



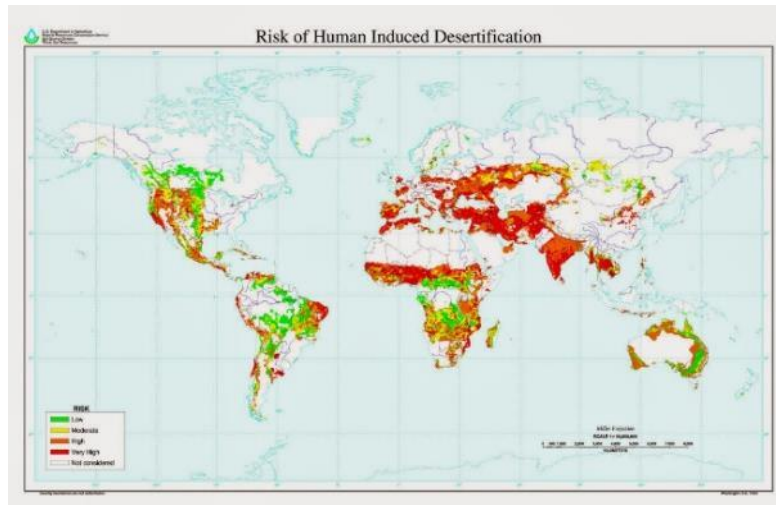
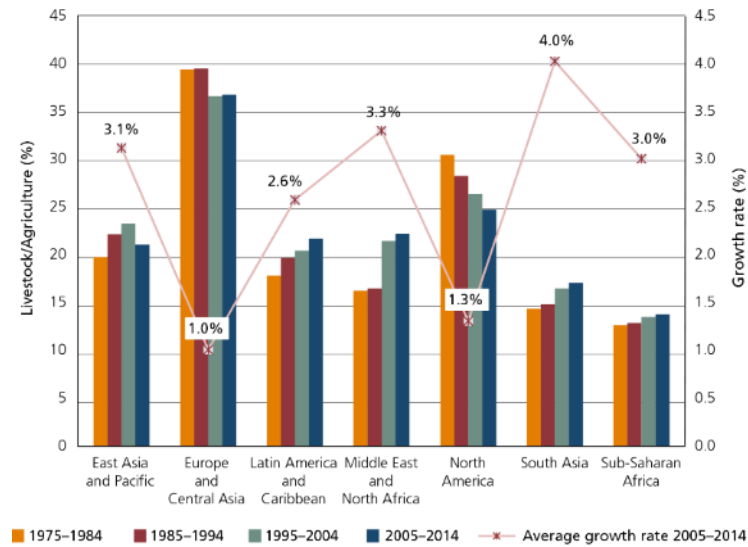
Challenges for Livestock Diversity

SDG indicators 2.5.1b and 2.5.2

Gregoire Leroy and Roswitha Baumung, AGAG
Animal Production Officers, FAO

03/05/21

Global challenges around livestock production



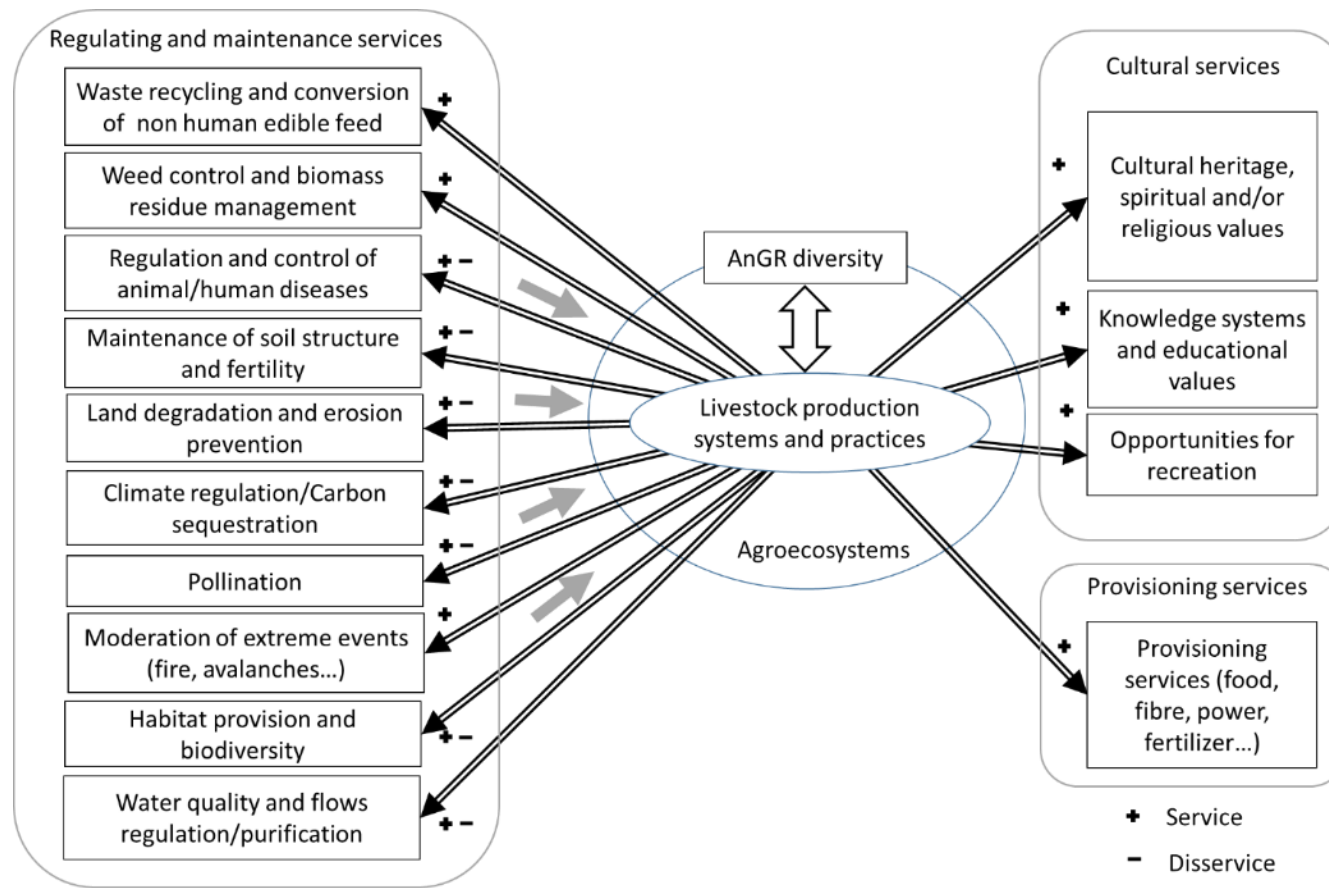
- Demand for livestock products is increasing (regional differences)
- Changing economic and social importance of livestock (e.g. animal welfare, cultural role...)
- Increased role of livestock regarding mitigation, adaptation but also contribution to climate change

