
The conservation of Animal Genetic Resources in an international context

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c/FAO/Giulio Napolitano



Why are animal genetic resources important?



- Essential part of biological basis for world food security
 - one billion people rely directly on livestock for major proportion of livelihood
- Diverse resource base critical to eradicate world hunger
 - adaptation to current and future environmental constraints
 - “raw material” for breeders to make genetic improvement
- International public good
 - logical role of FAO in global coordination



Decision flow on genetic resources in FAO



Genomic characterization of animal genetic resources



- Guidelines are based on the work of the Commission on Genetic Resources for Food and Agriculture
- Global Plan of Action for Animal Genetic Resources
- *The State of the World's Biodiversity for Food and Agriculture*, Interlaken (2007)
- "Reaffirming the World's Commitment to Global Plan of Action for Animal Genetic Resources" (FAO, 2017).
- Assessments of the state of the world's biodiversity and genetic resources for food and agriculture are based on country reports

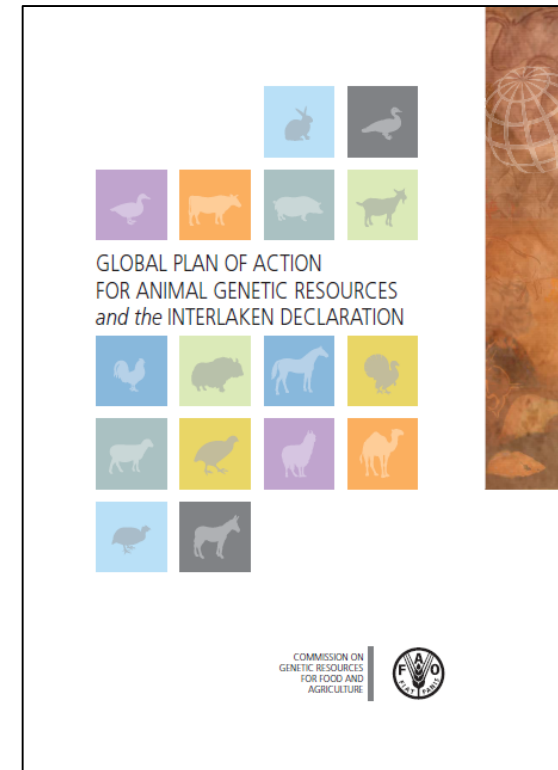




Global Plan of Action

4 Strategic Priority Areas:

1. **Characterization, Inventory and Monitoring**
2. Sustainable Use and Development
3. Conservation
4. Policies, Institutions and Capacity-building



Genomic characterization of animal genetic resources



- Assessment of the state of the world's biodiversity and genetic resources for food and agriculture is based on country reports
- Domestic Animal Diversity Information System (DAD-IS, www.fao.org/dad-is/en)
 - Established 1996
 - 182 countries report to DAD-IS
 - 15.000 national populations
 - 8800 breeds are represented



The role of DAD-IS

- Domestic Animal Diversity Information System
- Communication and information tool to manage animal genetic resources
- Online interface to the FAO Global Databank on Livestock Breeds
- Official country data provided by National Coordinators
- Contains information on:
 - Nearly 9000 breeds
 - >15,000 national breed populations
 - 38 species

The screenshot shows the DAD-IS website interface. At the top, there is a blue header with the FAO logo and the text "Food and Agriculture Organization of the United Nations". To the right of the header is a search bar labeled "Google Custom Search" and a navigation menu with links for "About FAO", "In Action", "Countries", "Themes", "Media", "Publications", "Statistics", and "Partnerships". Below the header, the main title "Domestic Animal Diversity Information System (DAD-IS)" is displayed. Underneath the title is a navigation bar with tabs for "Data", "News", "Publications", and "National Coordinators". The main content area features a large image of a cow's face in the foreground and a herd of cows in a field in the background. Below the image is the text "Workshop on 21-23 November 2017". To the right of the image is a section titled "What is DAD-IS?" with a detailed description of the system. Below the image and text are three interactive elements: "Browse by species and country" with a cow icon, "Status of reporting" with a donut chart showing 40%, 15%, 10%, and 35% segments, and "Transboundary breed" with a map of the world showing transboundary breeds. At the bottom right, there is a "Contacts" button.



What information does it contain?

