Gene Flow in Animal Genetic Resources – A Study on Status, Impacts, Trends from Exchange of Breeding Animals

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Objectives

- Quantify the transfer of animal genetic resources;
- Impact assessment within case studies;
- Input for First Report on the State of the World's Animal Genetic Resources of FAO (Food and Agriculture Organisation).

Introduction

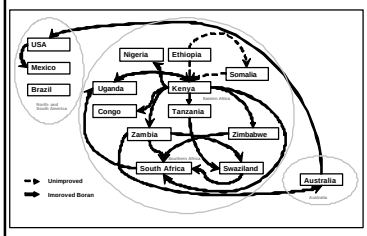
- Exchange of animal genetic material has always taken place, but baseline data on the history of gene flow is lacking;
- Quantitative data on the exchange of livestock genetic resources between and among industrialised and developing countries is lacking;
- Advantages and disadvantages of this gene flow for different stakeholders have not yet been assessed;
- Some stakeholders argue that animal genetic resources are being used without sharing of benefits.

Material and Methods

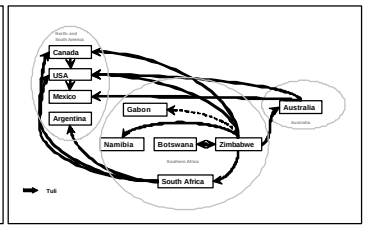
- Global study
  - Includes: sheep, goats, cattle and pigs;
  - Focus on selected breeds and regions;
  - Analysis of statistical records;
  - Analysis of project reports, publications and country report excerpts provided by FAO;
  - Systematic expert consultations leading to complementary information and crosschecking and validation of data.
- Selected case studies for impact assessment:
  - The worldwide gene flow of the Improved Awassi and Assaf breeds of sheep from Israel;
  - History and worldwide development of Anglo Nubian goats and their impacts in smallholder farms in Bolivia;
  - Boran and Tuli cattle breeds – origin, worldwide transfer, utilisation and the issue of Access and Benefit Sharing;
  - Impact of the use of exotic compared to local pig breeds on socio-economic development and biodiversity in Vietnam.

Results

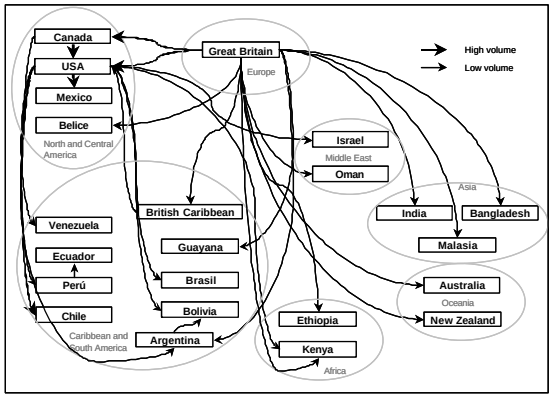
- Accessible information differs considerably in quantity and quality between species, breeds and regions;
- Human migration led to animal transfers in the past with high positive impact on biodiversity and food security;
- Animal movements from the perspectives of selected northern and southern countries for selected breeds are quantified over time;
- Global mobility, institutional concentration and high technology in the last decades led to massive transfers, negative effects on biodiversity and controversial effect on food security;
- Today trade and veterinary regulations increasingly constrain transfers.



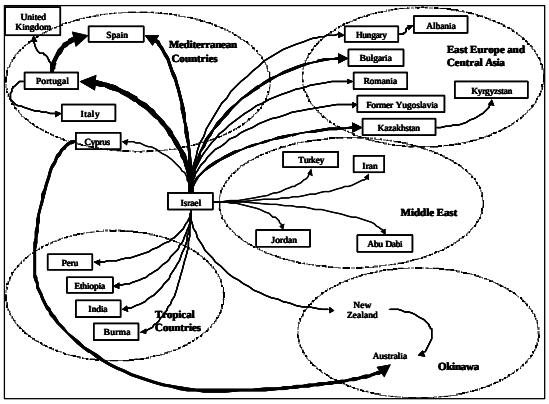
Boran cattle (Source: Homann et al, 2005)



Tuli cattle (Source: Homann et al, 2005)



Anglo Nubian goats (Source: Stemmer et al, 2005)



Awassi sheep (Source: Rummel et al, 2005)

Conclusions

- The impact of animal exchange cannot globally be valued positive or negative;
- Main determinant is breed suitability for prevailing production systems;
- Only within specific case studies conclusions on success and failure can be drawn;
- In most cases, gene flow is characterised by free animal movements, based on commercial interests on the side of the importer;
- Gene flow initiated by private persons, breeders or companies has more sustainable impact than development projects of governments or NGO's;
- For different stakeholders and aspects, like impact on biodiversity, environment and food security, conclusions differ;
- Need for a worldwide documentation with a minimum standard to establish an analysable database.

Institutions involved

- Commissioner: BMZ (Federal Ministry for Economic Cooperation and Development) and GTZ (German Technical Cooperation)
- Implementation: Institute of Animal Production in the Tropics and Subtropics, University of Hohenheim
- Implementing partner: FAO (Food and Agriculture Organisation)
- Advisory Panel composed of international scientists, representatives of donor and development agencies, private sector and NGOs

On behalf of: