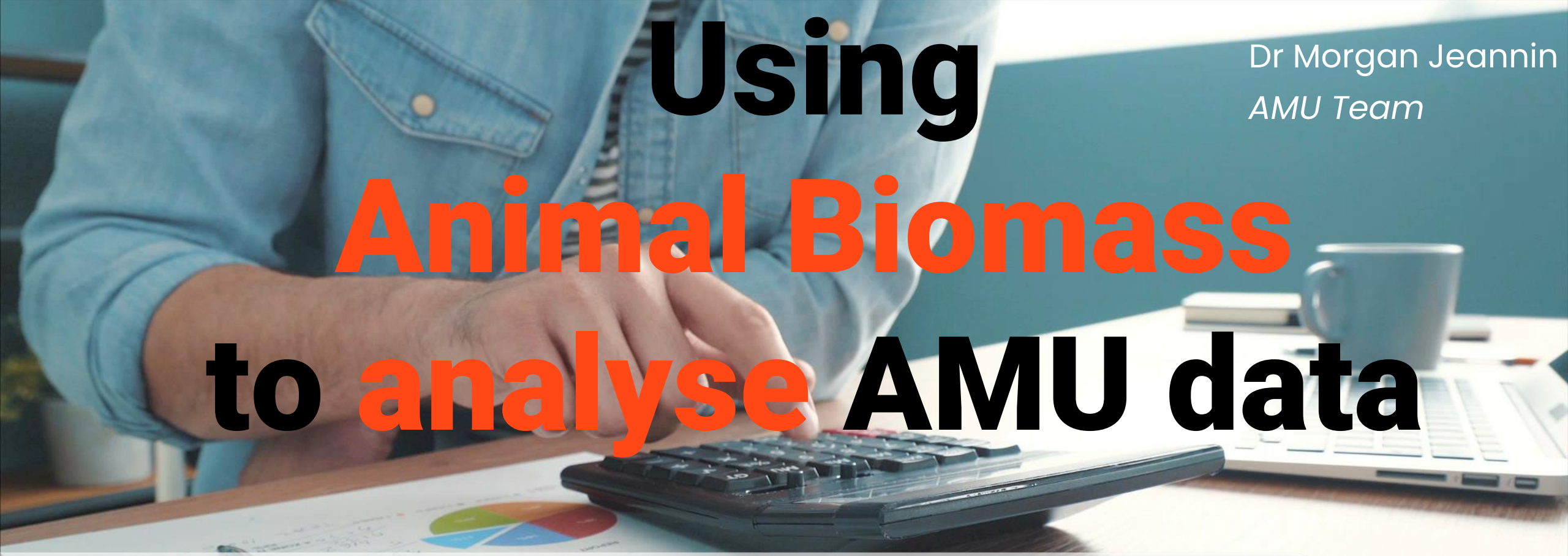
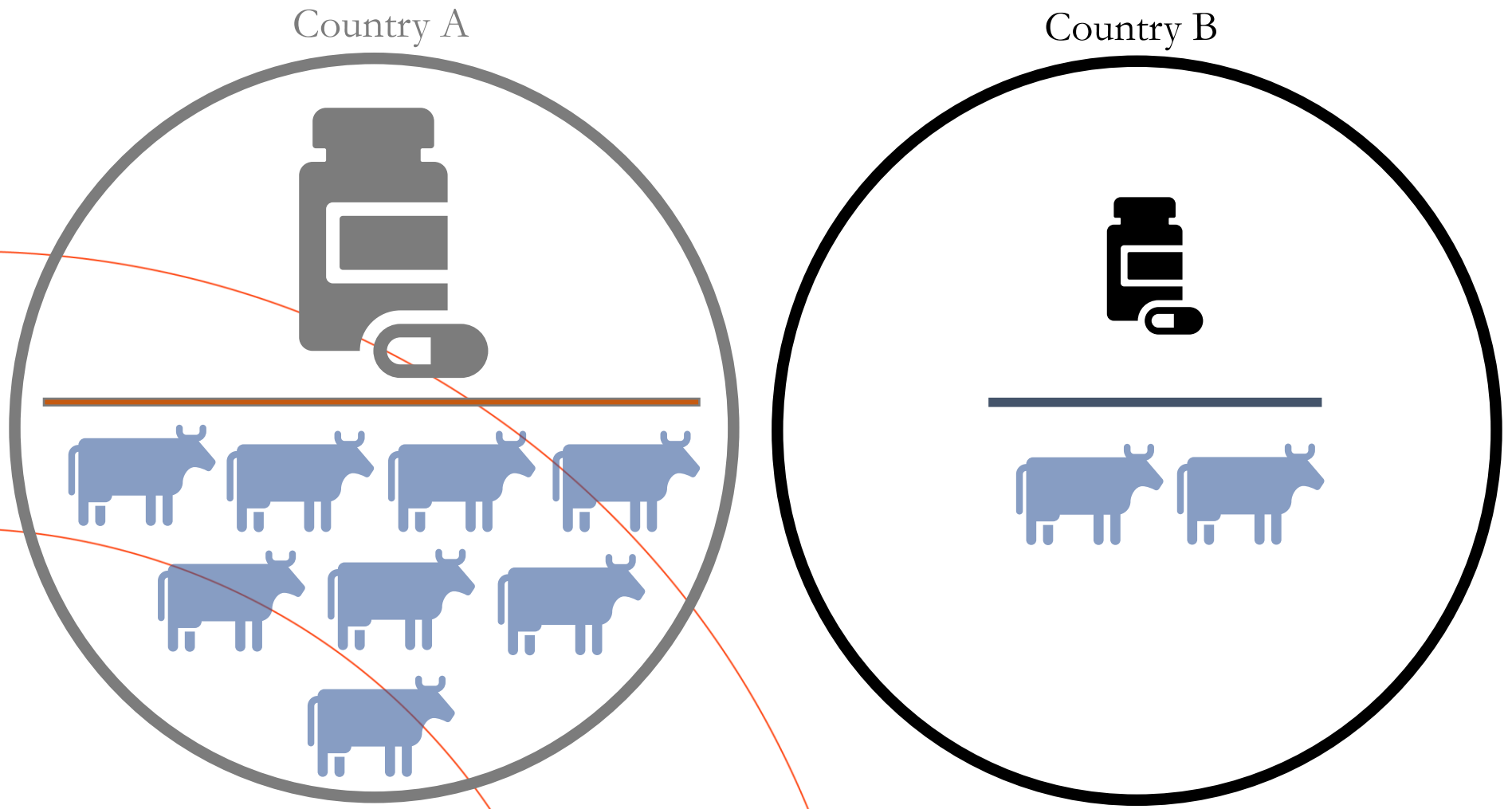