Animal genetic resources



- **Genetic material** of actual or potential value
- Livestock diversity: more than 15,000 national breed populations belonging to about **8800 breeds** representing **38 species**
- + managed honeybees for food and agriculture

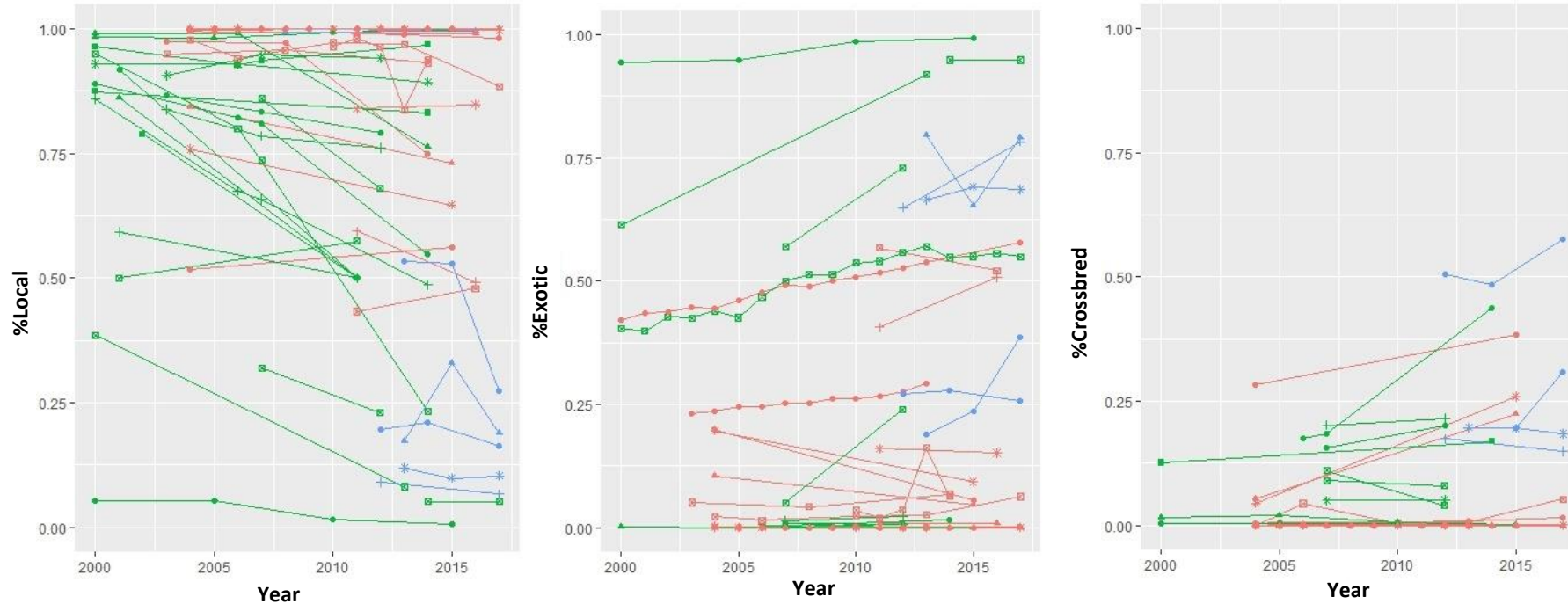
AnGRs: a potential for adaptation



Leroy et al. 2018

- A diversity of ecosystem services provided by a diversity of (locally adapted) breeds and their adaptive traits

