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Beef cattle breeding programmes for sub-Saharan Africa

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Organisation of Presentation

1. Introduction
2. The Breeding Process
3. Beef cattle farmers
4. Sampled cases
5. Community based organisation for genetic improvement of livestock
6. Concluding remarks and Acknowledgements
7. References

Introduction

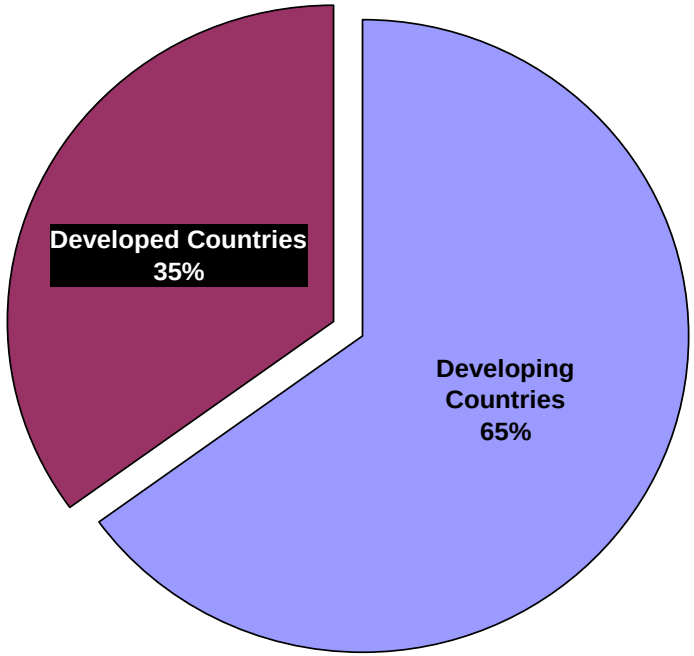


Figure 1. Projected meat demand by the year 2020 in different regions of the world: ***source: Delgado, C. L. (2003)***

- Growing meat demand, demands growing livestock numbers ("Livestock Revolution") especially in developing countries. Source: ***Delgado, C. L. (2003) and Tambi and Maina, (2003)***

