

Antibiotics consumption in animal production in Europe – on the path to 2030 goals

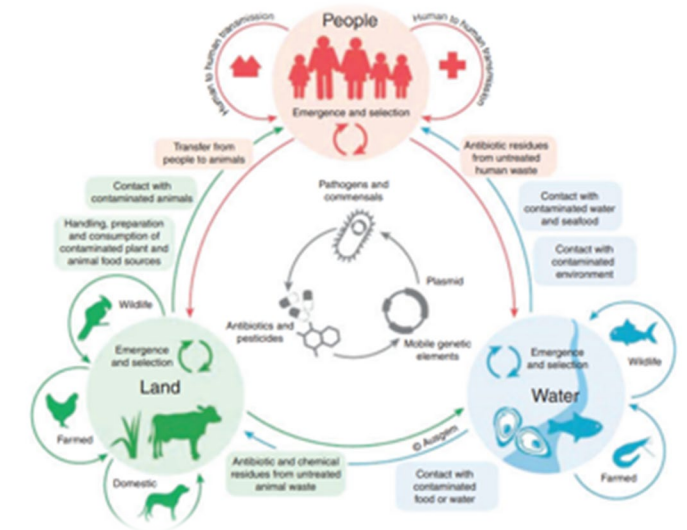
J. Sarraguça, M. Leitão, M. Taghouti, A.C.G. Monteiro, A.S. Santos



Session 93. Preventive approaches to livestock diseases to reduce drug resistance
4th September 2024 - Florence, Italy

Antimicrobial resistance (AMR)

- Can occur naturally...
- Additional human drivers can promote resistance development - inappropriate use of antimicrobial agents
- One of the biggest challenges we face:
 - > 35.000 people dying only in Europe in 2020 (ECDC, 2022)
 - > 10M deaths globally (RAMR, 2016)
 - > 92T € in costs until 2050 (WHO, 2023)
- Necessity of a One Health framework
 - Multisectoral problem that needs multisectoral solutions;



<https://api.semanticscholar.org/CorpusID:170023548>

Research & Innovation

- Developing new therapies
- Advancing scientific understanding
- Collaborative initiatives



Provide solutions and guidance for correct use

Regulations and policies

- Strengthening global policies
- Regulating antibiotic usage
- Supporting innovation



Significant legislative updates



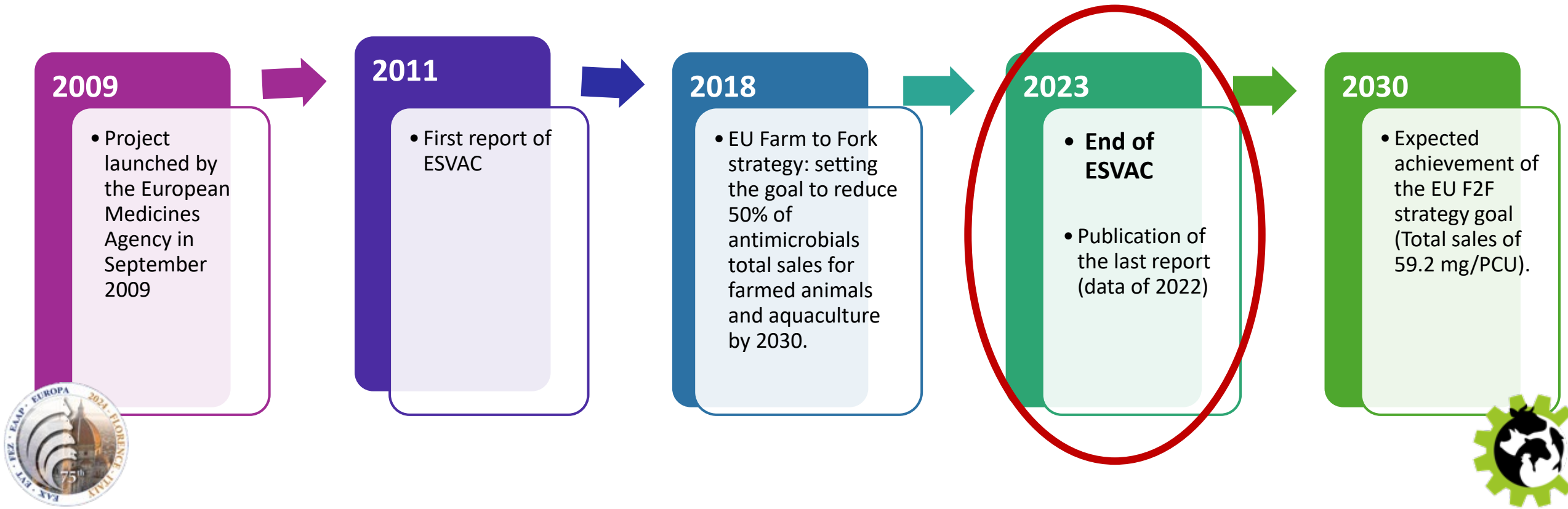
Monitoring and Surveillance

- Surveillance Systems
- Data Sharing and Reporting
- Early Detection and Response