■ Breed-related info

- Population size
- Breed description
- History
- Special traits and characteristics
- Summary stats
- Conservation programmes
- >4000 images

Food and Agriculture Organization of the United Nations

Google Custom Search

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Domestic Animal Diversity Information System (DAD-IS)

Home Data In Focus Publications National Coordinators Regional/National Nodes

DAD-IS is the Domestic Animal Diversity Information System maintained and developed by FAO. It provides you with access to searchable databases of breed-related information and photos and links to other online resources on livestock diversity. Furthermore, you can find the contact information of all National Coordinators for the Management of Animal Genetic Resources. It allows you to analyse the diversity of livestock breeds on national, regional and global levels including the status of breeds regarding their risk of extinction.

Key facts

- The roles and values of animal genetic resources remain diverse, particularly with regard to the **livelihoods of poor people**.
- There are around **8800 livestock breeds of 38 different species in the world**, providing a diversity of products and services.
- Many breeds have **unique characteristics** that can contribute to meeting challenges related to **climate change**.
- The threats to animal genetic resources **need to be better identified** and their potential effects better assessed, so that action can be taken.

Tools

DAD-IS provides you with tools to monitor national breed populations and with this, to make informed decisions on the management of animal genetic resources. More than 15 000 national breed populations (representing more than 8 800 breeds and about 40 species) from 182 countries are recorded.

You can measure progress made towards target 3.5 under the Sustainable Development Goals (SDG).

Success and other stories

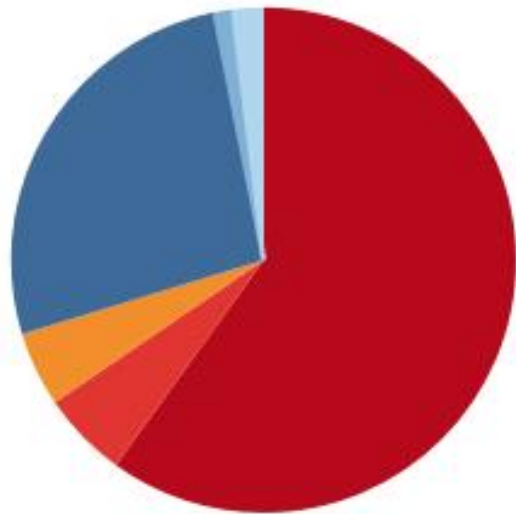


What can it be used for?

- Resource for general study of breeds
 - comparison
- Monitoring of breed diversity
- Identification of new stock for breeding programmes



Current situation – classification



Breeds Categories

- Local mammalian breeds
- Regional transboundary mammalian breeds
- International transboundary mammalian breeds
- Local avian breeds
- Regional transboundary avian breeds
- International transboundary avian breeds

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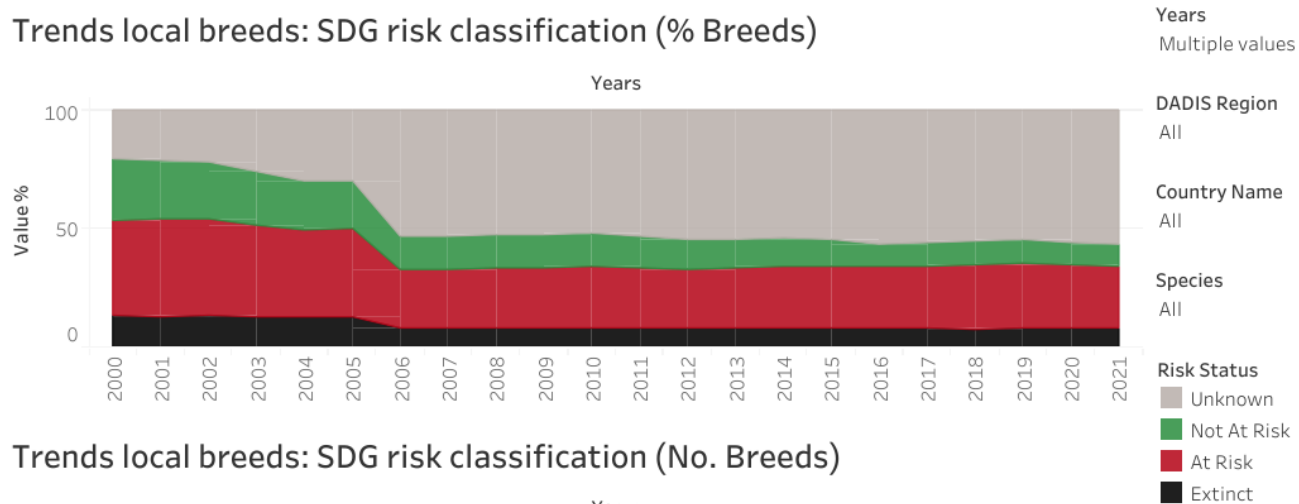