Introduction, cont'd

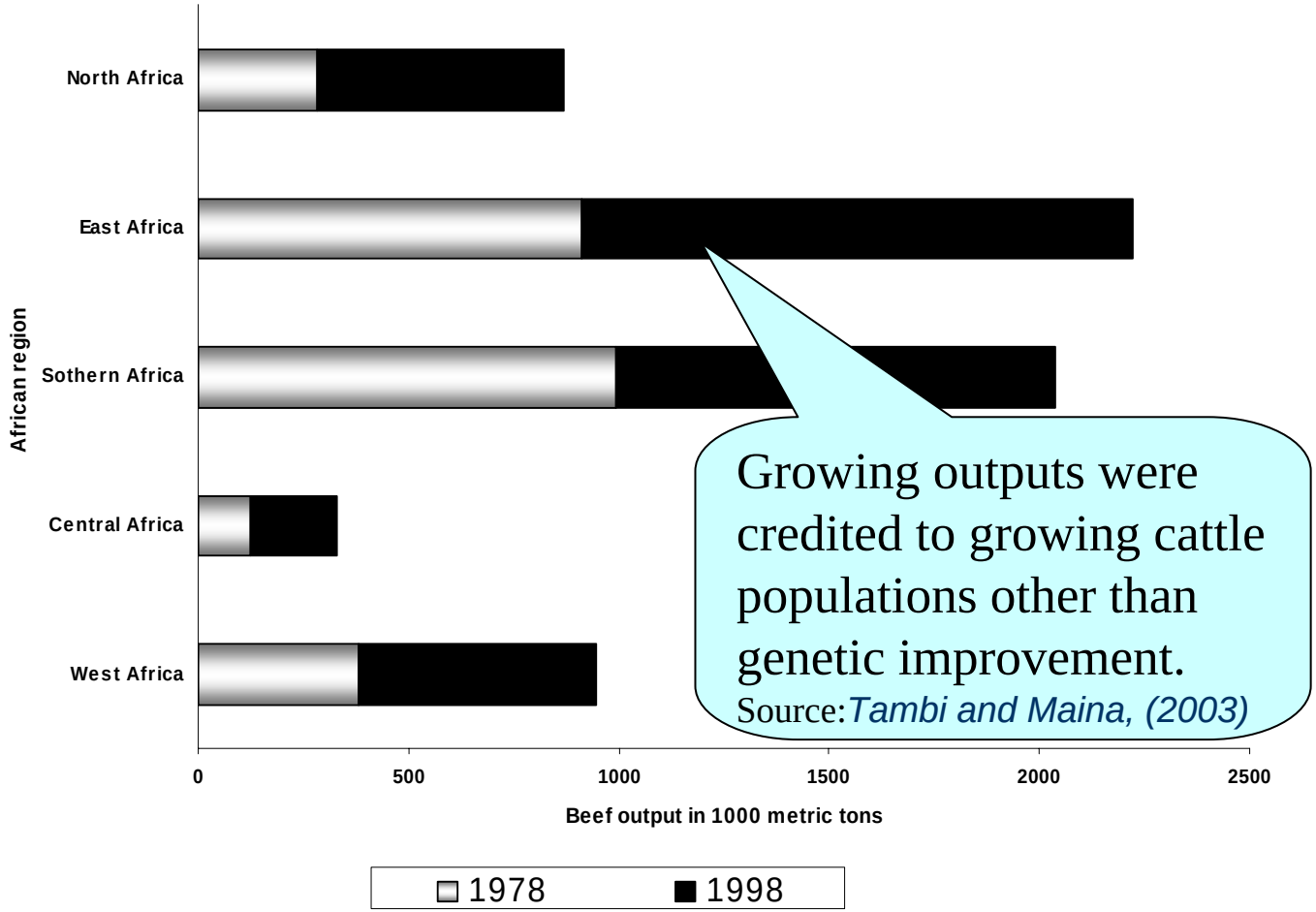


Figure 2. Regional beef output for Africa in 1978 and 1998
source: *Tambi and Maina, (2003)*

Research Question

- Do we have beef cattle genetic resources in sub-Saharan Africa?
- Is Breeding beef cattle necessary?
- Are all beef cattle farmers breeders?
- Are nucleus breeding programmes sustainable?
- What does the future look like for community based breeding programmes?

Schedule of the Breeding Process

- Development of breeding objectives
- Identification of selection criteria
- Recording and genetic evaluation
- Mating systems and dissemination of genetic gain
- Setting up breeding programmes

Beef cattle farmers

A classical classification example

- Livestock users - *purely exploitative relationship with the animal*
- Livestock keepers - *perform basic husbandry practices*
- Livestock producers - *supply additional inputs to improve animal production with market orientation*
- Livestock breeders - *have integrated herd management*

Source: Neidhardt, et al. (1996)

Table 1. Cattle production systems with a beef component in sub-Saharan Africa

Production system	Descriptors	Potential breeding objective
Nomadic/Pastoral	-Indigenous cattle (mostly) -Traditional settings -Irregular marketing -Rangeland grazing -Large (mixed) herds -Low-input	**Multipurpose objective** Milk, meat, draft, social security, savings and animal by-products
Farm Integrated	-Indigenous and crossbreds -Animal husbandry practiced -Strategic marketing -Small herds -Low-input	**-Dual-purpose objective** -Meat and milk
Market oriented	-Purebred indigenous/exotic and/or crossbreds -Record keeping -Regular marketing -Farmer organisations -Large herds -Medium-input	**-Single-purpose objective** -Meat production

Modified from: Neidhardt, et al. (1996)

Pictorial View of farmer groups

Baulé cattle in Burkina Faso

Large breeding herd in a ranch

DFID-AHP Photos: livestock_market

Small holder farmers trading livestock

Sampled Cases

The Case of N'Dama cattle

- Three-tier breeding programme Initiated in 1995 – ITC (*International Trypanosomiasis Centre*)
- Multiple breeding objective (meat, milk and disease resistance - trypanotolerance)
- A simple young-sire system

