Framing the global poultry meat industry

07 July 2022

Nicolò Cinotti – Secretary General

INTERNATIONAL POULTRY COUNCIL

VET for Africa

AFROHUN ETHIOPIA

VETERINARY CAPACITY BUILDING
in the context of the «One Health»

Con il contributo della RegioneEmilia-Romagna

WOLLO UNIVERSITY

CUP n. E17D20000040003

About IPC

- Founded in 2005
- Voice of the global poultry meat industry, representing the whole value chain
- Recognized by FAO, OIE, Codex Alimentarius Commission and CoAg

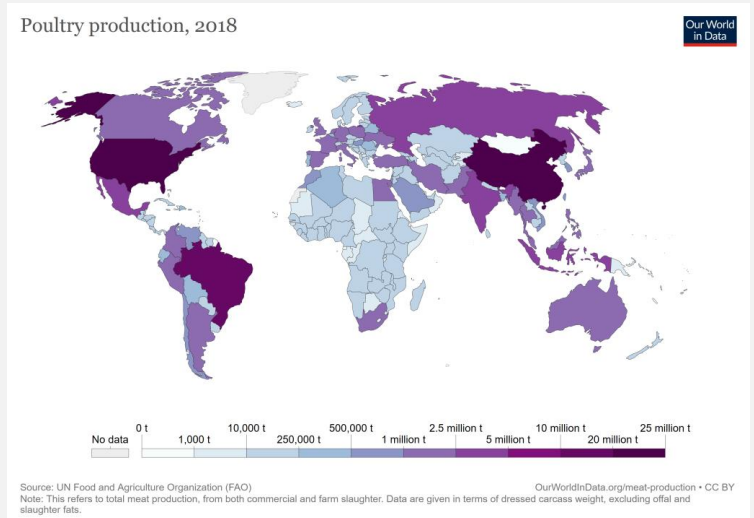
About the global poultry meat industry (2020)

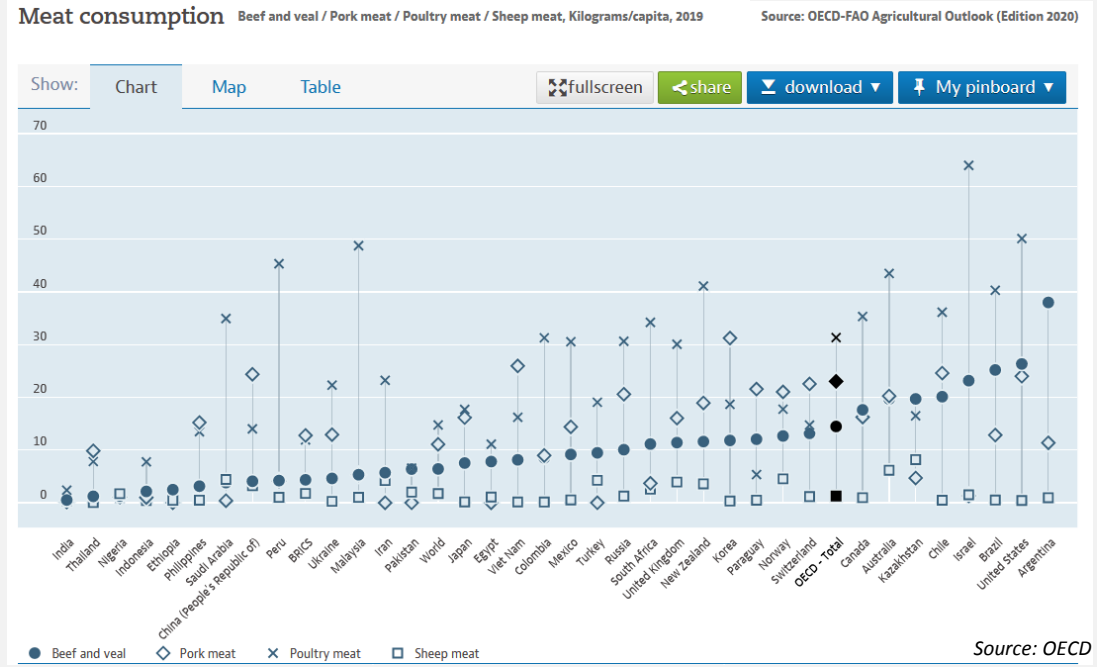
- Over **1,9 M** large broiler, turkey and duck farms
- Nearly **91 M** household and micro-producer farms
- Over **130 M** tons of poultry meat annually
- Value: more than **$221 B**
- Growth since 2010: more than **35%**
- Exports: **15,97 M** metric tons
- Net export value: **$24,62 B**
- The most traded kind of meat globally by volume
- Contribution to global GDP: **$388 B**

IPC represents 88% of global poultry meat production and 95% of global poultry meat trade

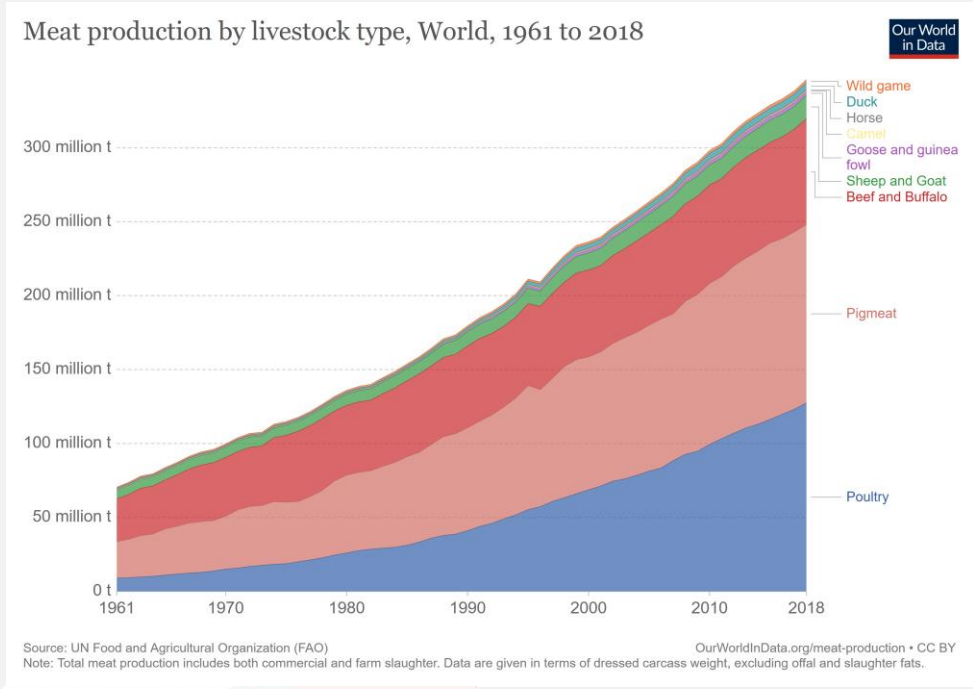
Source: DIS Report on Macroeconomic Indicators for the Global Poultry Meat Industry (to be published)

About the global poultry meat industry





Source: OECD



2018	
Wild game	2.11 million tonnes
Duck	4.46 million tonnes
Horse	791,991 tonnes
Camel	557,432 tonnes
Goose and guinea fowl	2.65 million tonnes
Sheep and Goat	15.77 million tonnes
Beef and Buffalo	71.61 million tonnes
Pigmeat	120.88 million tonnes
Poultry	127.31 million tonnes
Total	**346.14 million tonnes**

What is “food security”?

According the United Nations’ Committee on World Food Security, food security is defined as the means that all people, at **all times**, have **physical**, **social**, and **economic** access to sufficient, **safe**, and **nutritious** food that meets their **food preferences** and dietary needs for an active and **healthy life**

CFS

COMMITTEE ON WORLD FOOD SECURITY

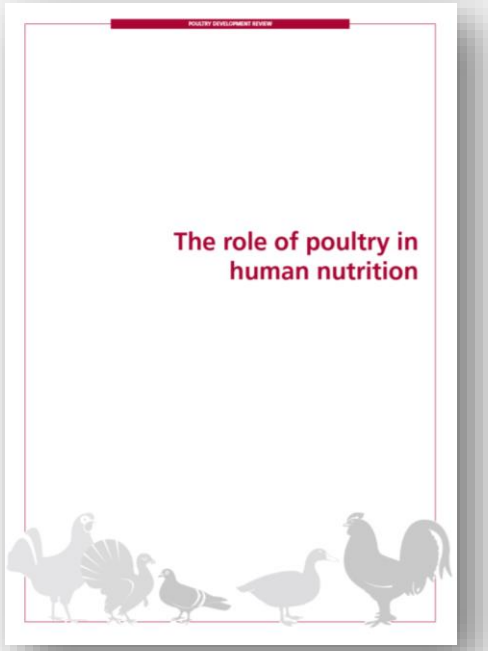
"Translating" the definition

1. *Access to food all time*
   It means that food must be available
2. *Economic access to food*
   It means that food must be affordable
3. *Social access to food*
   It means that food must be socially acceptable
4. *Safe food*
   It means that food must be safe
5. *Nutritious Food*
   It means that food must be nutrient
6. *Food preferences*
   It means that food must be a free choice
7. *Food for an healthy life*
   It means that food must contribute to an healthy life

How poultry contributes to food security

- During the pandemic, the poultry industry provided the world population with uninterrupted access to food
- Poultry is widely accepted across cultures and religions
- The poultry industry is the most technologically advanced and works to ensure the safety of its products
- Poultry meat is an important part of a healthy, nutritious and balanced diet.
- Poultry meat has an excellent protein profile and a low-fat content.
- Food safety is at the heart of the poultry industry and the industry implements biosecurity and HAACP programs to reduce zoonoses risks.
- Unfortunately, animal protein are still only an aspiration in some areas of the world.
- IPC's role is to help facilitate global access for all

Role of poultry meat in human nutrition



Source and Accessed: http://www.fao.org/3/i3531e/i3531e02.pdf - April 4, 2019

TABLE 1

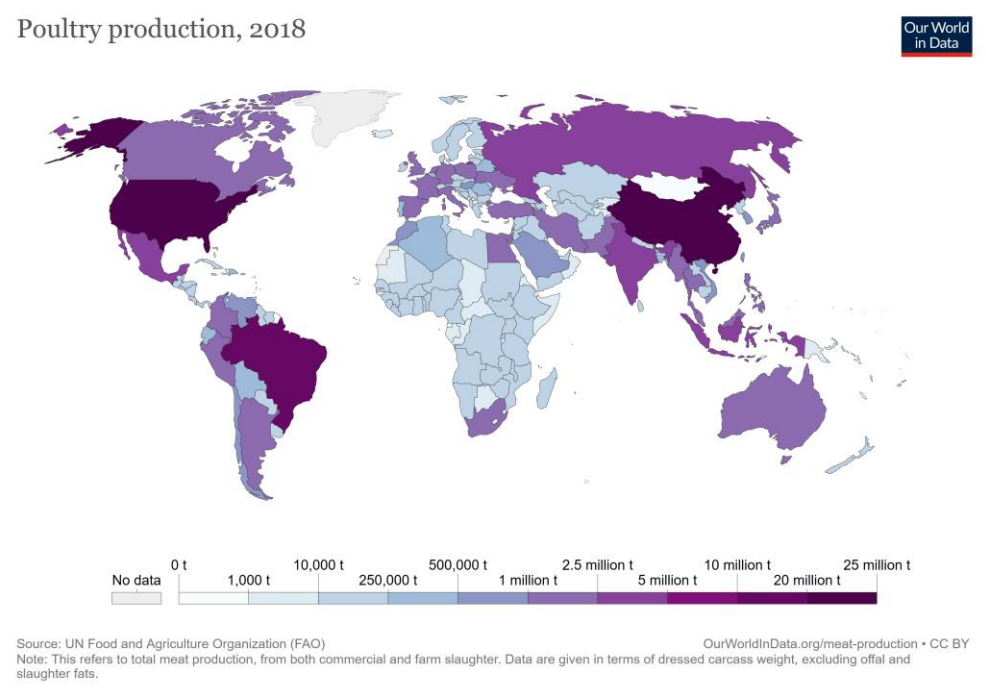
Contributions of nutrients from 22 g/day of chicken meat and 36 g/day of eggs in the diet of a three-year-old girl

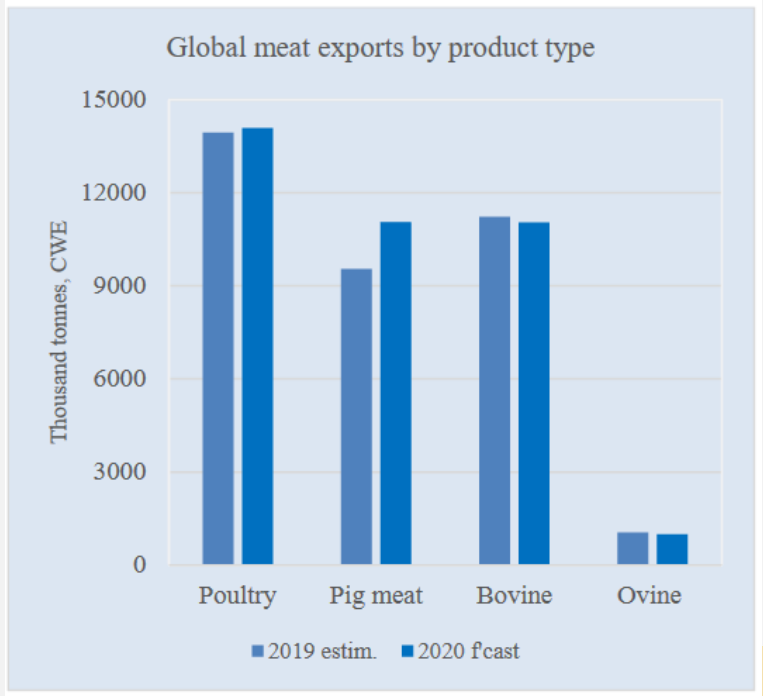
	Meat	Eggs	Total	% RDI*
Lysine (mg)	398	310	768	> 100
Meth + cyst (mg)	212	252	464	> 100
Tryptophan (mg)	55	76	131	> 100
Threonine (mg)	194	230	424	> 100
Niacin (mg)	2.0	0.04	2.04	20
Folic acid (µg)	11	34	45	30
B12 (µg)	0.55	0.11	0.66	66
Vitamin K (µg)	12	2	14	> 100
Iodine (µg)	12	14	26	29
Iron (mg)	0.3	0.7	1.0	14
Zinc (mg)	0.3	0.5	0.8	11

* RDI for an infant of three to four years of age, if known, otherwise RDI for an adult.