Using Animal Biomass to analyse AMU data

Dr Morgan Jeannin
AMU Team

ANIMUSE Global Database

A denominator : What for?



WOAH Animal Biomass denominator

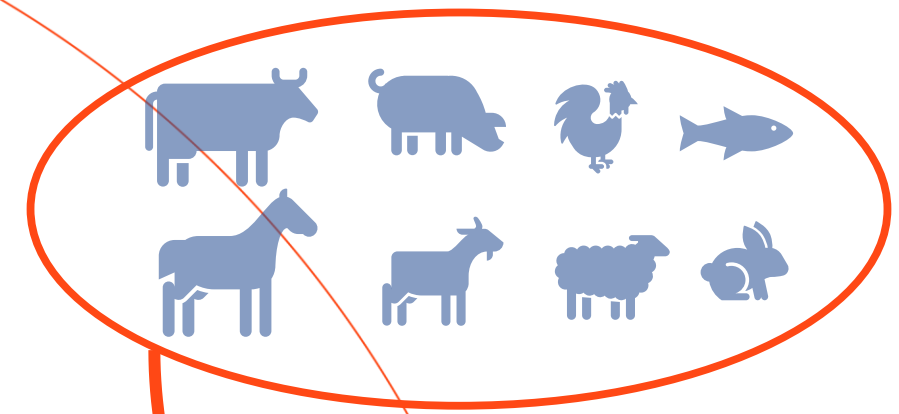
Quantities of antimicrobial agents **(mg)**