Current situation – risk status

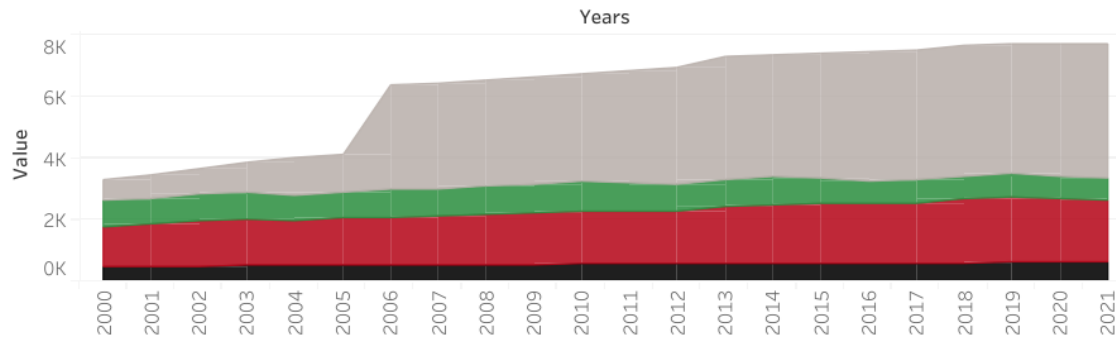
Trends: SDG risk classification

Trends: detailed risk classification

Trends local breeds: SDG risk classification (% Breeds)



Trends local breeds: SDG risk classification (No. Breeds)