AnGRs: a heritage which evolves



- In developing countries, increasing use of crossbred animals and exotic breeds



AnGRs: a heritage which evolves

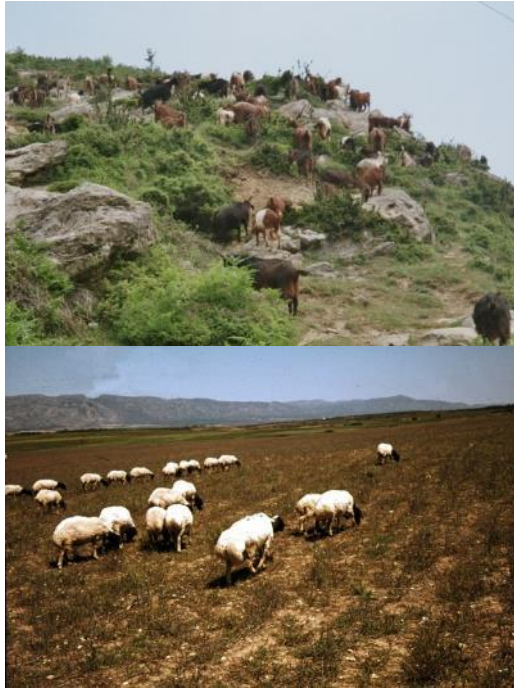
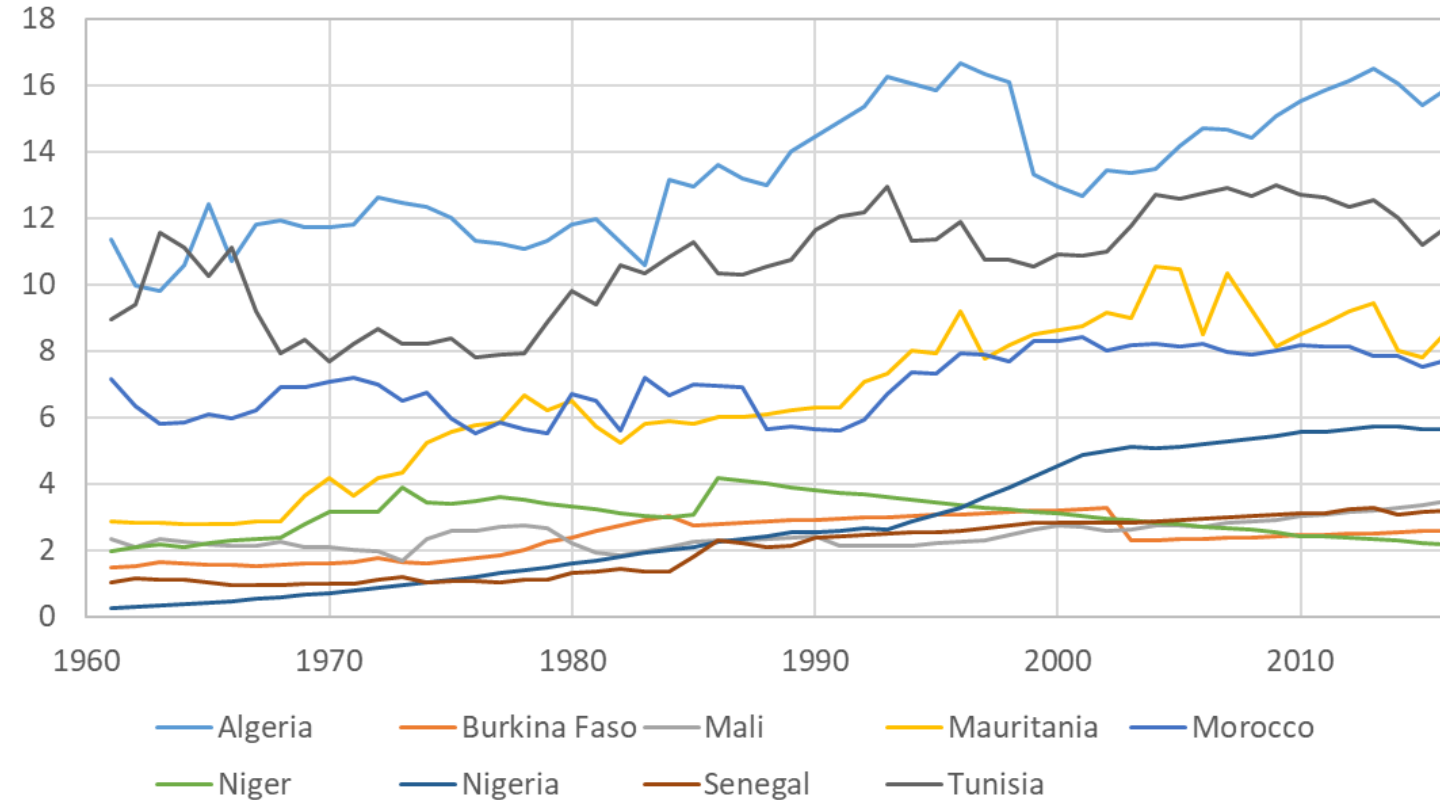


Photo: Kume, K., Gley Khaldi

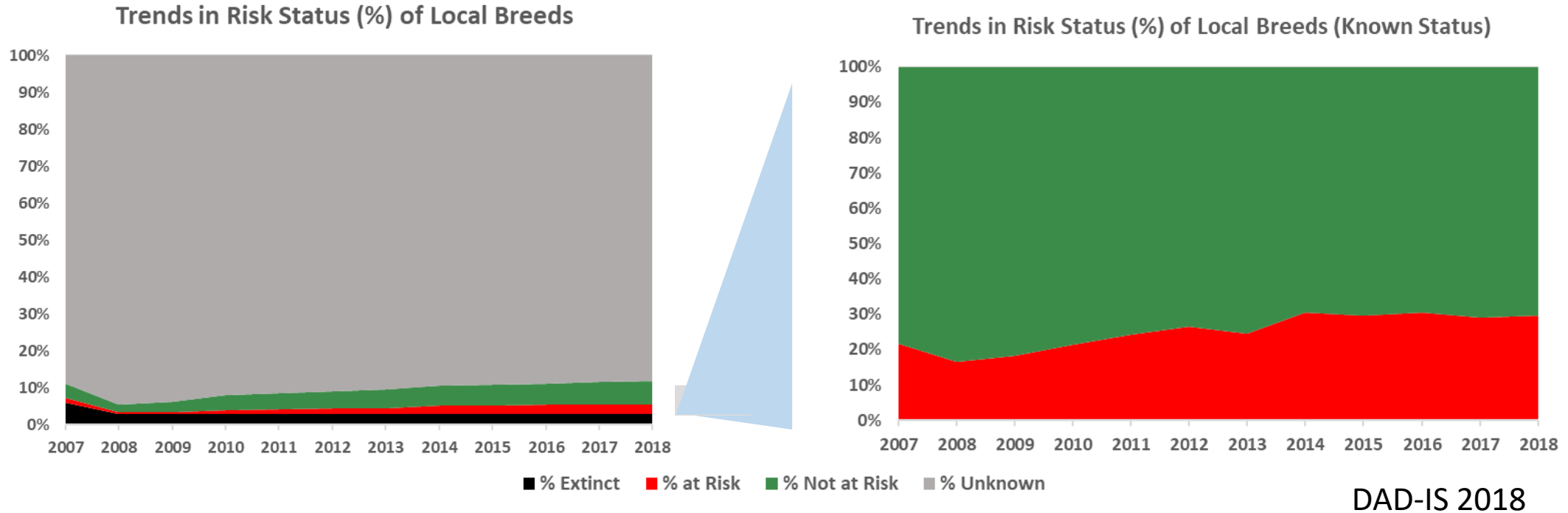
Evolution of small ruminants/ cattle ratio



FAOSTAT 2018

- Increasing importance of small ruminants in some African countries -> shift between species

AnGRs: a heritage in danger?



- An increasing number of local breeds threatened in developing countries

SDG Goal, target & indicator



Goal 2 is to end hunger, achieve food security, improved nutrition and promote sustainable agriculture.

Target 2.5 is concerned with genetic resources for food and agriculture:

“By 2020, maintain the genetic diversity of seeds, cultivated plants and **farmed and domesticated animals and their related wild species including through soundly managed and diversified seed and plant banks at the national, regional and international levels,**

and

promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.”

