Animal Identification and Recording for Breeding and Management

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Animal identification and recording (AIR) systems for traceability and livestock development in sub-Saharan Africa

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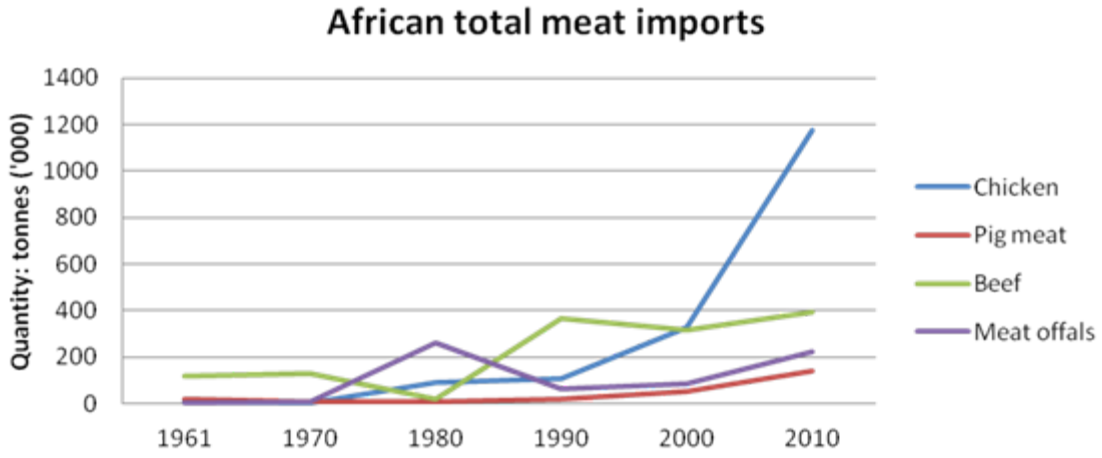
Partner Logo

Some observations and facts about Africa's livestock sector

Global and Africa's meat markets

- **Africa: Net importer of animal source foods**



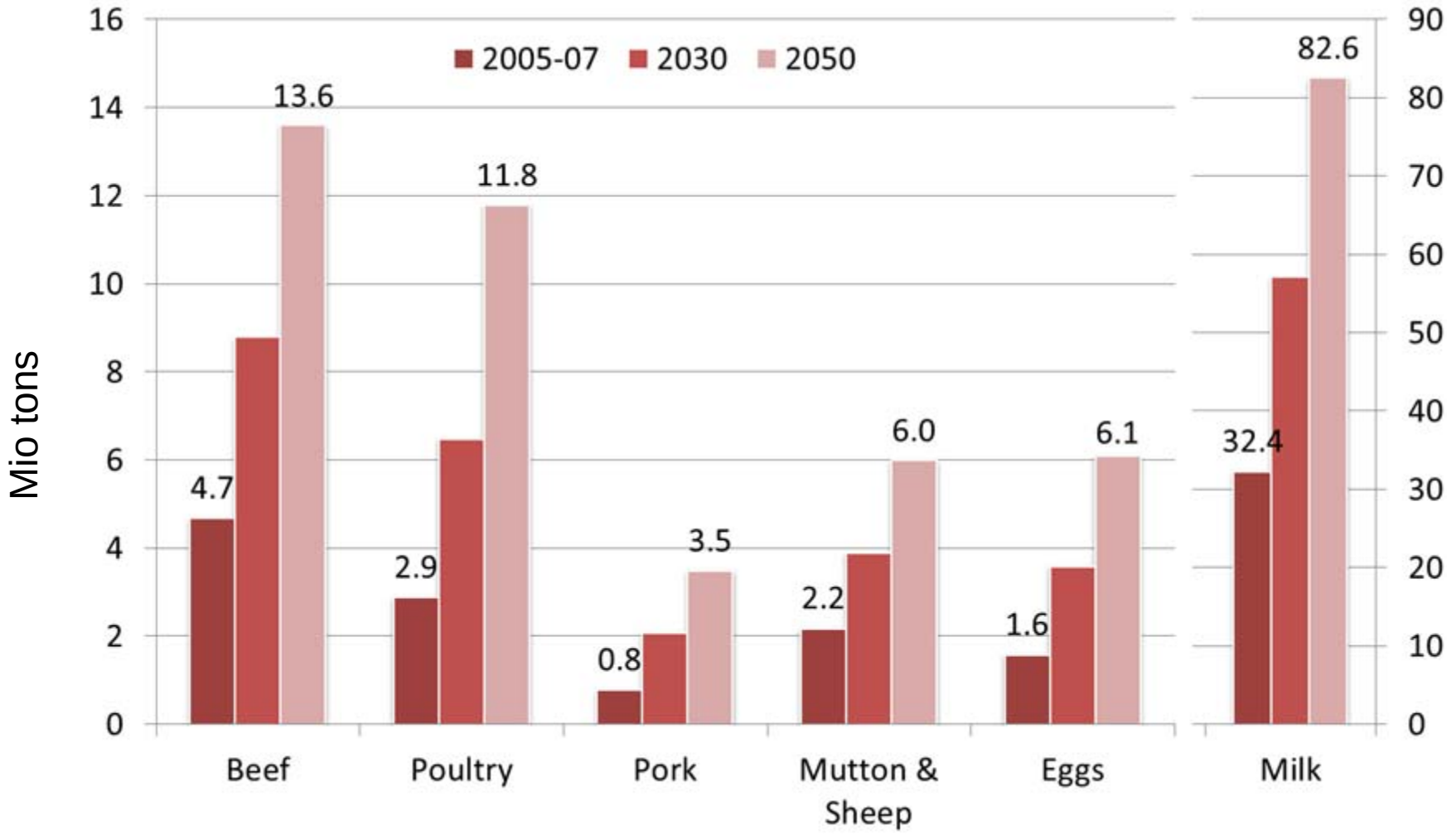
Source: Calculated from FAO data (FAOSTAT, 2013)

- Production will not keep pace with consumption growth if current systems don't change
- Africa expected to continue being a net importer of animal sourced foods
- Global trade share: 3%
- Intra-regional trade (2009): 10%

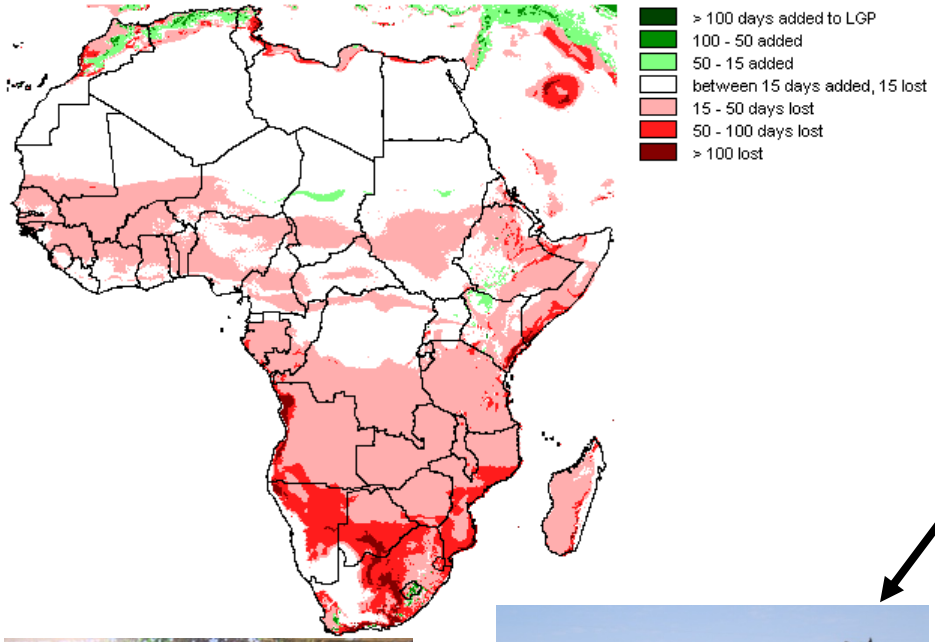
Africa is hugely disadvantaged in terms of balance of trade in Animal products

But Africa's economies are growing fast (~5% per annum

Past and projected trends in consumption of Animal Source Foods in Africa

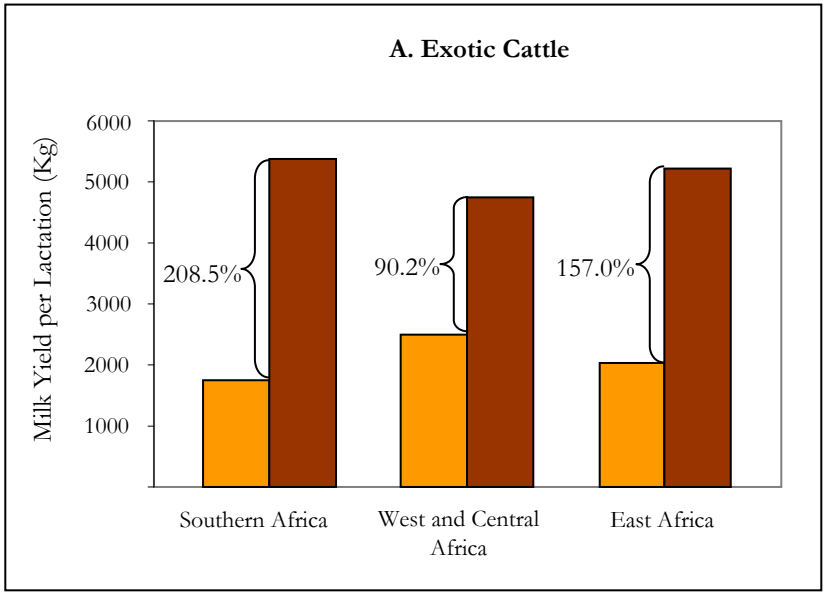


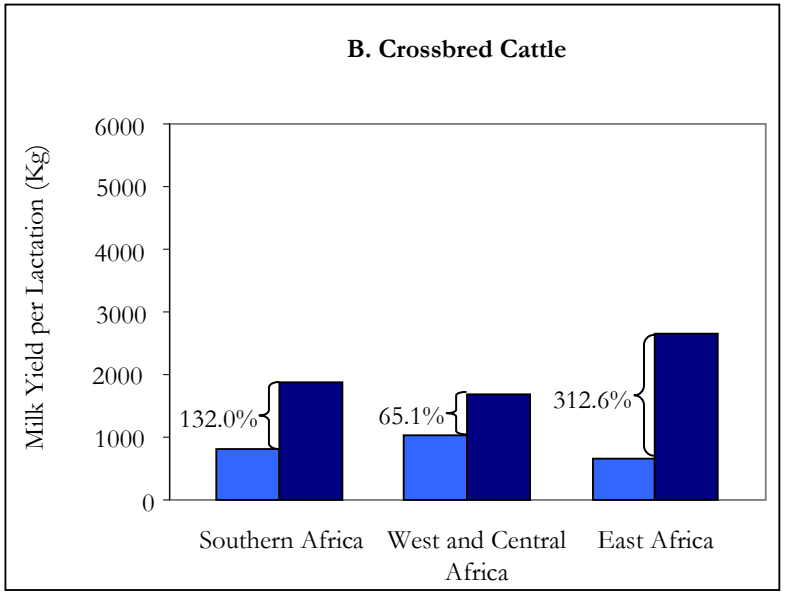
Drastic changes are occurring (climate change)

