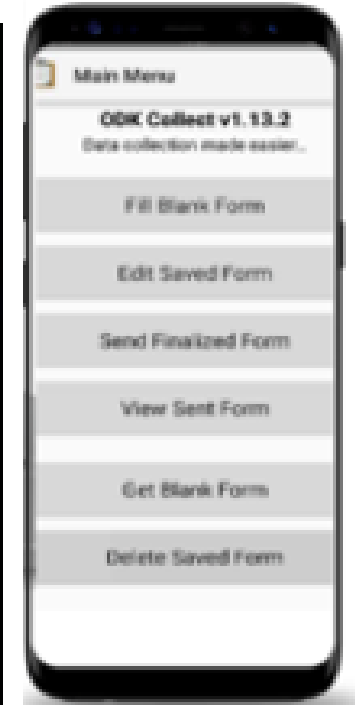
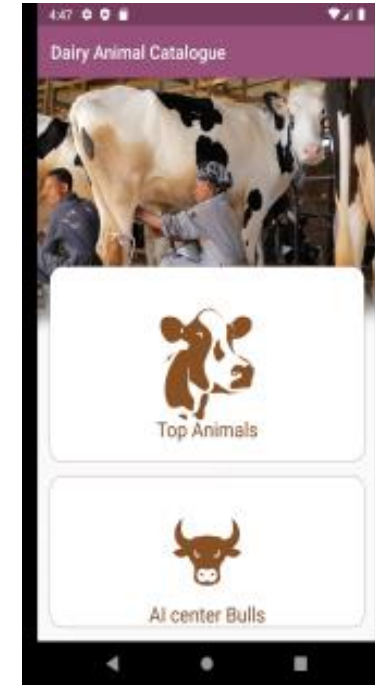
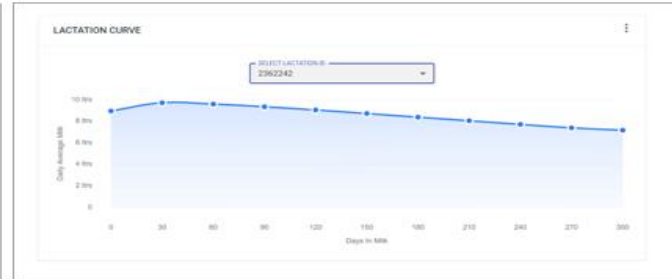
Body Length (cm)

Heart Girth (cm)

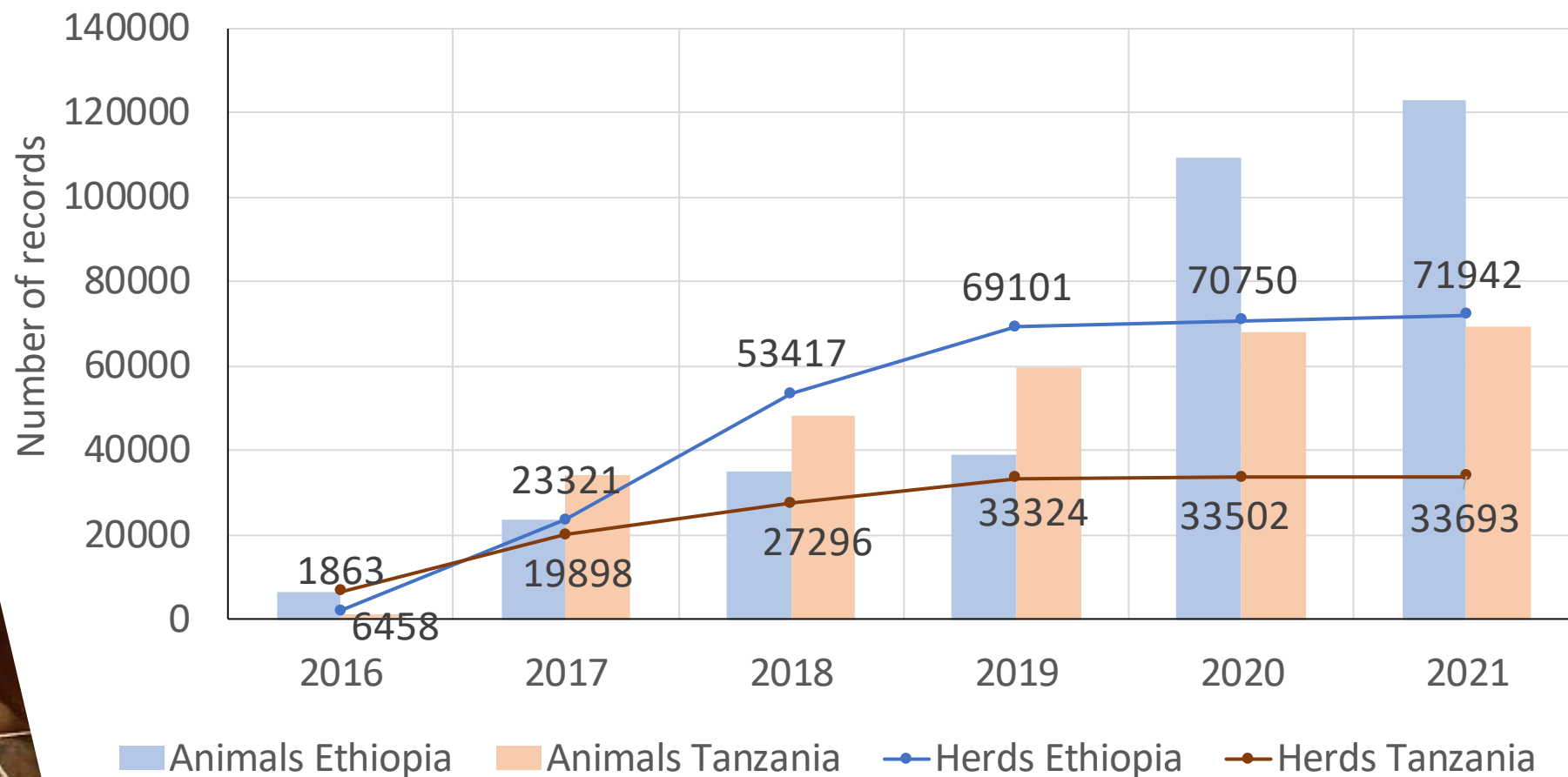
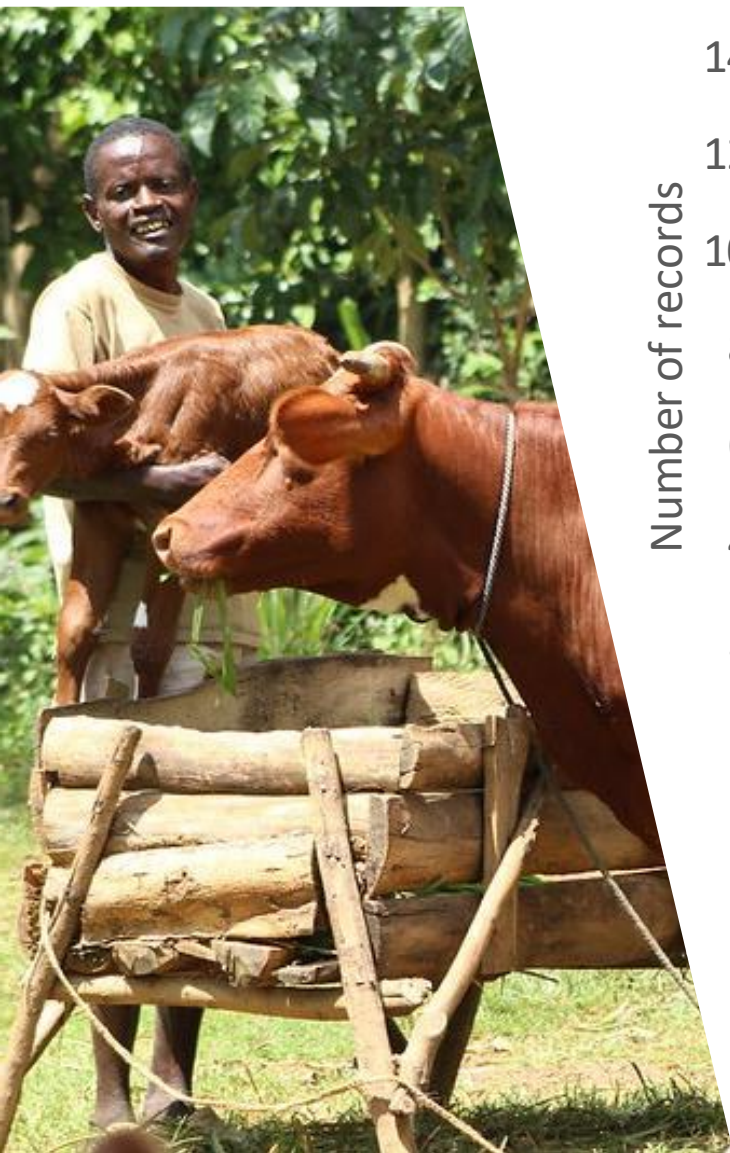
Weight (kg)

