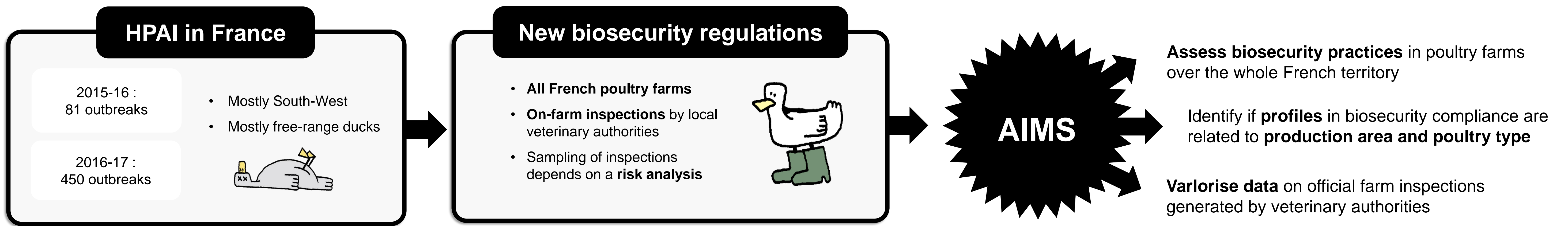# Biosecurity measures in French poultry farms are associated with