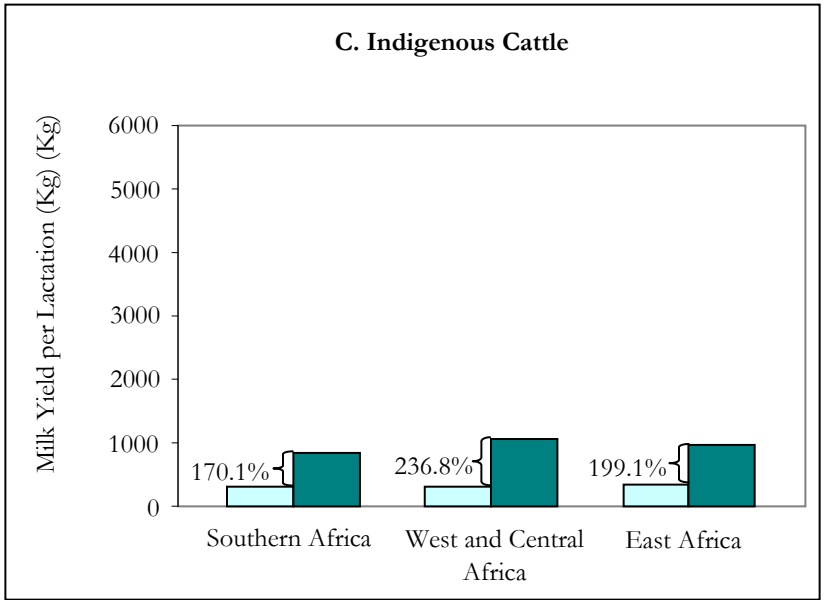


Increased frequency and extremity of weather events: (drought/floods), erosion, soil degradation

Maximum (dark *coloured*) and minimum (*light coloured*) levels of milk production for different genotypes of cattle in Sub-Saharan Africa







Better strategies are required & innovative use of technology is key

Huge opportunities to increased wealth creation & food security

Mwacharo *et al.*, 2009

Conclusion based on the above

Given the current low animal and herd/flock productivity, projected demand for animal source foods in Africa, the huge yield gaps, low level of investments in the sector, there is urgent need for significant increased investment through systems that aim at enabling sustained productivity gains, in which improved animal health services, market access, animal management and genetic improvement are an integral components, and through Private-Public Partnerships.

Key genetic constraints to livestock productivity improvement in SSA

- **Limited Investment** in livestock genetic improvement programs:
  - Failure to recognize genetics as being key to sustainable productivity gains
  - How to identify genetically outstanding animals and record performance
  - How to systematically and sustainably improve & conserve
  - Too small a scale, fragmented, short-term with little scope, hence **no impact.**
  - Inadequate expertise to design, implement & evaluate improvement programs
  - Poor infrastructure (*limited computing power, N_2 supply, poor roads, ITC etc.*)

But we have been trying to do

This Environment

This Animal

To this

Animal

Environment

Results from some recent smallholder dairy farm-based research in Eastern Africa

Principal Component Analysis results (566 HD chip)

