

# Reduction of antibiotic use in farm animals and aquaculture production in Norway over the last 30 years.

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# Brief history of antibiotics

In ancient time: Various moulds and plant extracts were used to treat infections in earlier civilizations

Egyptians used moulded bread on infected wounds

**John Parkinson** (1567 -1650) documented the use of mould to treat infections

**Paul Erlich** chemical arsphenamin (Salvarsan) was an effective treatment for syphilis (chemotherapy) (1909)

**Alexander Fleming** (London) found that *Penicillin notatum* prevented growth of *Staphylococcus* even when diluted 800 times (1928).

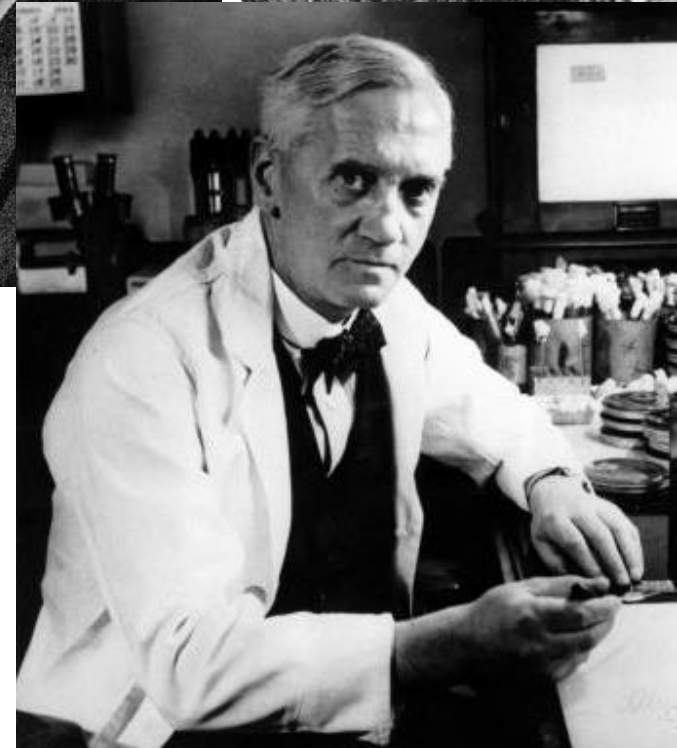
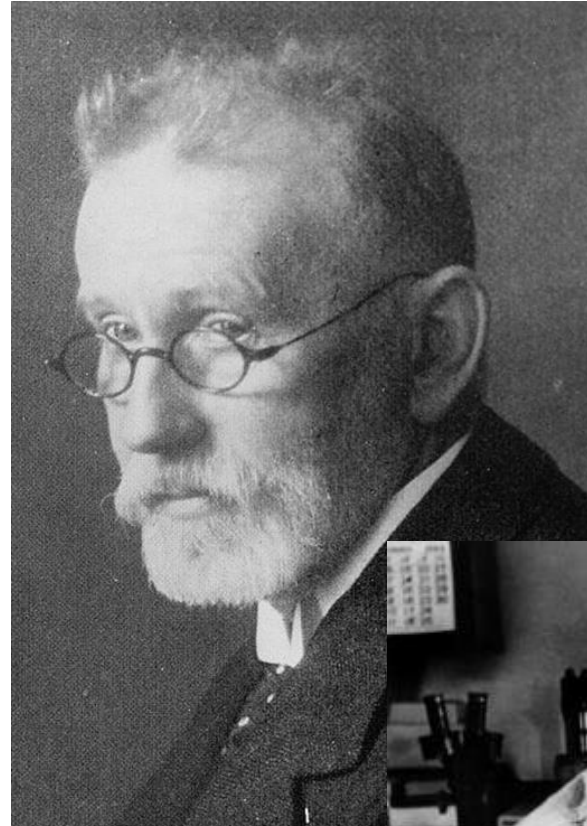
**Bayer (IG Farben)** Sulfonamid antimicrobial activity (1935)

**Howard Flory and Ernst Chain** (Oxford) developed mass production

USA starts mass production after a night club fire in Boston in 1942 when penicillin saved lives

«**the wonder drug**» during WW II:

**Fleming, Flory and Chain** received the Nobel Prize in physiology and medicine in 1945



# Use of antibiotics in farm animals

**Sulfonamids:** Available for livestock (1930s)

**Penicillin:** Easy access after WW2

**New antibiotics** being synthesized

**Therapeutic use:** Treating the sick animal

**Metaphylaxis:** Treating a herd when at least one animal is sick

**Prophylaxis:** To prevent outbreak of infectious and contagious bacterial diseases

**Factory farming,** the use of antibiotics took off to reduce the negative effect of high stocking densities

**Growth stimulation** with sub-therapeutic doses of antibiotics (1940s) (first was byproduct from oxytetracycline production given to chicken)

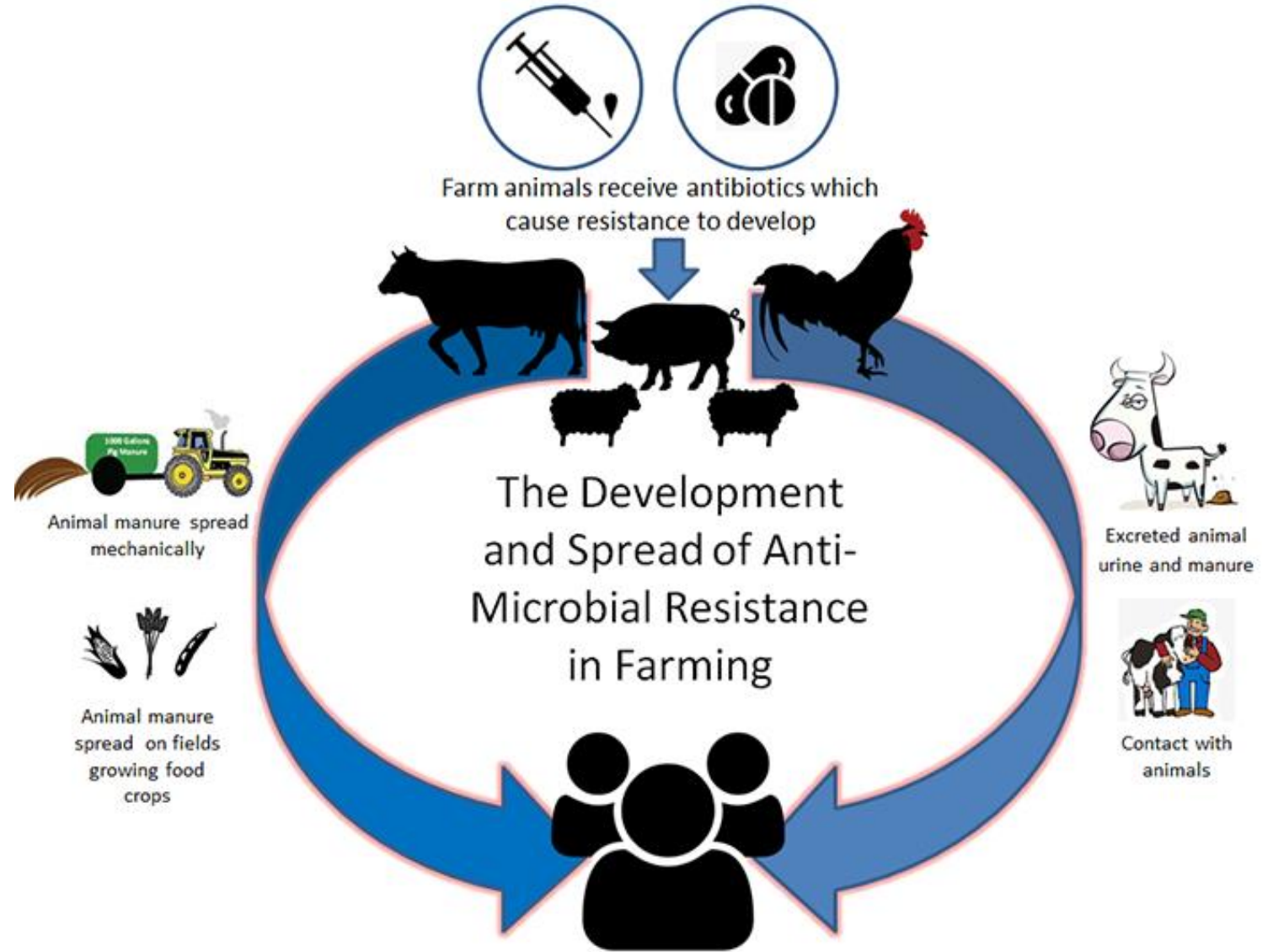


# Serious concern about antibiotic use in farm animals

## Residues in the food chain

**Environmental residues** in manure and ground water (up to 90 % is excreted)

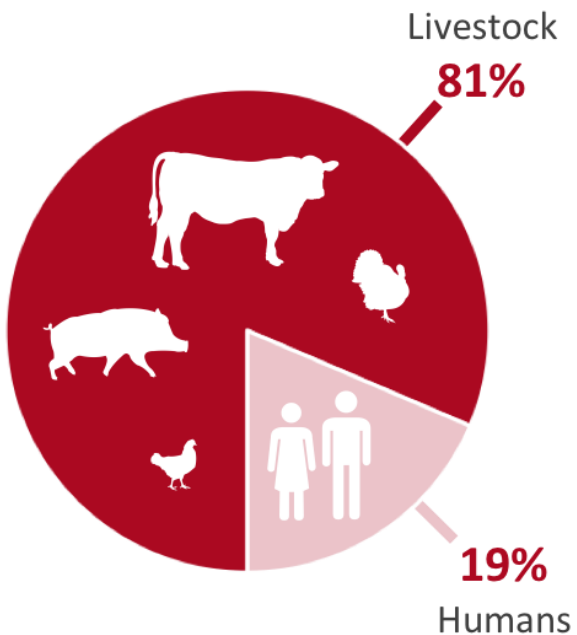
**Antibiotic resistance** is one of the biggest **threats to global health**, food security, and development today. (WHO)



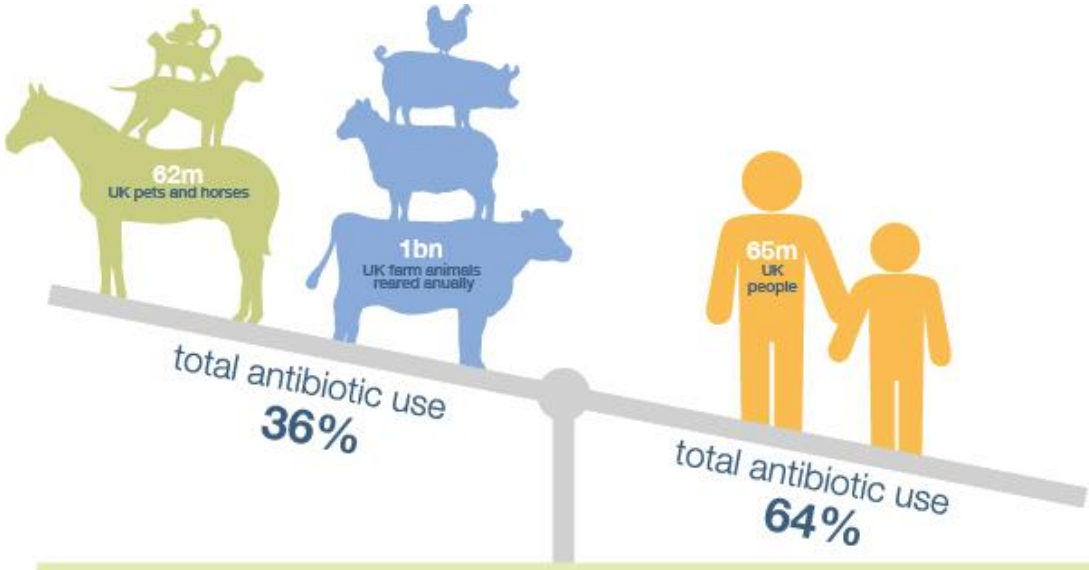
# Use of antibiotics in farm animals vs. humans

## USA, (before 2017)

Antibiotics Sold in the U.S.