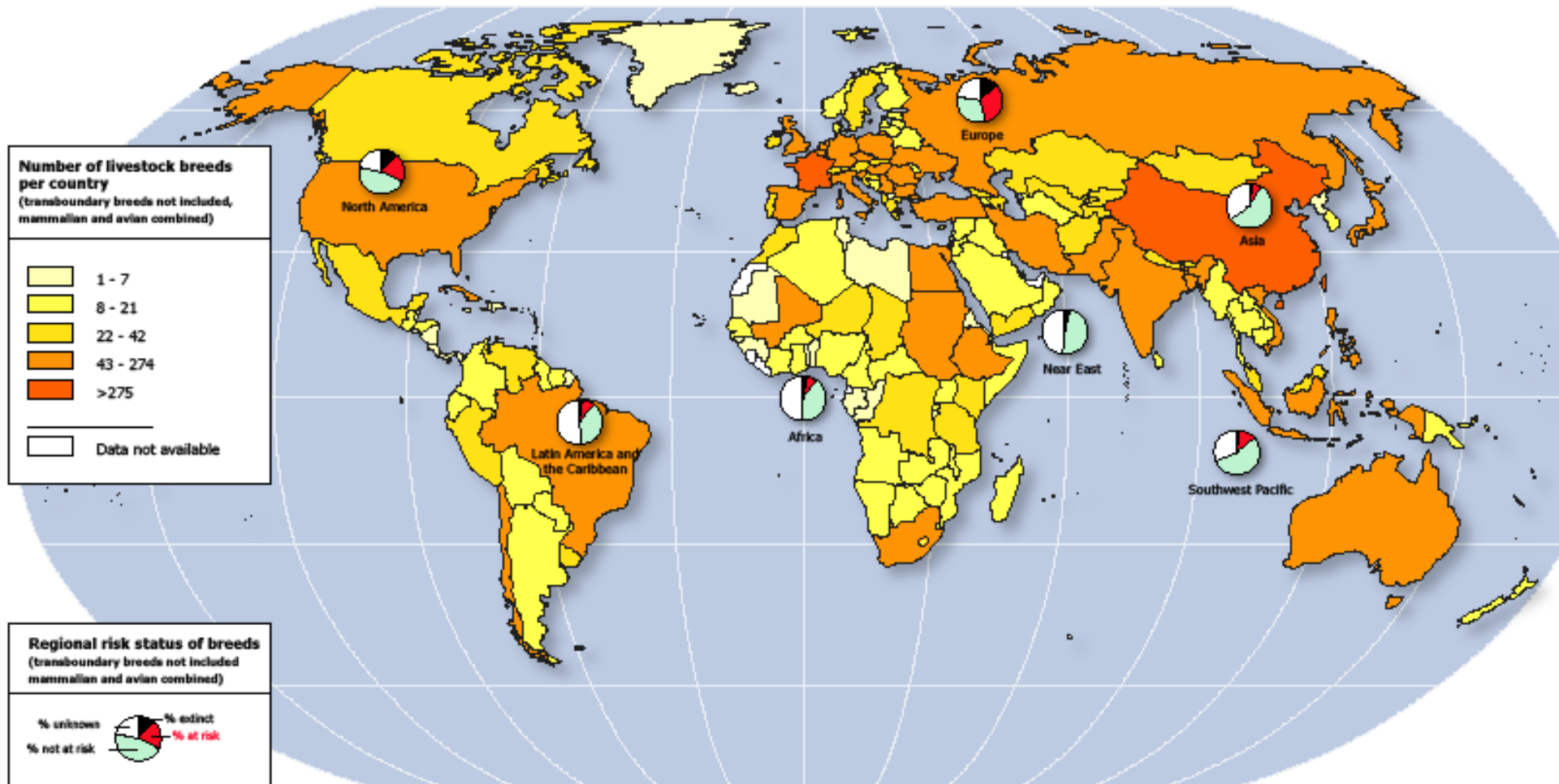


Transboundary breeds versus local breeds

- Some specialized breeds are widespread throughout the world (transboundary breeds)
- Local breeds represent around 80% of all breeds
 - are usually much less productive
 - replacement by crossbreeding can be a consequence
 - but they are well adapted to the local environment:
 - Heat tolerance
 - Drought tolerance
 - Resistance to certain diseases