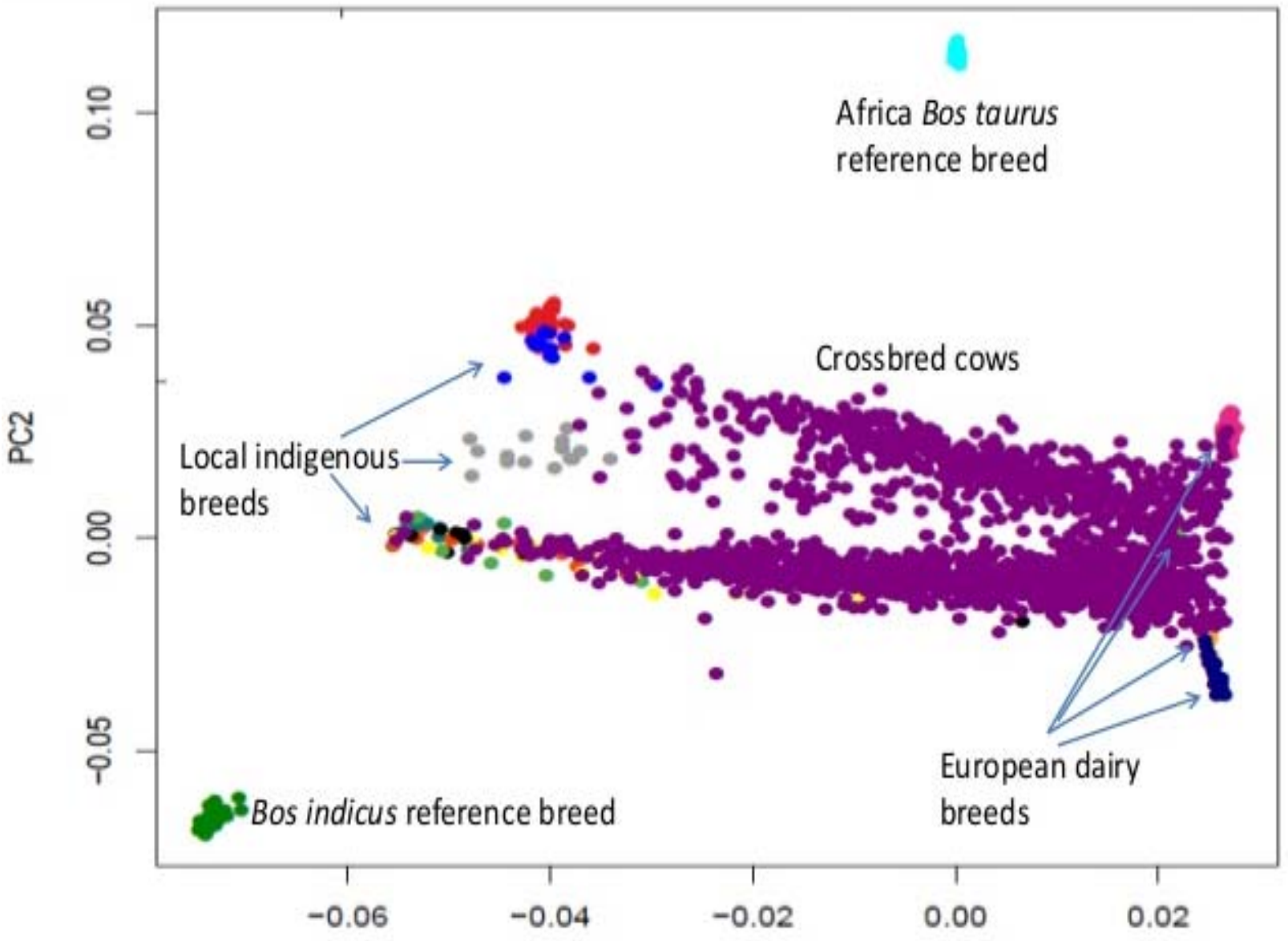
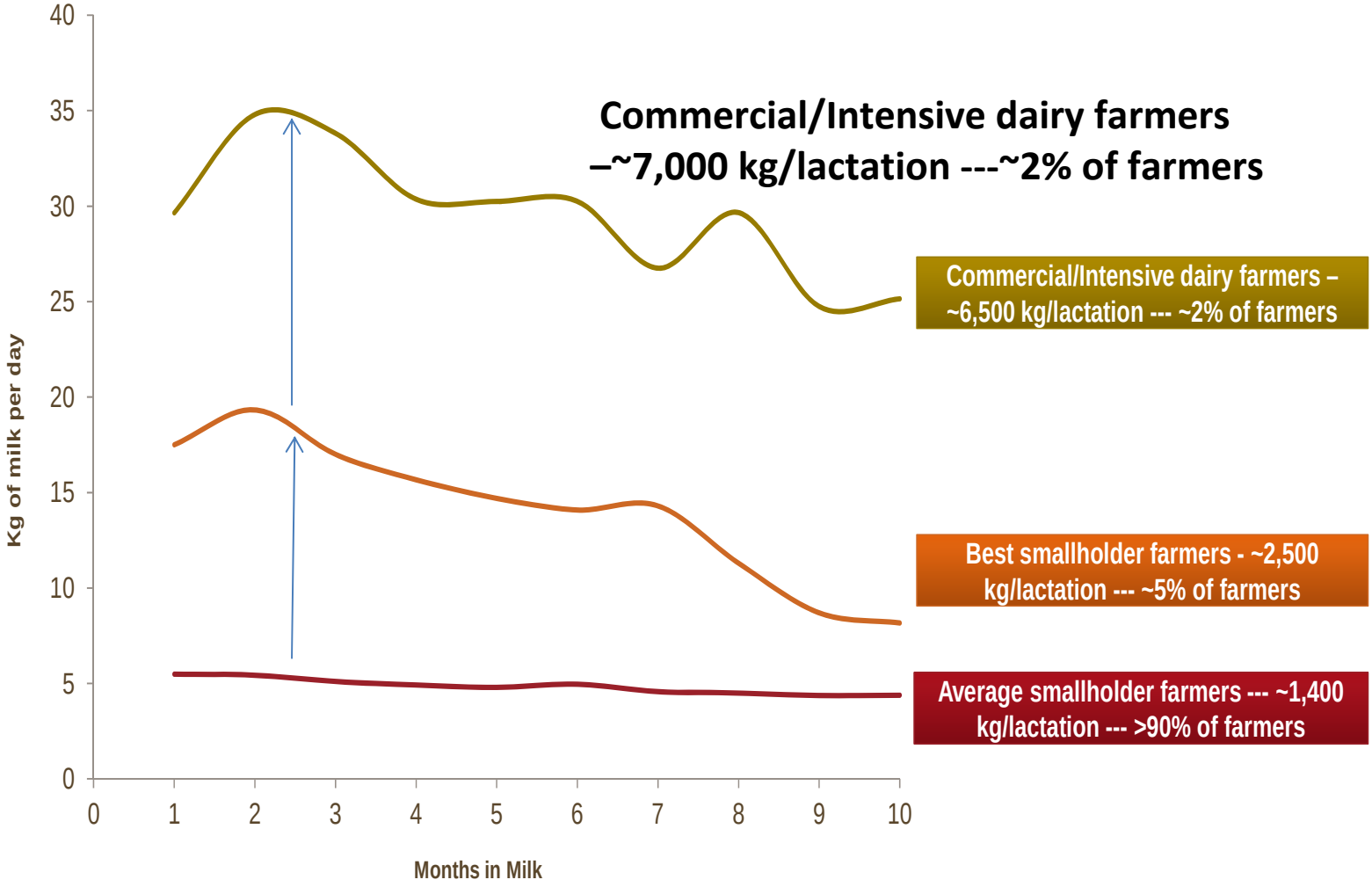
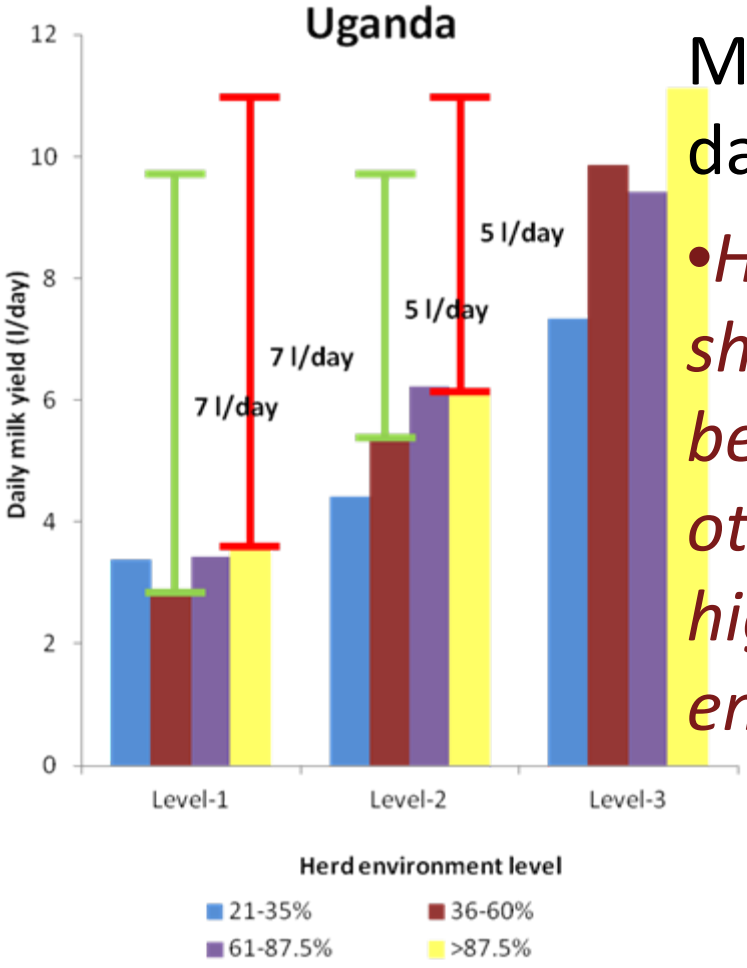