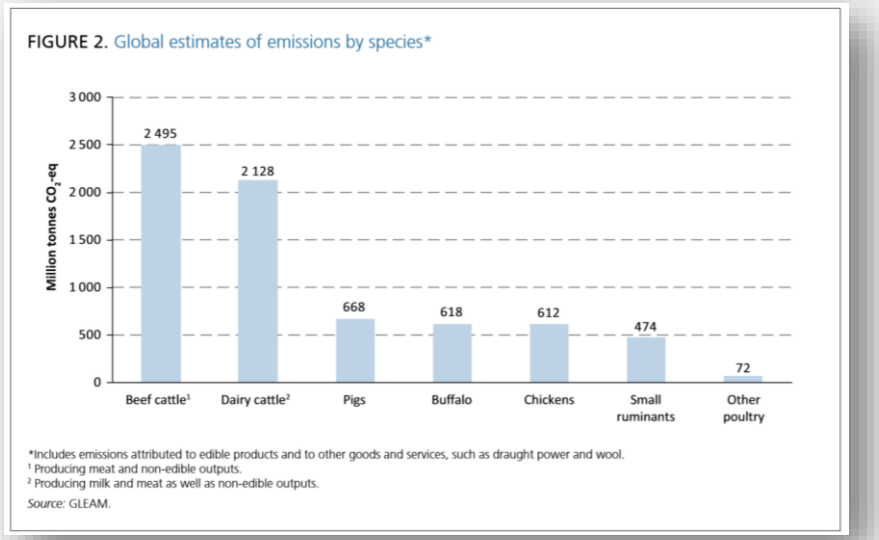
Role of trad in food security

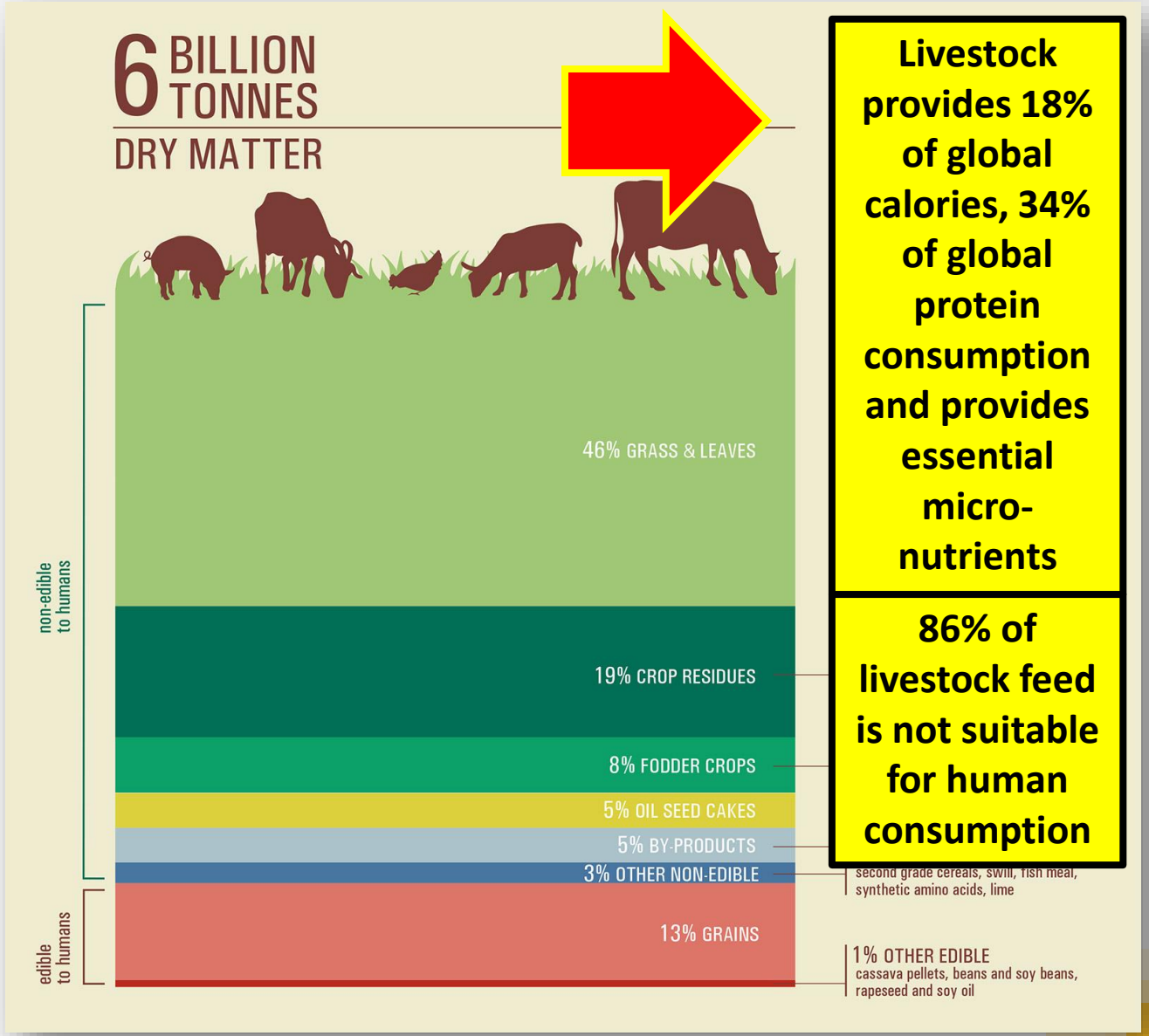
Trade is an essential part of the «food security» concept since it allow to meet the needs of the people globally.





Sustainability

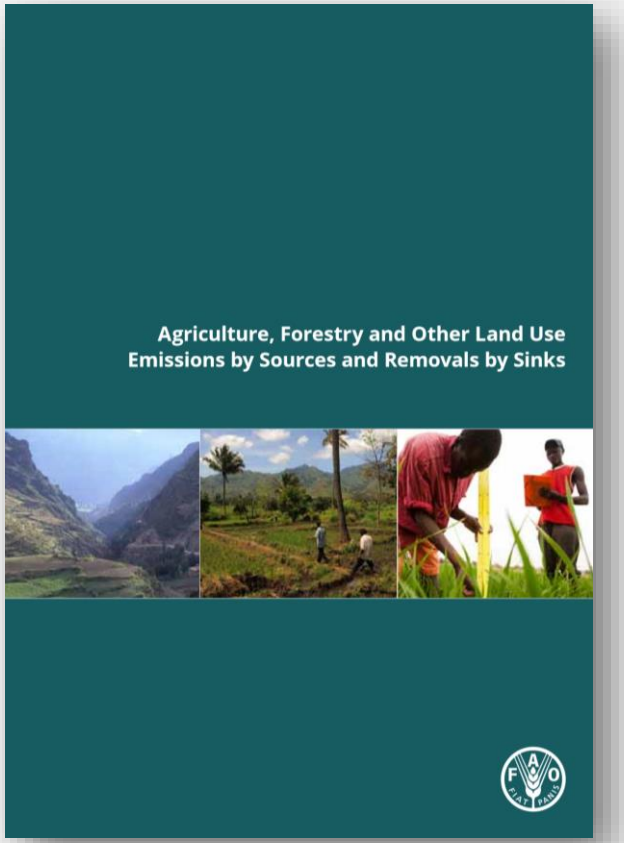




Livestock provides 18% of global calories, 34% of global protein consumption and provides essential micro-nutrients

86% of livestock feed is not suitable for human consumption

Sustainability



2001-2011 Trends: Sub-sectors

Emissions of manure management were dominated by cattle, responsible for half of the total (31% non-dairy cattle; 19% dairy cattle), followed by swine (34%) and buffaloes (9%) (Fig. 4-6).

Chicken broilers 3%

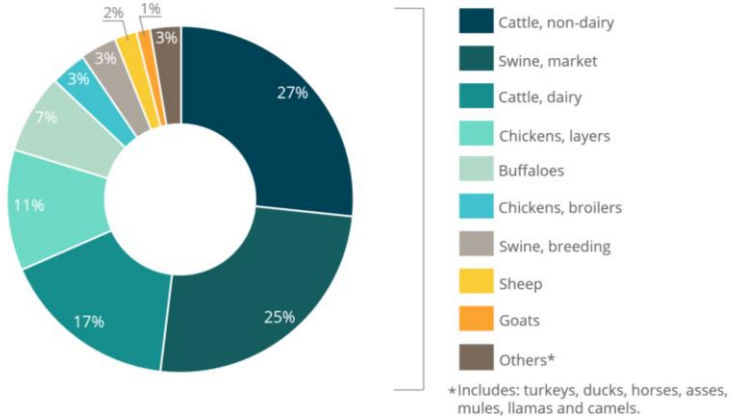


FIGURE 4-6 Manure management by sub-sector, for the period 2001-2011

Chicken meat - decreasing impact

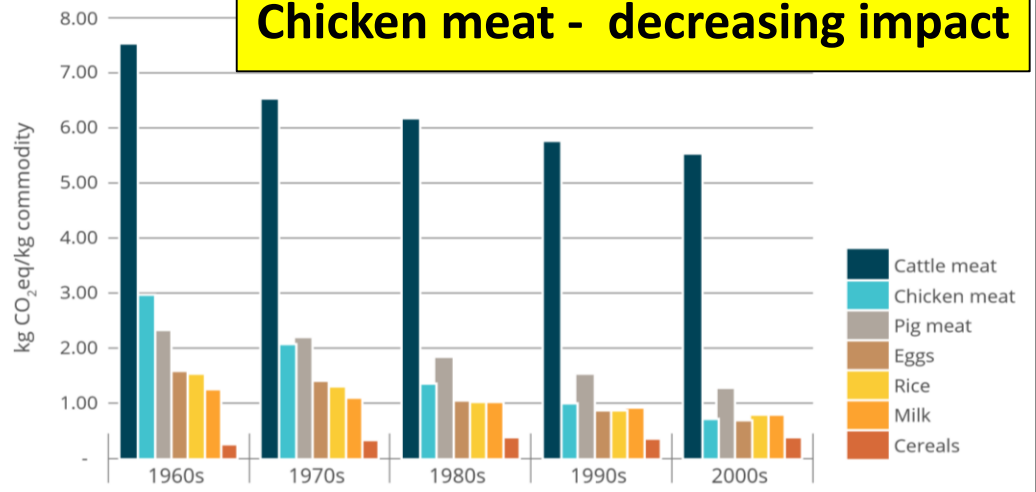
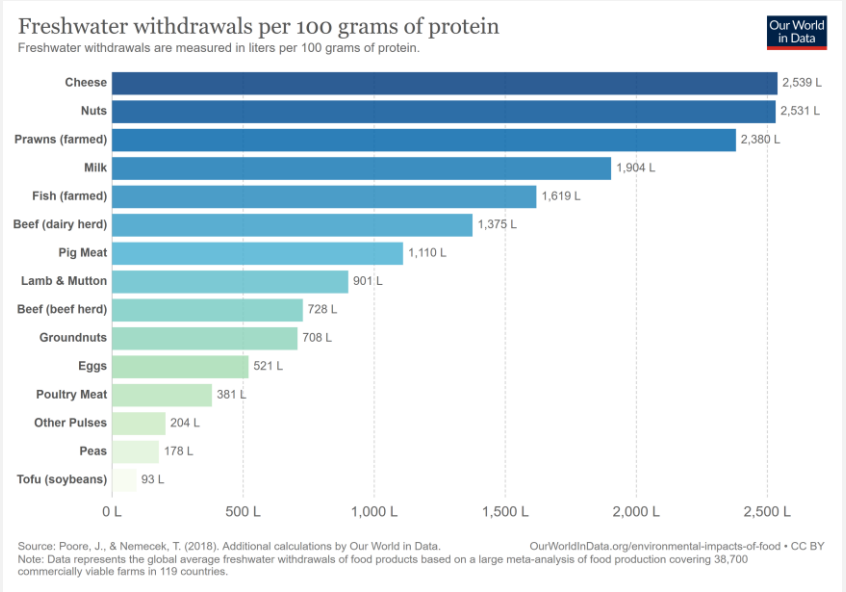
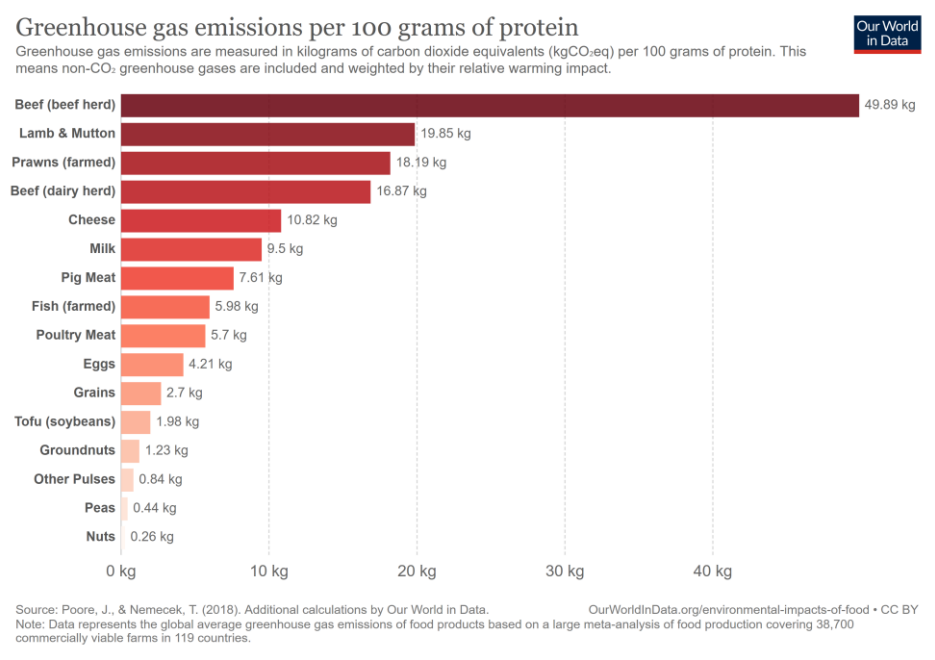
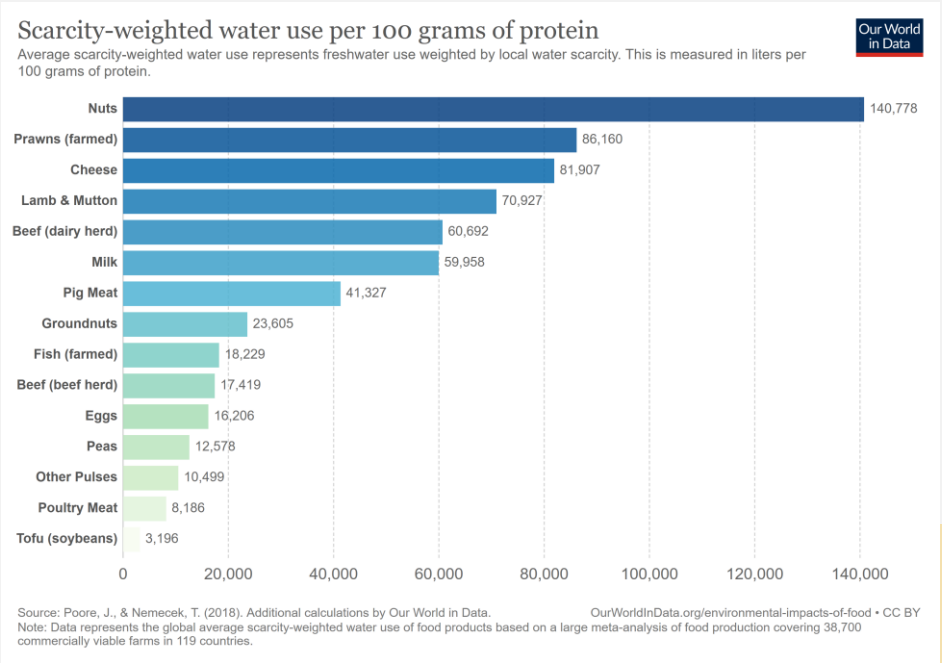


FIGURE 7-1 Historical trends in GHG emission intensity, by commodity, 1961-2010.

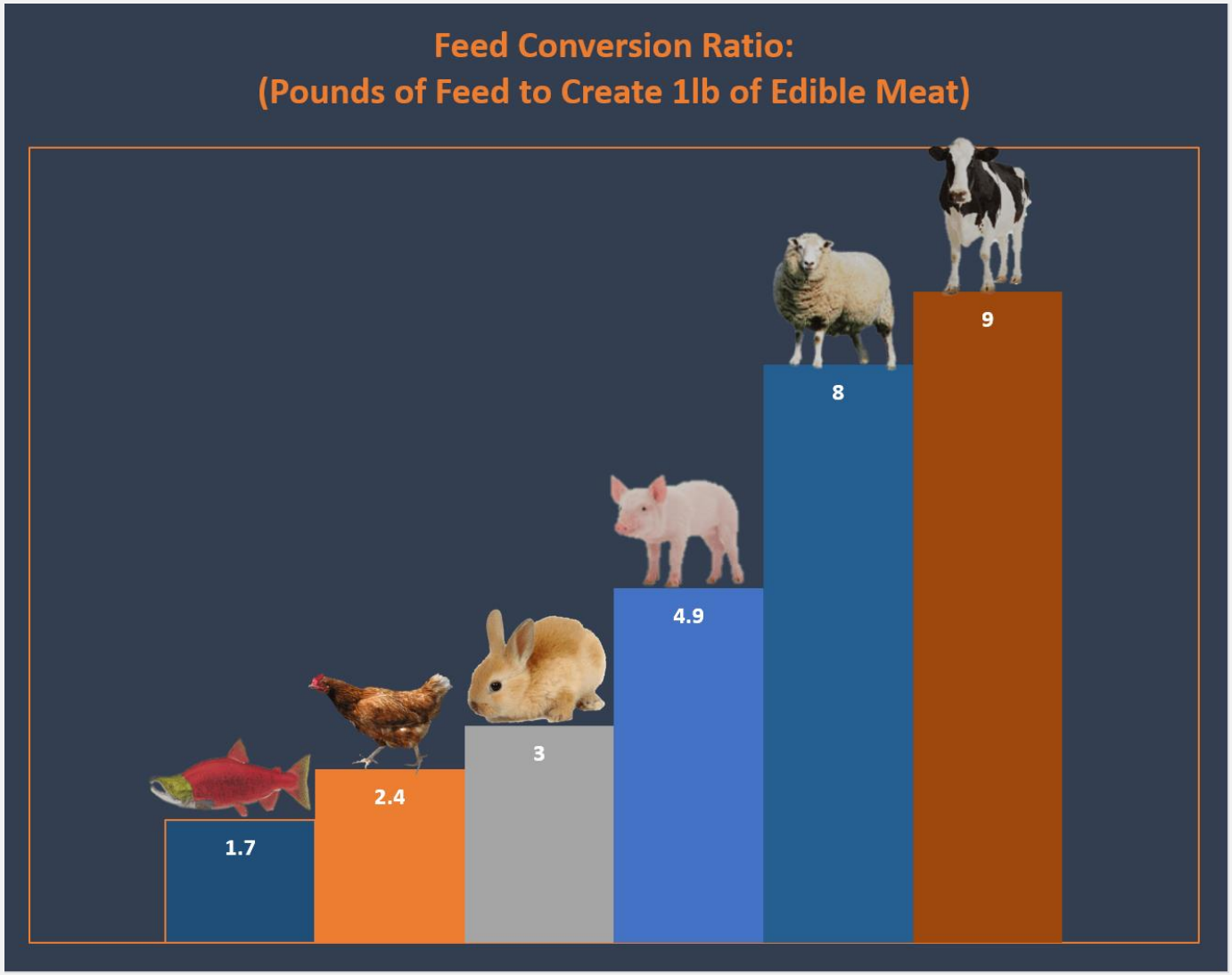
Sustainability







Why poultry meat?



Broiler growth chart

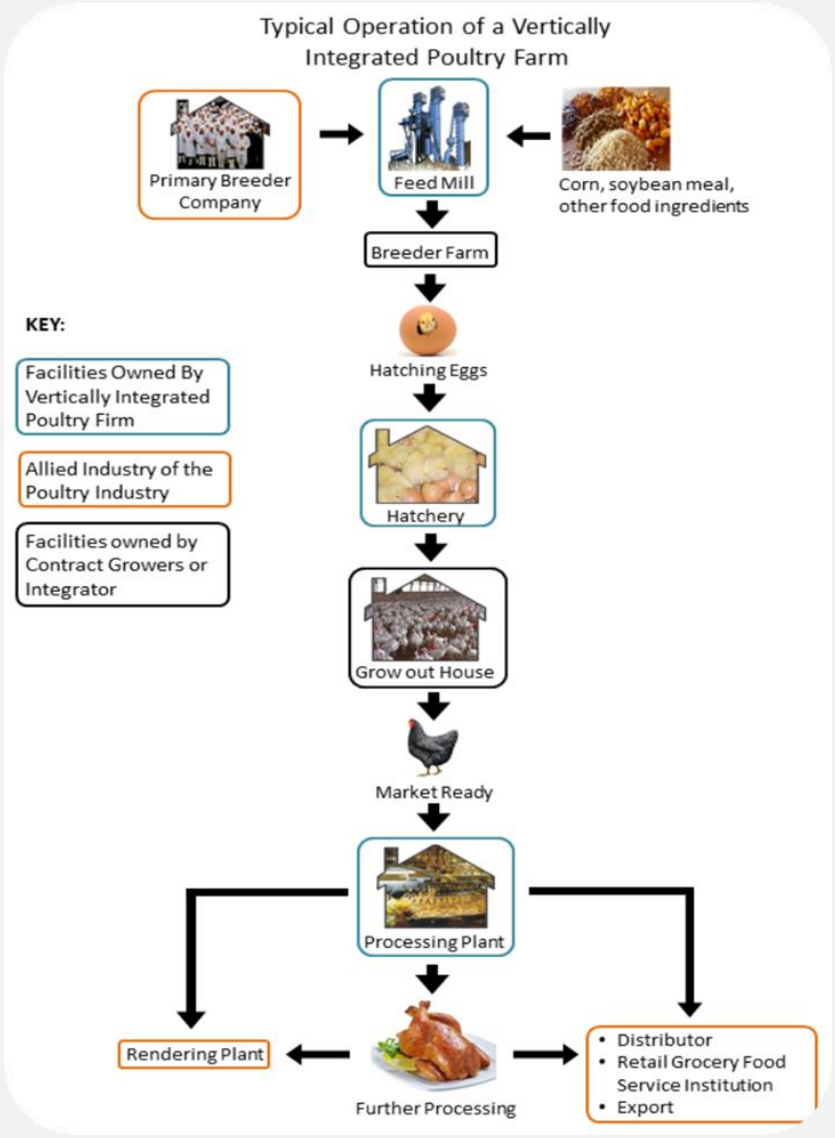
Average Daily Gain (ADG)
Average daily gain is simply the rate of weight gain per day over a specified period of time.

Feed Conversion Ratio (FCR)
The feed conversion ratio (FCR) is defined as the amount of feed needed to increase the animal's body weight by one kilogram. The FCR can be calculated by taking the total amount of feed consumed by the chicken and dividing it by the amount of weight gained or the number of eggs produced.
That is **input** divided by **output.** For your broiler production, an FCR of 1.5 means that your broiler chickens gain 1 kilogram of weight for every 1.5 kilograms of feed consumed.
The lower the FCR, the more efficient your animals are at converting feed into meat.

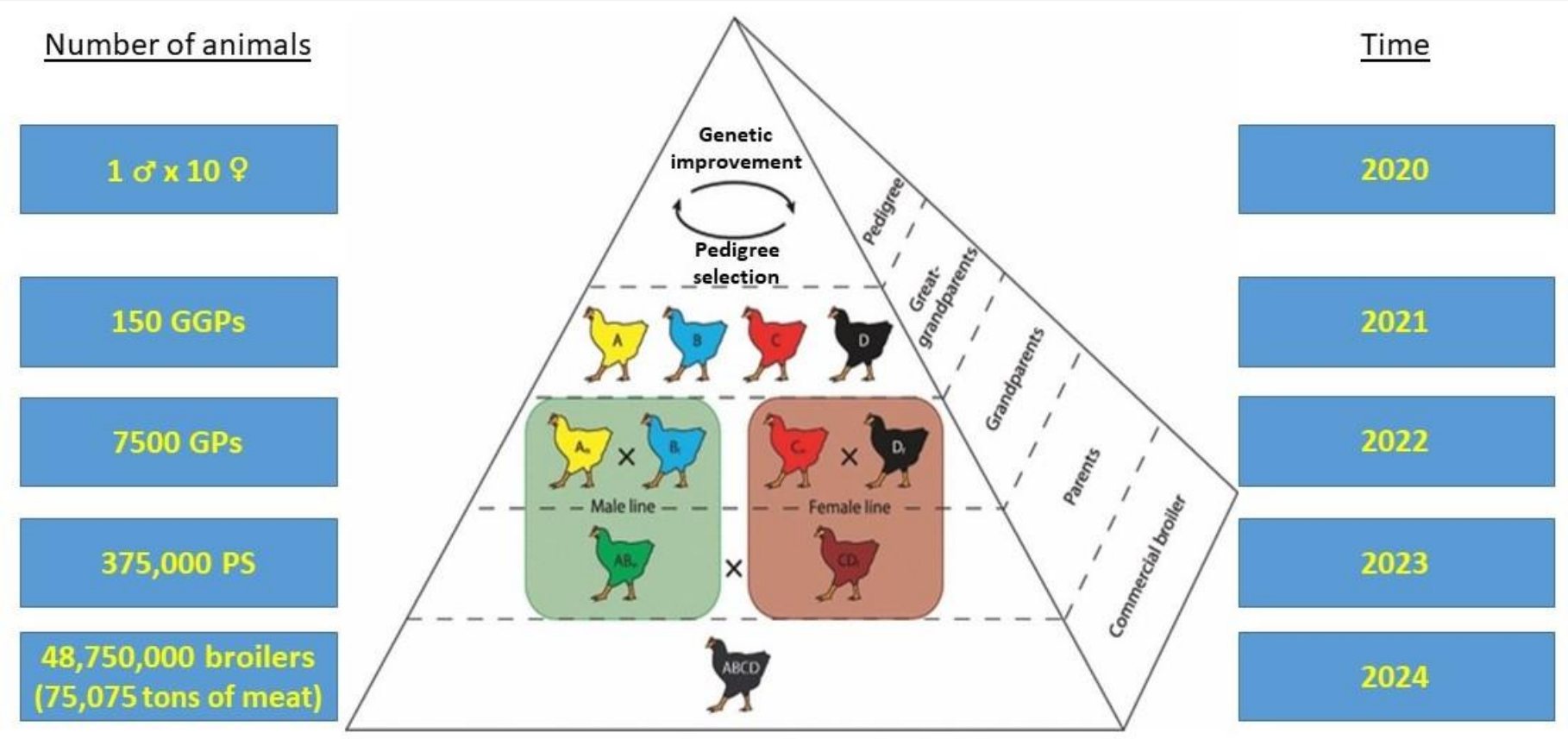
Broiler Weekly Feed Intake and Weight / Growth Chart

AGE (WEEK)	FEED CONSUMED PER BIRD (KG)	CUMULATIVE FEED CONSUMED (KG)	AVERAGE BODY WEIGHT PER BIRD (KG)	AVERAGE BODY WEIGHT GAIN PER BIRD (KG)
Week 1	0.133	0.133	0.148	0.106
Week 2	0.282	0.415	0.360	0.212
Week 3	0.466	0.88	0.652	0.292
Week 4	0.673	1.553	1.025	0.374
Week 5	0.849	2.402	1.460	0.435
Week 6	1.071	3.473	1.915	0.455
Week 7	1.181	4.654	2.362	0.448
Week 8	1.3	5.954	2.792	0.430
Week 9	1.41	7.366	3.197	0.405

Poultry industry integration



Primary breeding



Pedigree flocks are raised on farms under very stringent hygiene conditions, disease prevention controls and biosecurity. Over 40 different traits for overall health, welfare and productivity are measured. The selection process only focuses on the genetic characteristics that occur naturally in chickens and are able to be passed on to their offspring.