Animal biomass **(kg)**

mg/kg

AMU

as **reported** by the country to the WOAH AMU data collection for the target year



Total weight of all food-producing animals in the target year

↓ = ↑

ANIMAL BIOMASS

Calculated Animal Biomass **by AMU Team** for a country for the target year

WOAH Animal Biomass denominator

Methodology developed by WOAH *ad hoc* Group on AMR that acknowledged each country will have **variability of their animals' population numbers, cycle factors and average weights.**

Based on *Terrestrial Animal Health Code* Chapter 6.9 & *Aquatic Animal Health Code* Chapter 6.3 – « *When comparing AMU data over time, changes in* **size** *and* **composition** *of* **animal populations** *should also be taken into account.* »

Adjusting the quantitity of AM by the biomass improves the possibilities of,

- ❑ **following AMU over time**, taking into account the changes in animal population
- ❑ **Comparing AMU between different regions**, with different species of food-producing animals and different farming systems.

➔ *proxy* to measure the population **exposed to AMU** during the year of data collection

Which data are available?

Data needed

The number of animal present in the country for each age category of each species and their mean body weight.

Data available globally

WAHIS

- **WAHIS** census data → number of live animals per species at one time of the year (+/- age categories)

FAOSTAT

- **FAO** data → Production data: Number of animals slaughtered, for each species, in a whole year + mass of animal slaughtered & census data

Participation from the Countries

We need help from Members with validation of national animal population numbers and average species weights.

Methodology : How is calculated ?

General principles

- Animals with a life duration of less than one year → Use yearly **production data**
- Animals with a life duration of more than one year → Use **census data,** combined with estimates of average weights by sub-region/country.
- **Privilege census data** when possible→ Production data might not reflect backyard slaughter practices

Find out more with the peer-reviewed methodologies for data collection and analysis

General Methodology

- Animal biomass is calculated using country-level animal population data by species, data-derived estimates of their average weights by sub-region and country, and average reproductive rates of short-lived species (cycle factors).

→ kilograms animal biomass used as a *denominator* in analysis of antimicrobial use data (mg/kg)

Methodology: Estimation of average animal weights for any country in the world

Different AMU surveillance programs ➔ Different weight calculation methodologies

- Canada, ESVAC (EU), Thailand: weight at time of treatment
- USA, Japan: average weight by production category

- **From production data → carcass weight**

$$carcass\ weight\ (kg) = \frac{weight\ of\ species\ slaughtered\ (kg)}{number\ of\ species\ slaughtered\ (heads)}$$

- **From carcass weight → live weight at time of slaughter**

$$live\ weight\ at\ slaughter\ (kg) = \frac{carcass\ weight\ (kg)}{conversion\ coefficient\ (k)}$$

Refinement of Animal Biomass Calculation

- To refine the calculations of the Animal Biomass: considering region/country particularities

- Continued collaboration of the countries to research and verify :
  - ✓ Animal population figures
  - ✓ Average animal weights
  - ✓ Carcass conversion coefficients
  - ✓ Distribution of age groups in a species
  - ✓ Cycle factors

- Evolution of **WAHIS** system: Importance of **countries' commitment** in reporting animal population figures
  - Animal categories + sub-categories by age groups
  - Increased country-level understanding: Cycle factors, Mean live weight at slaughter…

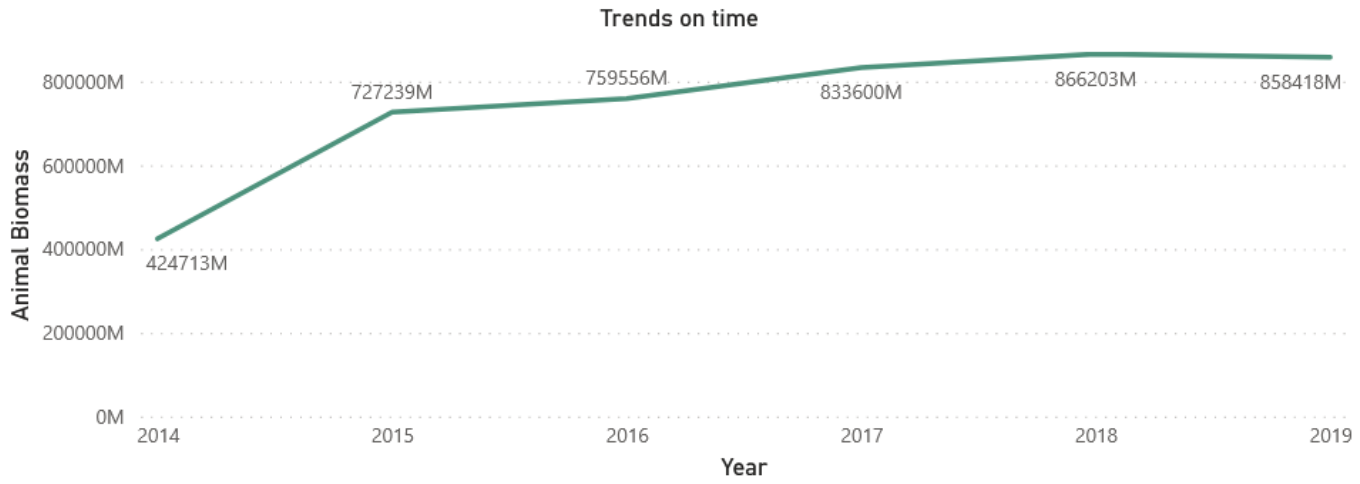
Discover the Animal Biomass : Globally

World Organisation for Animal Health
Founded as OIE

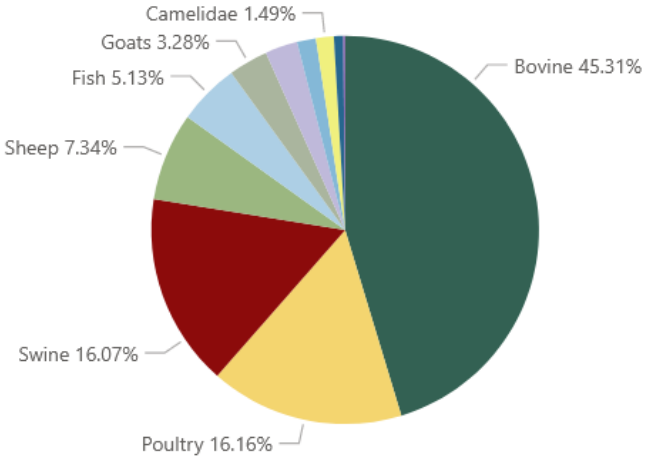
Animal Biomass

Home

Animal Biomass



Select all	2013	2018
2009	2014	2019
2010	2015	2020
2011	2016	2021
2012	2017	2022



Species
- Bovine
- Poultry
- Swine
- Sheep
- Fish
- Goats
- Equidae
- Molluscs
- Camelidae
- Crustaceans
- Rabbits and hares
- Cervidae

Species	Retained population for calculation (Nbr Heads)	Data source	Biomass (Tonnes)	Relative proportion
Bovine	10014552602	WAHIS	2920373M	45.31%
Poultry	399709630565	WAHIS	1041772M	16.16%
Swine	5842980626	WAHIS	1036046M	16.07%
Sheep	6945695816	WAHIS	473002M	7.34%
Fish		WAHIS	330371M	5.13%
Goats	6044803161	WAHIS	211674M	3.28%
Equidae	560480528	WAHIS	174529M	2.71%
Molluscs		WAHIS	101756M	1.58%
Camelidae	239535649	WAHIS	95800M	1.49%
All Specific Biomass	**430504632455**	**WAHIS**	**6445357M**	**100.00%**