Body Score

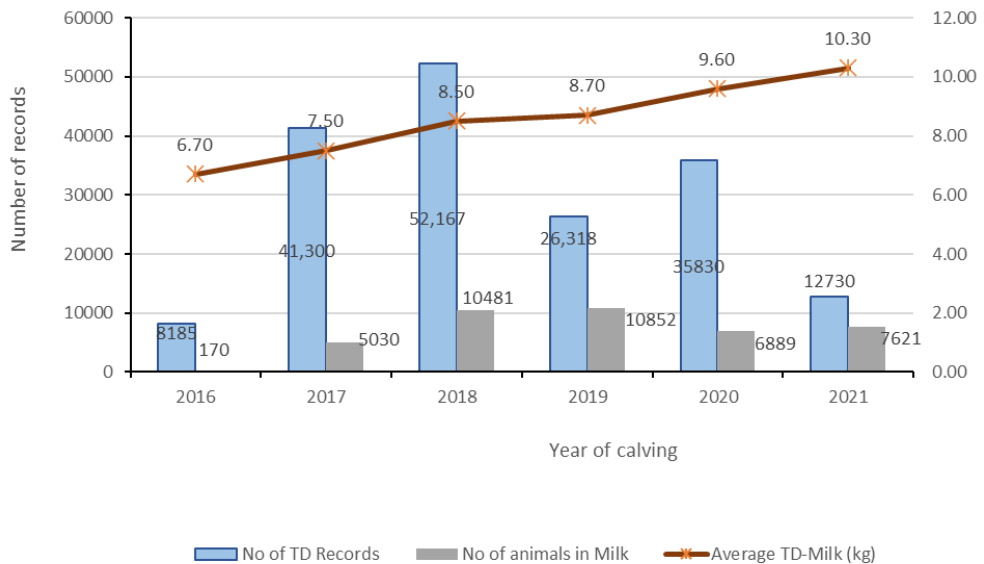
SAVE DETAILS



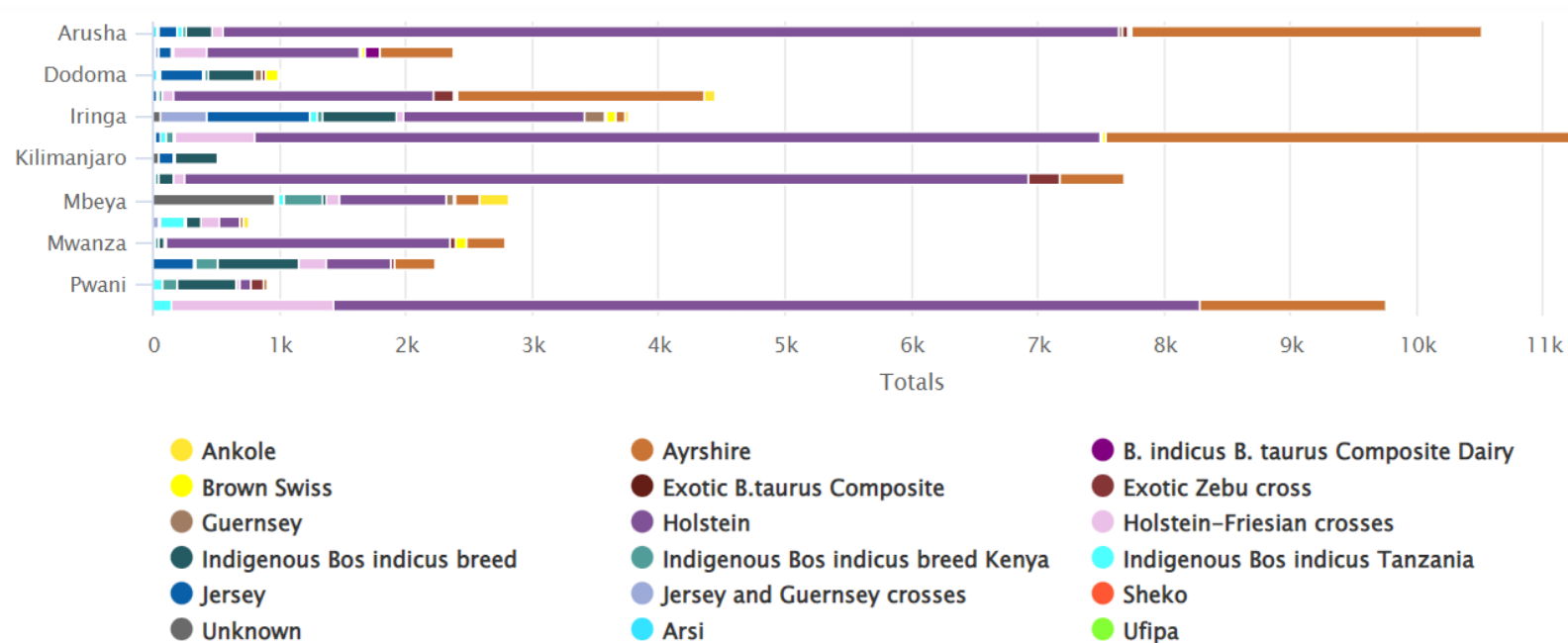
Achievements: Herds and animals registered in Ethiopia and Tanzania