## United Kingdom



In the UK, 3 times more antibiotics are used to treat people than animals on a 'kg for kg' basis  
One Health report 2019 (using 2017 data), based on tonnes of active ingredient

Produced by RUMA [www.farmantibiotics.org](http://www.farmantibiotics.org)

# Use of antibiotics as growth promoter

- 80 % of all antibiotic used in livestock in the US until 2017, was as growth promoter.
- USA partly banned this use in 2017.
  - EU in 2006
  - Sweden in 1986
  - Norway in 1995



## Regulation works

Reduction of antimicrobials in livestock after the use as growth promoter was banned (Bengtson, Wierup 2006):

- Sweden (65%)
- Denmark (47%)
- Norway (40%)
- Finland (27%)
- USA (33% 2016-2017) (FDA)







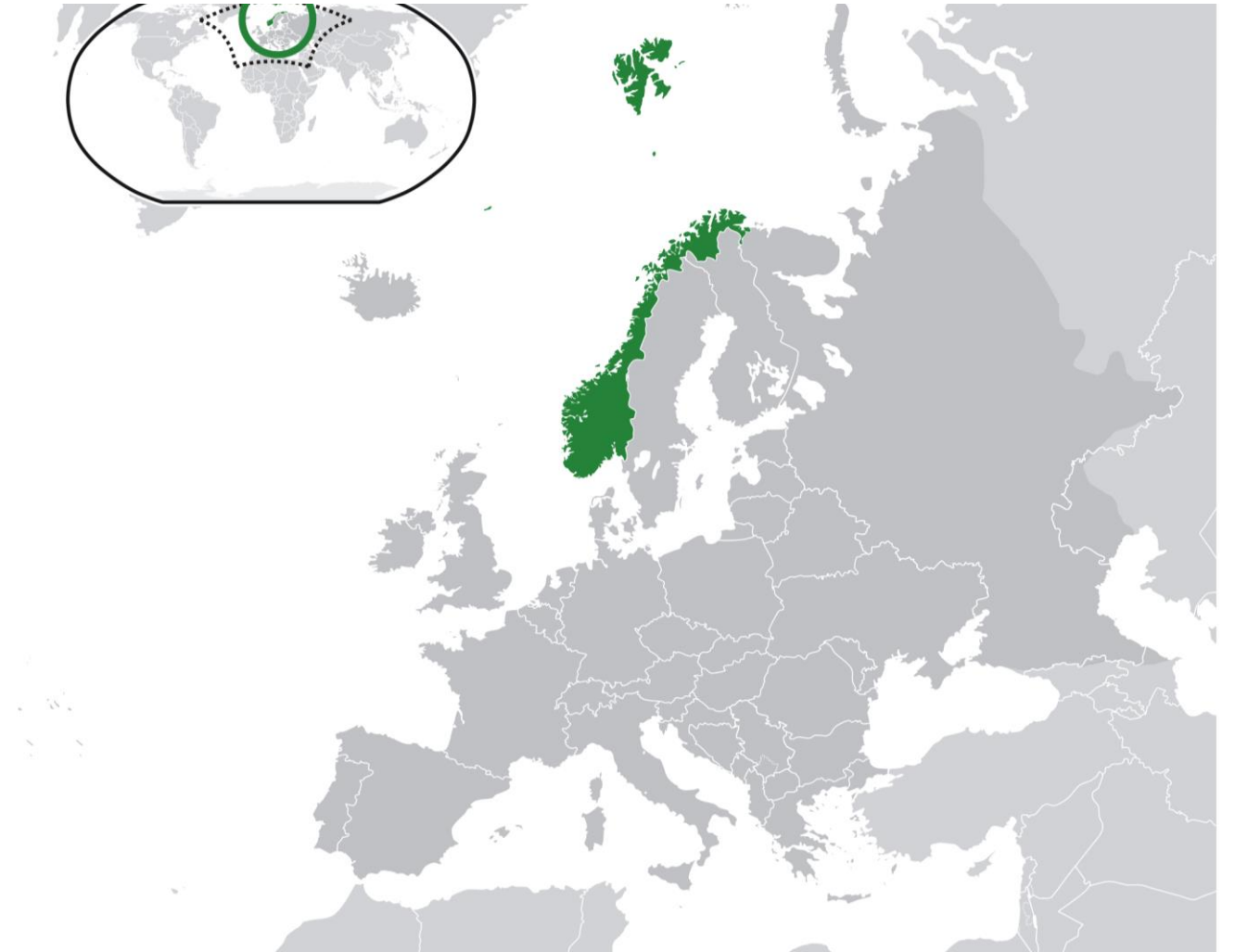
# The Norwegian story

Geography

Cold climate

Small scale food animal  
production

Distance between farms



# 1. Regulatory means

National veterinary authority founded in 1894, (Before National health authority)

Animal disease act 1894. (The act lasted until 1965). Notifiable diseases (Group A-, B diseases).

