SIAP Training Program for Supporting the Monitoring of Sustainable Development Goals (SDGs) 2030 in the Asia Pacific Region

SDG Indicators under FAO Custodianship

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GOAL 2. END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

2.5 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

- Indicator 2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities (Tier I)

- Indicator 2.5.2 Proportion of local breeds classified as being at risk, not at risk or at unknown level of risk of extinction (Tier I)

    ➤ They provide complementary information on plant and animals, with animal genetic resources tracked both *in situ* and *ex situ*

IMPORTANCE OF GENETIC RESOURCES

- Building blocks of food security

- Plant and animal diversity provides adaptability and resilience in the face of: climate change, emerging diseases, pressures on feed and water supplies and shifting market demands;

- Between 2005 and 2016, livestock breeds classified as being at risk of extinction increased from 15 to 17%;

- 58 percent of breeds are classified as being of unknown risk status because no recent population data are available

- An estimated three-quarters of crop genetic diversity has been lost since the 1900s

SDG INDICATOR 2.5.1

NUMBER OF **ANIMAL** GENETIC RESOURCES FOR FOOD AND AGRICULTURE SECURED IN EITHER MEDIUM- OR LONG-TERM CONSERVATION FACILITIES

Food and Agriculture
Organization of the
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SUSTAINABLE
DEVELOPMENT
GOALS

THE ANIMAL COMPONENT: METHODOLOGY (1)

- The animal component of the indicator is calculated as the number of **local breeds** with sufficient material stored in a gene bank

- The **local breeds** of a country consists of the animals belonging to a specific breed that is found only in the respective country.

- Mammalian and avian livestock breeds are reported to occur either in only a single country (local breeds), in several countries in one region (regional transboundary) or in different regions of the world (international transboundary).

- Fish are currently outside the scope of the indicator. However, FAO has reported on country *in vitro* and *in vivo* collection of aquatic species in *The State Of The World's Aquatic Genetic Resources For Food And Agriculture* report and is considering eventual integration of this data into the indicator

Food and Agriculture
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United Nations

SUSTAINABLE
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GOALS

- Populations with **sufficient material stored** means local breed populations with an amount of genetic material stored which is required to reconstitute the breed (differs between type of material, species, storage conditions etc.);

- 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.

DAD-IS – DOMESTIC ANIMAL DIVERSITY INFORMATION

- 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, management tools, publications, links and contacts of regional and national coordinators for the management of animal genetic resources

- http://www.fao.org/dad-is/en/

DAD-IS – DOMESTIC ANIMAL DIVERSITY INFORMATION

- Contains data from 15,000 national breed populations, including 8800 local breeds, from 182 countries and 40 species

- Allows countries to enter data for the calculation of the animal element of SDG indicator 2.5.1 and SDG indicator 2.5.2

- Provides graphical presentations of SDG indicator 2.5.1 and 2.5.2 for country, region or globally
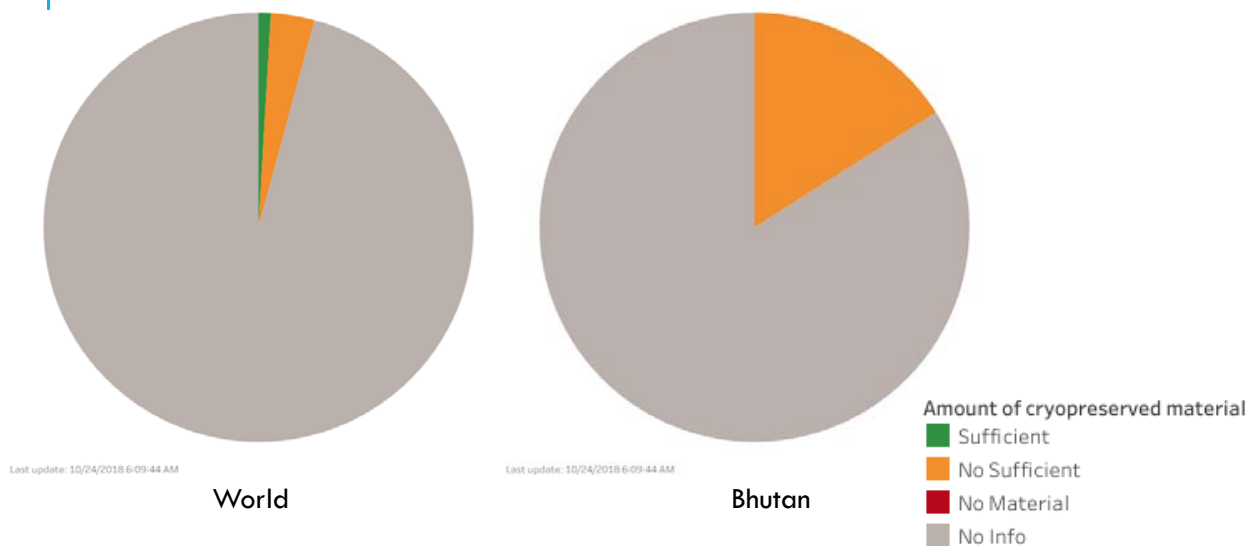
THE ANIMAL COMPONENT: CALCULATION AND REPORTING