Assess effectiveness

ESVAC - European Surveillance of Veterinary Antimicrobial Consumption

- Request from the European Commission (EC) to develop an approach for the harmonized collection and reporting of data on the use of antimicrobial agents in animals.
- Aimed to collect data on antimicrobial use in animal species, based on reporting made by the countries of the EU.
- Reporting was voluntary, by the end of the project 31 countries were participating.



Aim:

look at ESVAC reports between 2011 - 2022 and explore whether additional insights can be drawn from the data gathered by this project, with a particular focus on production profiles and total sales of these substances.

Multivariate analysis description

The multivariate data analysis was performed using Python programming language, Pandas and Sklearn packages.

Principal Component Analysis (PCA)

- The relation among production profiles of the different countries for the year 2021 was analysed by PCA. Data concerning the year 2021 was used for calculating the production profiles shown.
- A PCA was fitted with 2 components with a total explained variance of 50 % on the first 2 PCs (27.8% and 22.2% for PC1 and PC2 respectively). The data was pre-processed by scaling to unit variance and mean centered.

Data sources

- **ESVAC database** : data regarding animal production by species and antibiotic consumption in each country for the last decade mainly concerning animal production by species and consumption in each country.
- **ESVAC Reports**
- **National reports** of specific countries, present on the **ESVAC website**, were analyzed for selected cases, when necessary
- European Medicines Agency. European Database of Sales of Veterinary Antimicrobial Agents. Available online: <https://esvacbi.ema.europa.eu/analytics/saw.dll?PortalPages>

Profile of animal production (PAP)

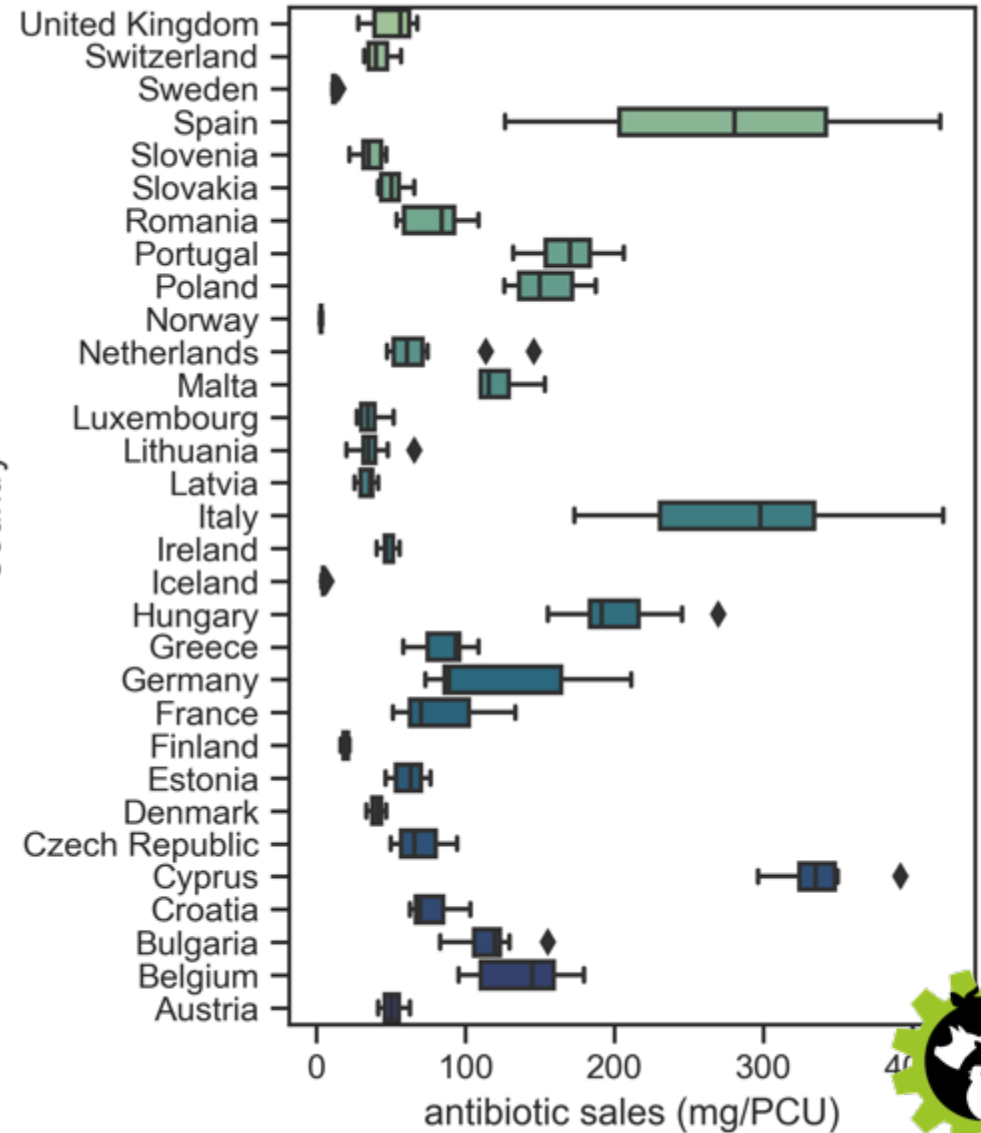
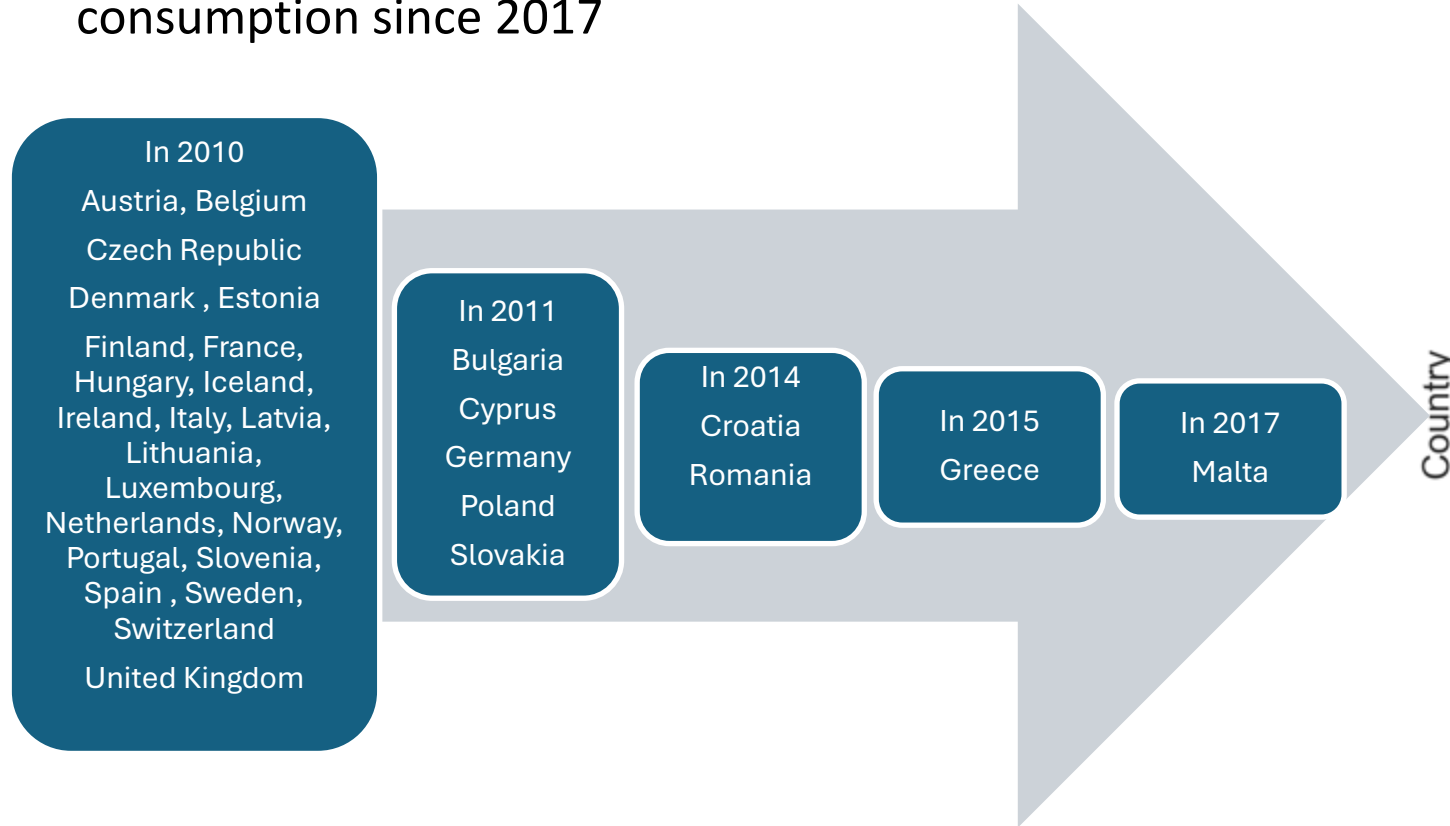
For comparison purposes between the relative importance of the amount of each species and comparison between countries

For each country in each year PAP was determined by dividing the values reported for production in each species in Population Correction Unit (PCU) in a year by the total animal production (in the PCU) of each country in the same year;

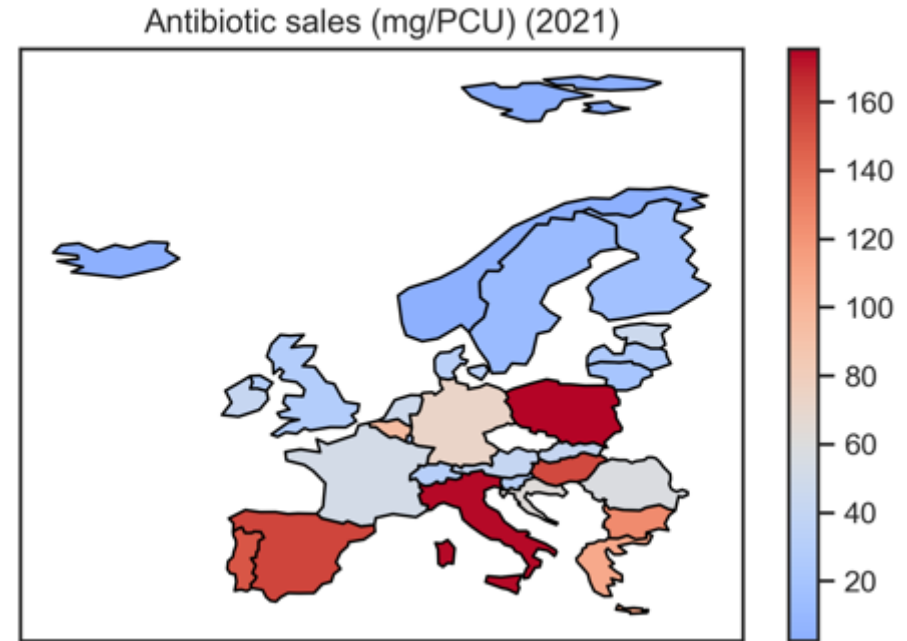
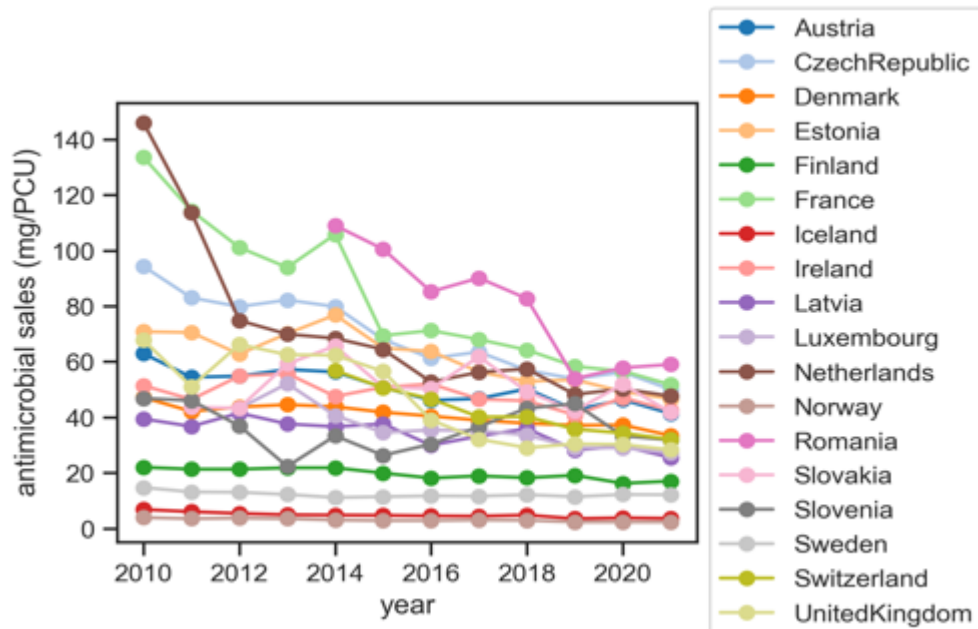
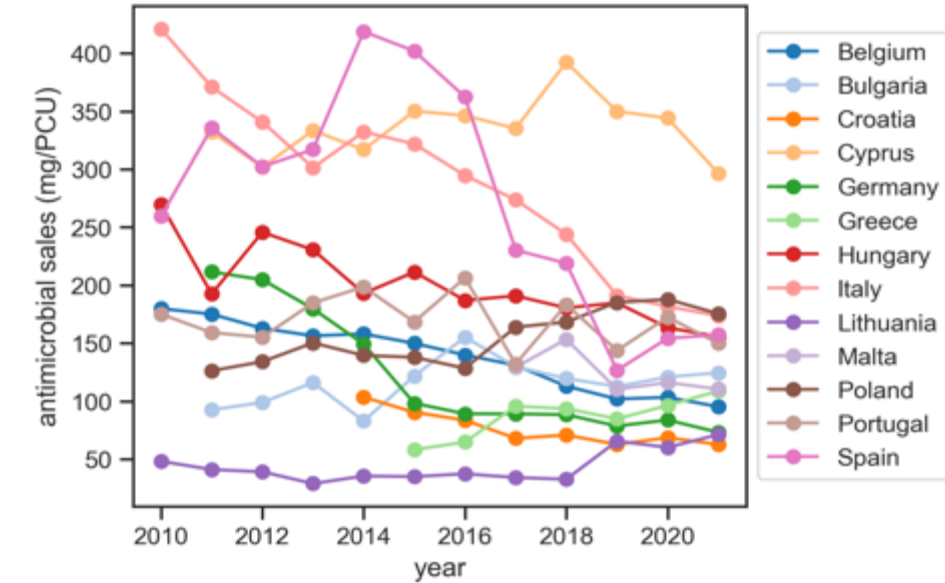
Profile is described considering the categories: “cattle”, “pigs”, “sheep and goats”, “horses”, “rabbits”, “fish”

Antibiotics sales reported in ESVAC in all countries for the reporting period (2010-2021)

- Data is available for 31 countries regarding antibiotics consumption since 2017



Antibiotic use reduction

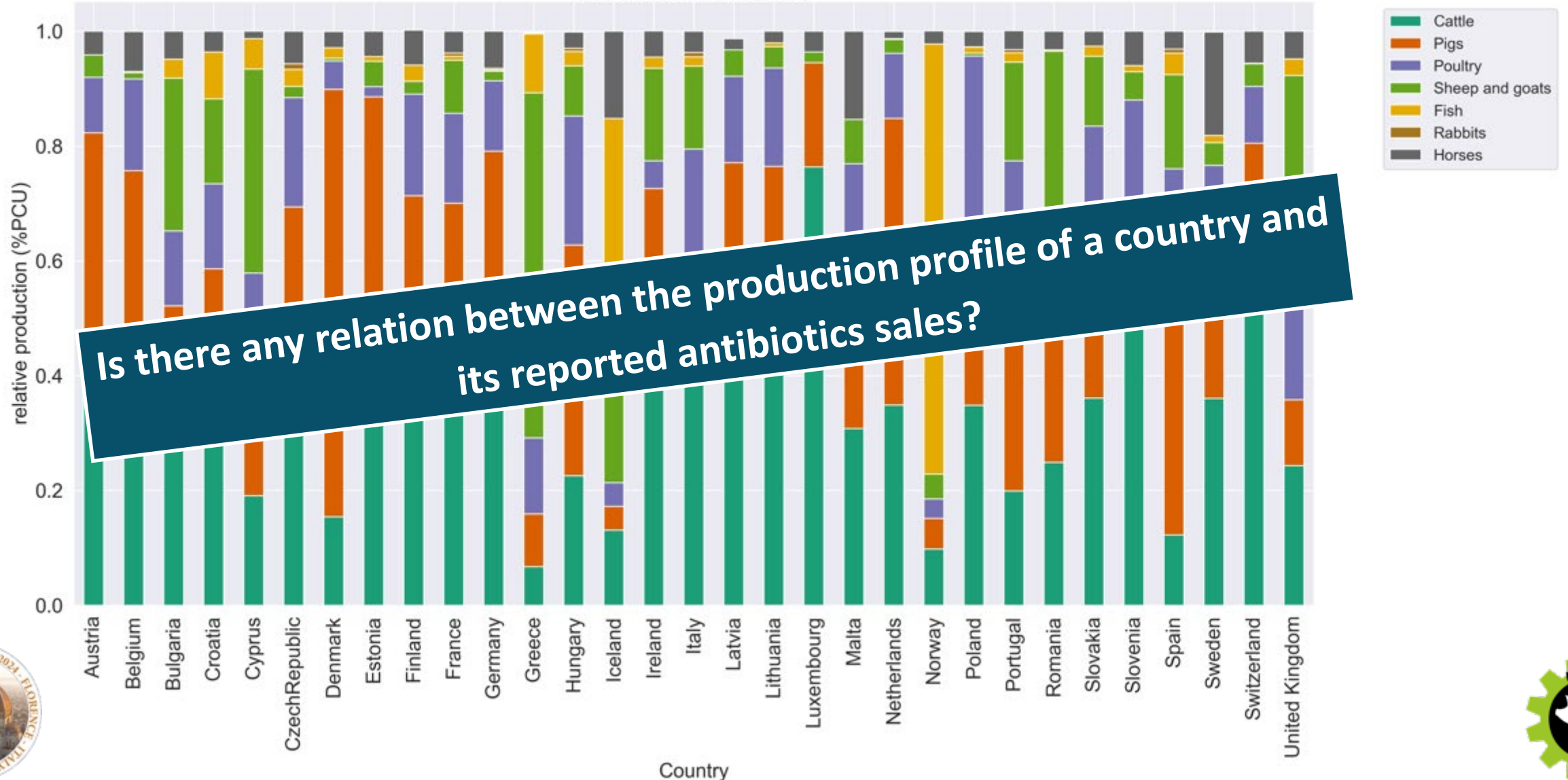


- 18 out of 31 countries have already achieved the 2030 goal of 59.2 mg/PCU by 2021;
- From these only 5 were above the goal in the 1st year reported.
- Only 4 countries (Greece, Poland, Lithuania and Bulgaria) show an increasing trend for consumption,
- The effort for decreased consumption is specially marked starting in 2014;

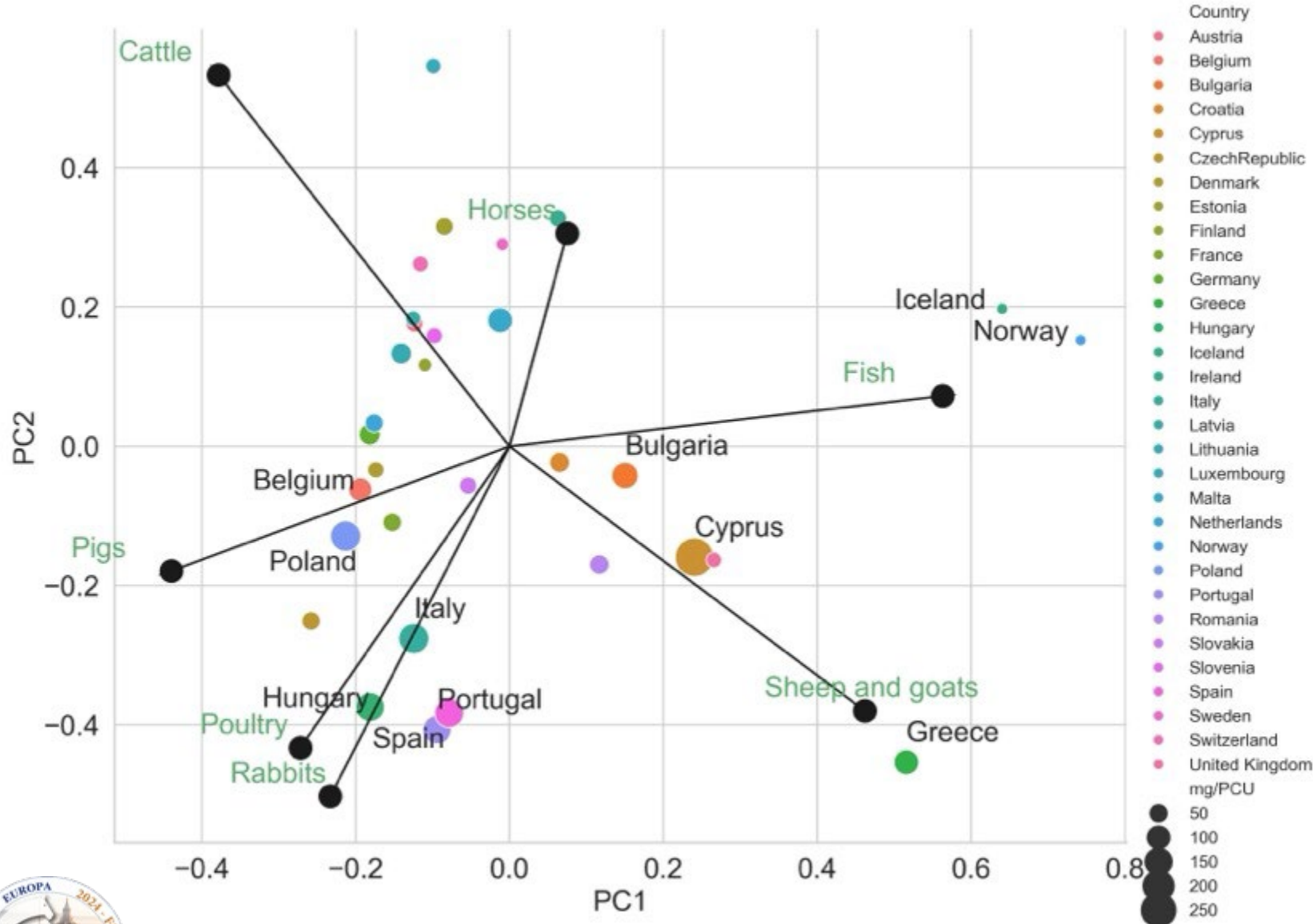
Production profiles

How different are the production profiles (in 2021)?

Production Profiles (2021)



How are the countries related by production profile?



From the biplot resulting from the PCA over the production profiles it becomes apparent that some profiles are correlated to the antibiotic sales.

Norway and Iceland, main fish producers, show a very low antibiotic reported sales

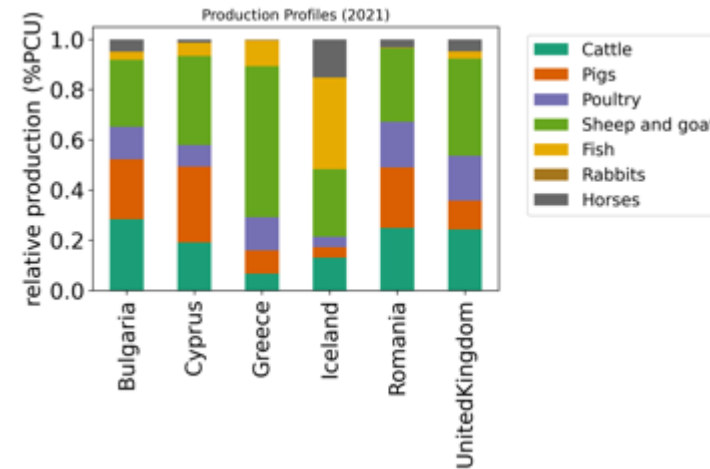
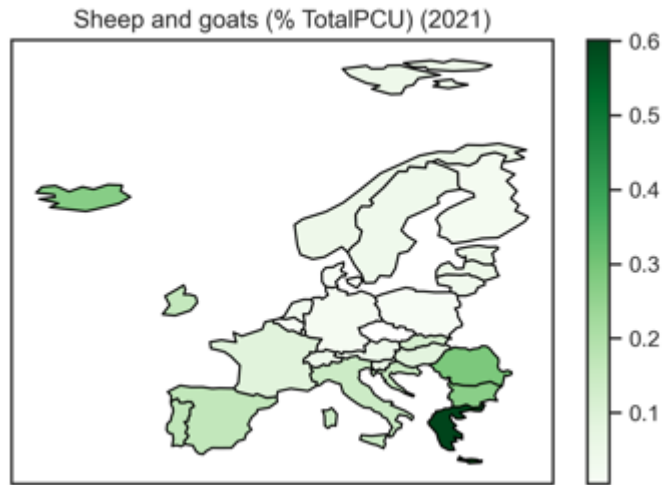
Greece, Cyprus and **Bulgaria** main producers of sheep and goats report a high consumption of antibiotics

Portugal, Spain, Hungary, and Belgium, major pigs producing countries also report high values of antibiotics consumption

Biplot showing scores and loadings for PCA analysis over calculated production profiles for all countries in 2021. Explained variance for PC1 and PC2 was 27.8% and 22.2% respectively.

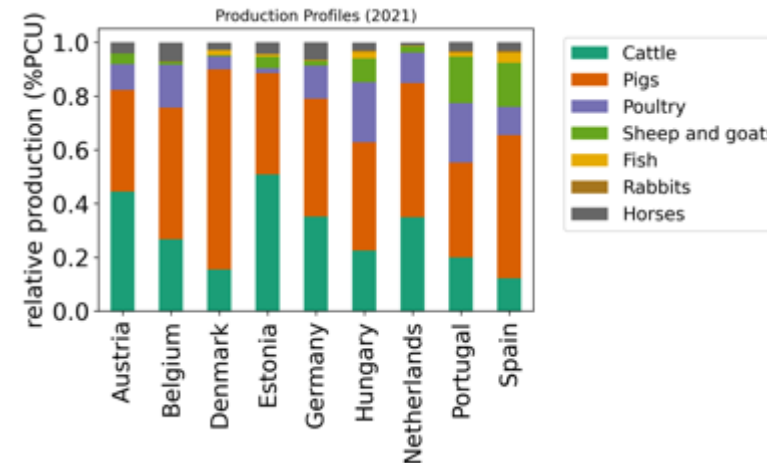
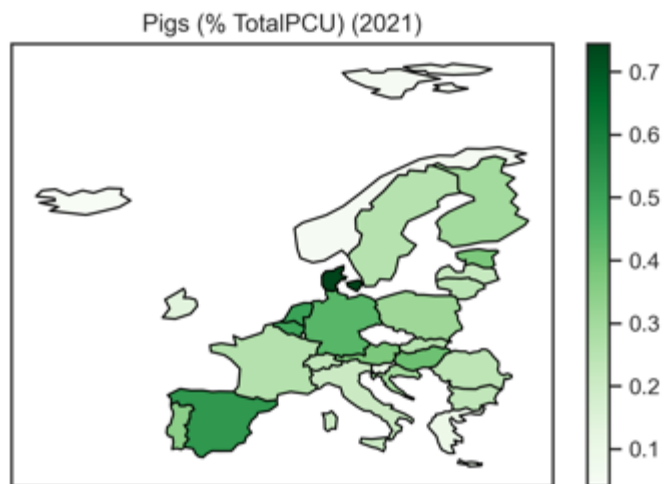
A closer look...