Pictorial view of N'Dama cattle

DAGRIS

provided by Campagnie J. Van Lancker

http://www.ansi.okstate.edu/breeds/cattle/

The Case of N'Dama cattle…

- Important Factors for success and sustainability;
  - Building capacity of local staff
  - Income generating ability
  - Close working relationship

- Results: formation of Indigenous Livestock Breeders' Associations to promote;
  - Public awareness (even through community radio)
  - Purchase of male offspring from multipliers
  - Encourage farmers' to participate
  - Supply of veterinary inputs

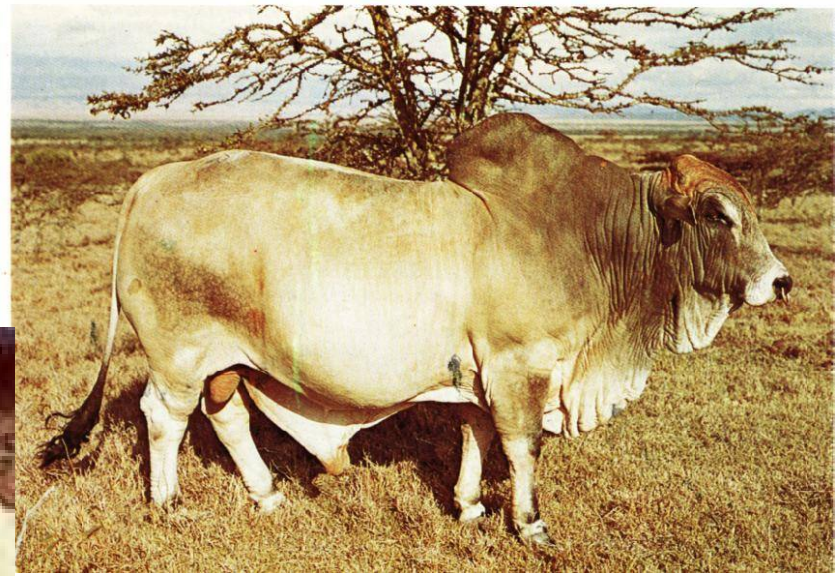
Source: Bosso, et al. (2006)

The Case for Kenya Boran Cattle

- *Bos indicus* breed kept primarily for beef production
- Challenge is to manage the breeding activities of the various farmers
- In 1968, National Beef Research Centre (NBRC),
- Setbacks
  - Lack of well-defined breeding objectives,
  - Lack of genetic evaluation,
  - Lack of feed back from research centre to farmers.

Pictorial view of Boran cattle

Ideal Boran Bull.
784 kg. 5 years old.



Source: Boran Cattle Breeders Society

The Case for Boran Cattle…

- In the 1970s a recording scheme was initiated: the Livestock Recording Centre (LRC)
- Producers opted out of the scheme – lack of feed back!
- Boran Cattle Breeders Society (BCBS) led to intuitive breeding of the improved Boran
- Boran cattle keepers are still independent with respect to selection and genetic improvement.

Source: Kahi (2006)

The case for Nguni Cattle

- Previously crossbred with European breeds
- This dilution of indigenous cattle genetic resources
- In 1950, the Bonsma report on appreciable deterioration of performance in European breeds in the semi-tropical regions of South Africa

Pictorial view of Nguni cattle

Nguni Bull

http://www.ansi.okstate.edu/breeds/cattle/

Nguni Cows and calves

http://www2.flickr.com/photos/overberg/42767607/

The case for Nguni Cattle ...

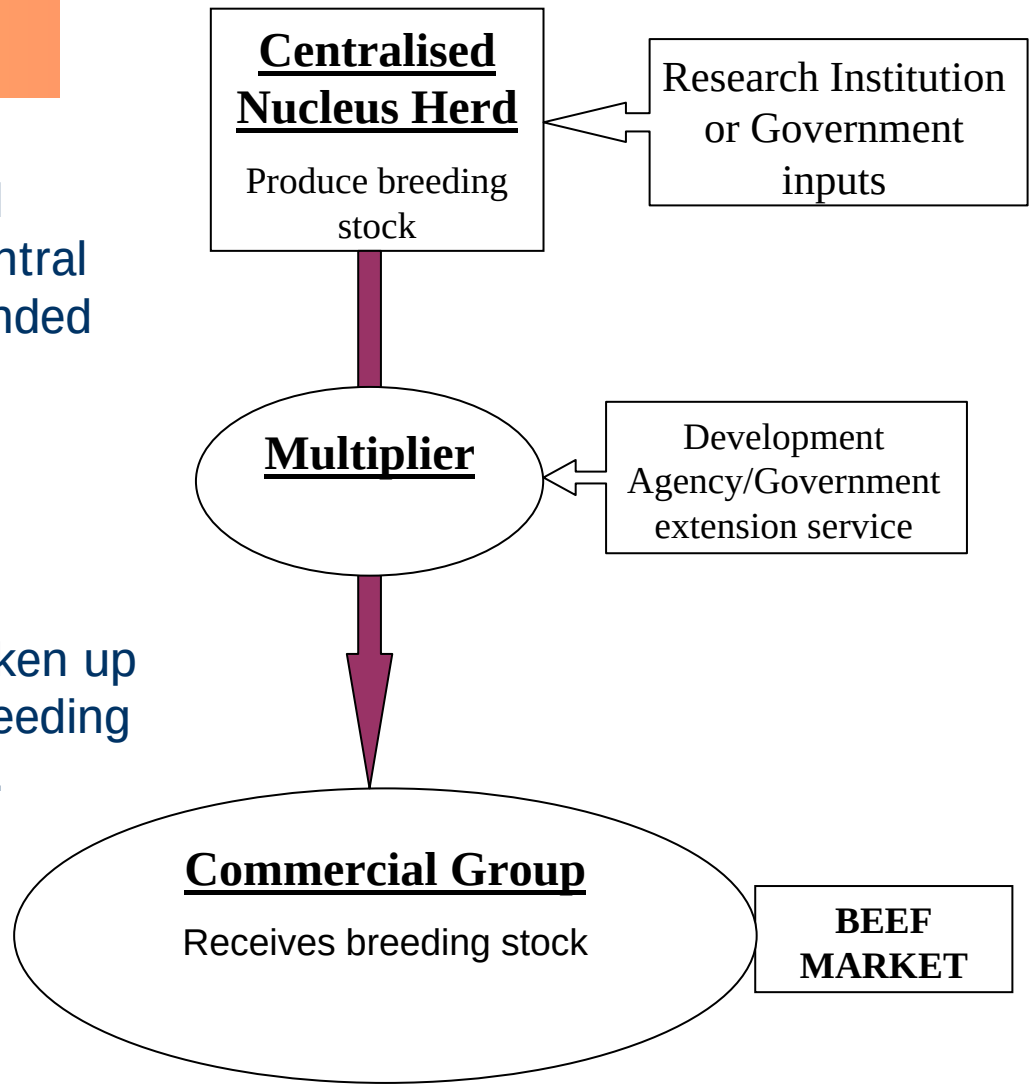
- In 1985, the Nguni Cattle Breeders' Society was incorporated
- Member of the South African Stud Book and Livestock Improvement Association
- The Nguni is being selected for functional efficiency
- South African studbook and livestock breeders association
  - Crucial for sustainability and advancement of livestock breeding programmes in South Africa.

http://studbook.co.za/society/nguni

General Comments

- Governments and international development agencies took central roles in establishing heavily funded breeding herds.

- Strong breed societies have taken up the initiative to oversee the breeding of their respective cattle types.