Region
All

Country
All

Species
All

World Bank Status
All

state
All

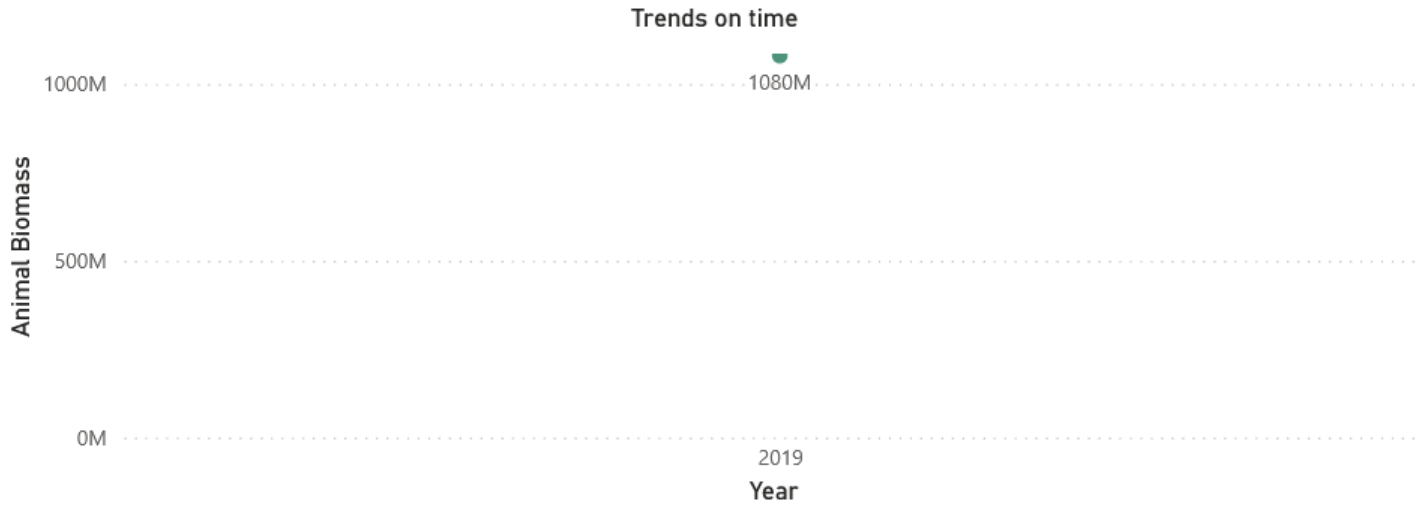
Discover the Animal Biomass : For your region

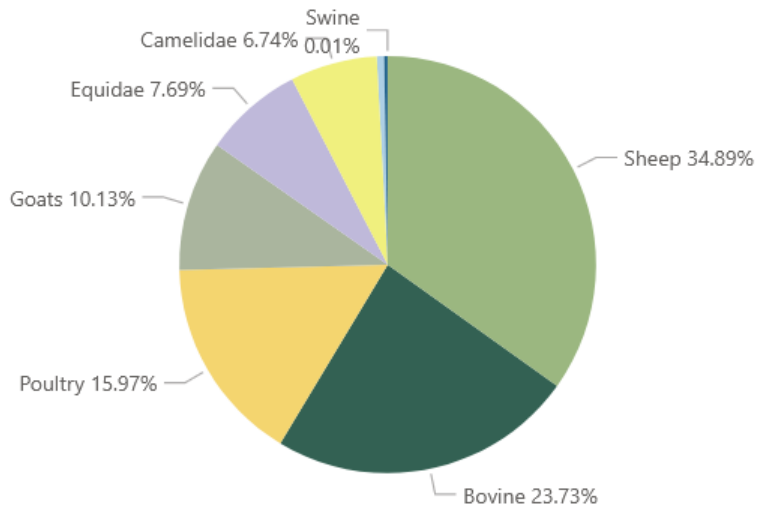
World Organisation for Animal Health
Founded as OIE