Sheep & Goat producing countries



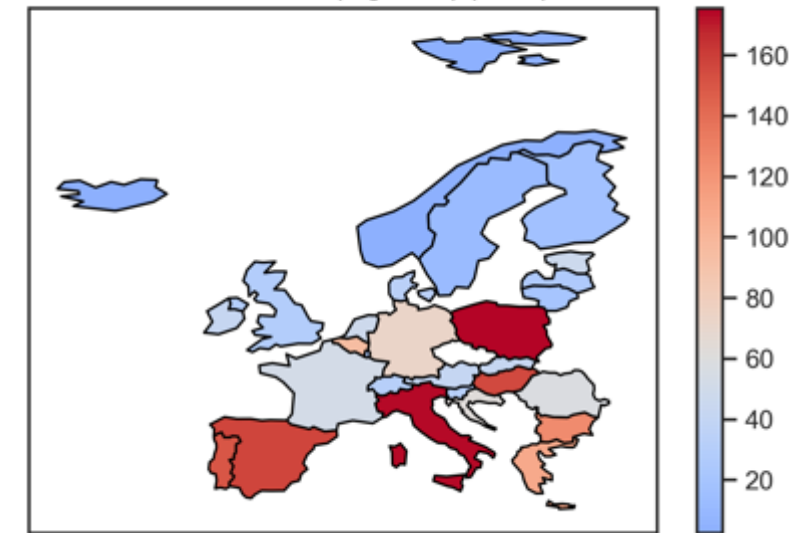
Production profiles of countries with a relative production of sheeps & goat higher than 25% (2021)

Pig producing countries



Production profiles of countries with a relative production of pigs higher than 33% (2021)

Antibiotic sales (mg/PCU) (2021)



A comparison between sales (right) and production maps (left) reveals some resemblance, suggesting eventual bias in the reported data for these species.

Possible reasons:

- inexistence of PCU for living goats might impact negatively mg/PCU indicator
- Pigs PCU not being duly corrected,



Data

- Collection system
- Uniformization
- No information by species

Reporting

- Voluntary reporting
- Missing data
- Under-reporting

Production profile / species

- Missing categories (*e.g.*: living goats)
- Don't represent directly each country animal production
- Production system

- **Shortcomings of the ESVAC project**

Improvements after the end of ESVAC project

ESUAvet WG

Provide support and advice to the European Medicines Agency (EMA) and the CVMP:

On **reporting, analysis** and **publication of data** on the volume of **sales** and on the **use** of veterinary antimicrobial products

Commission Delegated Regulation (EU) 2021/578 of 29 January 2021

Starting in **January 2024**:

- **Mandatory reporting** from all EU/EEA Member States of their sales of antimicrobials in animals to EMA.

Cattle, pigs, poultry → as of 2024

All other food-producing animals → from 2027

Dogs, cats and fur animals → from 2030

Starting in 2024

Path to 2030 goals – *Starting in 2024*

Delegated regulation - 2021/578 - EN - EUR-Lex (europa.eu)

The **first** report on the volume of sales of veterinary antimicrobial medicinal products and on the use of antimicrobial medicinal products **per animal species** shall be published by the Agency by **31 March 2025** and shall include the following:

- the volume of sales of veterinary antimicrobial medicinal products, covering data from 2023 and submitted by Member States by **30 June 2024**
- the use of antimicrobial medicinal products for relevant animal species, categories or stages covering data from 2023 and submitted by Member States by **30 September 2024**.

The path to 2030 is challenging, but with continued vigilance, innovation, and cooperation across sectors, EU goals can be achieved.

Thank you for your attention



Questions:

ESVAC & data setting collection: marcelo.leitao@feedinov.com

Data analysys: jorge.sarraguca@feedinov.com