Community based organisation for genetic improvement of livestock

Community based Organisation for Genetic Improvement of Livestock (CBOGIL)

- Livestock owner groups with similar objectives
  - Breeder groups
  - Multiplier groups
  - Commercial groups
- Avoids infrastructural and logistical – regional operations
- Breeder “group” nucleus – set of satellite nuclei
- The multiplier and commercial groups receive improved stock from breeder groups

Source: Kahi et al. (2005)

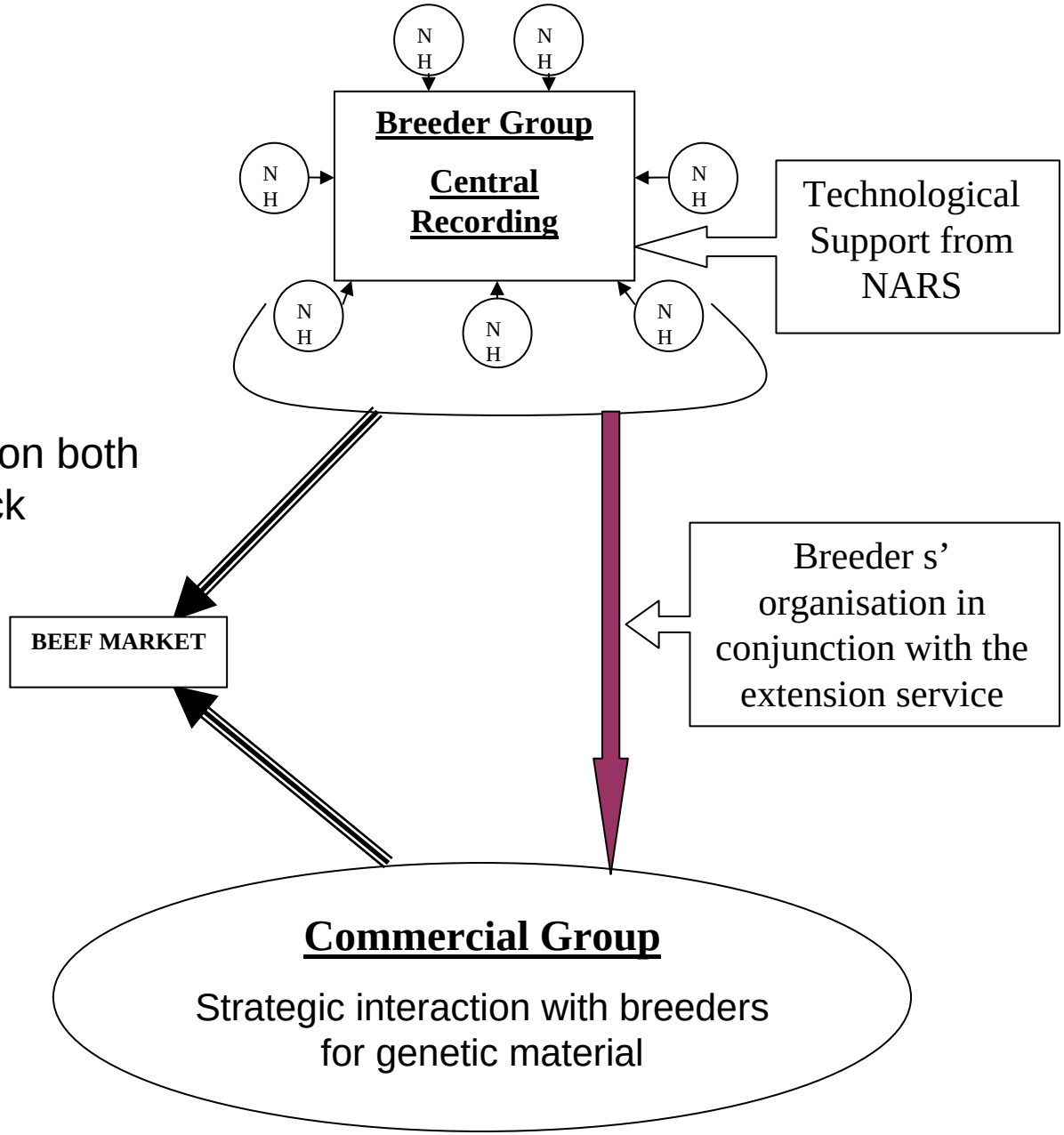
Application of breeding technologies

- Breeder groups support - National Agricultural Research Systems
  - breeding technologies, e.g. estimation of economic values, Strategic simple recording, computerisation of data
- Centralisation of data
  - Genetic evaluation and selection
- Dissemination of genetic material - supported by breeders' organisation and the government extension service