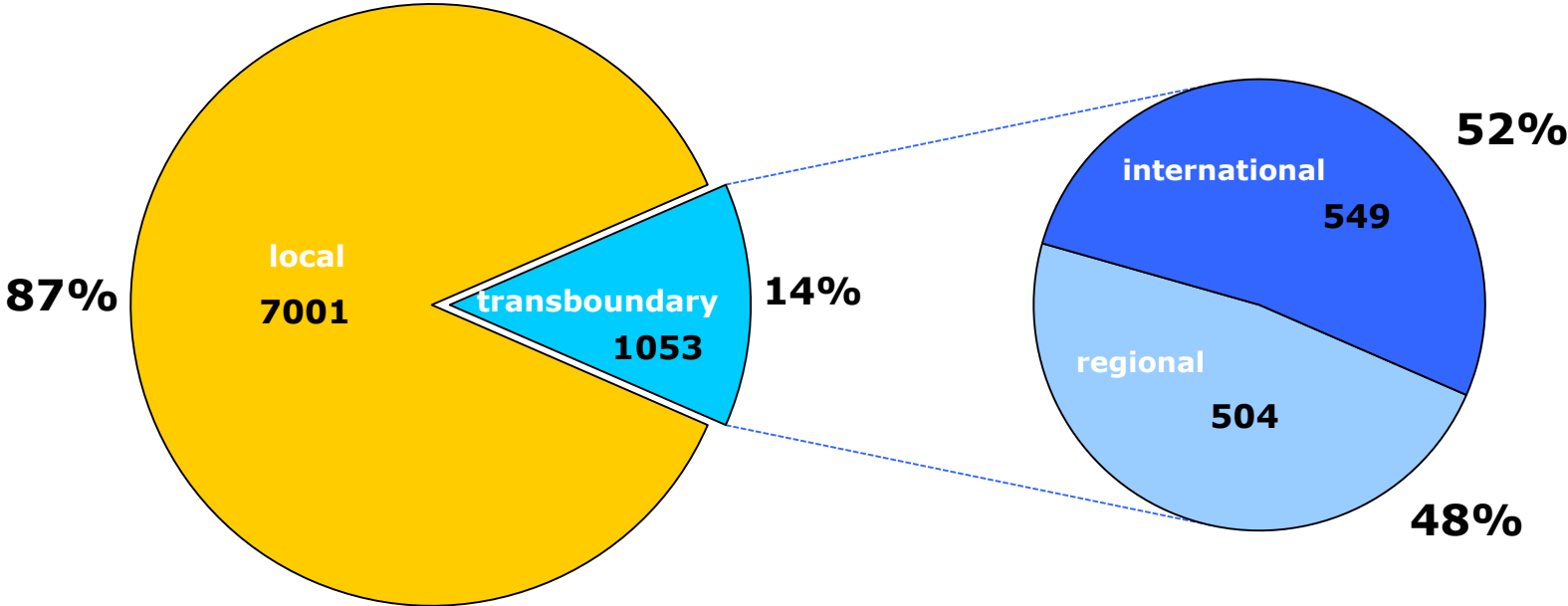
Local breeds by country



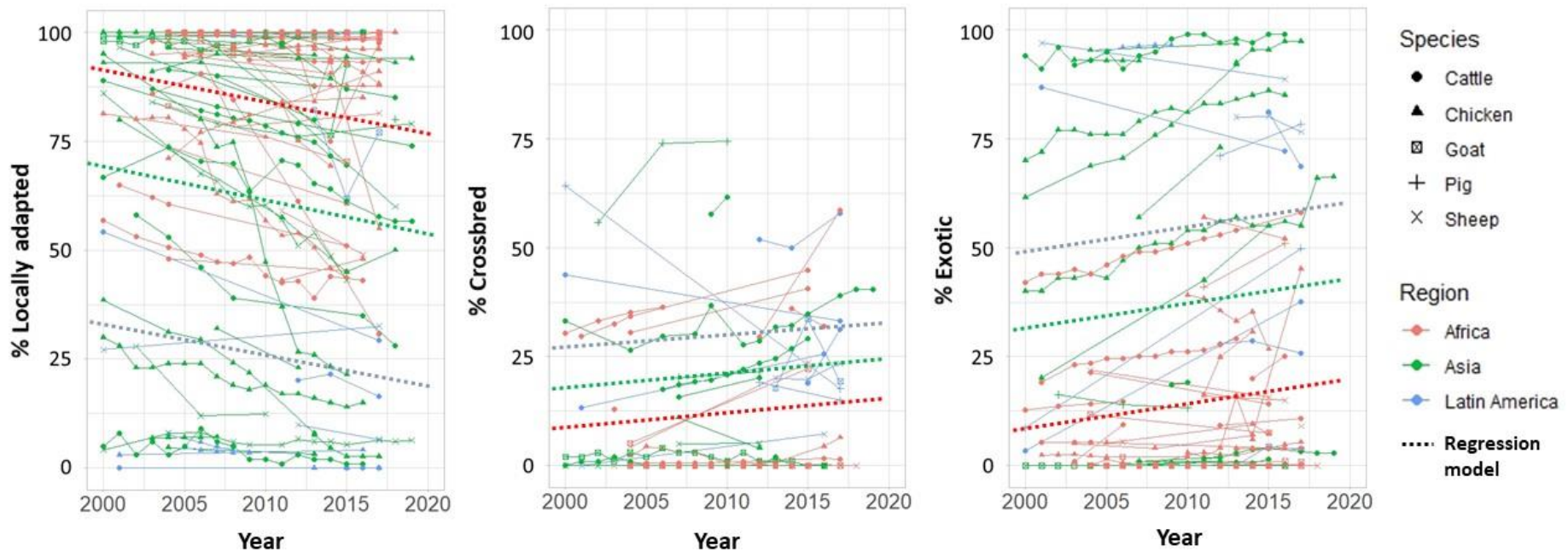
Updated Status of AnGR

Breed diversity – the global picture

8054 breeds reported



AnGRs: a heritage which evolves



- In developing countries, increasing importance of crossbred and exotic breeds



Adaptation: the role of genetic diversity

- Genetic diversity underpins adaptation to climate change in food and agriculture
 - Heat tolerance (PGR; AnGR)
 - Effective use of scarce water and nutrients (PGR; AnGR; AqGR; FoGR)
 - Use of low quality feed (AnGR)
 - Resistance to diseases (PGR; AnGR; AqGR; FoGR)
 - Phenological changes - timing of sowing and harvesting (PGR), growth control in forestry species to avoid late frosts (FoGR), age at puberty (AnGR)
- Breeding is a long-term effort and cumulative