Figure 1: Realized lactation curves of improved (crossbred or higher) dairy cows achieved by different farmer types in Kenya



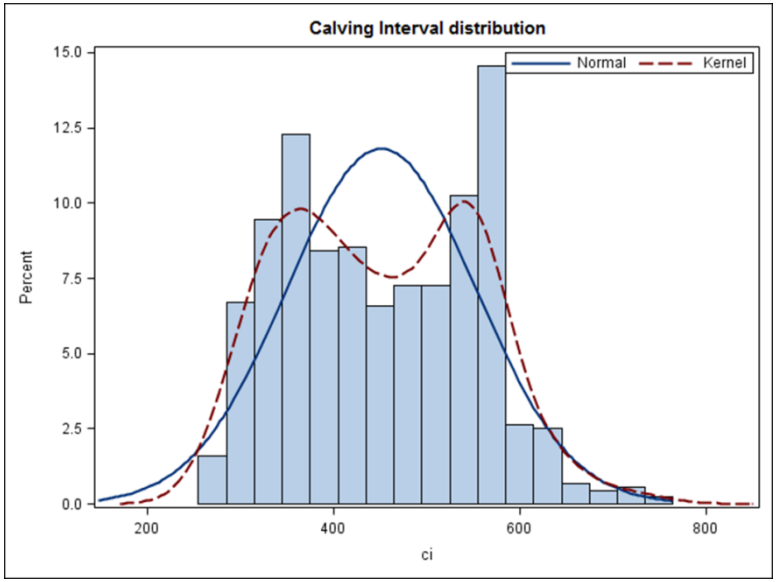


Milk production by % dairyness

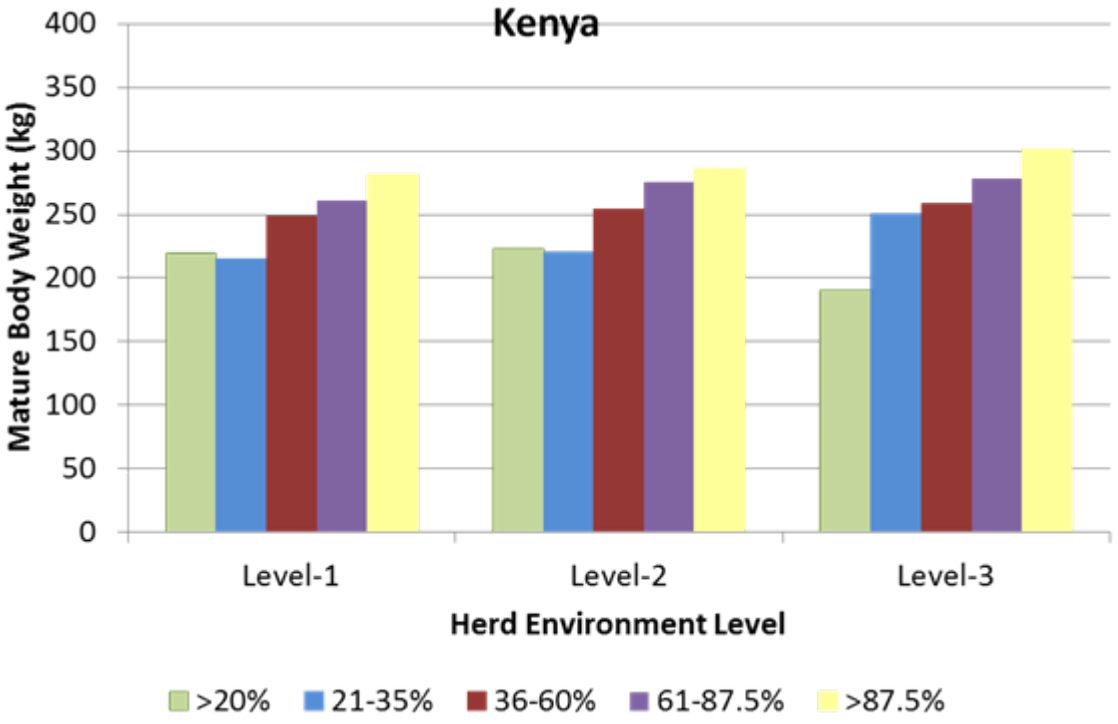
- *High grade cattle only showed substantially better milk yields than other grades in the highest production environment*

Calving intervals are long:

- Mean Calving Intervals: 427.7±124.8 days
- Calving Interval range: 260 to 862 days



- *Body size was relatively "small" and increased as proportion of exotic genes increased*



Some observations

- Most of the cows are crossbreds and there is no planned program for their improvement
- Demand for improved crossbreds outstrip their supply (heifer costs US$700-1500)
- Although AI service is preferred by most (>60%) of the farmers, who are willing to pay at market prices, the service is not readily available
- Most (60-70%) of farmers therefore use uncertified bulls for breeding

From the presentations made so far in this symposium

- It is clear that very few African Countries adhere to ICAR standards
- Most countries comply to OEI on traceability standards, but not fully
- Most African countries that are currently implementing AIT systems have not integrated performance recording to inform breeding and flock/herd management
- In each country, there is need for a simple, but integrated identification system that caters for performance recording and traceability, with a robust database & analytics, operated within a PPP institutional framework

Animal recording should aid farm management decisions, heath and genetic improvement

What is a record?

Documentation of an important production, health of production environmental event that relates to a specific animal!

So is possible to have one integrated identification system?

Let us look at integration as an opportunity not a challenge

What the other opportunities?

What are the value adds?

- What is in it for the farmer?
- Increased profits should partly be used for the identification and recording costs.
- Savings from improved animal health services should be partly used to support the AIR systems
- Who else is gaining?
- Participatory design and implementation is essential.