Layout of the regional community-based breeding programme

NH – Nucleus Herds

Breeder group trading on both beef and breeding stock

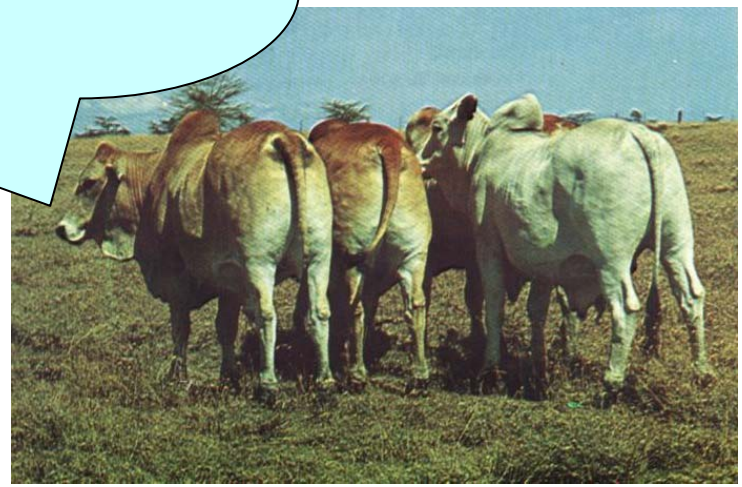


Source: Rewe et a., 2007

Concluding remarks

Technological and institutional adjustment is necessary for breeding programmes to work within breeder group communities of sub-Saharan Africa

CBOGILs provide an avenue for farmers to access breeding technologies towards market orientation



Acknowledgements

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THANK YOU!

References

- Bosso, N. A., van der Waaij, E. H., Somda, J., Corr, N., Kahi A. K. and J.A.M. van Arendonk (2006) 'The International Trypanotolerance Centre (ICT) N'Dama cattle genetic improvement programme: Present status and potential outlooks', *(in preparation).*
- Delgado, C. L. (2003) 'Rising consumption of meat and milk in developing countries has Created a new Food Revolution', *Journal of Nutrition,* Supplement, 133, pp 3907S-3910S.
- Neidhardt, R., Grell, H., Schrecke, W. and Jakob, H. (1996) 'Sustainable livestock farming in East Africa', *Animal Research and Development,* Vol 43/44, pp 44 – 52.
- Kahi, A. K., Rewe, T. O. and Kosgey, I. S. (2005) 'Sustainable community-based organizations for the genetic improvement of livestock in developing countries', *Outlook on Agriculture,* Vol 34, No 4, pp 261-270.
- Kahi, A.K., Wasike, C. B. and Rewe, T.O. (2006) 'Beef production in arid and semi-arid lands: Constraints and prospects for research and development', *Outlook on Agriculture,* Vol 35, No 3, pp 217 - 225.
- Rege, J. E. O. and Tawah, C. L. (1999) 'The state of African cattle genetic resources II. Geographical distribution, characteristics and uses of present-day breeds and strains', *Animal Genetic Resource Information,* Vol 26, pp 1 – 25.
- Tambi, N. E. and Maina, O. W. (2003) 'Patterns of change in beef production and consumption in Africa', *Review of Science Technology Off. int. Epiz,* Vol 22, No 3, pp 965 – 976.
- Rewe, T. O., Herold, P., Kahi, A. K. and Valle Zaráte, A. (2007) 'Breeding indegenous beef cattle genetic resources in sub-Saharan Africa. *Outlook on Agriculture (submitted)*