The progeny from the breeding program provides the next generations from great-grandparents (GGP) all the way to broiler chickens reared for meat production.

Hatching

Hatcheries receive fertilized eggs from parent breeder farms and incubate them in a procedure that partly replicates the brooding hen, until the broiler chick is hatched.

Incubation takes about 21 days and is often a two-step process with environmental and hygiene conditions optimized to help the chicks hatch in the best way possible.

On hatch day, all the chicks, females and males, are carefully inspected, spray vaccinated, counted, and placed in chick boxes, ready to be transported at the broiler farm on the same day. Specialized climate-controlled trucks are typically used, depending on climate and transport distance.

Broiler farming

Day-old chicks are placed on broiler farms in houses that have been pre-warmed, or under brooding heaters, and provided with water and then feed formulated to meet their nutritional needs.
Most broiler chickens are barn-reared indoors on litter of chopped straw or other bedding materials with freedom to roam the house. Free-range and organic free-range systems where the birds have daytime access to pasture outside the house, are also used depending on the customers' market requirements.
Broilers are raised following the best welfare, biosecurity, and health conditions, according to best production practices, national and regional laws, and customer requirements.

Slaughtering and processing

When birds reach required market weights, they are transported by truck to a processing plant.
Upon arrival, broiler chickens are inspected, and rendered instantaneously and humanely unconscious with scientifically approved methodologies. While unconscious and impervious to pain, they are slaughtered, the carcasses defeathered, and the internal organs are removed. The carcasses are washed, and then chilled, either by a cold air process or by immersion in cold water.
Once chilled the carcasses are graded and weighed, with some going for sale as whole birds of various market weights, some going to be cut up to be sold as chicken cuts or pieces, and some going for further processing into meat preparations or meat products such as cooked ready-meals.

Main international legislation framework

- → After the II World War, economies were recovering
- → National and regional legislation on food hygiene, animal health and trade
- → With economic thriving, international trade became a topic
- → Need for a more comprehensive international framework
- → General Agreement on Tariffs and Trade (GATT)

GATT (1947 – 1995)

→ During the 1940s, the United States sought to establish a set of post-war multilateral institutions (mainly on trade)

→ multilateral treaty of 23 countries in 1947 – GATT

→ Seven rounds of negotiations occurred under GATT (1949 to 1979)

→ mainly focussed on tariffs and non-tariff barriers

→ GATT operated for almost half a century as a semi-institutionalized multilateral treaty régime on a provisional basis

→ 1982 - Ministerial Declaration identifying problems in adapting to new globalizing world economy

→ September 1986 – launched the 8th GATT round (Uruguay round)

→ the biggest negotiating mandate on trade ever agreed

GATT Uruguay round (1986-1994)

→ 1982 - Ministerial Declaration identifying problems in adapting to new globalizing world economy

→ September 1986 – launched the 8th GATT round (Uruguay round)

→ the biggest negotiating mandate on trade ever agreed

→ all the original GATT articles were up for review

→ The Final Act concluding the Uruguay Round was signed 15 April 1994, during the ministerial meeting at Marrakesh, Morocco, aka the Marrakesh Agreement

→ The agreements fall into six main parts on of which is the Agreement Establishing the **WTO**

WTO (1995-today)

→ Is the «son» of GATT

→ Based in Geneve (Swiss)

→ Its most important function is the promotion of growth by facilitating trade

→ The WTO oversees about 60 different agreements which have the status of international legal texts

→ One of the most important is the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)

Sanitary and Phytosanitary Agreement

- → It's an international treaty
- → Negotiated during the Uruguay round of the General Agreement on Tariffs and Trade (GATT)
- → Entered into force with the establishment of the WTO at the beginning of 1995
- → Broadly, SPS measures are those aimed at the protection of human, animal or plant life or health from certain risks
- → Under the SPS agreement, the WTO sets constraints on member-states' policies relating to food safety as well as animal and plant health
- → The SPS agreement is closely linked to the Agreement on Technical Barriers to Trade (TBT agreement)
- → TBT aims to ensure non-discrimination in the adoption and implementation of technical regulations and standards

SPS measures – Main provisions

- Article 1 – General Provisions - Outlines the application of the Agreement.
- Annex A.1 – Definition of SPS measures.
- Article 2 – Basic Rights and Obligations. Article 2.2 - requires measures to be based on sufficient scientific analysis. Article 2.3 - states that Members shall ensure that their sanitary and phytosanitary measures do not arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail, including between their own territory and that of other Members. Sanitary and phytosanitary measures shall not be applied in a manner which would constitute a disguised restriction on international trade.
- Article 3 – Harmonization. Article 3.1- To harmonize sanitary and phytosanitary measures on as wide a basis as possible, Members shall base their sanitary or phytosanitary measures on international standards, guidelines or recommendations, where they exist, except as otherwise provided for in this Agreement, and in particular in paragraph 3. Article 3.3 – allows Members to implement SPS measures higher than if they were basing them on international standards where there is a scientific justification or the Member determines the measure to be appropriate in accordance with 5.1-5.8.
- Annex A.3 – outlines the standard-setting bodies.
- Article 5 – Risk Assessment and Determination of the Appropriate Level of SPS Protection. Article 5.1 - Members shall ensure that their sanitary or phytosanitary measures are based on an assessment, as appropriate to the circumstances, of the risks to human, animal or plant life or health, taking into account risk assessment techniques developed by the relevant international organizations.
- Annex A.4 – outlines risk assessment process.
- Article 5.5 - each Member shall avoid arbitrary or unjustifiable distinctions in the levels it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade. Article 5.7– echoes the 'Precautionary Principle' where there is no science available with which to justify a measure.

SPS Agreement – Article 3, point 4

Members shall play a full part, within the limits of their resources, in the relevant international organizations and their subsidiary bodies, in particular **the Codex Alimentarius Commission, the International Office of Epizootics**, and the international and regional organizations operating within the framework of the **International Plant Protection Convention**, to promote within these organizations the development and periodic review of standards, guidelines and recommendations with respect to all aspects of sanitary and phytosanitary measures.

Standard setting bodies on WTO/SPS Agreemnet

3 Sisters International Organizations recognized by the SPS Agreement as reference point for:

- Animal health: World Organization for Animal Health (OIE)
- Plant health: International Plant Protection Convention (IPPC) – FAO
- Human health: Codex Alimentarius Commission (Codex Alimentarius) – Joint FAO/WHO Food Standards Programme

World Organization for Animal Health (WOAH)

- Formerly known as Office International des Epizooties (OIE)
- is an intergovernmental organization coordinating, supporting and promoting animal disease control.
- In early 1900, a cattle plague called rinderpest was swepting across the globe, ravaging livestock and devastating livelihoods
- The crisis clearly demonstrated how animal diseases can pose a threat to food security and economic growth
- global community needed to address them in a coordinated way
- on January 25 1924 the Office International des Epizootieswas created through an international Agreement
- In May 2003, the Office became the World Organisation for Animal Health but kept its historical acronym OIE which was in use until May 2022

https://www.woah.org/en/home/

World Organization for Animal Health (WOAH)

- The main objective of the WOAH is to control epizootic diseases and thus to prevent their spread
- Other objectives consist of: transparency, scientific information, international solidarity, sanitary safety, the promotion of Veterinary Services, food safety and animal welfare
- It is recognized as a reference organisation by the World Trade Organization (WTO)
- in 2018 had a total of 182 member states
- The WOAH does not depend on the UN system; its autonomy is both institutional and financial and its activities are governed by its own constitutional texts
- WOAH helps policymakers and governments create a future in which humans and animals benefit and support each other so that livelihoods are transformed, economies are boosted and the world is safer and healthier for everyone.

https://www.woah.org/en/home/

OIE Terrestrial Animal Health Code (2021)

The OIE Terrestrial Animal Health Code (the Terrestrial Code) provides standards for the improvement of animal health, and veterinary public health worldwide. These standards should be used by Veterinary Services to set up measures for the early detection, reporting and control of pathogenic agents, including zoonotic agents, and preventing their spread. Implementation of the recommendations in the Terrestrial Code ensures the safety of international trade in animals and animal products, while avoiding unjustified sanitary barriers.

Two Volumes: General provisions and Recommendations applicable to OIE Listed diseases and other diseases of importance to international trade

https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/

OIE Terrestrial Animal Health Code (2021)

General provisions:

Section 1 – Animal disease diagnosis, surveillance and notification

Section 2 – Risk analysis

Section 3 – Quality of veterinary services

Section 4 – Disease prevention and control

Section 5 – Trade measures, import/export procedures and veterinary certification

Section 6 – Veterinary Public Health

Section 7 – Animal Welfare

OIE Terrestrial Animal Health Code (2021)

Recommendations applicable to OIE Listed diseases and other diseases of importance to international trade:

Section 10 – Aves

- Avian chlamydiosis
- Avian infectious bronchitis
- Avian infectious laryngotracheitis
- Infection with high pathogenicity avian influenza viruses
- Infection with *Mycoplasmagallisepticum* (Avian mycoplasmosis)
- Duck virus hepatitis
- Fowl typhoid and pullorum disease
- Infectious bursal disease (Gumboro disease)
- Infection with Newcastle disease virus

https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmfile=titre_1.10.htm

OIE Terrestrial Animal Health Code (2021)

Chapters of interest:

Chapter 1.3: Diseases, infections and infestations listed by the OIE

Chapter 1.4: Animal health surveillance

Chapter 1.6: Procedures for official recognition of animal health status, endorsement of an official control programme, and publication of a self-declaration of animal health status, by the OIE

Chapter 4.13: Disposal of dead animals

Chapter 4.18: Vaccination

Chapter 4.4: Zoning and compartmentalisation

Chapter 4.5: Application of compartmentalisation

Chapter 5.10: Model veterinary certificates for international trade in live animals, hatching eggs and products of animal origin

OIE Terrestrial Animal Health Code (2021)

Chapters of interest:

Chapter 6.5: Biosecurity procedures in poultry production

Chapter 6.6: Prevention, detection and control of *Salmonella* in poultry

Chapter 7.1: Introduction to the recommendations for animal welfare

Chapter 7.3: Transport of animals by land

Chapter 7.4: Transport of animals by air

Chapter 7.5: Slaughter of animals

Chapter 7.6: Killing of animals for disease control purposes

Chapter 7.10: Animal welfare and broiler chicken production systems

Chapter 10.4: Infection with high pathogenicity avian influenza viruses

Chapter 10.9: Infection with Newcastle disease virus

Avian Influenza

- Avian influenza virus
- Genus Influenzavirus A, Family Orthomyxoviridae
- Classified into subtypes based on surface antigens
  - Hemagglutinin
    - 16 types
  - Neuraminidase
    - 9 types
- High pathogenicity avian influenza (HPAI)
  - Causes severe disease in poultry, contains subtypes H5 or H7
- Low pathogenicity avian influenza (LPAI)
  - Causes mild disease in poultry, contains other H subtypes
- Includes non-HPAI H5 and H7
- LPAI H5 or H7 subtypes can mutate into HPAI
- Waterfowl and shorebirds

Avian Influenza

- Avian influenza virus closely related to other influenza A viruses
- Influenza viruses found in each species usually infect only that species
- Antigenic drift
  - Small changes in influenza virus due to point mutations accumulate during virus replication
- Antigenic shift
  - Abrupt change in virus subtype
    - Genetic reassortment between subtypes
    - Direct transfer of virus
    - Re-emergence of virus
- Epidemic requirements
  1. New influenza subtype must emerge in species with little to no immunity
  2. Virus must produce disease in that species
  3. Sustainable transmission must occur in new species (humans)

Avian Influenza

- LPAI occurs worldwide
  - Wild birds and poultry
- HPAI
  - Eradicated from domestic poultry in most developed nations
  - Epidemic ongoing in parts of Asia, the Pacific, Middle East, Europe, North America and Africa
- Domesticated poultry
  - HPAI morbidity and mortality rates approach 90-100%
- Wild birds
  - Typically asymptomatic, some H5N1 viruses may cause death
- Influenza virus shed in feces, saliva, nasal secretions
- Fecal-oral predominant mode of transmission
- Other possible modes
  - Fecal-cloacal
  - Respiratory
- Virus persistence in feces - weeks to months

Avian Influenza

- In an infected flock, virus can spread in multiple ways
  - Fecal-oral
  - Aerosol
  - Fomites
  - Mechanical vectors
- Virus introduction
  - Migratory birds
  - Infected poultry, pet birds
- Poultry: 1-7 days
- Disease control purposes
  - 21-day incubation period used
  - Accounts for virus transmission dynamics

Avian Influenza

- In Poultry: Highly virulent
  - Clinical signs
  - Sudden death
  - Systemic disease
  - Drop in egg production
  - Neurological signs
  - Depression, anorexia, ruffled feathers
  - Combs swollen, cyanotic
  - Conjunctivitis and respiratory signs
- Most birds in an affected flock die
- In Wild Birds disease often subclinical
  - Some strains cause illness
  - Clinical signs minimal in ducks and geese
  - Swans may be found dead

Avian Influenza

- Differential Diagnosis
  - Virulent Newcastle disease (clinically indistinguishable)
  - Avian pneumovirus
  - Infectious laryngotracheitis
  - Infectious bronchitis
  - Chlamydia
  - Mycoplasma
  - Acute bacterial diseases
    - Fowl cholera, E. coli infection
- Virus isolation
  - Oropharyngeal, tracheal,a nd/or cloacal swabs, feces, organ samples
- Virology and serology necessary for definitive diagnosis
  - AGID, ELISA, RT-PCR
- NO TREATMENT!