farm type and location
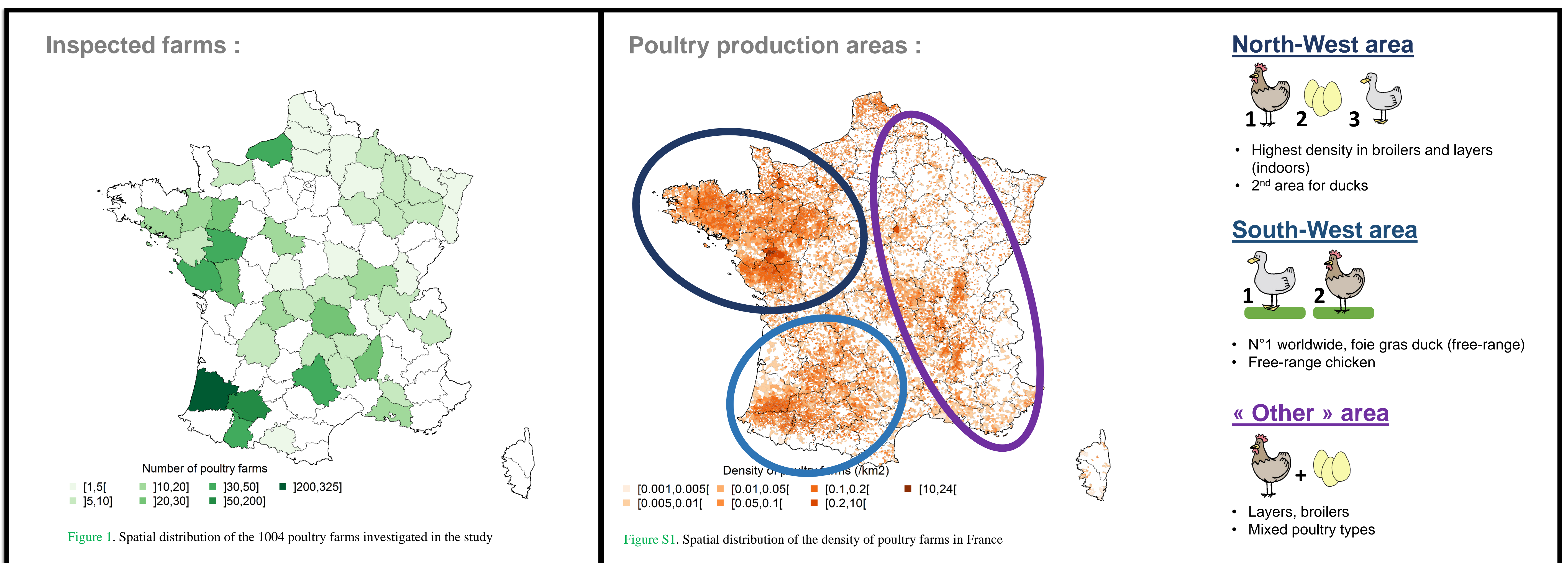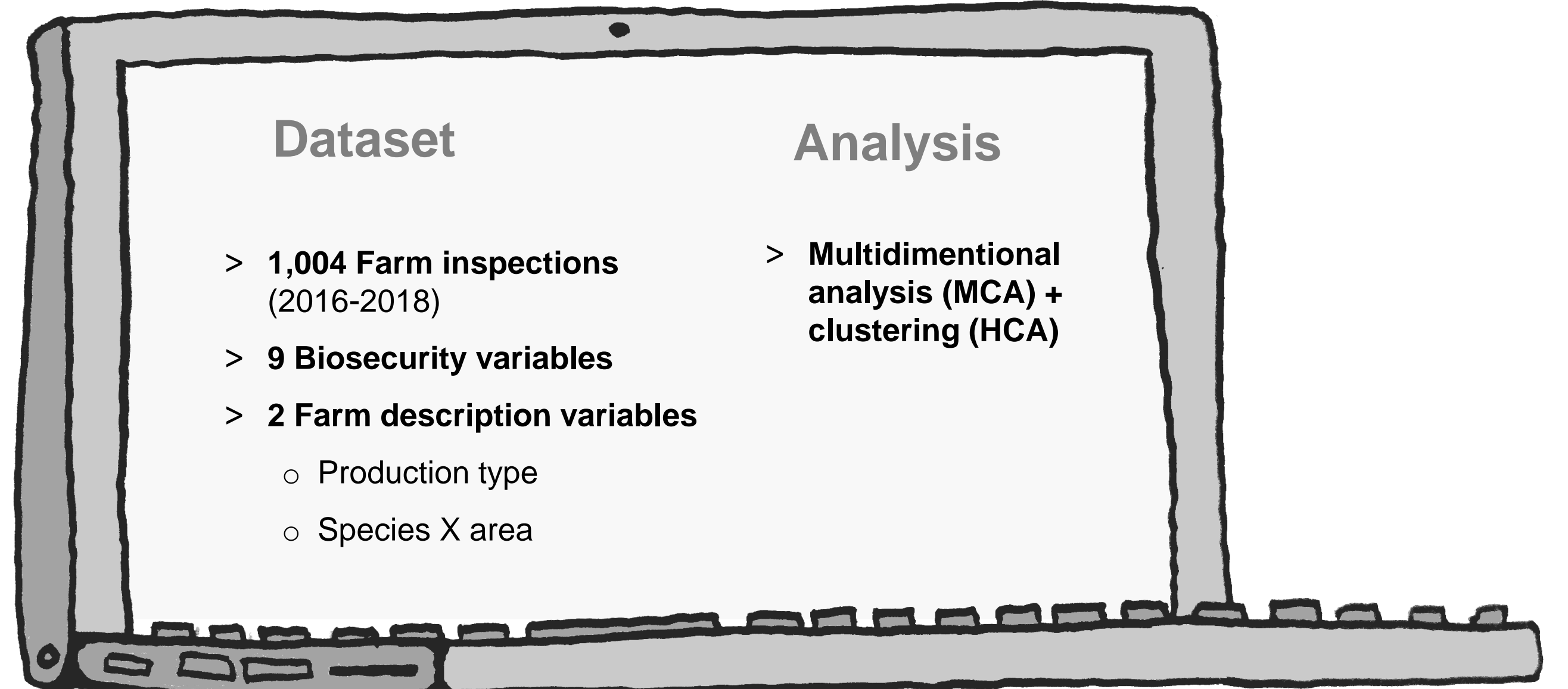