Restricted import control of live animals, and also restrictions for transporting animals between regions

New knowledge about bacterias and contagious diseases late 1800.

Diagnostic tools, i.e. tuberculin produced in Norway in 1891



## 2. Free from seroius contageous diseases

Bovine tuberculosis: Eradicated in 1963.  
Started to produce tuberculin in 1891

Brucellosis: Eradicated in 1953

Foot and Mouth disease: Last outbreak  
1951/52; outbreaks in 1924/25, 1938/39,  
1940/43.

Rabies last incidence beginning of 1800.  
Svalbard sporadic since 1980, (Artic fox).

(IBR/IPV: 1994, EBL: 1997, BVD: 1997)

Economic compensation to the farmer



### 3. Norwegian farming

Small family owned farms:

- Average dairy farm: 27 cows
- Average pig farm: 100 sows

90 % of farmers member of farmers union and national breeding associations

Tradition in working together with veterinary association and veterinary authorities

Food animal production is strongly subsidized



# 4. Focus on preventive medicine

- Health card since 1975
- Health parameters included in breeding programme
- First national preventive health plan in cattle 1981 (mastitis), swine 1985

**ANIMALIA**  
HELSEJENESTEN FOR STORFE

**HELSEKORT KU – INDIVIDKORT**

Produsentnummer: \_\_\_\_\_ Fylke \_\_\_\_\_ Kommune \_\_\_\_\_ Gard \_\_\_\_\_

Føres av eier/røtter	Sjukdomsregistrering												Beh- kode	Kuas avstamning	Registrert av: Veterinær nr. evt. Andre: 9997 Eier: 9999	Inn- rapp.			
	Fødsel/fruktbarhet				Produksjonslidelser														
Kalving	Tilbake- holdt etter byrd 326	Bor- beten- nelse 333	Egg- stokk- cyster 334	Brunst/ omløp 331, 340, 341	Mjølke- feber 386	Kelose 385	Klauvlidelser 369-378		Klinisk mastitt Ah/ Mod. 303 Mild 304		Sir- tis- beh. 310	Andre sjuk- dommer og forebyggende behandling (se kodeliste)	Kode	Mors nr. og navn .....	Fars nr. og navn .....	Merknader om symptomer, behandling mv.	Nummer	Dato	
År	Dato	Dato	Dato	Dato	Kode	Dato	Dato	Dato	Kode	Dato	Dato	Dato	Dato	Kode					

dselsår og dato..... Kuas nr. og navn..... Slaktet/død dato..... årsak.....

## 5. Campaigning for prudent use of antibiotics

1995-2000 Farmers organisations / Veterinary association sat a goal to reduce antibiotic use with 25 %. **Result 40 %**

Maybe more important: A **change in attitude** among veterinarians and farmers

1995: Banned use of antibiotics as growth promotor (Zn-bacitracin, avoparcin: chicken)

(Naracin still used prophylactic as coccidiostaticum until 2016)

2013 – 2018 Farmers organisations, veterinary authority and veterinary association sat goal to reduce antibiotic use with 15 %. **Result 18 %**



## 6. Veterinary practice

- All antibiotic treatment based on veterinary diagnosis
- Therapeutic use only
- Metaphylaxis to flock animals (chicken, salmon)
- Prescription of antibiotics from pharmacy
- Veterinarians may hand out antibiotics to a farmer until antibiotics can be obtained from the pharmacy
- Veterinarians not allowed to make any profit in selling antibiotic
- Focus on preventive veterinary medicine – leave the antibiotic in the car