Avian Influenza – WOAH Chapter

AI Chapter in Terrestrial Code provides:

→ List of safe commodities (no restrictions on trade)

→ Country or zone free from high pathogenicity avian influenza

→ Compartment free from high pathogenicity avian influenza

→ Establishment of a containment zone within a country or zone free from high pathogenicity avian influenza

→ Recovery of free status (28 days since CL/DS without outbreaks)

→ Recommendations for importation from a country, zone or compartment free from high pathogenicity avian influenza

→ Procedures for the inactivation of high pathogenicity avian influenza viruses in meat products from poultry

→ Principles of surveillance for avian influenza

Zones and Compartments

→ « Zone » means « a clearly defined part of a country containing an animal subpopulation with a distinct health status with respect to a specific disease for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade »

→ means one or more establishments under a common biosecurity management system containing an animal subpopulation with a distinct health status with respect to a specific disease or specific diseases for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade.

Codex Alimentarius

- Mid 1800s - Bananas are first shipped to Europe from the tropics
- 1800s - The first general food laws are adopted and enforcement agencies established, food chemistry gains credibility, and reliable methods are developed
- Late 1800s - A new era of long-distance food transportation is ushered in by the first international shipments of frozen meat from Australia and New Zealand to the United Kingdom
- Early 1900s - Food trade associations attempt to facilitate world trade through the use of harmonized standards
- 1903 - The International Dairy Federation (IDF) develops international standards for milk and milk products.
- 1945 - FAO is founded, with responsibilities covering nutrition and associated international food standards
- 1948 - WHO is founded, with responsibilities covering human health and, in particular, a mandate to establish food standards
- 1961 - The FAO Conference decides to establish a Codex Alimentarius Commission and requests an early endorsement by WHO of a joint FAO/WHO food standards programme
- 1962 - The Joint FAO/WHO Food Standards Conference requests that the Codex Alimentarius Commission implement a joint FAO/WHO food standards programme and create the Codex Alimentarius

Codex Alimentarius

- Codex Alimentarius is a latin term for «food code» or «food law»
- Its name is derived from the Codex Alimentarius Austriacus, a collection of standards, guidelines and product descriptions for a variety of foods. It was originally established by the Austrian-Hungarian Empire in 1891 and is still in use today
- Is a subsidiary of the FAO and WHO
- The Codex Alimentarius is a collection of internationally recognized standards, codes of practice, guidelines, and other recommendations developed by the Codex Alimentarius Commission
- 188 Member Countries and 1 Member Organization (The European Union)
- Currently the Codex Alimentarius Commission has 243 Observers from UN and other intergovernmental and NG organisations (industry, consumer and academia)
- Secretariat is located in Rome

Codex Alimentarius objectives

- To protect the health of consumers
- To ensure fair practices in food trade
- To coordinate all work regarding food standards
- To determine the priorities for food safety
- To initiate the preparation of standards
- To publish the standards

https://www.fao.org/fao-who-codexalimentarius/home/en/

Codex Alimentarius structure

Codex Alimentarius Commission	CAC
Executive Committee of the Codex Alimentarius Commission	CCEXEC
General Subject Committees	CCCF, CCFA, CCFH, CCFICS, CCFL, CCGP,CCMAS, CCNFSDU, CCPR, CCRDVF
Commodity Committees	CCFFP, CCFFV, CCFO, CCSCH
FAO/WHO Coordinating Committees	CCAFRICA, CCASIA, CCEURO, CCLAC, CCNASWP, CCNE

Codex Alimentarius structure

Codex Alimentarius Commission (CAC)

The Codex Alimentarius Commission or CAC is the body responsible for all matters regarding the implementation of the Joint FAO/WHO Food Standards Programme.

Membership of the Commission is open to all Member Nations and Associate Members of FAO and WHO which are interested in international food standards.

Executive Committee of the Codex Alimentarius Commission (CCEXEC)

The Executive Committee of Codex comprises the Chair, three vice Chairs, six regional coordinators and seven elected representatives from the various geographical groups of Codex.

Between sessions, the Executive Committee acts as the Executive organ of the Commission.

In particular, the Executive Committee can make proposals to the Commission regarding general orientation, strategic planning, and programming of the work of the Commission.

The Executive Committee assists in the management of the Commission’s programme of standards development by conducting a "critical review" of proposals to undertake work and monitoring the progress of standards development.

Codex Alimentarius structure

General Subject Committees

General subject committees develop General Standards, Guidelines and Codes of Practice which are applied transversely to all products and product categories. These texts deal with hygienic practice, labelling, additives, inspection & certification, nutrition and residues of veterinary drugs and pesticides.

Commodity Committees

Codex commodity standards define the physical and chemical characteristics of nearly 200 traded products – from apples and wheat to frozen fish and bottled water.

ad hoc Intergovernmental Task Forces

Codex Alimentarius legal tools

Standards (currently 238)

- Food requirements intended to provide consumers with a sound, wholesome food product free from adulteration, correctly labelled and presented.
- Explicitly quantifies and specifies in acceptable form, exactly what is considered to be in compliance with regards to certain commodities.
- Prescribed format used to develop each standard, must include:
  - Name
  - Scope
  - Description
  - Essential composition and quality factors
  - Food additives
  - Contaminants
  - Hygiene
  - Weights and measures
  - Labeling
  - Methods of analysis and sampling

https://www.fao.org/fao-who-codexalimentarius/codex-texts/list-standards/en/

Codex Alimentarius legal tools

Code of Practices (currently 55)

- Advisory text issued to all members
- Designed to assist members in achieving pourposes of Codex
- Individual members decide how to use codes
- Typically describe “hygiene” requirements (Adequate/Acceptable)
- Considered “checklist” of requirements for enforcement authorities

https://www.fao.org/fao-who-codexalimentarius/codex-texts/codes-of-practice/en/

Guidelines and recommendations (currently 81)

- Basic tool to help member nations in elaboration of their standards to conform to Codex
- Not binding but accepted worldwide
- Very useful to developing countries

https://www.fao.org/fao-who-codexalimentarius/codex-texts/guidelines/en/

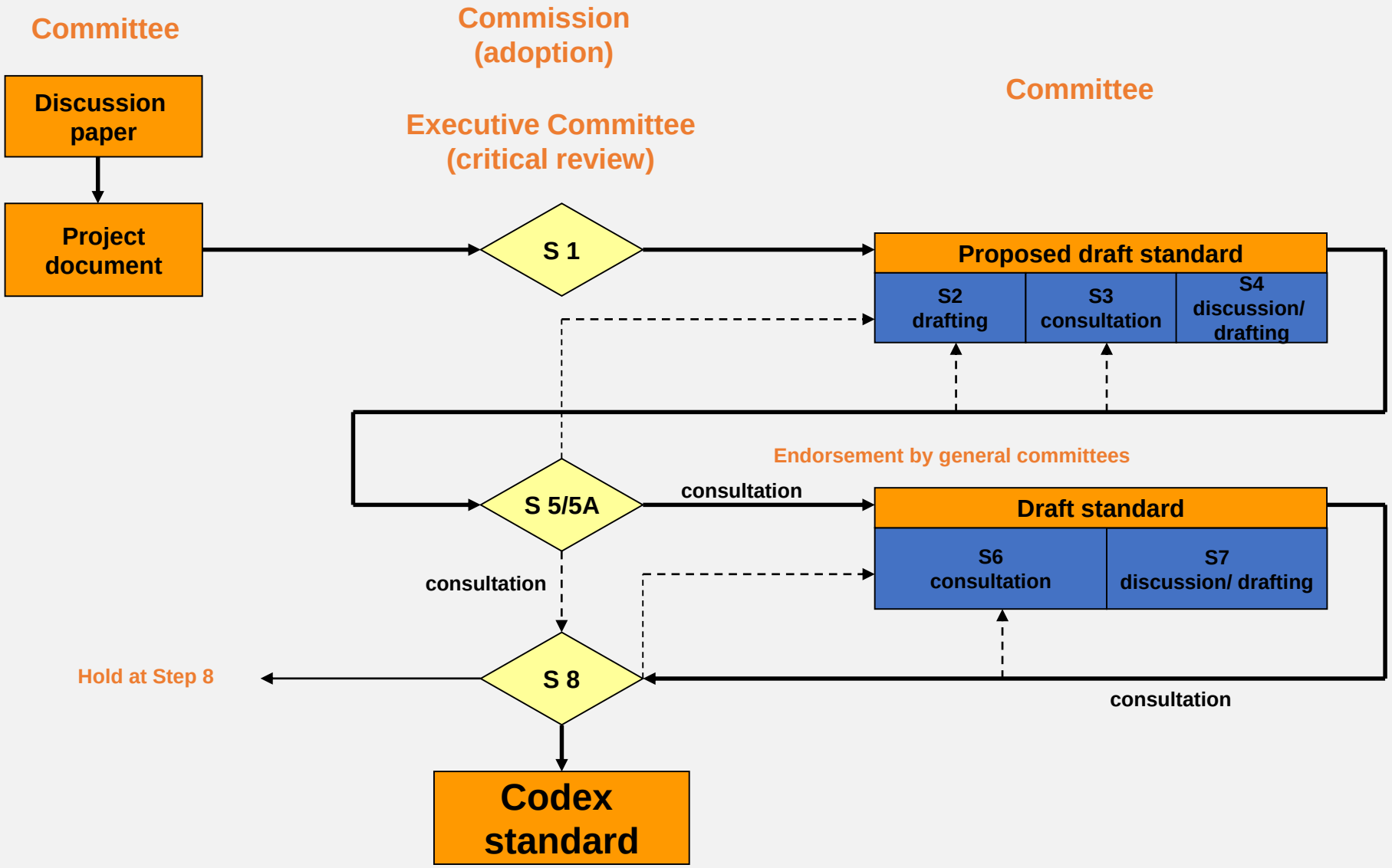
Codex Alimentarius acceptance and enforcement

- Members must formally accept Codex standards
- Types of acceptance
  - Full acceptance
  - Acceptance with specific variations
  - Target Acceptance
  - Free Distribution (replaced Target Acceptance)
  - Non Acceptance
- Codex regulation not binding until adopted by member
- Member ratification of Codex standards is mandatory
- Violation would then be violation of the member country's national law and punished accordingly

Codex standard development process

- A country proposes development of a new standard in a committee
- New work being approved by CAC
- Proponent leads the effort to get the standard adopted
- Scientific data including risk assessment information provided by FAO/WHO expert bodies (e,g, JEFCA)
- Proposed draft is submitted to members of the Committee for comments and amendments
- Proposed standard goes through an 8 steps process
- Codex Committee, as risk manager, adopts the standards
- CAC adopts the standards

Codex Alimentarius procedures



What about animal welfare?

- The WTO rules currently make no reference to animal welfare
- AW can't be subject of negotiations under WTO rules
- An increasing number of countries and stakeholders now agree that this omission is anachronistic
- In bilateral trade agreements between countries or groups of countries, animal welfare is increasingly being taken into consideration
- The growth in legislation based on animal welfare has increased the likelihood of a dispute
- A dispute is likely to look at cultural differences between countries
- Sustainability?

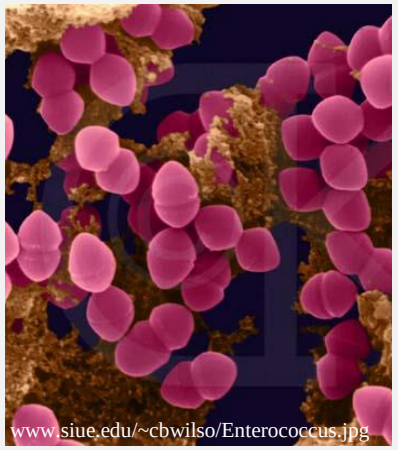
Food Borne Antimicrobial Resistance (AMR)

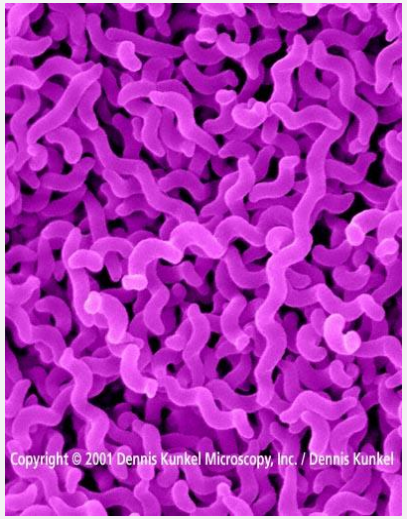
Veterinary medical need for antibiotics (OIE)

Human medical need for antibiotics (WHO)

The Issue: Food animal intestinal bacteria may become resistant to an antimicrobial during use, contaminate food eaten by people who may become ill, and when they are given the same type of antimicrobial, the bacteria will likely not be affected

Which Intestinal Bacteria?