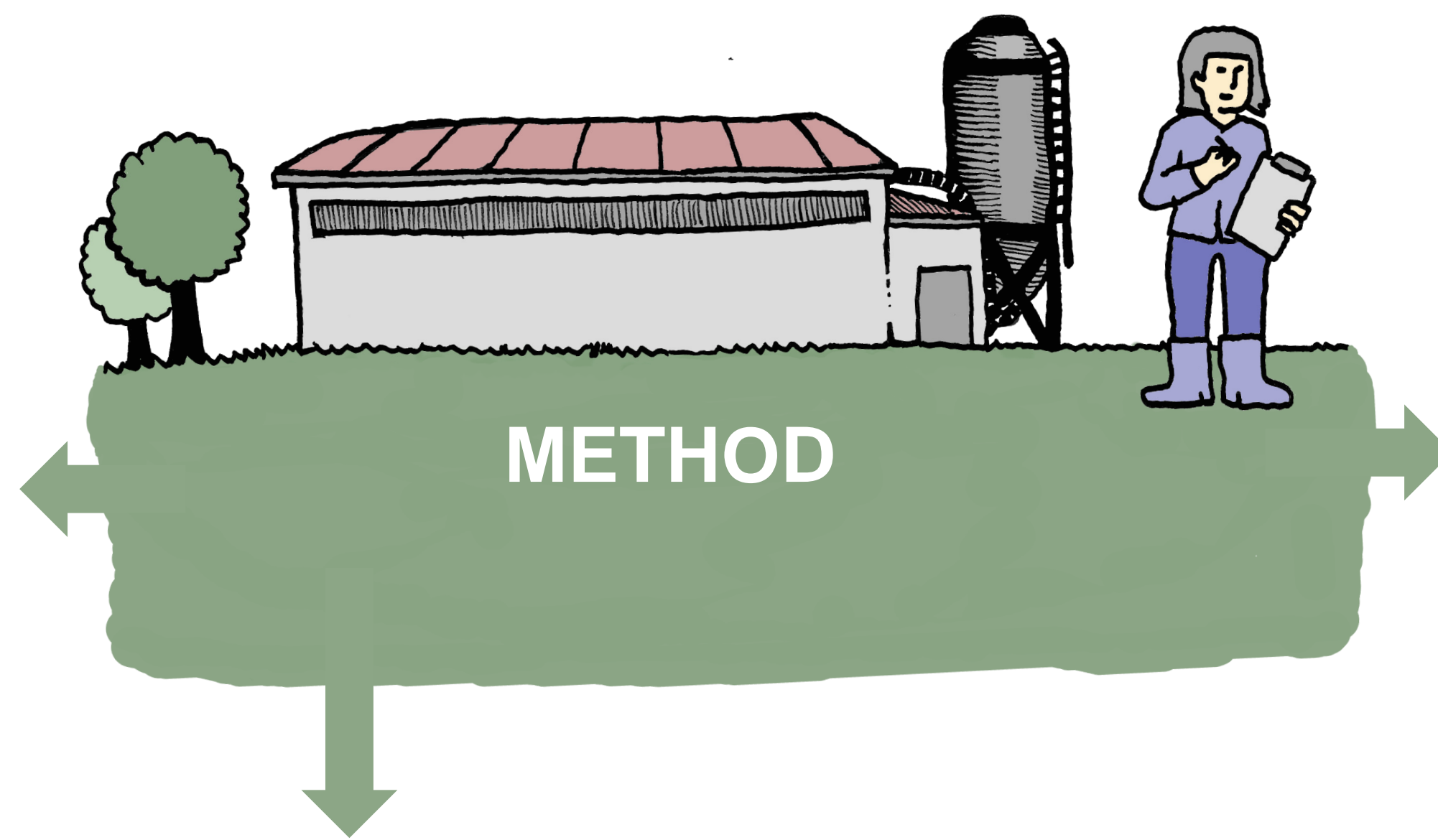
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HPAI in France