Animal Biomass

Home

Animal Biomass





Species
- Sheep
- Bovine
- Poultry
- Goats
- Equidae
- Camelidae
- Fish
- Crustaceans
- Swine
- Cervidae
- Molluscs

Species	Retained population for calculation (Nbr Heads)	Data source	Biomass (Tonnes)	Relative proportion
Sheep	388343124	WAHIS	28338M	34.89%
Bovine	66509184	WAHIS	19272M	23.73%
Poultry	8433251000	FAOSTAT	12972M	15.97%
Goats	187129721	WAHIS	8228M	10.13%
Equidae	16686433	WAHIS	6248M	7.69%
Camelidae	12160186	WAHIS	5472M	6.74%
Fish		WAHIS	467M	0.57%
Crustaceans		WAHIS	213M	0.26%
Swine	56460	WAHIS	7M	0.01%
All Specific Biomass	**9104151108**	**WAHIS**	**81218M**	**100.00%**

Discover the Animal Biomass : Relevant to you (Private Portal)

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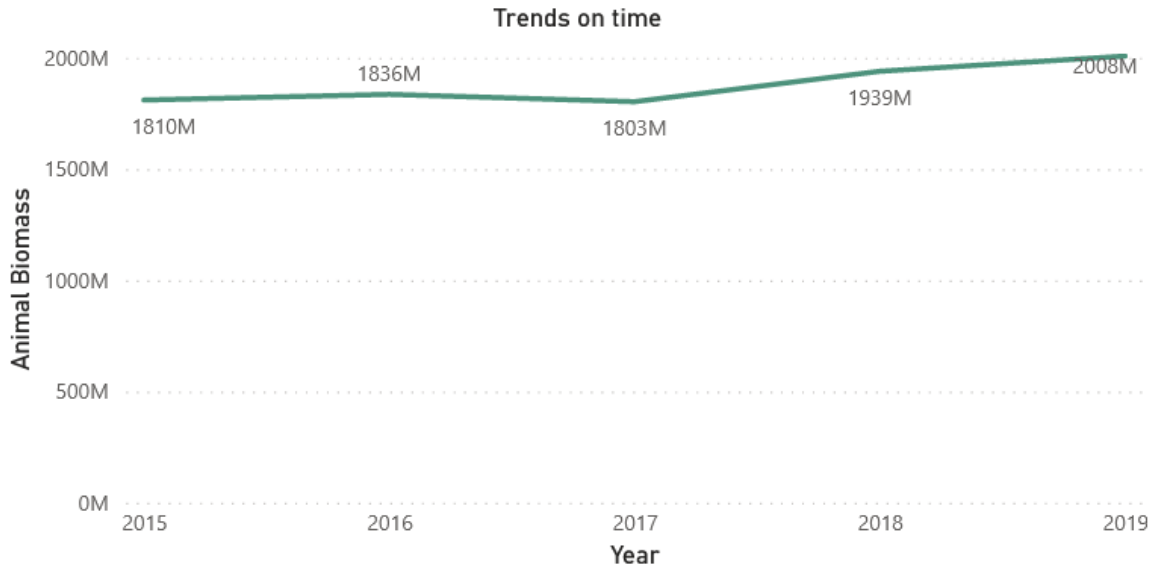
Animal **Biomass**