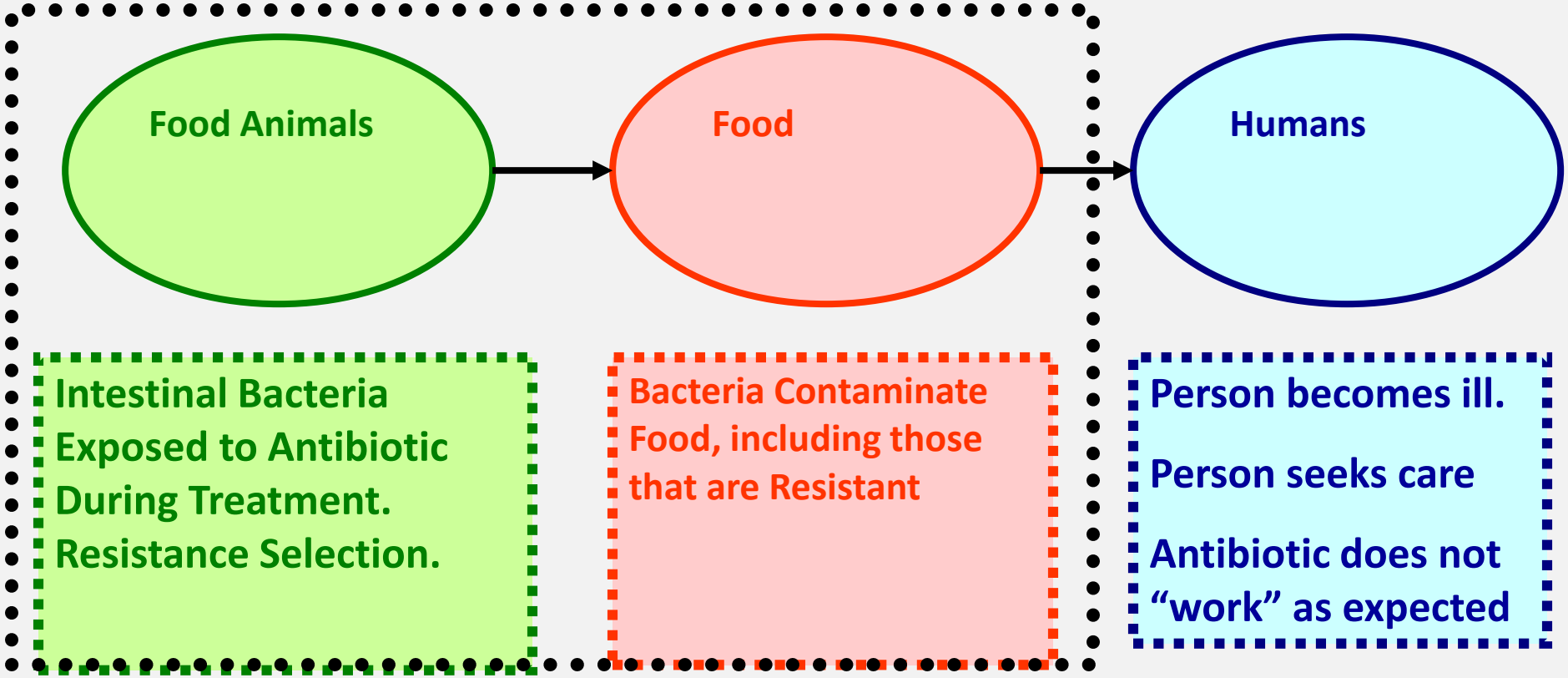




- *Salmonella*
- *E. coli*
- *Campylobacter*
- *Enterococcus*

Intestinal bacteria in animals may become resistant to antibiotics and therefore must be taken into account by a veterinarian when the same class of antibiotic is also used in humans

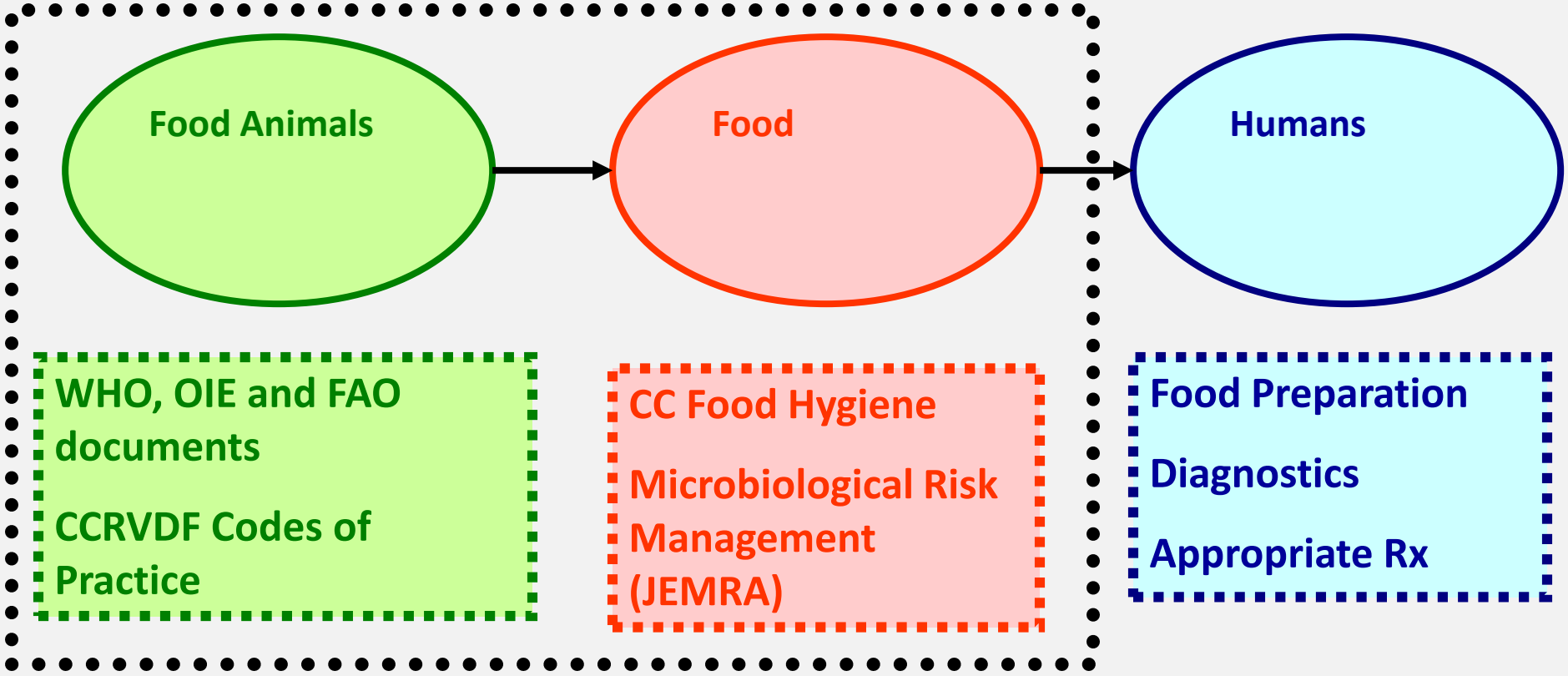
Transmission from Food Animals to Food to People



Many steps to connect each "circle"

Monitoring (AMR and "Use") useful for Risk Assessment "Prediction"

Continuum of Codex Risk Management Options



Measurements help determine the effectiveness of risk management actions to protect human and animal health

Monitoring (AMR and "Use") + Risk Assessment "Prediction"

Overview of Actions and Recommendations

Reduce the Need for Antimicrobial Use

Appropriate production health and disease prevention practices, education of workers, innovation

Responsible Antimicrobial Use Practices

Veterinarian oversight of antibiotic use practices, evaluation of flock interventions for next flock

Antimicrobial Resistance Monitoring

Antibiotic Sales (Use?) Monitoring

Regulatory Controls

Risk assessment-based regulatory decisions on microbial food safety guide decisions on product use:

Approval with appropriate label indications and use, prescription

Research

Why Veterinarian Oversight?

Veterinarians are viewed as having the necessary experience and accountability to prescribe antibiotics – just like physicians

Therapeutic indications!

Disease presentation, diagnostics, client relationship and other considerations require veterinary expertise to integrate into a medication decision

Consistent with Responsible Use Principles

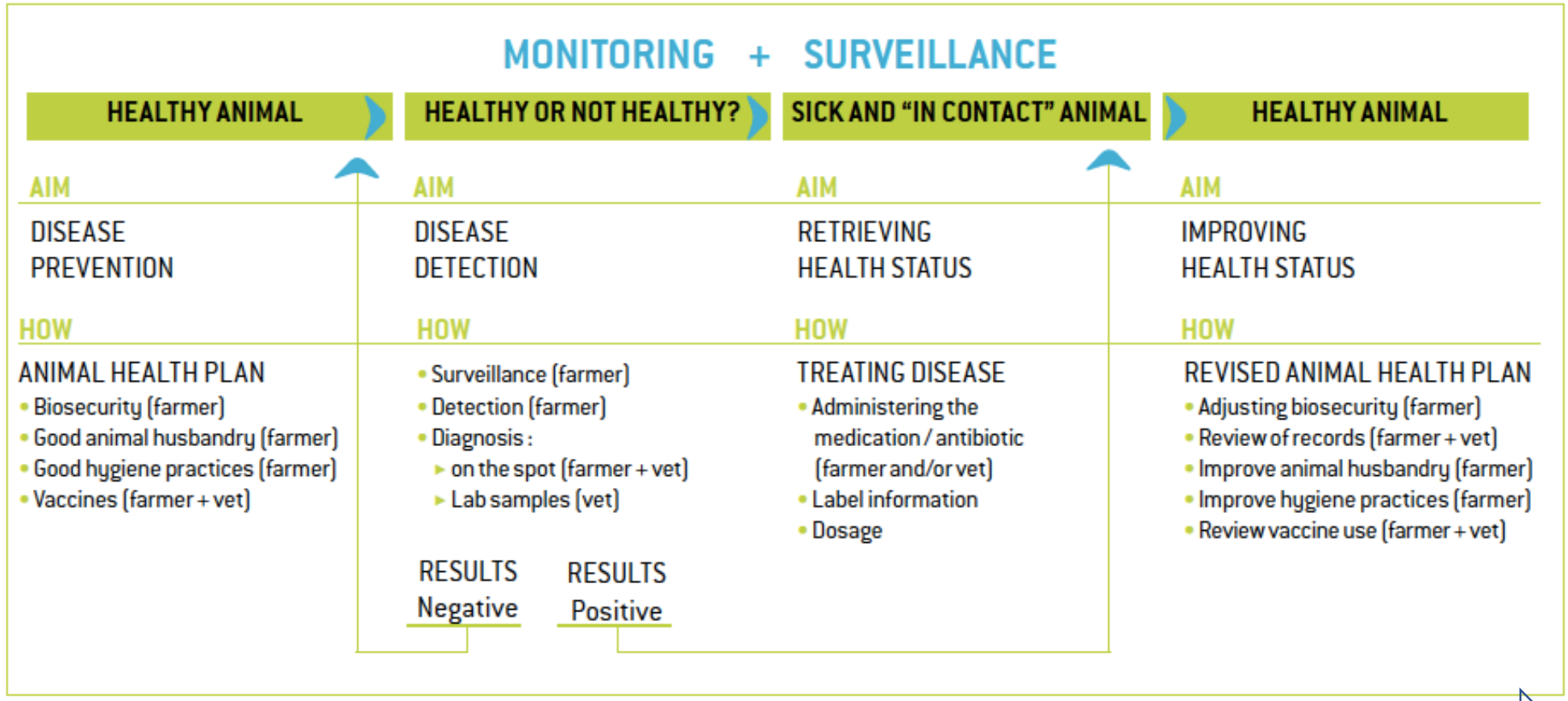
Consensus Principles

- Prevention strategies emphasized
  - Minimize environmental contamination; vaccinate; biosecurity, nutrition, housing, management at high levels
- Minimize therapeutic use
  - Treat only at-risk or ill animals
- Utilize only licensed products by label directions; exercise clinical judgment for off-label usages
- Utilize culture and sensitivity
- Use narrow spectrum antibiotics when possible
- Vet-client-patient relationship encouraged
- Record keeping
- Periodically review usage practices

Veterinarian Oversight includes…

- Establish veterinarian-client-patient-relationship
- Establish herd/flock health care program to minimize disease prevalence
- Obtain accurate disease diagnosis and/or utilize clinical judgment
- Determine need for treatment and appropriate product
- Administer product per label directions or extra-label use decision-tree when necessary
- Maintain adequate records of treatment and clinical outcome to guide subsequent use

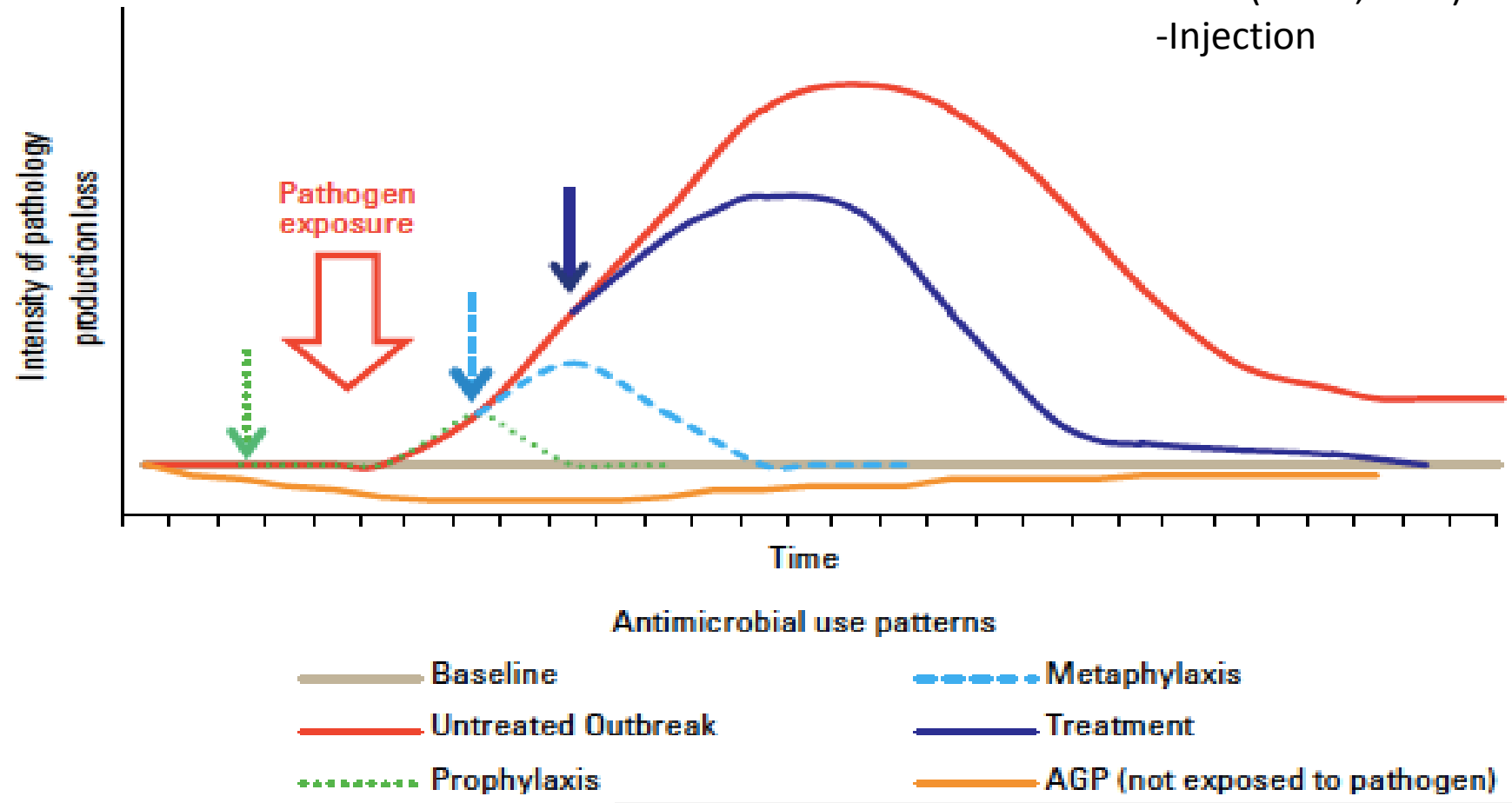
Poultry Production Timeline for Raising Healthy Birds