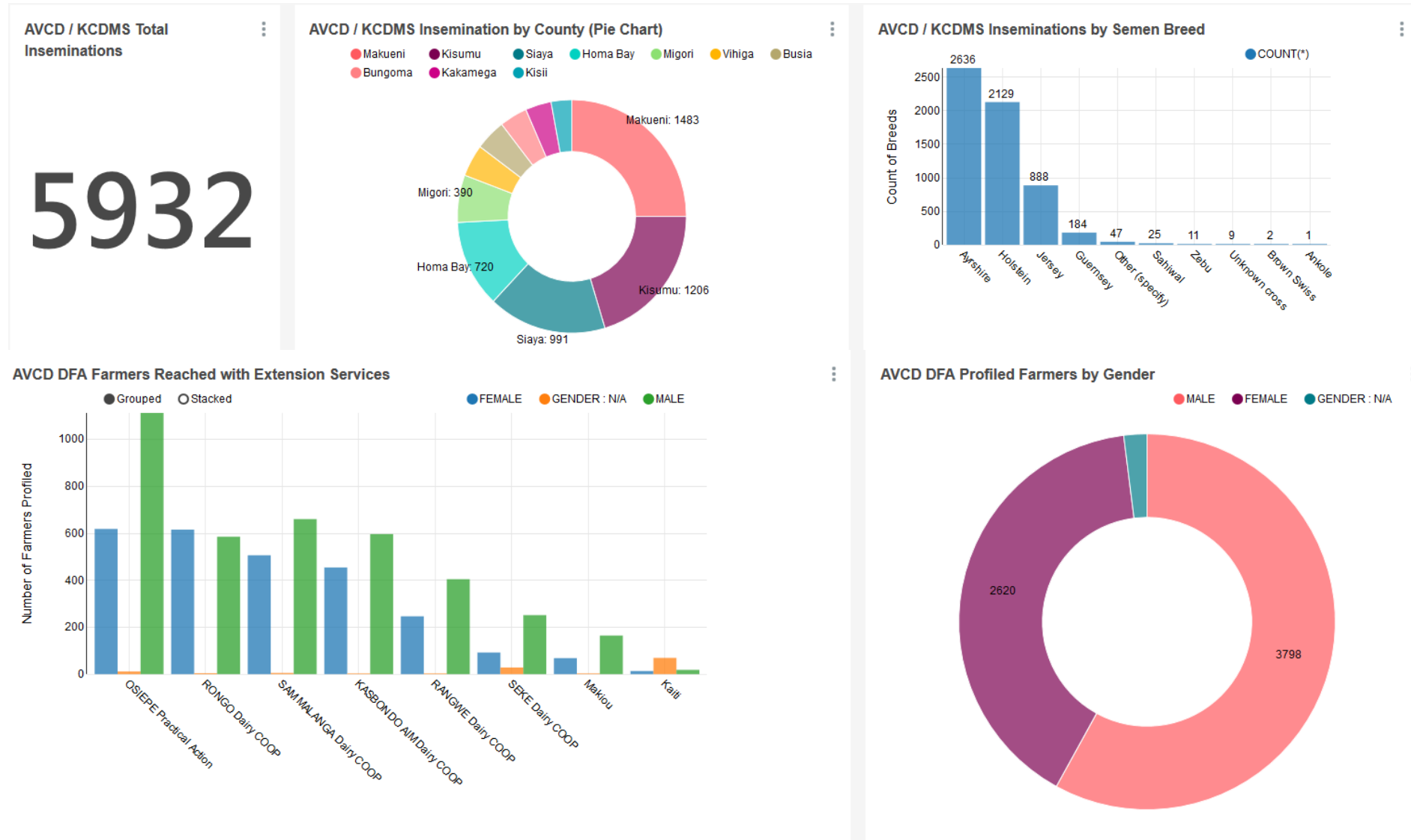
Tanzania- Average Test-Day Milk production (kg)