Domestic Animal Diversity Information System (DAD-IS)



Data

In Focus

Publications

National Coordinators

Logout

DAD-IS is the Domestic Animal Diversity Information System hosted 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 messages



Up to **2 billion people** in developing countries rely on livestock for draught power and transport



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 or combinations** of characteristics that can contribute to meeting challenges related to **climate change**



The world's livestock diversity remains at risk

DAD-IS – Domestic Animal Diversity Information System

- Hosted by FAO
- Communication and information tool for implementing strategies for the management of animal genetic resources
- Provides the user with searchable databases of breed-related information, images, visualization tools, links and contacts of regional and national coordinators for the management of animal genetic resources
- Clearing house mechanism recognized by Convention of Biological Diversity

DAD-IS – Domestic Animal Diversity Information System

- Contains data from 8800 breeds, from 182 countries and 38 species
- Allows to enter data for the calculation of the animal element of SDG indicator 2.5.1 and 2.5.2
- Calculates the animal element of SDG indicator 2.5.1 and 2.5.2 for country, region or globally
- Provides graphical presentations of SDG indicator 2.5.1b and 2.5.2 for country, region or globally

DAD-IS – Domestic Animal Diversity Information System

- DAD-IS data are official country data
- Only the officially nominated national coordinator (NC) for the management of animal genetic resources can enter data
- The NC is nominated by the respective ministry of the country (e.g. Ministry of Agriculture or Livestock)
- FAO provides usernames and password, but does not enter or amend data provided by NC

SDG Goal, target & indicator



Goal 2 is to end hunger, achieve food security, improved nutrition and promote sustainable agriculture.

Target 2.5 is concerned with genetic resources for food and agriculture: “by 2020, maintain the **genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species....**”

This target is measured by two indicators:

Indicator 2.5.1: “number of plant and animal genetic resources for food and agriculture secured in either medium or long term conservation facilities”

Indicator 2.5.2: “Proportion of local breeds classified as being at risk of extinction”

Indicator Methodology – 2.5.1b ANIMALS

2.5.1b (animals): Number of **animal genetic resources for food and agriculture** secured in either medium or long term conservation facilities

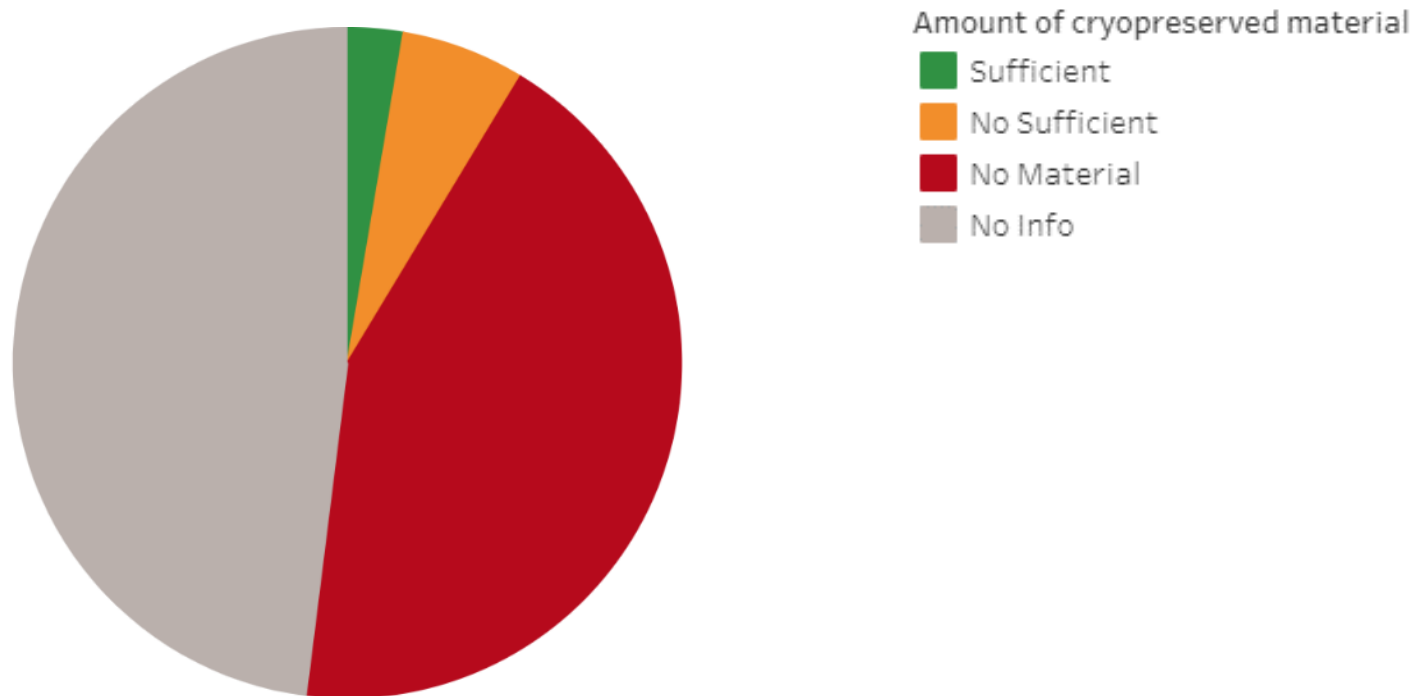
- Number of **local breeds** with **sufficient** material stored in a gene bank
- The conservation of animal genetic material over the medium and long term is done by **cryoconservation**.
- Cryoconservation is the deep-freezing of semen, embryos, oocytes (immature eggs) and other types of tissue in liquid nitrogen.