- 2015-16 : 81 outbreaks
- 2016-17 : 450 outbreaks

- Mostly South-West
- Mostly free-range ducks

New biosecurity regulations

- **All French poultry farms**
- **On-farm inspections** by local veterinary authorities
- Sampling of inspections depends on a **risk analysis**

AIMS

Assess biosecurity practices in poultry farms over the whole French territory

Identify if **profiles** in biosecurity compliance are related to **production area and poultry type**

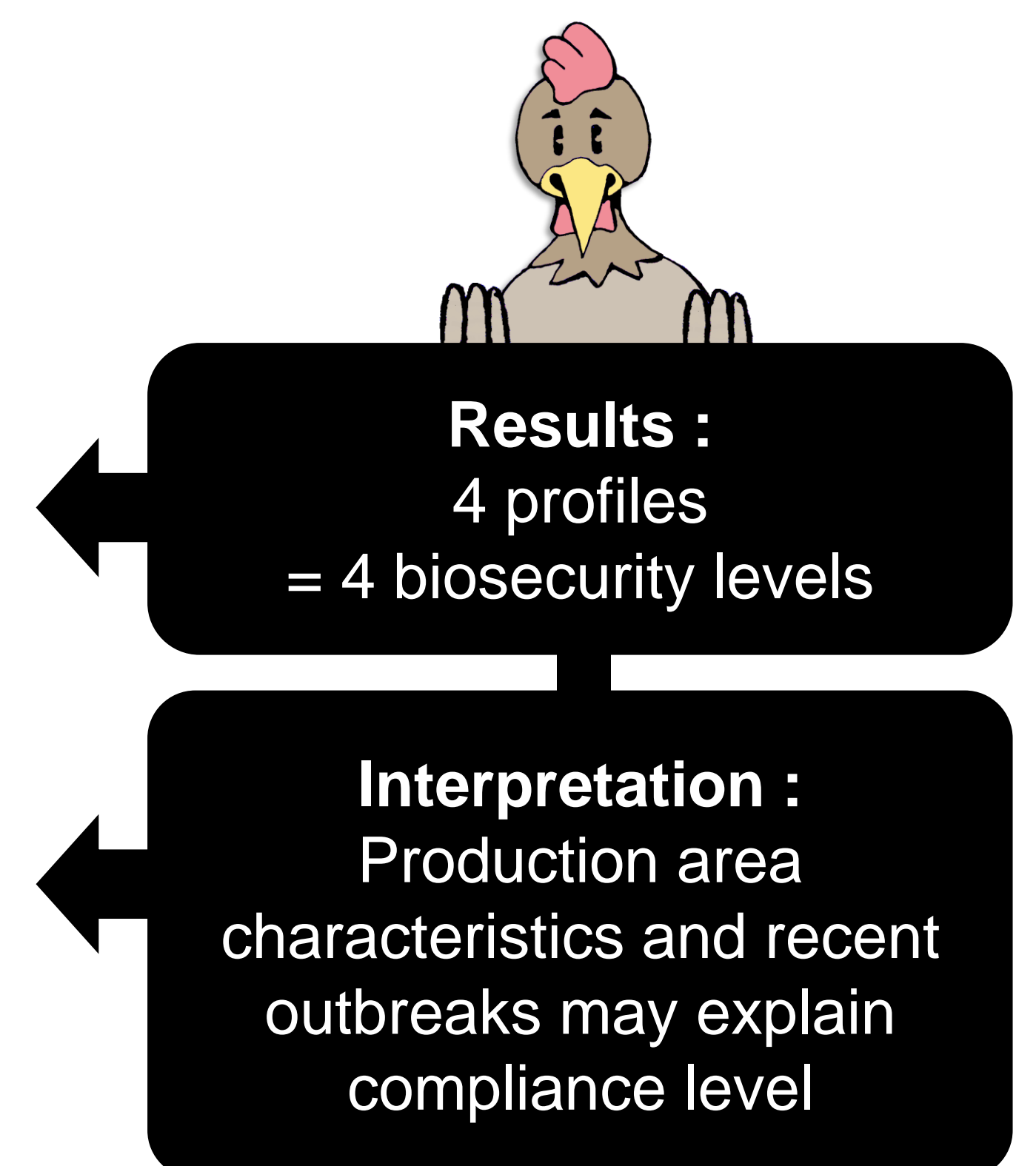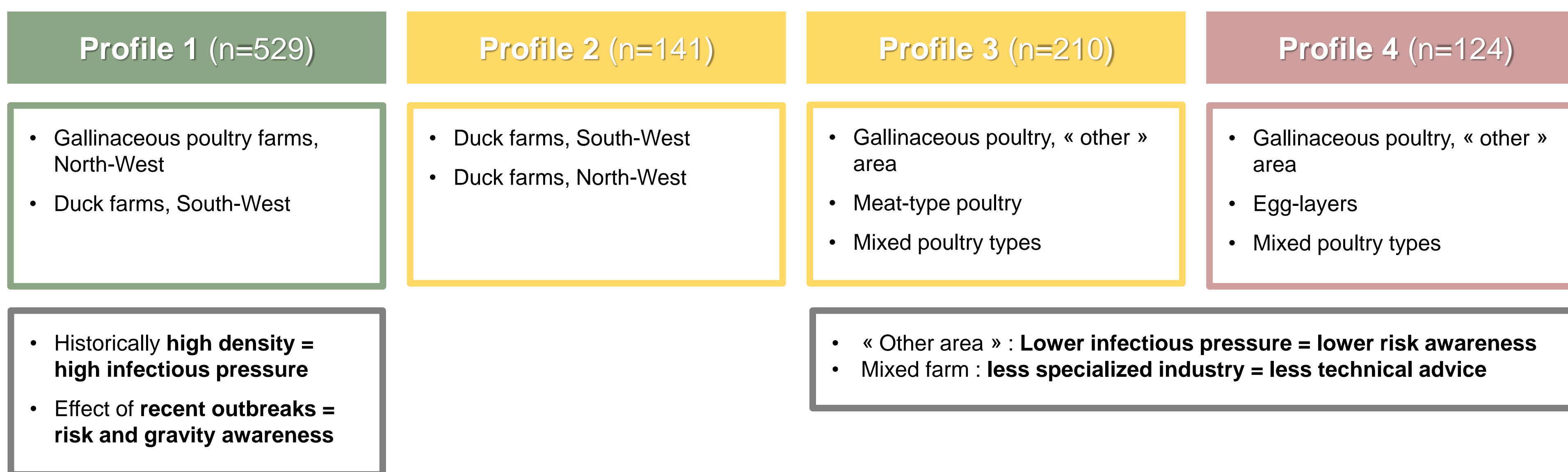**Varlorise data** on official farm inspections generated by veterinary authorities