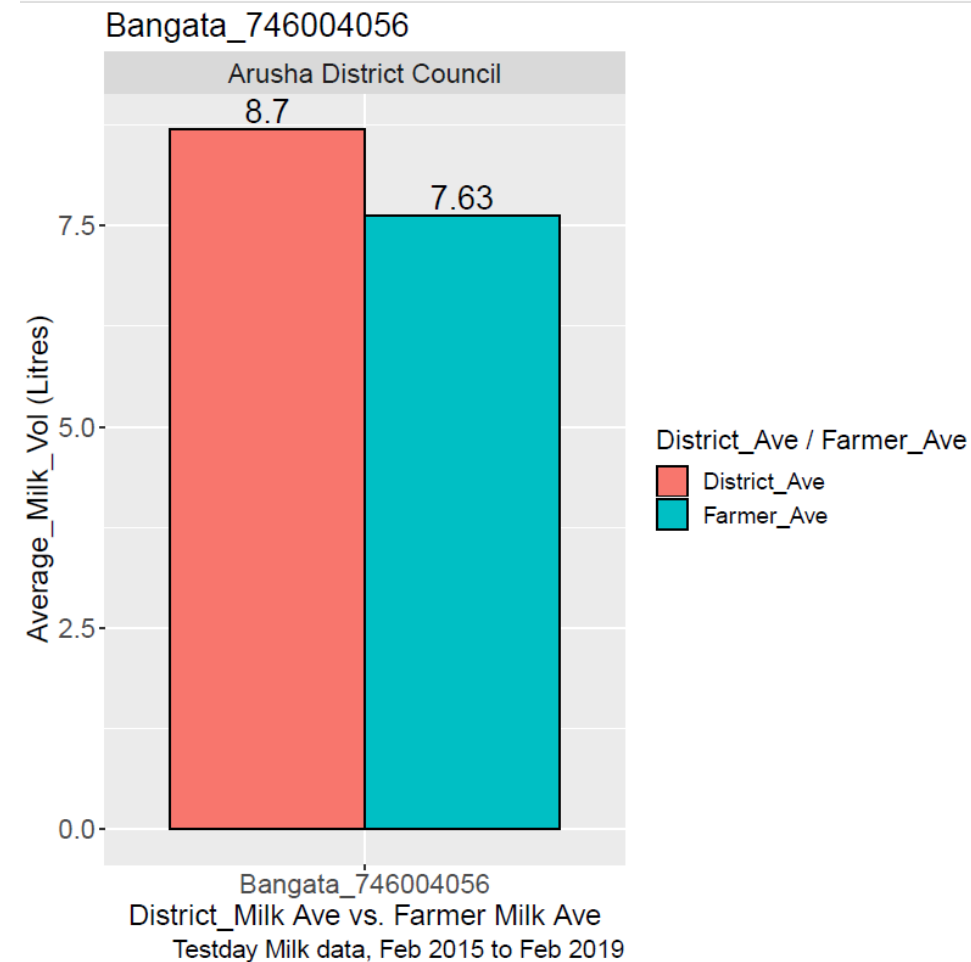
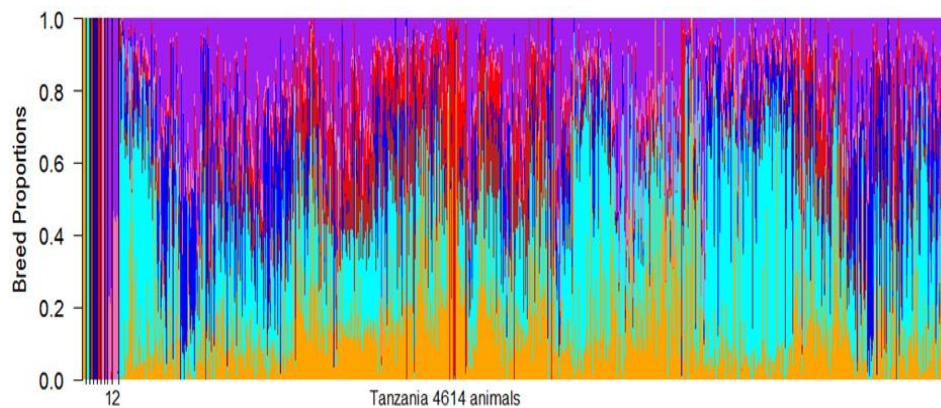
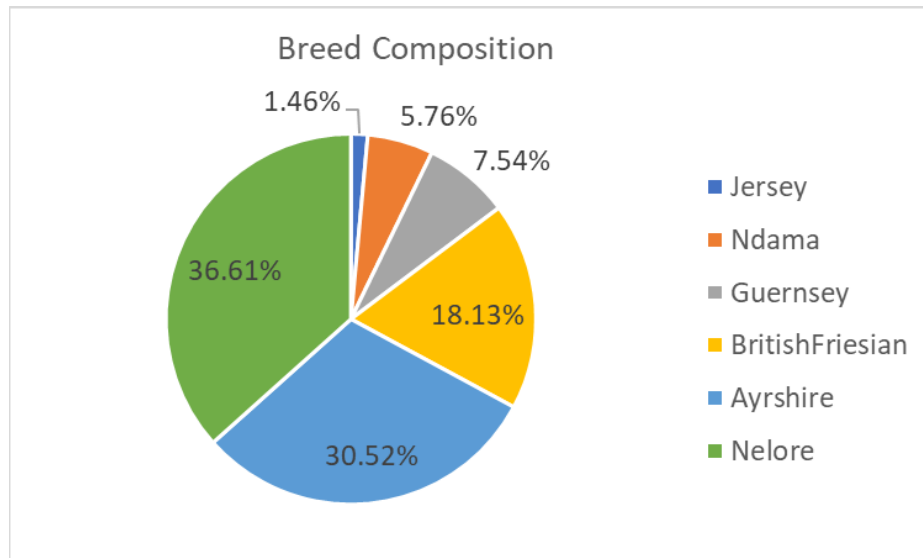
Breeds reared in different regions