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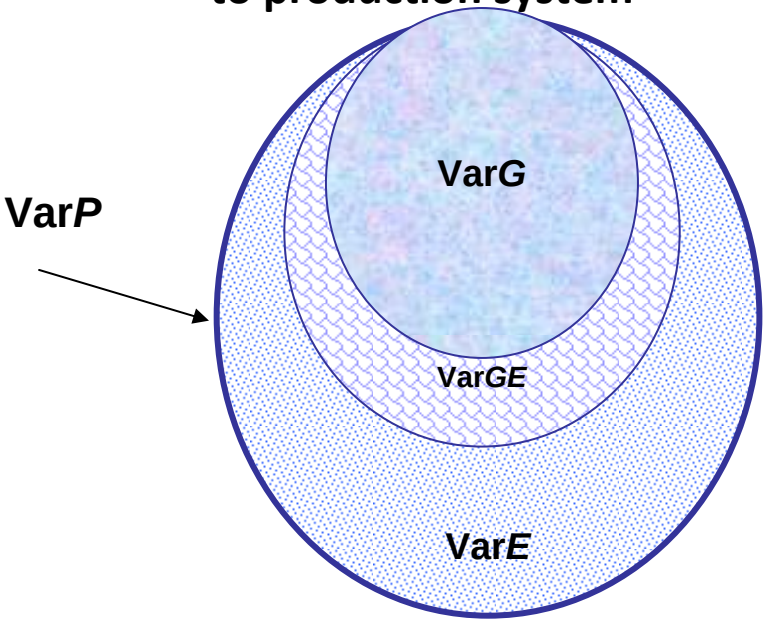
Performance recording is important becauese it enables:

- objective selection, management and breeding decisions
- monitoring of genetic progress and inbreeding levels
- Better matching of genotypes to production system



Environment enables or denies expression of genetic potential; performance recording enables you to make informed management and selection decisions

Innovative application of information is possible:

Handheld data capture tool: mobile phone, ODK

Ng'ombe Planner

a farmer centric data collection system and real-time data received

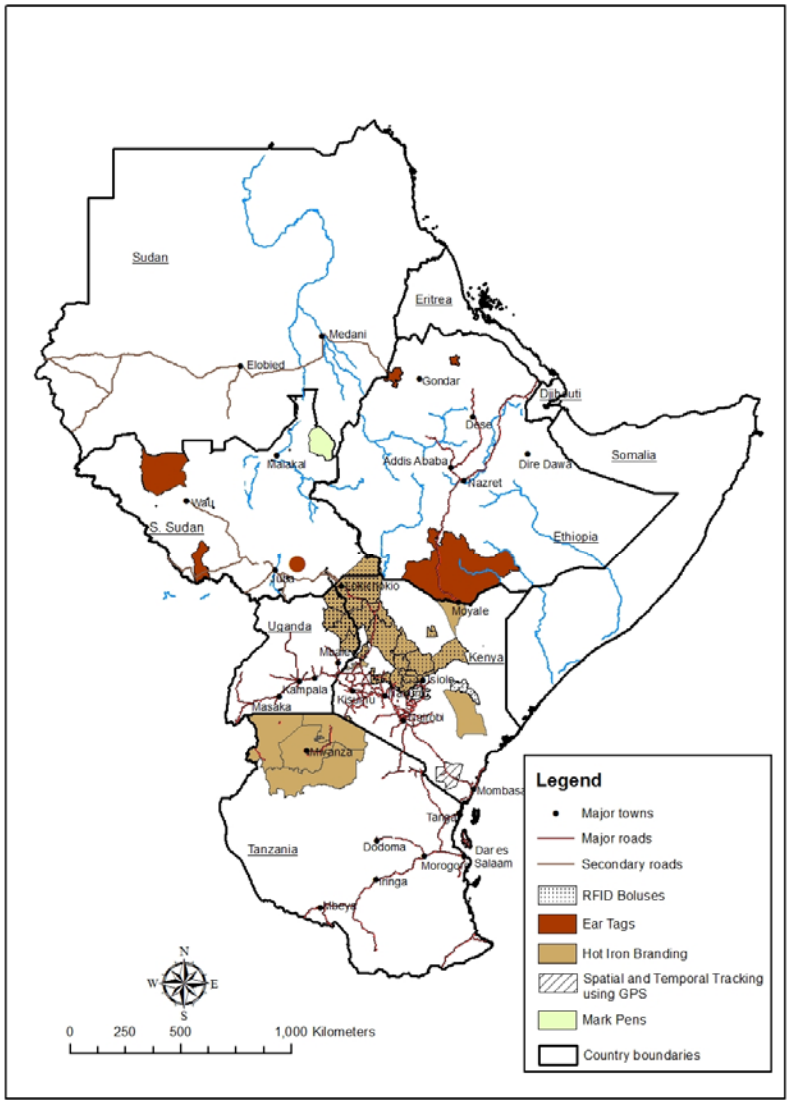
Recording of:
- Production data
- Reproduction events
- Sickness
- Events
- Sickness

Farmer Feedback System:
- Animal husbandry tips
- Farm management tips
- Reminders
- Notifications
- Retrieval of recorded data

Available on all phones:
- Low end phones via USSD
- Mid tier phones using Java
- High end phones - Android

ILRII-DGEA-Ng'ombe planner http://biolives.wordpress.com/2014/08/11/filling-the-milk-glass-east-african-farmers-to-gain-from-new-recording