- DAD-IS – Data for SDG indicator 2.5.1

  ✓ Cryo data (storage status per year)

  ✓ Where such data can be found: in national or regional gene banks

  ✓ Contact information of the gene bank manager

  ✓ Updates possibly on yearly base

- DAD-IS automatically calculates the Indicator 2.5.1 based on the data provided by the National Coordinator; can estimate if genetic material stored is "sufficient" in case of uncertainty

Year	Semen samples	Semen donors	Embryos	Embryos donors Tot/M/F	Oocytes	Oocyte donors	Somatic cell samples	Somatic cell Donors Tot/M/F	DNA samples	DNA donors Tot/M/F	Sufficient
2017	500	30	25	-/25/-	-	-	-	-/-/-	-	-/-/-	YES
2010	210	15	-	-/-/-	-	-	-	-/-/-	-	-/-/-	NO

SDG 2.5.1 EXAMPLE OF BHUTAN

Last update: 10/24/2018 6:09:44 AM — World

Last update: 10/24/2018 6:09:44 AM — Bhutan

Amount of cryopreserved material
- Sufficient
- No Sufficient
- No Material
- No Info

- World : 3.28% of local breeds reported with material, and 0.92% with enough material to allow breed reconstitution.

- **Bhutan** : 4 local chicken breeds with limited number of semen doses stored (10 to 106 per breed) corresponding to 16% of the total number of local breeds within the country

DAD-IS – DOMESTIC ANIMAL DIVERSITY INFORMATION

- DAD-IS Data are official country data

- Only the officially nominated National Focal Point for the management of animal genetic resources can enter data

- The National Focal Point is nominated by the respective ministry of the country (e.g. Ministry of Agriculture)

- FAO provides usernames and password, but does not enter or amend data provided by countries

Country	National Focal Point, 2.5.1/animal and 2.5.2
Australia	Mr Guy Summers, Trade and Market Access Division Australian Government Department of Agriculture
Afghanistan	undefined
Bhutan	Dr Jigme Dorji, National Biodiversity Center Ministry of Agriculture
India	Dr J.K. Jena, Director Animal Science & Fishery Science Indian Council of Agricultural Research
Iran	Dr Cyrus Amirinia, Research, Education and Extension Organization, Ministry of Agriculture
Japan	Mr Shin-ichi Yamamoto, Ministry of Agriculture, Forestry and Fisheries (MAFF)
Korea	Dr Yang Changbum, National Institute of Animal Science (NIAS)
Laos	Dr Bounthong Bouahom, National Agriculture and Forestry Research Institute (NAFRI)

Country	National Focal Point, 2.5.1/animal and 2.5.2
Malaysia	Dr Saifullizam bin Abd Kadir, Department of Veterinary Services
Maldives	Mr Hamid Ibrahim Fulhu, Ministry of Fisheries and Agriculture
Mongolia	Mr Lkhasuren Choi-Ish, Ministry of Industry and Agriculture of Mongolia
Pakistan	Dr Qurban Ali, Ministry of of National Food Security & Research
Papua New Guinea	Ms Regina Nukundj, Food Security Branch, Department of Agriculture & Livestock
Samoa	Mr Leota Laumata Pelesa, Animal Production and Health Division, Ministry of Agriculture and Fisheries
Turkmenistan	Mr Oraz Muhamed Annageldiyev, Livestock Breeding and Veterinary Research Institute, Turkmenmallary
Uzbekistan	Mr Yusup Ibragimov, Uzbekistan Association of Animal Production

2.5.1/animal	% breeds with material stored	% breeds with sufficient material to reconstitute breed
Australia	0%	0%
Afghanistan	0%	0%
Bhutan	16.00%	0%
India	0%	0%
Iran	0%	0%
Japan	0%	0%
Laos	0%	0%
Malaysia	0%	0%
Maldives	0%	0%
Mongolia	0%	0%
Pakistan	0%	0%
Papua New Guinea	0%	0%
Republic of Korea	4.35%	0%
Samoa	0%	0%
Turkmenistan	0%	0%
Uzbekistan	0%	0%