Hatch and Placement and Grow Out in House → Transport / Slaughter

Timing of Ab Administration vs. Disease

Routes of Administration
-Oral (water, feed)
-Injection



Rev. sci. tech. Off. int. Epiz., 2012, **31** (1), 145-188

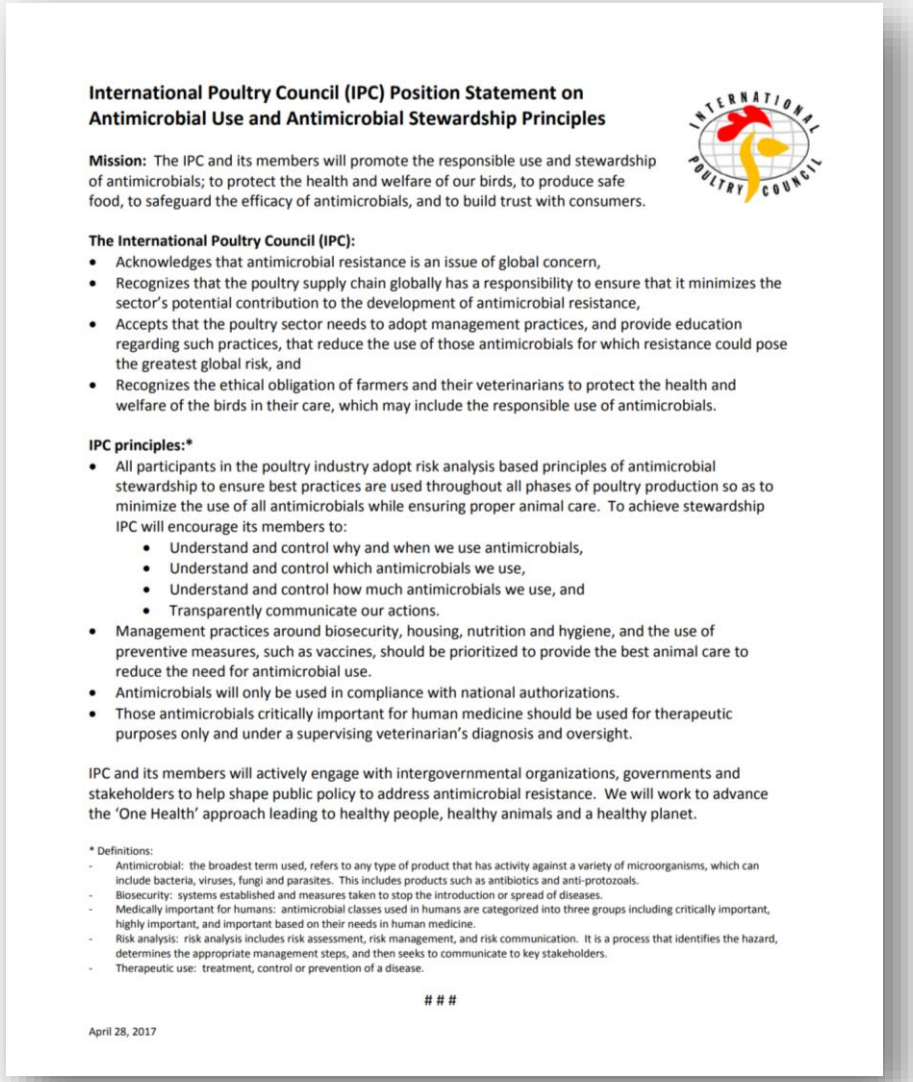
Poultry Antimicrobial Importance Rankings (1)

Class	WHO Rank	VCIA	VHIA	VIA
Aminocyclitol	IA	Spectinomycin		
Aminoglycosides	CIA	Gent, Neo, Strepto		
Amphenicols	HIA	Florfenicol, Thiamphenicol		
Cephalosporins 1st	HIA		Cefalexin	
Cephalosporins 3rd	HP-CIA	Ceftiofur		
Lincosamides	HIA		Lincomycin	
Macrolides	HP-CIA	Erythro, tylosin, etc		
Penicillins	CIA	Amoxicillin, Ampicllin, Amox/Clav		
Penicillins	HIA	Benzyl Pen, Phenoxy Pen		
Phosphonic Acids	CIA		Fosfomycin	

Poultry Antimicrobial Importance Rankings (2)

Class	WHO Rank	VCIA	VHIA	VIA
Pleuromutilins	IA		Tiamulin	
Polypeptides	IA		Bacitracin	
Polymyxins	HP-CIA		Polymyxin E (colistin)	
Quinolones	HP-CIA	Fluoroquinolones		
Sulfonamides	HIA	Sulfonamides		
Streptogramins	HIA			Virginiamycin
Tetracyclines	CIA	Tetracycline, etc.		
Various	Not Used in Humans	Ionophores	Novobiocin	Avilamycin

IPC Position Statement on Antimicrobial Use and Stewardship Principles and Best Practice Guidance



International Poultry Council (IPC) Position Statement on Antimicrobial Use and Antimicrobial Stewardship Principles

Mission: The IPC and its members will promote the responsible use and stewardship of antimicrobials; to protect the health and welfare of our birds, to produce safe food, to safeguard the efficacy of antimicrobials, and to build trust with consumers.

The International Poultry Council (IPC):

- Acknowledges that antimicrobial resistance is an issue of global concern,
- Recognizes that the poultry supply chain globally has a responsibility to ensure that it minimizes the sector's potential contribution to the development of antimicrobial resistance,
- Accepts that the poultry sector needs to adopt management practices, and provide education regarding such practices, that reduce the use of those antimicrobials for which resistance could pose the greatest global risk, and
- Recognizes the ethical obligation of farmers and their veterinarians to protect the health and welfare of the birds in their care, which may include the responsible use of antimicrobials.

IPC principles:*

- All participants in the poultry industry adopt risk analysis based principles of antimicrobial stewardship to ensure best practices are used throughout all phases of poultry production so as to minimize the use of all antimicrobials while ensuring proper animal care. To achieve stewardship IPC will encourage its members to:
  - Understand and control why and when we use antimicrobials,
  - Understand and control which antimicrobials we use,
  - Understand and control how much antimicrobials we use, and
  - Transparently communicate our actions.
- Management practices around biosecurity, housing, nutrition and hygiene, and the use of preventive measures, such as vaccines, should be prioritized to provide the best animal care to reduce the need for antimicrobial use.
- Antimicrobials will only be used in compliance with national authorizations.
- Those antimicrobials critically important for human medicine should be used for therapeutic purposes only and under a supervising veterinarian's diagnosis and oversight.

IPC and its members will actively engage with intergovernmental organizations, governments and stakeholders to help shape public policy to address antimicrobial resistance. We will work to advance the 'One Health' approach leading to healthy people, healthy animals and a healthy planet.

* Definitions:
- Antimicrobial: the broadest term used, refers to any type of product that has activity against a variety of microorganisms, which can include bacteria, viruses, fungi and parasites. This includes products such as antibiotics and anti-protozoals.
- Biosecurity: systems established and measures taken to stop the introduction or spread of diseases.
- Medically important for humans: antimicrobial classes used in humans are categorized into three groups including critically important, highly important, and important based on their needs in human medicine.
- Risk analysis: risk analysis includes risk assessment, risk management, and risk communication. It is a process that identifies the hazard, determines the appropriate management steps, and then seeks to communicate to key stakeholders.
- Therapeutic use: treatment, control or prevention of a disease.

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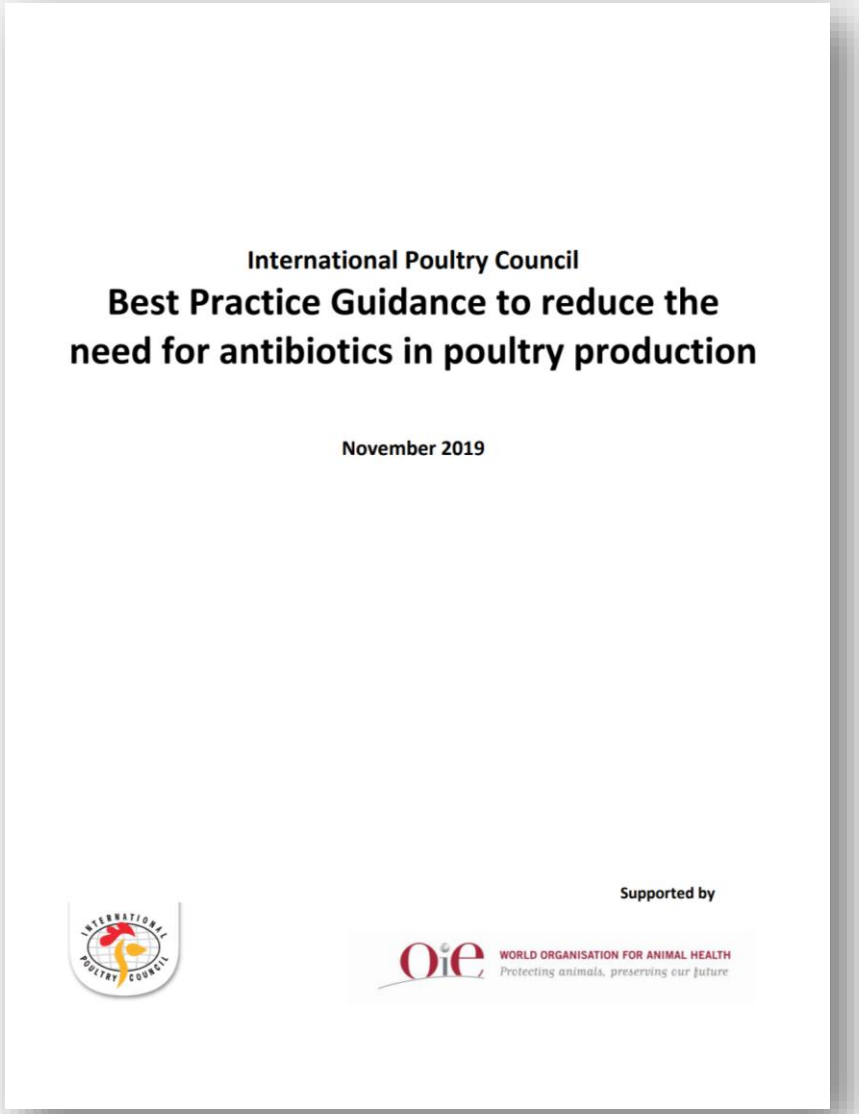
April 28, 2017



International Poultry Council

Best Practice Guidance to reduce the need for antibiotics in poultry production

November 2019

Supported by

WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future

IPC Position Statement on Antimicrobial Use and Antimicrobial Stewardship Principles

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IPC Best Practice Guidance to reduce the need for antibiotics in poultry production

Stockmanship and Training

Biosecurity: External environment

Biosecurity: Internal environment

Bird Environment

Hygiene: Houses

Hygiene: Hatcheries

Flock Health and Welfare Plans

Nutrition

Antibiotic Medication - Responsible use

Growth Promotion

Data Collection

Usage Data Collection

Described in WHO and OIE documents

- Variability in methods, reporting, interpretation

EU – 9 country specific basis (ESVAC)

- Per species, country and antibiotic class

US – mandated for 2009 by legislation

- kgA sold and pooled by antibiotic class

Other countries – various methods

Key Issue: what to do with the data?

Poultry Management: Back To The Basic

- →Houses Preparation and Biosecurity
- →Chick Quality and Transportation
- →Feed Quality and Feeder
- →Water Quality and Drinker
- →Management and Knowledge
- →Good Production

Houses Preparation and Biosecurity

→Litter material should be spread evenly to a depth of 3–4 in (7.5–10 cm) and then levelled and compacted in the brooding area.

→ The necessary equipment must be assembled in the appropriate configuration.

→ Equipment in the house (i.e., feeders, drinkers, heaters and fans) should be arranged to allow chicks to maintain body temperature without dehydration and to find feed and water easily.

→ Configuration will depend on the brooding system and on other equipment being used.

→ Supplementary feeders and drinkers shouldbe placed in close proximity to the main systems.

→Houses should be pre-heated for a sufficient period to achieve target house and litter temperatures prior to chick arrival.

→Temperature should be monitored regularly to ensure a uniform environment exists throughout the whole brooding area.

WATER AND FEED

→Prior to chick delivery, a final check must be made of feed and water availability and distribution within the house.

→ Drinker lines should be flushed and sanitized prior to bird arrival.

→ The water quality, purity, and temperature must be checked in advance.

→ Water should be within the correct temperature range (65–75°F; 18–24°C).

→Contaminated water can spread disease and cause diarrhea, leading to dehydration and death in younger flocks.

→All chicks must be able to eat and drink immediately on placement in the house.

→Ideally, the chicks should be placed at the farm and provided water and feed in less than 8 hours from time of hatch.

→ Longer delays could lead to dehydration and chick weight shrinkage.

WATER AND FEED

- If the chicks have been in transport for a long period (3 hrs. up), providing water for the first 3 or 4 hours, and then providing feed is suggested.
- It is imperative that chicks be encouraged to consume water as soon as possible.
- add some sort of sweetener substance, like sugar to the water (4% solution) for the first few hours of life.
- The sugar helps to replenish the depleted energy in the chicks, and may stimulate the chicks to consume feed.
- The sweet water can also may loosen up the impacted intestine and prepare the gut linings for the incoming feed.
- After the addition of sugar, it is recommended to add a vitamin supplement to the water for the first three days of life, to boost the chicks' vitality.