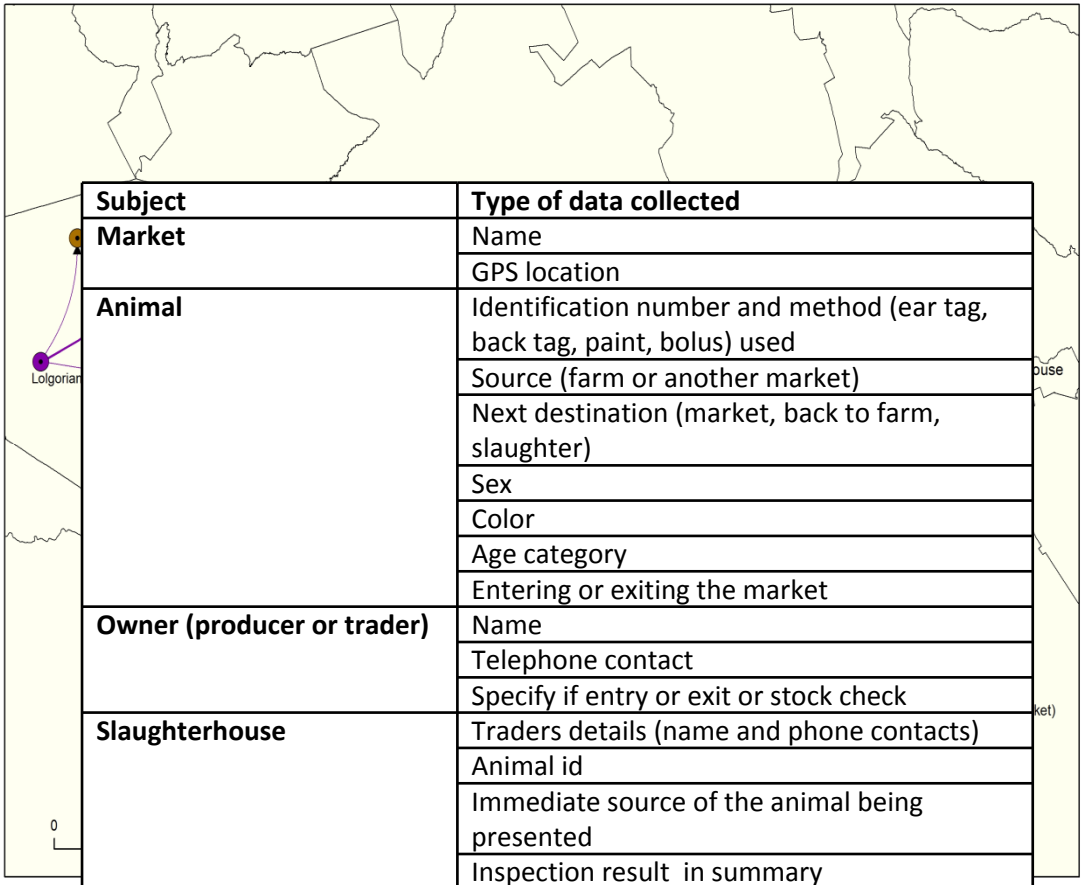
On-going LITS interventions in IGAD region



- Tanzania – combined visual and RFID (combo) ear tags
  (MoA/TANLIS)
- Uganda – Karamonja region – rumen boluses
  (under Cattle Theft Prevention Program)
- South Sudan – tamperproof ear tags
  (MoA/CNFA)
- Ethiopia – Borena, tamperproof ear tags
  (MoA/CNFA)

Ref: The Standards Methods and Procedures in Animal Health (SMP) project

Pilot study in a pastoral area in Kenya



Subject	Type of data collected
Market	Name
	GPS location
Animal	Identification number and method (ear tag, back tag, paint, bolus) used
	Source (farm or another market)
	Next destination (market, back to farm, slaughter)
	Sex
	Color
	Age category
	Entering or exiting the market
Owner (producer or trader)	Name
	Telephone contact
	Specify if entry or exit or stock check
Slaughterhouse	Traders details (name and phone contacts)
	Animal id
	Immediate source of the animal being presented
	Inspection result in summary
	Specify if sample is taken (barcode id of the sample linked to the animal id)
Laboratory	Sample identification number
	Tests done (antibiotic residue; brucellosis)

- Goal:
  - To design a LIT system to support surveillance for trade-sensitive diseases
    → more trade
- Pilot areas
  - Kenya, Uganda and Ethiopia
- Partners
  - AU IBAR
  - ICPALD
  - USAID
  - IGAD countries + Tanzania

Data capture systems – android-based smart phones, GSM network and ODK

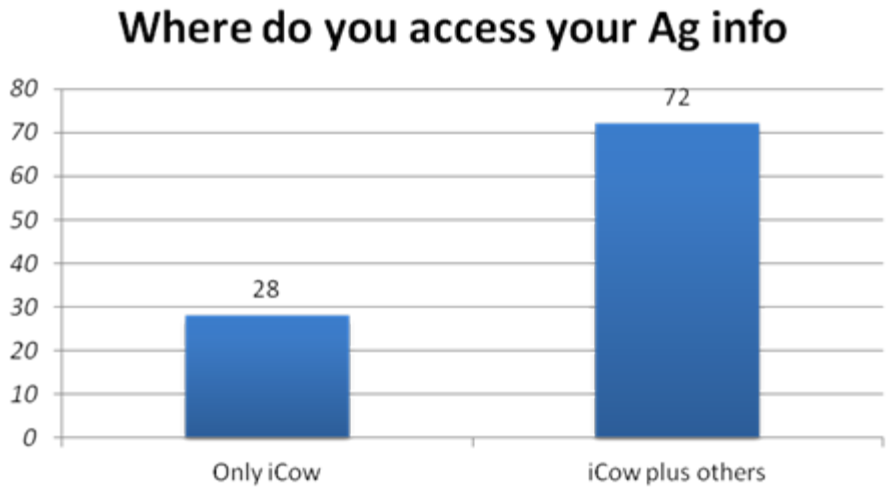
Initial observations

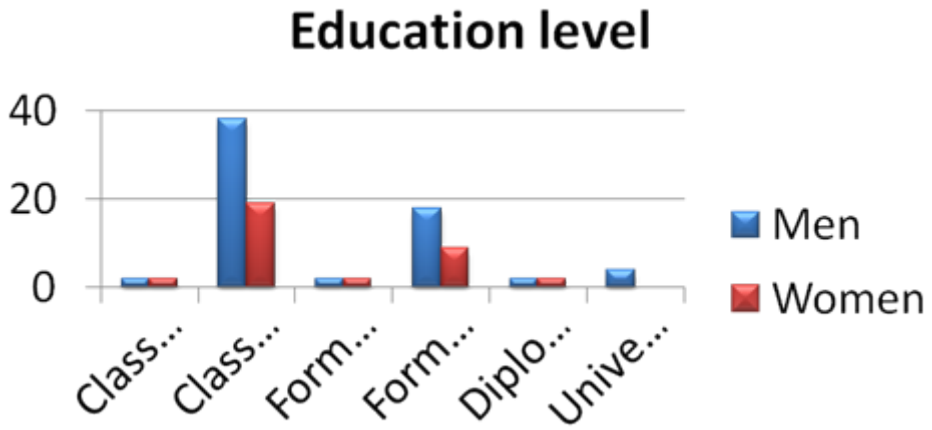
Fig. Cattle being ear-tagged in the primary market
ILRI/F. Mutua