SDG INDICATOR 2.5.2 PROPORTION OF LOCAL BREEDS CLASSIFIED AS BEING AT-RISK, NOT-AT-RISK AND UNKNOWN-LEVELS OF RISK OF EXTINCTION

INDICATOR METHODOLOGY

- Proportion of local livestock breeds classified as being at risk, not at risk or of unknown risk of extinction at a certain moment in time

- **Local breed** definition same as for 2.5.1/animal: 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 animals belonging to a breed: the lower the number the higher the risk

INDICATOR METHODOLOGY

▪**At risk**: a breed that has been classified as being at risk based on the following criteria:

✓population size, number of breeding females and proportion vs. breeding males

✓reported demographic trend and percentage of female bred pure

✓presence of active conservation programmes.

▪**Not at risk**: the breed does not fall in the at risk categories

▪**Unknown**: population data is unavailable or >10 years old

[**Cryoconserved only**: no breeding males or females remain, but sufficient cryoconserved material is available to reconstitute the breed [SDG indicator 2.5.1/animal]

EXAMPLES OF RISK CLASSIFICATION

Country	Specie	Breed	Year	Population min	Population max	Risk status
Korea, Republic of	Pig	Chookjin Chamdon	2014	70	70	At risk
Malaysia	Goat	Jermasia	2010	1500	5000	At risk
Bhutan	Horse	Yuta	2010	17490	17494	Not at risk

▪ The population size threshold for being not at risk is, considering population average (other parameters may also be considered)
3600 for breeds with high reproductive capacity (chicken, pig…)
7200 for breeds with low reproductive capacity (cattle, sheep, goat, horse…)

▪ Therefore Chookjin Chamdon pig is considered at risk (actually critical), Jermasia goat at risk (actually vulnerable) and Yuta horse not at risk.
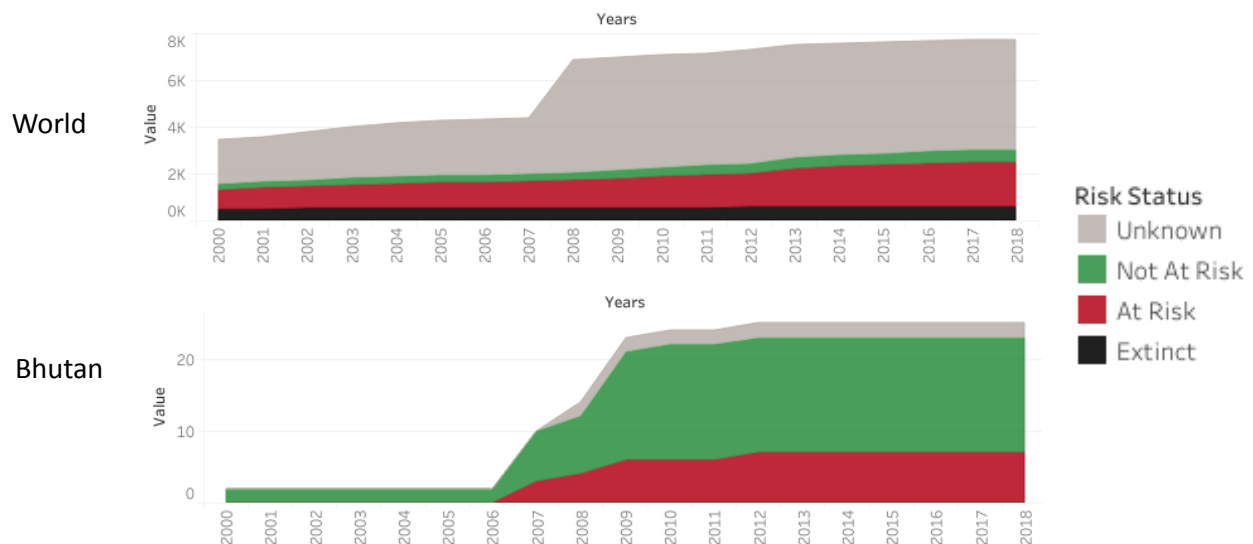
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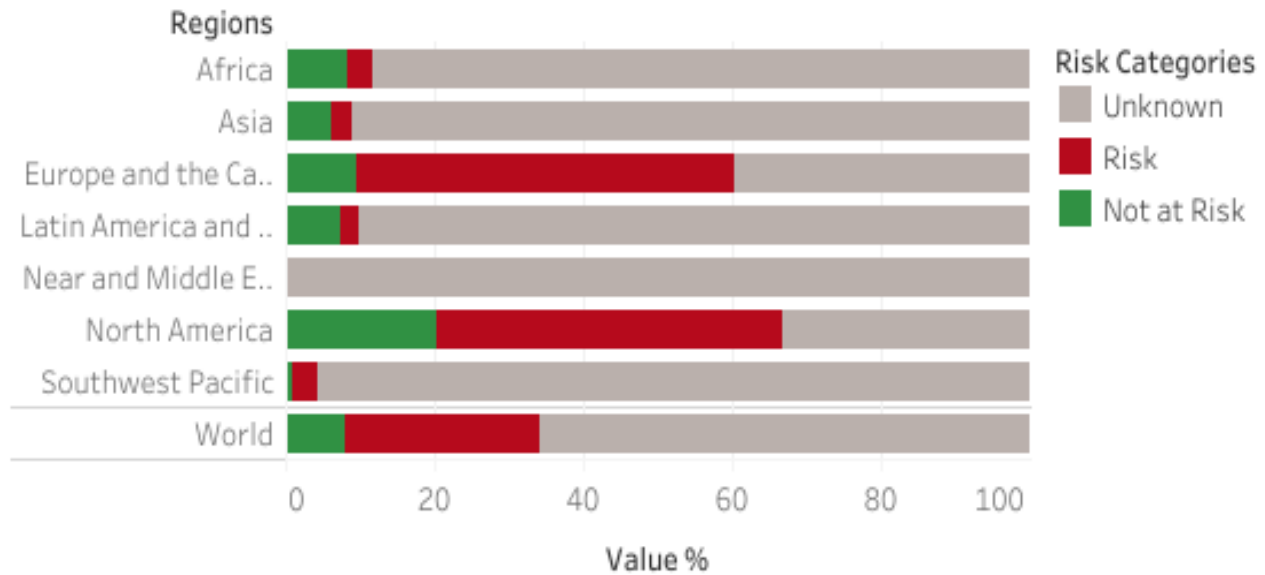
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SDG 2.5.2 Example of Bhutan

While globally, population information have not been entered for breeds registered in 2008, Bhutan have updated regularly this information for 23 out of its 25 local breeds.

CALCULATION AND REPORTING

- Officially appointed national focal points report through DAD-IS (as with SDG indicator 2.5.1/animal) **population size data for each local breed** (status per year)

- DAD-IS calculates the risk level of local breeds automatically based on population size data provided by the national focal point

- Where such data can be found:

  ✓ Livestock Censuses on breed level

  ✓ Breeders associations

  ✓ Key-informants and rapid appraisals

- Data should be updated at least every 10 years

2.5.2	Number of local breeds	At risk	Not-at-risk	% unknown
Afghanistan	37	0%	0%	100%
Australia	126	2%	5%	100%
Bhutan	25	64%	28%	8%
India	223	0%	0%	100%
Iran	59	0%	0%	100%
Japan	48	0%	0%	100%
Laos	16	0%	0%	100%
Malaysia	24	8%	17%	75%
Maldives	4	0%	0%	100%
Mongolia	41	2%	0%	98%
Pakistan	105	0%	0%	100%
Papua New Guinea	9	0%	0%	100%
Republic of Korea	46	9%	43%	48%
Samoa	3	0%	0%	100%
Turkmenistan	10	0%	0%	100%
Uzbekistan	21	0%	0%	100%

IMPLEMENTATION CHALLENGES

- Breed-related information remains far from complete. Globally, for almost 60 percent of all reported breeds, risk status is not known because of missing population data or lack of recent updates.

- In the Asia-Pacific region, in many countries 100 percent of all reported breeds are of unknown status

- Generally data collection should be possible in all countries. Updating of population size data at least each 10 years is needed for the definition of the risk classes.

- National coordinator/ National focal point needs support from livestock statisticians for indicator 2.5.2:

CAPACITY DEVELOPMENT

- A global training workshop took place in Rome/FAO HQ in November 2017, complementing the launch event of the new DADIS interface

- **Mongolia** took part: Mr Terbish JAMBALDORJ

- FAO provides comprehensive guidelines on surveying and monitoring the

  - cryoconservation of animal genetic resources (SDG indicator 2.5.1/animal), and

  - *in vivo* conservation of animal genetic resources (SDG indicator 2.5.2)

  http://www.fao.org/dad-is/publications/en/

- E-learning courses on both indicators has now been launched!

THANK YOU

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For more detailed information please see:

- http://www.fao.org/sustainable-development-goals/indicators/251/en/

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