Indicator Methodology – 2.5.1 ANIMALS

2.5.1b (animals): Number of **animal genetic resources for food and agriculture** secured in either medium or long term conservation facilities

- The **local breeds** are breeds reported in a single country.
- Extinct breeds are included.
- Breeds with **enough material stored** means breeds with an amount of genetic material stored which is required to reconstitute the breed (differs between type of material, species, storage conditions etc.; based on the guidelines on cryconservation of animal genetic resources, FAO, 2012, accessible at (<http://www.Fao.Org/docrep/016/i3017e/i3017e00.Htm>))

Results Indicator 2.5.1b

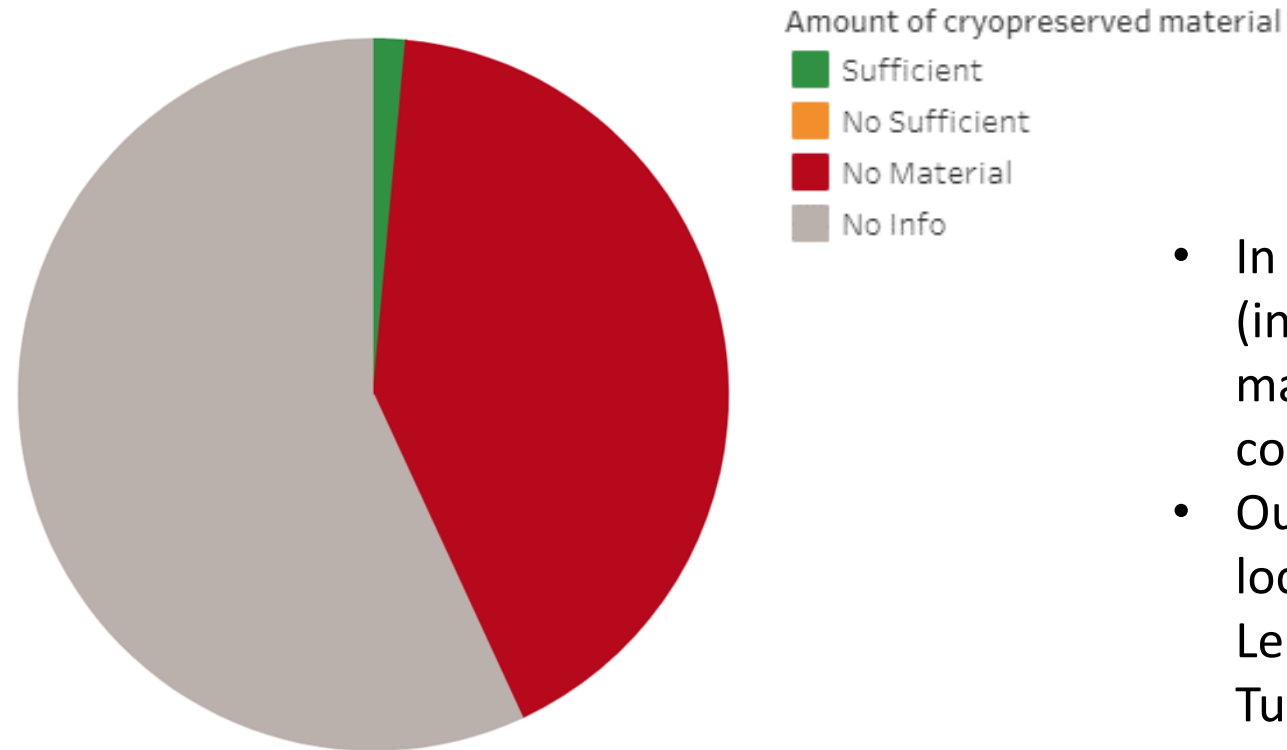


9% of local breeds with material reported at global scale (3% with sufficient material, 6% with no sufficient material), 43% with no material reported and 48% with no information.

According to the Second State of the World for AnGR genetic material is cryoconserved for 15% of national breed populations.

-> Some issue with under-reporting!

SDG 2.5.1b ANIMALS: ESCWA Countries



- In ESCWA countries, out of 341 local breeds (including extinct ones), 1% with sufficient material collected, 42% with no material collected, and 57% with no information
- Out of 22 countries, 9 countries with at least 1 local breed updated (Comoros, Djibouti, Iraq, Lebanon, Oman, Yemen, Morocco, Sudan, Tunisia)

Two causes

- Need to improve capacities for ex situ conservation
- Under reporting

Indicator Methodology – 2.5.2 ANIMALS

2.5.2: Proportion of local breeds classified as being at risk of extinction

- A local breed occurs only in one country (different to transboundary breeds with national breed populations in several countries).
- The risk of extinction is linked to the number of animal belonging to a breed, the lower the number the higher the risk.

Indicator Methodology – 2.5.2 ANIMALS

2.5.2: Proportion of local breeds classified as being at risk of extinction

A wide range of experts developed the following risk categories (see also <http://www.fao.org/docrep/018/i3327e/i3327e.pdf>)

- Unknown (population data is unavailable or more than 10 ys old)
- **Not at risk (no risk of extinction)**
- **Vulnerable (medium risk)**
- **Endangered (high risk)**
- **Critical (very high risk)**
- **Cryoconserved only (no breeding males or females remain, but sufficient material is available to reconstitute the breed)**
- **Extinct (no breeding males or females remain, not enough cryoconserved material available)**

Indicator Methodology – 2.5.2 ANIMALS

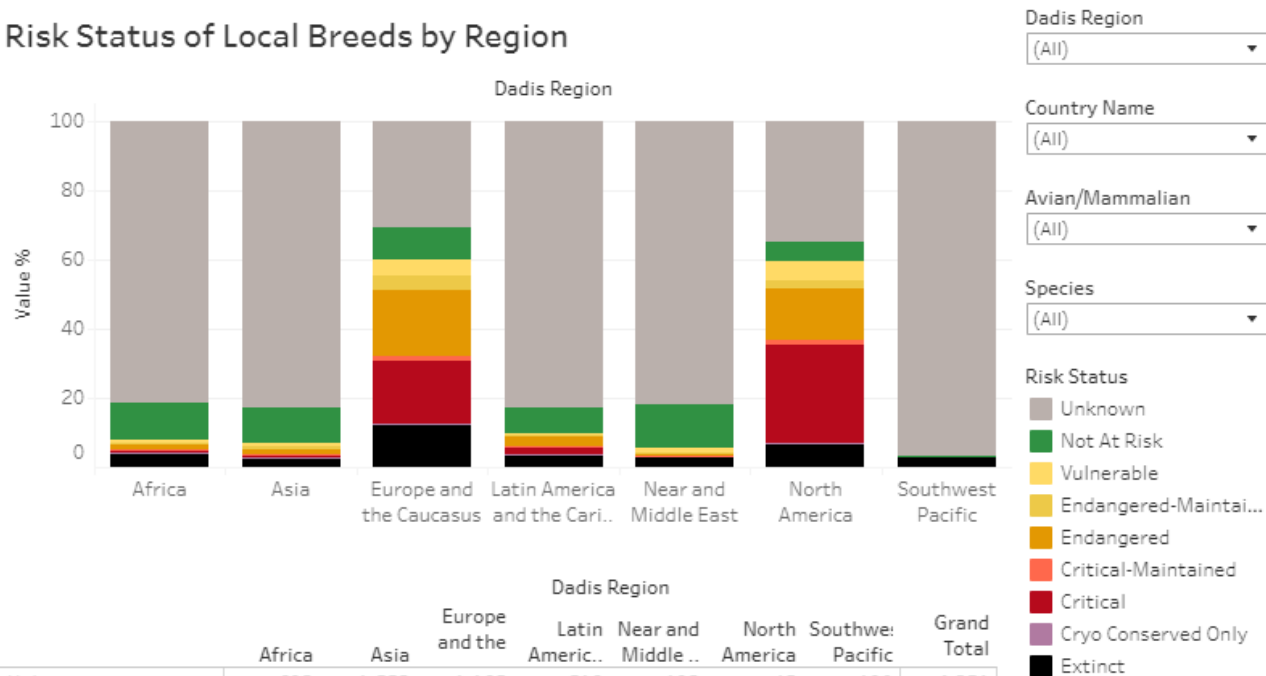
2.5.2: Proportion of local breeds classified as being at risk of extinction