Visualization tools for partners e.g. -for NAICs




Feedback to farmers



Milestones & Achievements



- Ethiopia First dairy animal parade held on Tuesday March 30, 2020, Fikiru Regessa, State Minister of Agriculture (extreme left), Selam Meseret ADGG Ethiopia National Coordinator (middle), and Asrat Tera, Director General of National Animal Genetics Institute (NAGII) Ethiopia.



Dairy Animal Certificate





Bull ID: ETH000006776
 Birth Date: Nov 2015
 Test day milk yield EBV: +0.62 L (Genomic EBV)
 Reliability: 55%

Herd:
 Oromia region, Serkalem Abebe

Breed: Indigenous zebu: 18%
 African taurine: 31%
 Exotic: 51%

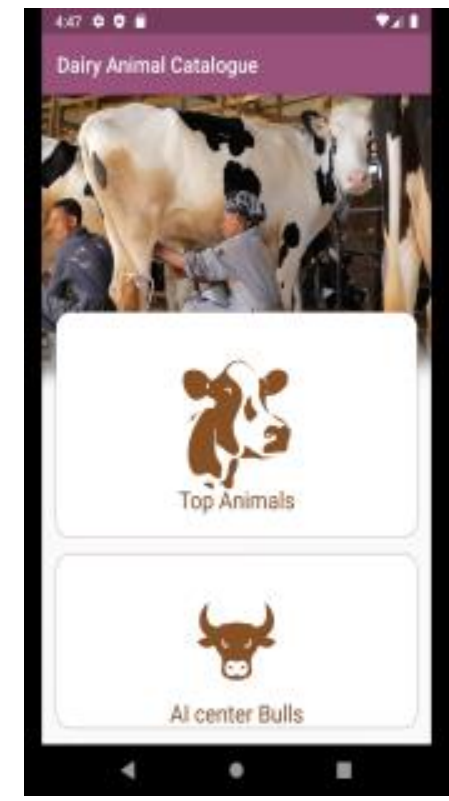
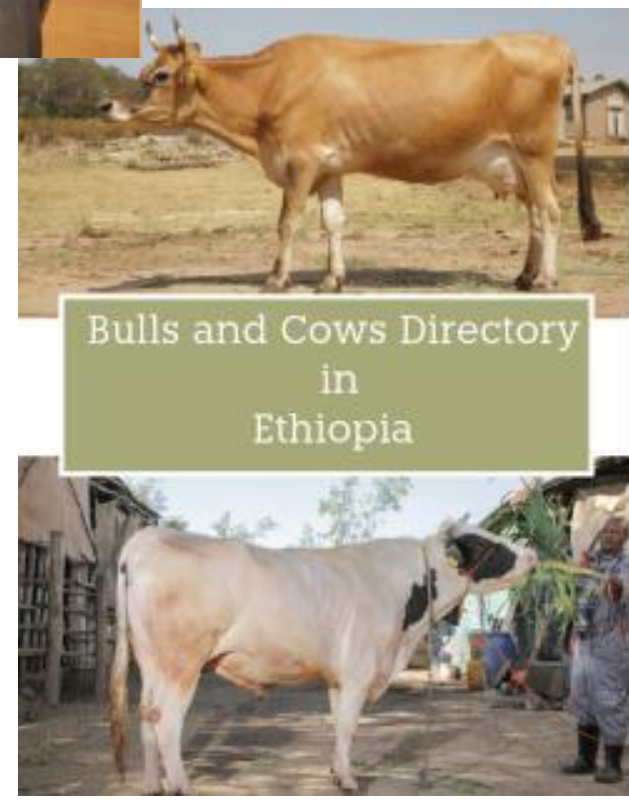
National Genetic Improvement Institute International Livestock Research Institute