- Ear tags highly preferred compared to other ID methods
  - 36% [100/276] of traders interviewed indicate they would pay for the system
  - The other proportion spread between various combinations of IDs
- Smart phones + ODK offer an alternative and reliable data capture systems
  - Flexibility in the types and structure of databases
- Inadequate facilities and infrastructure to scale up LITS in the region
- Rates of recapture low
  - In a pastoral set up, less than 15% of animals tagged at the primary markets are captured at processing plants, indicates:
    - Extensive coverage required – how can the informal sector be involved?
    - Public participation, including enforcement of LITS policies

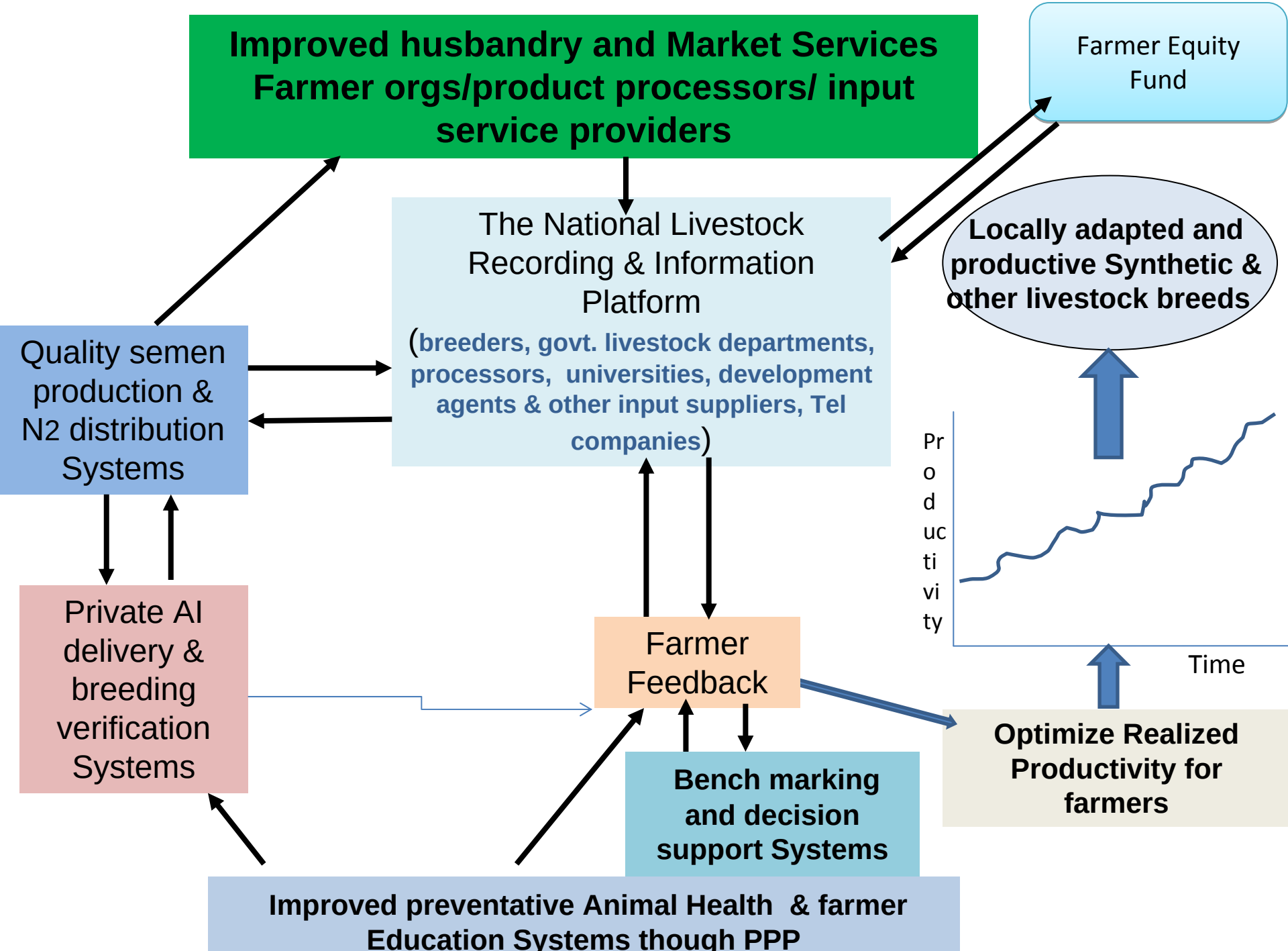
Green Dreams TECH Ltd, Icow Platform in Kenya

http://www.ke.undp.org/content/kenya/en/home/ourwork/inecgr/successstories/cultivating-youth-entrepreneurship-through-agribusiness.html)





Functional institutional frameworks are key and Private sector participation is important for sustainability


Improved husbandry and Market Services
Farmer orgs/product processors/ input service providers
Farmer Equity Fund
The National Livestock Recording & Information Platform
(breeders, govt. livestock departments, processors, universities, development agents & other input suppliers, Tel companies)
Locally adapted and productive Synthetic & other livestock breeds
Quality semen production & N2 distribution Systems
Private AI delivery & breeding verification Systems
Farmer Feedback
Bench marking and decision support Systems
Optimize Realized Productivity for farmers
Improved preventative Animal Health & farmer Education Systems though PPP
Productivity
Time

Some Conclusions

- Principle: "*Keep it simple, integrated & sustainable*" *(don't run before you walk)*
- Limit to few Economically Relevant Traits *(common sense: own performance-Growth/survival & for close relative-survival and fertility)*
- In low input and extensive systems adopt Community-based breeding programs for a start
- Embrace Public- Private-Partnerships
- Build systems around strong institutions that support robust databases and inbuilt analytics
- Good governance is critical for success

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