- Population size data (status per year)
- Where such data can be found:
 - Livestock Censuses on breed level
 - Breeders associations
 - Household surveys
 - Key-informants and rapid appraisals
- Update at least every 10 years! Annual updates are recommended.

Indicator Methodology – Risk Status

DAD-IS- Examples of graphics that can be exported

Risk Status of Local Breeds by Region

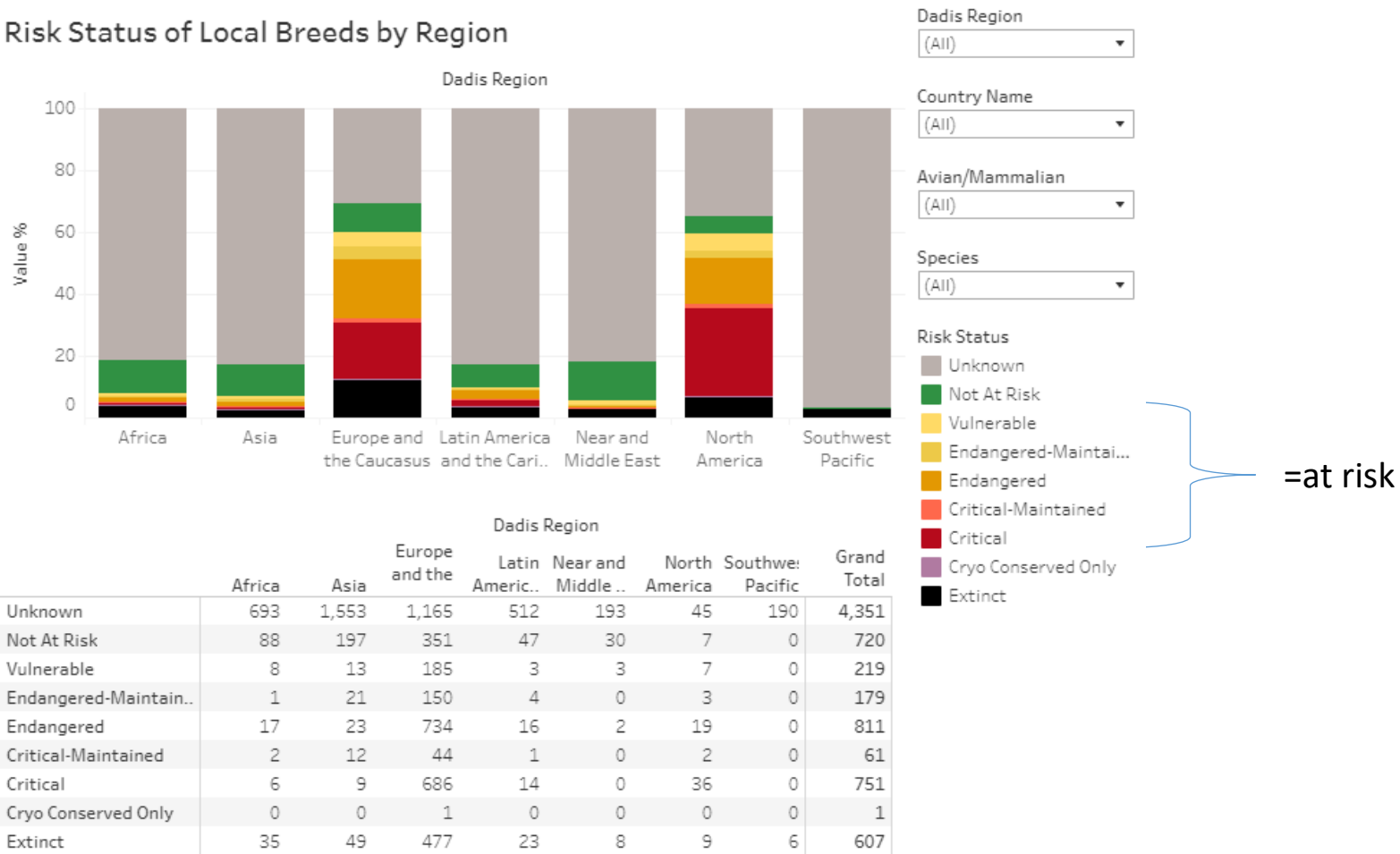


	Dadis Region							Grand Total
	Africa	Asia	Europe and the Caucasus	Latin America and the Caribbean	Near and Middle East	North America	Southwest Pacific	
Unknown	693	1,553	1,165	512	193	45	190	4,351
Not At Risk	88	197	351	47	30	7	0	720
Vulnerable	8	13	185	3	3	7	0	219
Endangered-Maintained	1	21	150	4	0	3	0	179
Endangered	17	23	734	16	2	19	0	811
Critical-Maintained	2	12	44	1	0	2	0	61
Critical	6	9	686	14	0	36	0	751
Cryo Conserved Only	0	0	1	0	0	0	0	1
Extinct	35	49	477	23	8	9	6	607

Indicator Methodology – Risk Status

DAD-IS- Examples of graphics that can be exported

Risk Status of Local Breeds by Region



Indicator Methodology – 2.5.2 ANIMALS

2.5.2: Proportion of local breeds classified as being at risk of extinction

- **Blanche de Montagne** is a local sheep breed from Morocco
- The last estimate from 2019 indicated a population of 20000-30000 animals with 243 breeding males and 999 breeding females.
- Which risk category would Blanche de Montagne be assigned to?



