



Food and Agriculture  
Organization of the  
United Nations

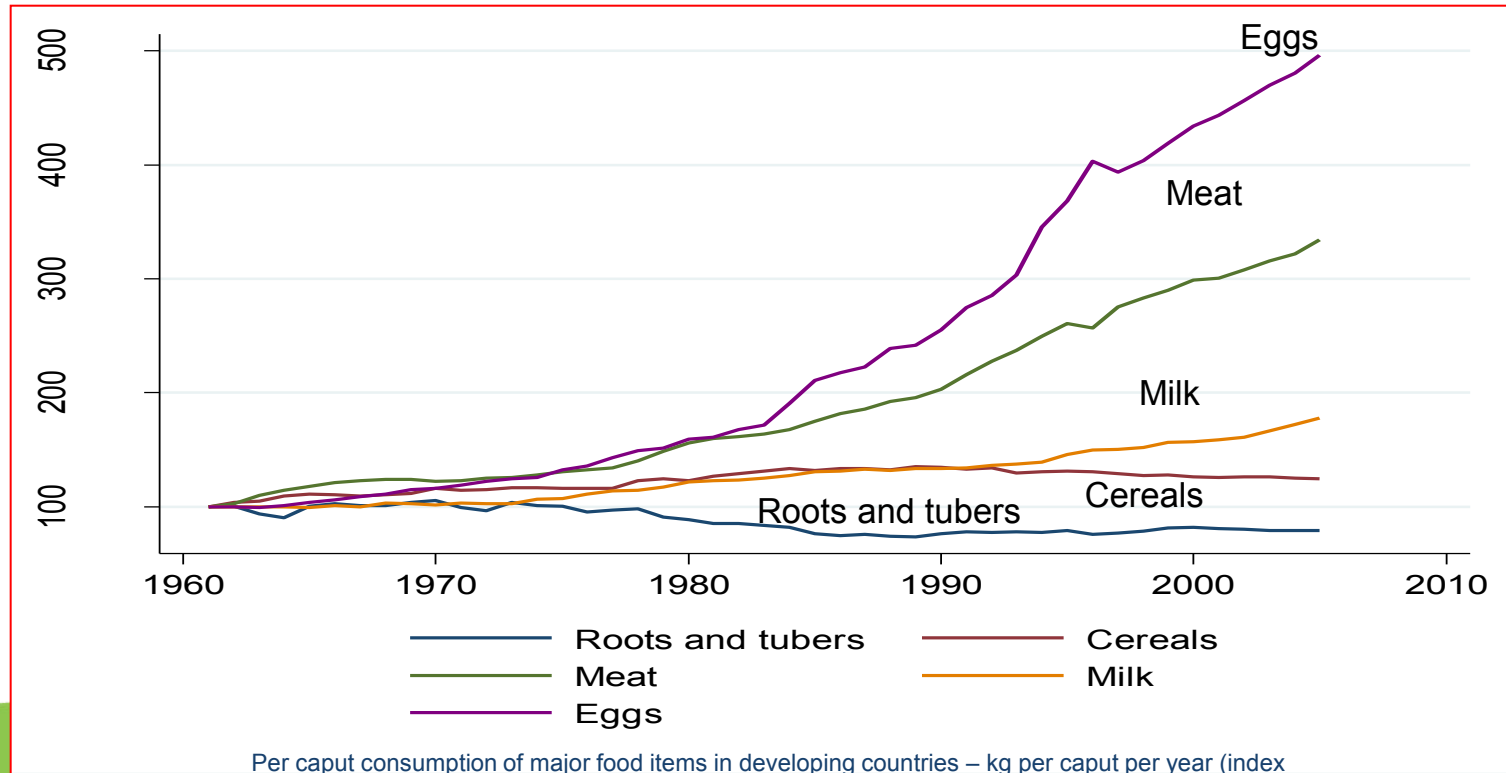
# FAO strategy and initiatives in Antimicrobial resistance