METHOD

Biosecurity variables

1. Biosecurity plan
2. Training in biosecurity
3. Delimitation of farm and units
4. Management of vehicle movements
5. Anterooms
6. Cleaning and disinfection
7. Clear area around poultry units
8. Pest management protocols
9. Downtime

Dataset

- **1,004 Farm inspections** (2016-2018)
- **9 Biosecurity variables**
- **2 Farm description variables**
  - Production type
  - Species X area

Analysis

- **Multidimentional analysis (MCA) + clustering (HCA)**

Inspected farms :

Number of poultry farms
[1,5[   ]10,20[   ]30,50[   ]200,325]
]5,10[   ]20,30[   ]50,200]

Figure 1. Spatial distribution of the 1004 poultry farms investigated in the study

Poultry production areas :

Density of poultry farms (/km2)
[0.001,0.005[[0.01,0.05[[0.1,0.2[[10,24[
[0.005,0.01[[0.05,0.1[[0.2,10[

Figure S1. Spatial distribution of the density of poultry farms in France

North-West area
1 2 3
- Highest density in broilers and layers (indoors)
- 2nd area for ducks

South-West area
1 2
- N°1 worldwide, foie gras duck (free-range)
- Free-range chicken

« Other » area
- Layers, broilers
- Mixed poultry types

Compliance (+++) ← → Compliance (---)

Profile 1 (n=529)
- Gallinaceous poultry farms, North-West
- Duck farms, South-West

Profile 2 (n=141)
- Duck farms, South-West
- Duck farms, North-West

Profile 3 (n=210)
- Gallinaceous poultry, « other » area
- Meat-type poultry
- Mixed poultry types

Profile 4 (n=124)
- Gallinaceous poultry, « other » area
- Egg-layers
- Mixed poultry types

- Historically **high density = high infectious pressure**
- Effect of **recent outbreaks = risk and gravity awareness**

- « Other area » : **Lower infectious pressure = lower risk awareness**
- Mixed farm : **less specialized industry = less technical advice**

Results :
4 profiles = 4 biosecurity levels

Interpretation :
Production area characteristics and recent outbreaks may explain compliance level

Discussion : method

- **Valorization** of data from **veterinary health authorities**
- **Sampling** : over-representeation of Southwestern duck farms, due to a risk-based sampling
- **Reliability of data** : cross-checking of different data sources (interview + farm records + observations)
- **Many inspectors involved** : guidelines were distributed to avoid an interviewer bias, but some data was lost because of some discrepancies

Discussion : persepctives

- **Adaptation of sampling,** for future biosecurity inspections campaigns
- **Adaptation of biosecutiy advice** given by stakeholders, after the identification of common breaks in biosecurity
- **Massive biosecurity database that can be used for other research.** (e.g.,Guinat et al., 2020, Biosecurity risk factors for highly pathogenic avian influenza (H5N8) virus infection in duck farms, France)