Indicator Methodology – 2.5.2 ANIMALS

Example of calculating the risk category where number of male and female breeding animals is known: **Blanche de montagne: at risk (endangered)**

Reproductive capacity	Males (n)	Breeding females (n)						
		≤100	101 - 300	301 - 1 000	1 001 - 2 000	2 001 - 3 000	3 001 - 6 000	>6 000
High*	≤5	Critical	Critical	Critical	Critical	Critical	Critical	Critical
	6 - 20	Critical	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered
	21 - 35	Critical	Endangered	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable
	>35	Critical	Endangered	Endangered	Vulnerable	Vulnerable	Vulnerable	Vulnerable
Low**	≤5	Critical	Critical	Critical	Critical	Critical	Critical	Critical
	6 - 20	Critical	Endangered	Endangered	Endangered	Endangered	Endangered	Endangered
	21 - 35	Critical	Endangered	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable
	>35	Critical	Endangered	Endangered	Vulnerable	Vulnerable	Vulnerable	Vulnerable

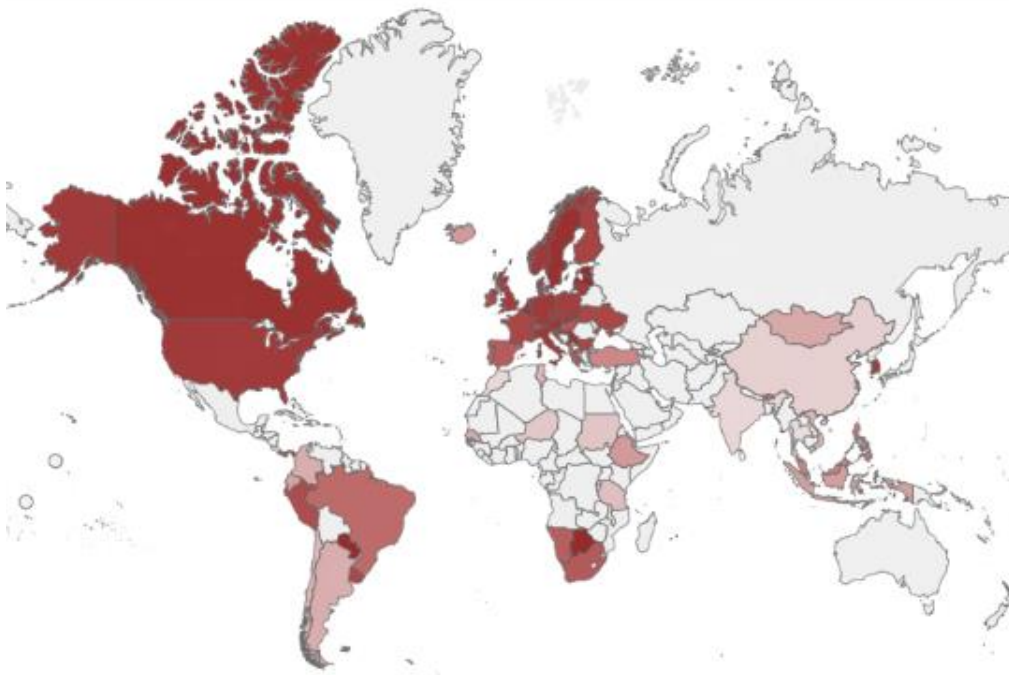
= critical,
 = endangered,
 = vulnerable and
 = not at risk.

*High reproductive capacity species = pigs, rabbits, guinea pigs, dogs and all poultry species.

**Low reproduction capacity species = horses, donkeys, cattle, yaks, buffaloes, deer, sheep, goats and camelids.

Indicator Methodology – 2.5.2 ANIMALS

The indicator presents the **percentage of local livestock breeds among local breeds with known risk status classified as being at risk**, at a certain moment in time, as well as the trends for this percentage.



SDG Region: *
DAD-IS Region: *
Country: *
Percentage of local breeds with unknown risk status: 61,35%

Totals:
Not at risk: 720
At risk: 2.021
Unknown risk: 4.351
Proportion of countries with at least partial reporting: 40,76%

SDG Indicator 2.5.2

Regional aggregation not permissible due to less than 50% of countries reporting

Aggregation is not permissible if proportion of countries with at least partial reporting is less than 50%

SDG 2.5.2 ANIMALS: ESCWA countries

Total Number of Local Breeds



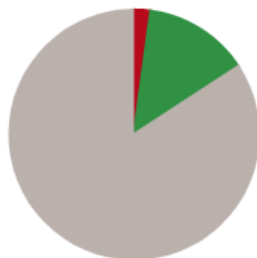
ESCWA countries provided information for 329 LOCAL breeds, and for 84% of them, status is unknown.

Sdg Region: (Tutti) | Dadis Region: (Tutti) | Country Name: (Valori multipli)

Risk Status of selected countries: Nessuno

For SDG indicator 2.5.2 please go to tab "SDG Indicator 2.5.2"

Risk Status
■ At Risk
■ Not at Risk
■ Unknown



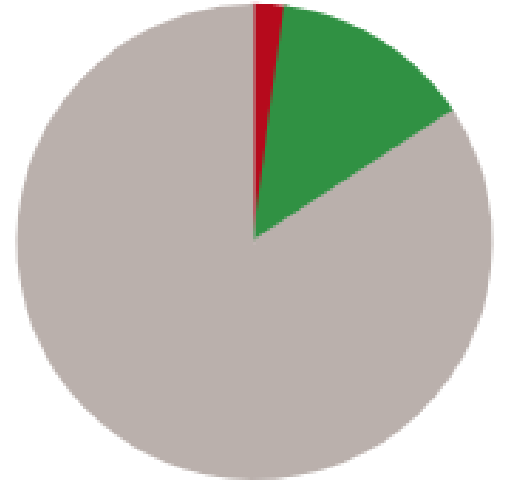
Out of 22 countries, only 5 countries with at least 1 local breed updated over the last 10 years (Oman, Yemen, Morocco, Sudan, Tunisia)

SDG 2.5.2 ANIMALS: ESCWA Countries

562 national breed populations reported in DAD-IS:

- **Cattle: 109**
- **Goat: 100**
- **Chicken: 68**
- **Dromedary: 50**
- **Sheep: 123**
- **Horse: 40**
- **Others: 72**

**Out of the 329 local breeds, only 52 with an updated status
(45 not at risk; 7 at risk)**



Indicator Policy Use and Interpretation

- Knowledge on genetic resources is fundamental to their conservation and sustainable use
- A prerequisite to make informed decisions
- Even vital, genetic diversity is under threat due to intensive farming, mechanization, demand for uniform products, **uncontrolled crossbreeding**, land use change, **habitat degradation**, **overgrazing**, **climate change**, etc.
- Monitoring the implementation and the impact of National Strategies and Action Plans, Global Plans of Action.....