Signature: _____ Date: _____ Signature: _____ Date: _____

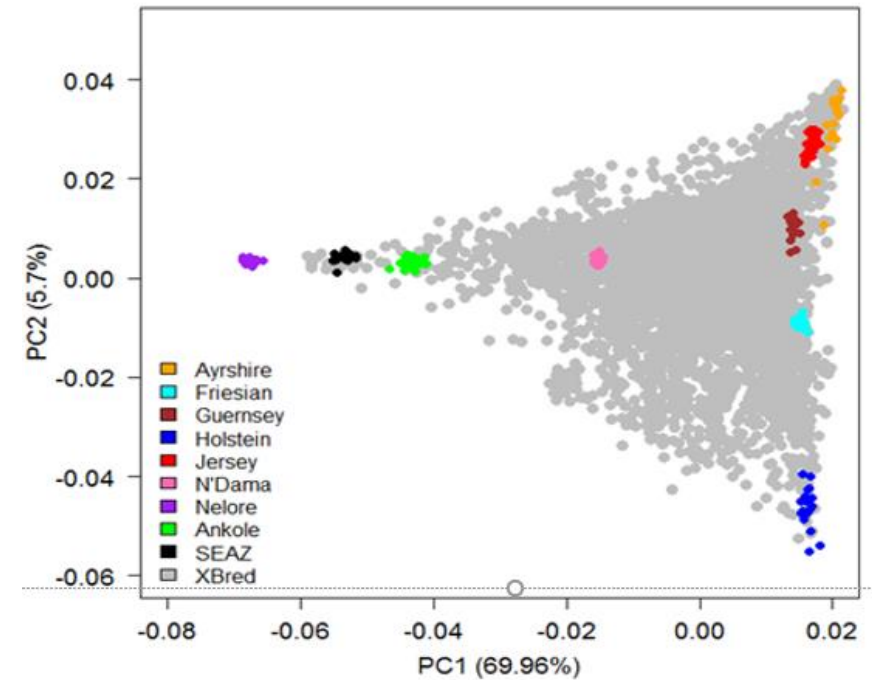


- ILRI director general, Jimmy Smith (left) and Minister for Livestock and Fisheries Luhaga Mpina (2nd to left) present the award for best bull at a special bull and cow show at the Nane Nane exhibition center in Dodoma, Tanzania, June 2019. Photo ILR



Genotyping

- In 2018, about 5600 animals sampled
- GeneSeek Genomic Profiler (GGP) Bovine 50K used for genotyping
- 40581 SNPs imputed to high density
- In 2022 an additional 3000 animals sampled for genotyping per country