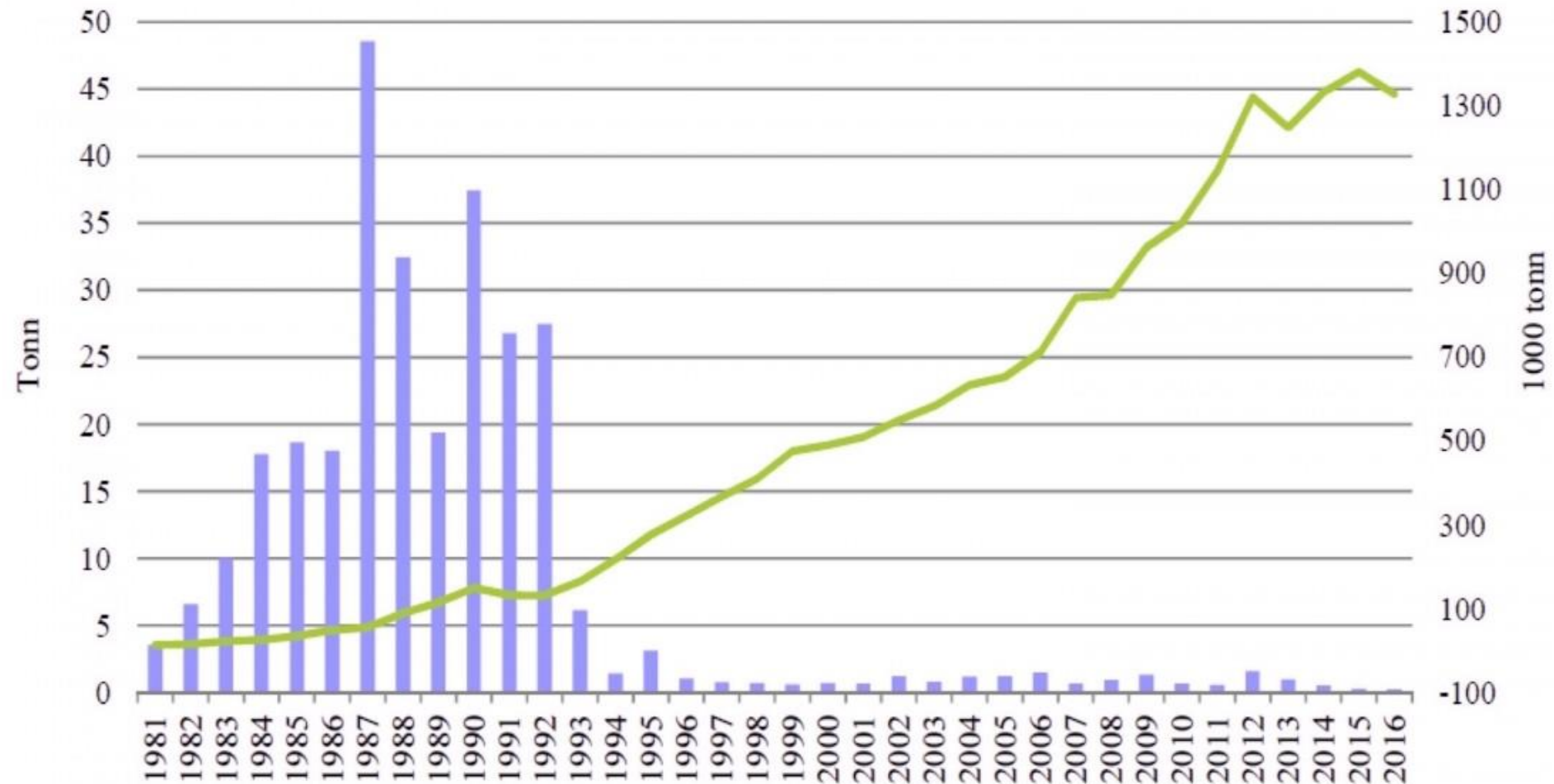
# Salmon industry - Factory farming in Norway

- Salmon farming started in the beginning of 1970s
- Norway's 2. largest export industry after oil
- High density – 25 kg biomass/m<sup>3</sup>
- 1-2 million fish in one farm (200 000 in each pen)
  
- Great Challenge with infectious diseases
- Huge amount of antibiotic was used to control bacterial diseases
- A preventive veterinary medicine approach, biosecurity measures
- **Vaccine development**
- Still challenge with infectious diseases due to viral diseases
  - no treatment available
  - less effective vaccines,





# Use of antibacterial agents in salmon farming



Thank you for your attention