Indicator Limitations

Target 2.5 is concerned with genetic resources for food and agriculture:

“by 2020, maintain the **genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species**, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable **sharing of benefits** arising from the utilization of genetic resources and associated **traditional knowledge**, as internationally agreed.”

Implementation Challenges

- National coordinator needs to update the data information system (DAD-IS) regularly
- National coordinator needs support from statisticians for indicator 2.5.2:
 - If no national information systems are available, population size data need to be estimated or collected either via **livestock censuses on breed level, in the framework of household surveys or estimation of population sizes based on stratified sampling**
- The indicators are as good as the underlying data

Example of actions of FAO to supports data collection

- Risk status unknown for a majority of breeds
- Main factors identified during a national coordinators workshop in Rome in 2017
 - Difficulty to collect population data
 - Difficulty to access data collected elsewhere
 - Others: lack of knowledge of the role, capacity, mandate, etc.
- FAO has launched a series of projects to assist countries to collect/estimate breed related data allowing them to fulfill their commitments to the CBD, the Global Plan of Action and the Agenda2030.

The principle

- Implementation of cost efficient solutions to allow countries to regularly estimate the population sizes of their animal genetic resources, over the long term.
- Work on a regional scale via service providers
- Three regions targeted so far:
 - Latin America
 - Southern Africa
 - North Africa

The partners in North Africa (January-December 2020)



- The countries:
 - Algeria
 - Libya
 - Mauritania
 - Morocco
 - Tunisia

إتحاد المغرب العربي
ARAB MAGHREB UNION



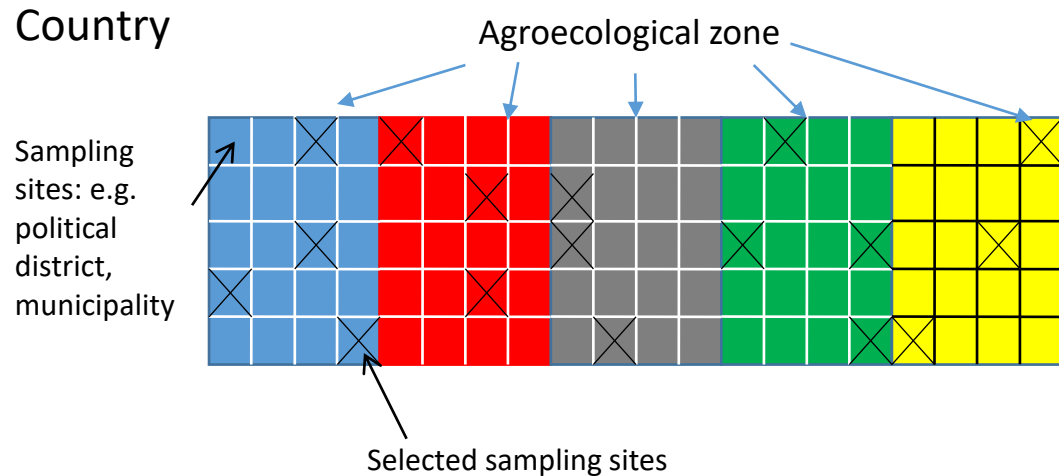
- Regional Partner
 - Arab Maghreb Union

The context (DAD-IS data beginning 2018)

Countries	Local			Regional			International			Total
	At risk	Not at risk	unknown	At risk	Not at risk	unknown	At risk	Not at risk	unknown	
Algeria	0	0	16	0	0	7	1	11	2	37
Libya	0	0	3	0	0	1	0	0	2	6
Mauritania	0	0	6	0	1	9	0	7	3	26
Morocco	0	0	42	0	0	4	1	25	8	80
Tunisia	0	1	7	0	0	0	0	10	11	29

Livestock censuses on species level exist, no censuses on breed level

The methodology








Combine population data available at species level with expertise at regional support

- Involvement of ministry offices and private representatives to provide assessment in each regions

Alternatively, or in complementarity

- Stratified sampling: strata = agroecological zone, country 100% covered
- Semi-random sampling within strata (representative + accessible + cost efficient)
- Estimation of total population sizes based on direct counts from sample sites

The results (preliminary)

Country	Indicator 2.5.2	Project result
Algeria		0 updates in DAD-IS (Data collected for 39 breeds)
Libya		0 updates in DAD-IS
Mauritania		0 updates in DAD-IS (Data collected for ? breeds)
Morocco		51 updates in DAD-IS
Tunisia		41 updates in DAD-IS

Main results

- Data update for 2 out of 5 countries (but data collection in 4 despite Covid situation)
- Institutional changes (nomination of new NC, activation of NC committee, implementation of data collection process...)

Lessons learned

- Wide use of local remote meeting
- Bottleneck at the National Coordinator level for 3 out of 5 countries
- Importance of multi-partnership coordination at national level

FAO – Capacity Development/Technical Assistance

- Frequent training courses for NCs on the use the data information systems
- Training on the interpretation of SDG indicators
- E-learning courses on indicators at <http://www.fao.org/elearning/#/elc/en/Course/SDG251-252>
- Guidelines on surveying and monitoring of AnGR at <http://www.fao.org/docrep/014/ba0055e/ba0055e00.htm>

THANK YOU - MERCI



Credit: Fabrice Romain Monteiro - Werner-Lampert-GmbH



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<http://www.fao.org/ag/AGInfo/programmes/en/A5.html>