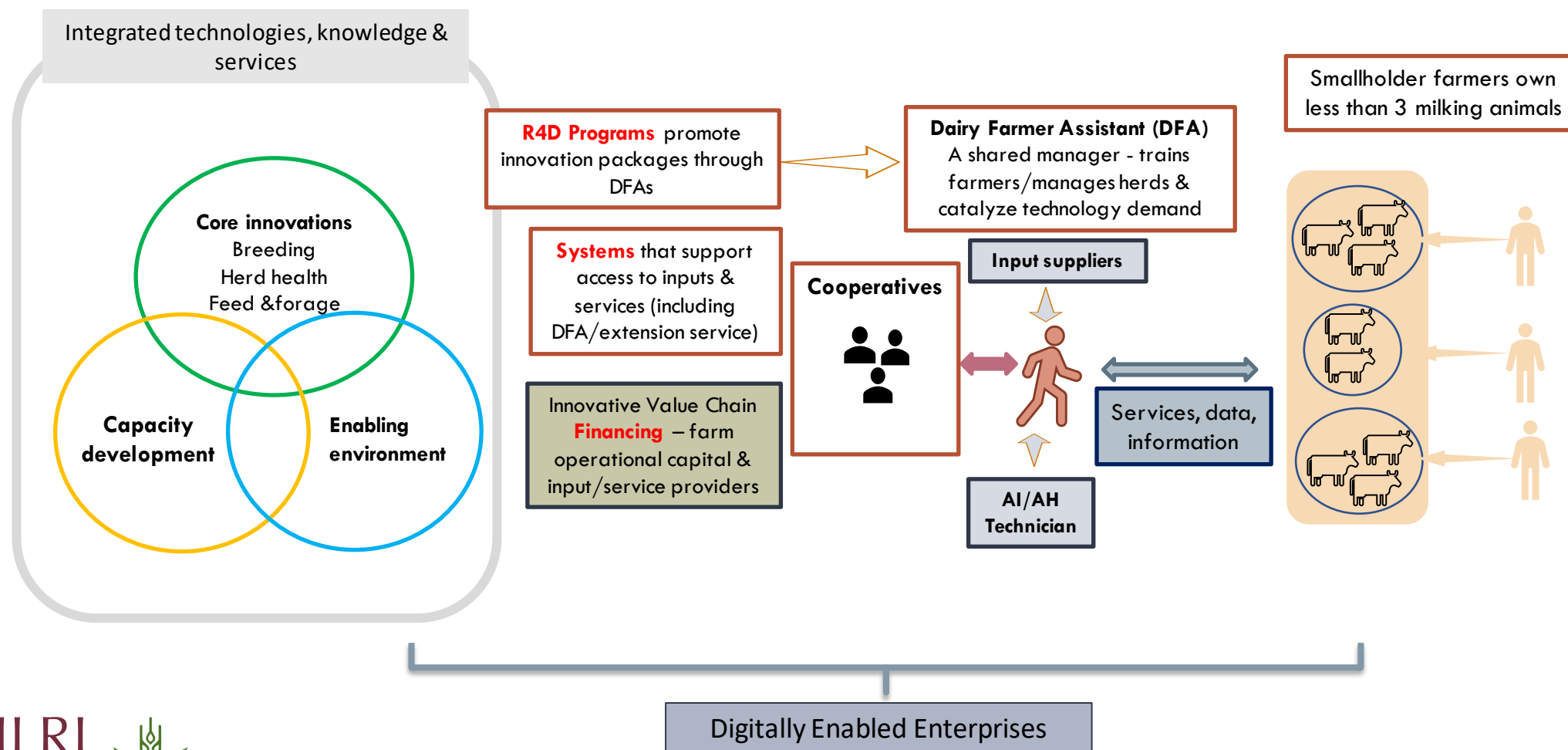


Index for selecting seed animals

- Index developed using results from genomic evaluation to improve milk production without increasing body weight



Sustainability options



Take home message...



- ✓ Sufficient variations exist within smallholder livestock populations to allow for significant genetic gains
- ✓ National livestock identification & recording for smallholder systems is feasible
- ✓ Genetic improvement is long term and should be a continuous activity (Not projects!)
- ✓ Inter-institutional & country collaboration and joint evaluations adds value
- ✓ Public investments and private partnerships are needed (Farmers are the critical partners) for sustainability
- ✓ ICT, genomic tools and reproductive technologies present new opportunities to hasten genetic gains in low and middle income countries
- ✓ ICT technologies have provided a great opportunity to crowdsource animal performance data from smallholder farmers in Africa
- ✓ Genomic evaluation of animals in smallholder systems helps accelerate identification and use of superior animals
- ✓ Digital farmer extension and feedback systems are catalyzing desired change in smallholder dairy production

Several Digital tools available



The Platform for Africa Dairy Genetics Gain (ADGG)

A guide on use of the ADGG Data Platform
2020

<https://hdl.handle.net/10568/110179>

<https://hdl.handle.net/10568/110180>

<https://hdl.handle.net/10568/98250>

<https://hdl.handle.net/10568/108942>

Dairy tool: <https://m.learn.ink/ilri>)

[ADGG Platform-help Module:](#)

<https://portal.adgg.ilri.org/sites/default/files/ADGG-platform-help-module.pdf>

- **Helping your cow to calve:**
<https://my.learn.ink/course/219ccf98-a46c-4d6a-8dcc-a15685a65643>
- **Basic Hygiene for dairy farmers:**
<https://my.learn.ink/course/8773682a-2c0c-4571-a429-ea9bdc56ca11>

Partners



Centre for Tropical Livestock Genetics and Health



NAGRC & DB



ADGG
African Dairy Genetic Gains
More productive and profitable dairy cows



BILL & MELINDA GATES foundation



National/regional Institutions/govts.


Dairy Farmers & Farmer organizations





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