WATER AND FEED

- With the exception of water vaccination time, drinking water must be adequately chlorinated.
- The chlorine level at the drinker level should be
  - 1PPM-nipple drinkers,
  - 2PPM-plasson drinkers, and
  - 3PPM-trough drinkers
- A newly hatched chick is 85% water. When 10% of this water is lost, it becomes a cull chick, and when there is 20% dehydration, the chick could die.
- It is important to hydrate the chick adequately and promptly.
- This will promote feed consumption and better body weights.
- If water and feed are consumed in sufficient amounts and correct brooding temperature and air quality are provided,
- A broiler chick should be able to quadruple(4x) the post-hatch body weight by seven days of age.

WATER AND FEED

→ To monitor if chicks are consuming adequate feed, it is recommended to select chicks and palpate their crops.

→ The crops should be quite full.

➢ If the crop feels half empty or empty,

➢ there must be something wrong in the management, and the above-discussed points must be reviewed very carefully.

➢ It is never too late to act and make corrections, but a problem must be detected before it can be corrected.

CHICK PLACEMENT

- If the mixing of chicks from different age breeder flocks is unavoidable, chicks should be grouped by breeder age as much as possible
- Ensure light intensity and duration are set prior to chick arrival (2.5 foot candles / 25 lux; 23 hr).
- Expected delivery time of chicks should be established so they may be unloaded and correctly placed as quickly as possible.
- The longer chicks are in transport boxes, the greater the degree of dehydration.
- This may result in early mortality and reduced growth potential.
- Chicks must be tipped quickly, gently and evenly over the brooding area.
- Empty boxes should be removed from the house as soon as possible.
- Chicks should be left to settle for 1–2 hr to become accustomed to their new environment.
- After this time, a check should be made to see that all chicks have easy access to feed and water and that chicks are active.
- Adjustments should be made to equipment and temperatures where necessary.

CHICK PLACEMENT

→These checks should be made every 4–6 hr after placement for the first 24 hr.

→From two to three days of age, existing feeders and drinkers should be repositioned and adjusted and additional ones introduced as the illuminated area is increased.

→During the early brooding period, feed should be provided in crumble form on supplemental feeders (1/100 chicks) so chicks have easy access.

→ Mechanical feeders should also be charged before arrival.

→Remove 1/3 of the supplemental feeders on each of days 8, 9 and 10.

→ Chicks should be gradually trained to the main feeding system within the first 10 days of placement.

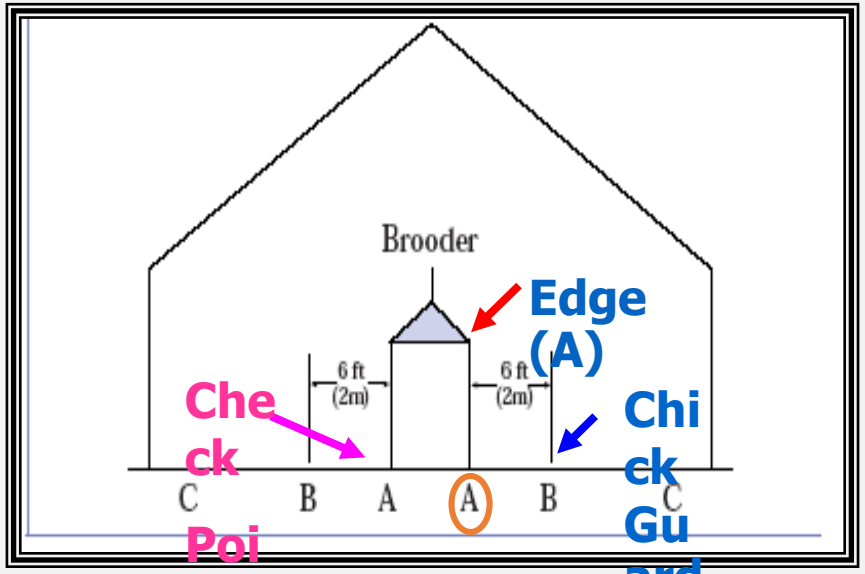
BROODER MANAGEMENT

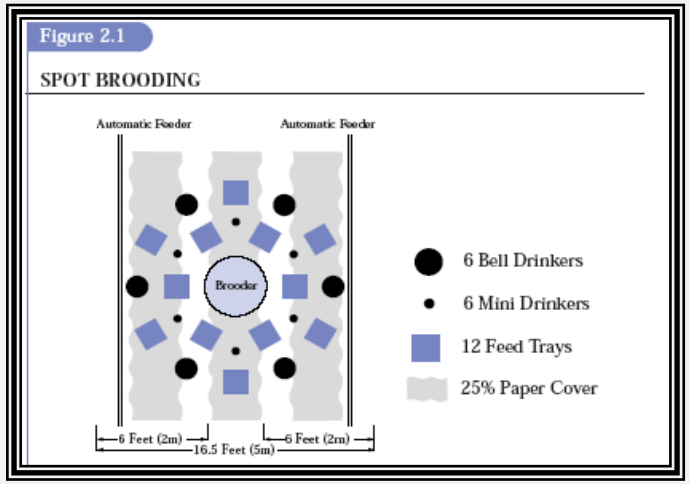
- The objective of proper brooding is to develop appetite as early as possible.
- Feed intake will be reduced if chicks are kept at temperatures greater than those suggested
- Two basic practices for brooding broilers are:
- Spot brooding
- Whole/partial house brooding
- Both systems are effective in getting chicks off to a good start if managed properly.
- Brooder guards may be employed to assist in controlling early chick movement.
- The contained area should be expanded from three days of age until finally removed by five to seven days.
- Chicks should be placed evenly throughout the brooding area.
- The use of stirring fans will enhance air quality and uniformity of temperature and RH.

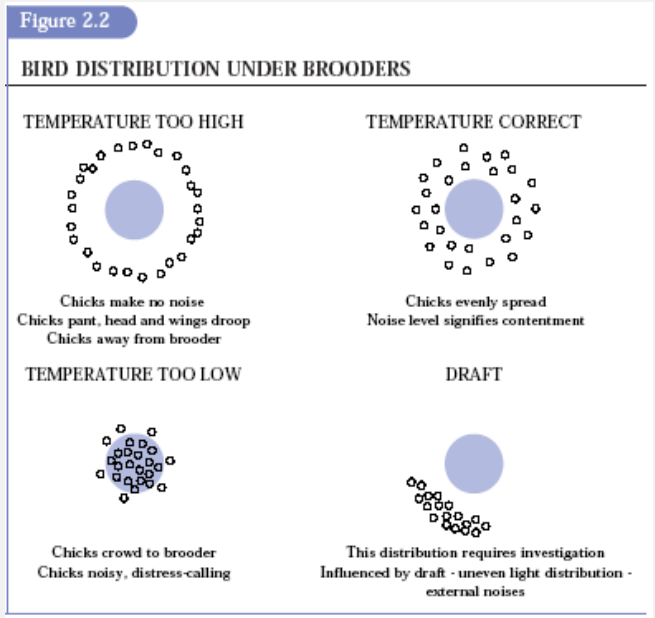
BROODER MANAGEMENT

- →Heat is provided by conventional canopy brooders.
- →For maximum effectiveness, brooder guards should be used to keep birds confined to the desired area of heat, feed and water.
- → In spot brooding, a temperature gradient is provided by genetic Companies
- →For whole/partial house brooding measured at feed and water sources;
- →For spot brooding, measured at brooder edge. Assumes RH of 60%.
- →Chick behavior is the best indicator of correct brooder temperature.
- →With spot brooding, correct temperature is indicated by chicks being evenly spread throughout the brooding area

BROODER MANAGEMENT







VENTILATION

→Air quality is critical during the brooding period.

→Ventilation is required during the brooding period to maintain temperatures at the targeted level and to allow sufficient air exchange to prevent the accumulation of harmful gases such as carbon monoxide, carbon dioxide and ammonia.

→Establishing minimum ventilation rates from one day of age will ensure fresh air is supplied to chicks at frequent, regular intervals.

→ Stirring fans can be used to maintain evenness of air quality at chick level.

LIGHTING

- Historically, lighting programs have consisted of continuous light regimens to maximize daily weight gain.
- These regimens consist of a long continuous period of light, followed by a short dark period (e.g. 0.5–1 hr) to allow birds to become accustomed to darkness in the event of a power failure.
- Other lighting programs have been devised to modify growth, minimize FCR or reduce mortality.
- To stimulate early feed intake, any lighting program should provide a long day length (e.g. 23 hr light) and adequate intensity for the first seven days.
- Light intensity at placement should be 2–2.5 foot candles (20–25 lux) at the feeder level, then be gradually reduced so that by 28 days it is approximately 0.30–0.50 foot candles (3–5 lux).
- Light intensity should be uniform throughout the house.

Hubbard classic and Hi-Y

Table 3
Reduced Day-Length Programs For Broilers*

	Blackout housing	Open-sided housing
0-3 days	24 hours	23 hours
4-11 days	6 hours	Natural daylength
12-18 days	10 hours	Natural daylength
19-25 days	14 hours	18 hours
26-32 days	18 hours	23 hours
33-39 days	22 hours	23 hours
40+ days	23 hours	23 hours

*Use a normal broiler nutritional and feeding program.

HUMIDITY

→Relative humidity (RH) in the hatcher, at the end of the incubation process will be high (approx. 80 percent).

→ Houses with whole house heating, especially where nipple drinkers are used, can have RH levels as low as 25 percent.

→Houses with more conventional equipment (i.e., spot brooders, which produce moisture as a byproduct of combustion and bell drinkers, which have open water surfaces) have a much higher RH (usually over 50 percent).

→To limit the shock to the chicks of transfer from the incubator,

→RH levels in the first three days should be maintained near 70 percent.

HUMIDITY

- RH within the broiler house should be monitored daily.
- If it falls below 50 percent in the first week, chicks will begin to dehydrate,
- Causing negative effects on performance.
- In such cases, action should be taken to increase RH.
- If the house is fitted with high-pressure spray nozzles (i.e.,foggers) for cooling in high temperatures, then these can be used to increase RH during brooding.
- Chicks kept at appropriate humidity levels are less prone to dehydration and generally make a better, more uniform start.
- As the chick grows, ideal RH falls.
- High RH from 18 days onward can cause wet litter and its associated problems.
- As broilers increase in live weight, RH levels can be controlled using ventilation and heating systems.

INTERACTION BETWEEN TEMPERATURE AND HUMIDITY

- Chickens lose heat to the environment by evaporation of moisture primarily from the respiratory tract.
- At high RH, less evaporative loss occurs increasing the birds'apparent temperature.
- The temperature experienced by the birds is dependent on the dry bulb temperature and RH.
- High RH increases the apparent temperature at a particular dry bulb temperature,
- Whereas low RH decreases apparent temperature.
- The temperature profile in Table 2.2, assumes RH in the range of 60 percent.

INTERACTION BETWEEN TEMPERATURE AND HUMIDITY

Heat Stress Index Calculation													
Temperature	%RH												
ºC	40	45	50	55	60	65	70	75	80	85	90	95	100
35.0	37.2	38.9	40.6	42.8	45.0	47.8	50.6	53.3	56.7	60.0	63.9	67.8	71.7
34.4	36.1	37.8	39.4	41.1	43.3	45.6	48.3	51.1	53.9	57.2	60.6	64.4	68.3
33.9	35.0	36.7	38.3	40.0	41.7	43.9	46.7	48.9	51.7	54.4	57.8	61.1	65.0
33.3	34.4	35.6	37.2	38.3	40.6	42.2	44.4	46.7	49.4	52.2	55.0	58.3	61.7
32.8	33.3	34.4	36.1	37.2	38.9	40.6	42.8	45.0	47.2	50.0	52.2	55.6	58.3
32.2	32.8	33.3	35.0	36.1	37.8	39.4	41.1	42.8	45.0	47.2	50.0	52.8	55.6
31.7	31.7	32.8	33.9	35.0	36.1	37.8	39.4	41.1	43.3	45.0	47.2	50.0	52.2
31.1	31.1	31.7	32.8	33.9	35.0	36.7	37.8	39.4	41.1	43.3	45.0	47.2	49.4
30.6	30.6	31.1	31.7	32.8	33.9	35.0	36.7	37.8	39.4	41.1	42.8	45.0	46.7
30.0	29.4	30.6	31.1	31.7	32.8	33.9	35.0	36.1	37.8	38.9	40.6	42.2	44.4
29.4	28.9	29.4	30.0	31.1	31.7	32.8	33.9	35.0	36.1	37.2	38.9	40.0	41.7
28.9	28.3	28.9	29.4	30.0	31.1	31.7	32.2	33.3	34.4	35.6	36.7	37.8	39.4
28.3	27.8	28.3	28.9	29.4	30.0	30.6	31.1	31.7	32.8	33.9	35.0	36.1	37.2
27.8	27.2	27.8	28.3	28.9	29.4	30.0	30.6	31.1	31.7	32.2	32.8	33.9	35.0
27.2	27.2	27.2	27.8	27.8	28.3	28.9	29.4	29.4	30.0	30.6	31.1	32.2	32.8
26.7	26.7	26.7	27.2	27.2	27.8	27.8	28.3	28.9	28.9	29.4	30.0	30.0	30.6
25.6	26.1	26.1	26.1	26.1	26.7	26.7	26.7	26.7	26.7	26.7	26.7	27.2	27.2
24.4	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.0	25.0	25.0	24.4	23.9	23.9

INTERACTION BETWEEN TEMPERATURE AND HUMIDITY

→Table shows the predicted dry bulb temperature required to achieve the target temperature profile over a range of RH.

→The information in Table can be used in situations where RH varies from the target range (60 percent).

→If RH is outside the target range,

→ the temperature of the house at chick level can be adjusted to match that given in Table.

→ At all stages, chick behaviour should be monitored to ensure chicks are experiencing an adequate temperature.

→ If subsequent behaviour indicates chicks are too cold or too hot,

→ the house temperature should be adjusted appropriately.

Conclusion

→Before chicks arrive, inspect the house closely to ensure proper setup.

→ After a poor start, there is little time to compensate for the lost growth as a chick's life is only approximately 1000 hours.

→Thus, every hour represents 0.10% of the chick's life. In a 24-hour period, 2.4% performance can be lost.

→ Many producers recognize that performance lost the first day or first week will be reflected in final performance results.

Thanks for your attention

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