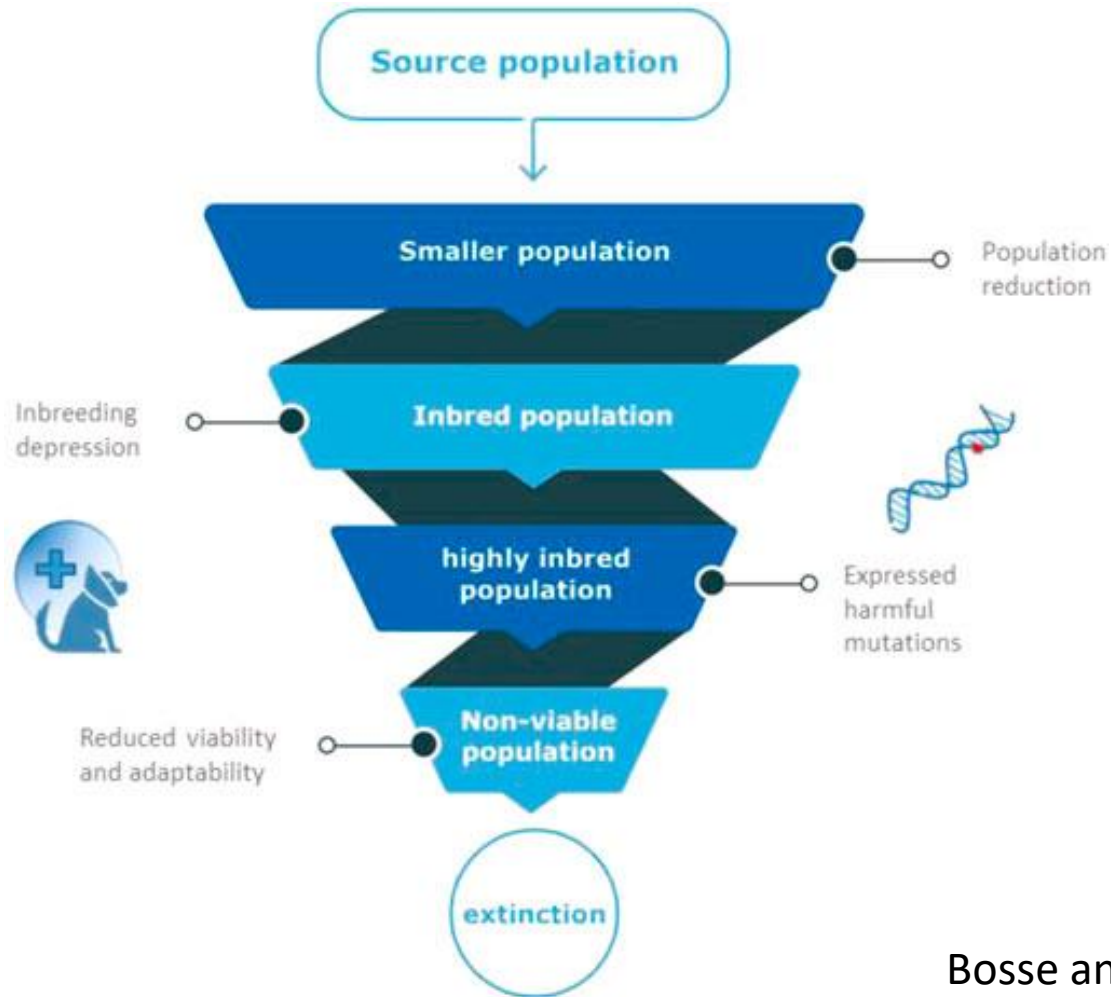


Why is Maintenance of Diversity Important?

- Domestic Animal Diversity should be maintained for its economic potential
- Allows for responses to changes in:
 - market demands and/or associated regulations
 - availability of external inputs
 - emerging disease challenges
 - climate with consequences for the ecosystem
 - a combination of these factors
- Allows for continual genetic improvement in a stable environment
- Allows for development of new products



What can happen with endangered breeds?



Bosse and van Loon, 2022



Conclusions

- Conservation of animal genetic resources is essential for future generations
- Monitoring of animal genetic resources is essential for conservation
- Efforts should be strengthened