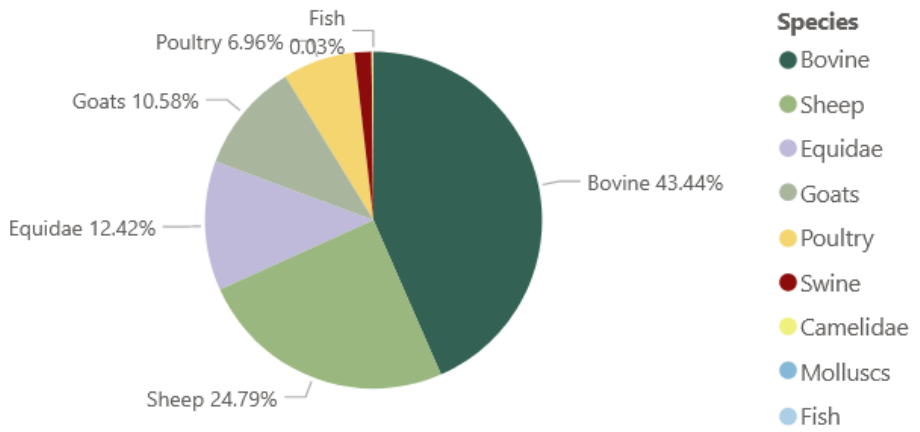
Home

Animal Biomass



Animal biomass

Is used to represent animals that are likely to be exposed to the quantities of antimicrobial agents reported. Since antibiotics are used differently depending on animal species and farming systems, variation in the species composition of regional biomass may explain some of the difference in antimicrobial consumption.
This denominator is calculated by WOAH using publicly available databases (e.g. WAHIS, FAOSTAT etc). More information on the animal



Discover the mg/kg: Relevant to you (Private Portal)

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Antimicrobial Quantities Adjusted by Animal Biomass **(mg/kg)**

Home

Mg/kg

Antimicrobial quantities as **reported** by your country to the WOAH, converted to mg

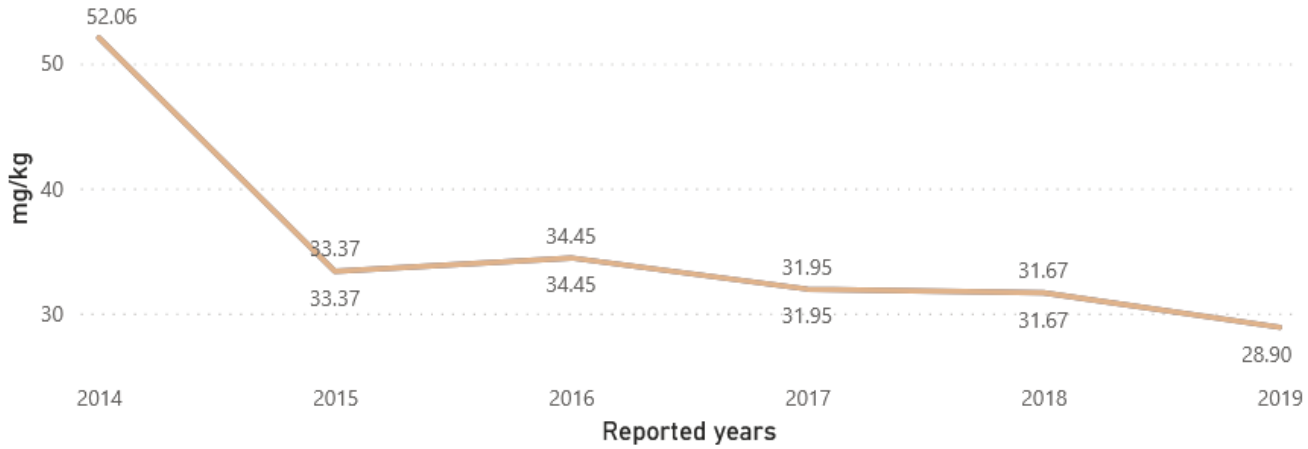
Animal Biomass : Total weight of food-producing animals in the target year, calculated by WOAH from animal population public databases

Select all	2015	2018	2021
2013	2016	2019	
2014	2017	2020	

Country

Species: All

Trends on time



Year	Position*	Number of Countries**	Dossier status
2014	17	34	VALIDATED
2015	30	52	VALIDATED
2016	28	48	VALIDATED
2017	32	57	VALIDATED
2018	34	65	VALIDATED
2019	35	68	VALIDATED

**Position: The ranking of your country in relation to other countries, with 1 being the highest value for mg/kg.*

***Number of countries: the total number of countries that provided data for that year*

Thank you

Regional ANIMUSE Training for Middle East

10-12 May 2023, Dubai, United Arab Emirates

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