**Juan Lubroth, DVM, PhD, ACVPM**  
Chief Veterinary Officer

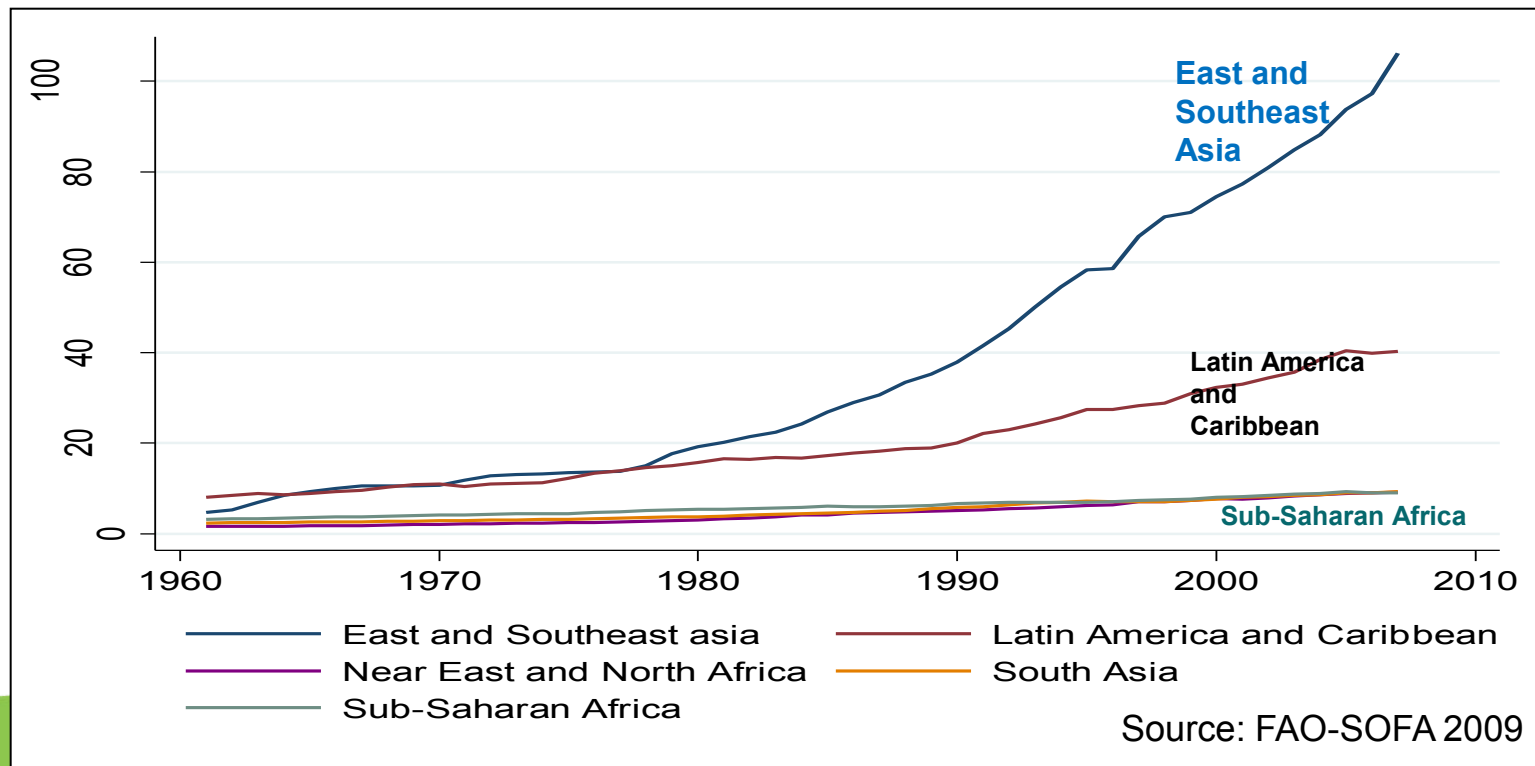


# Consumption is growing rapidly...



Source: FAO-SOFA 2009

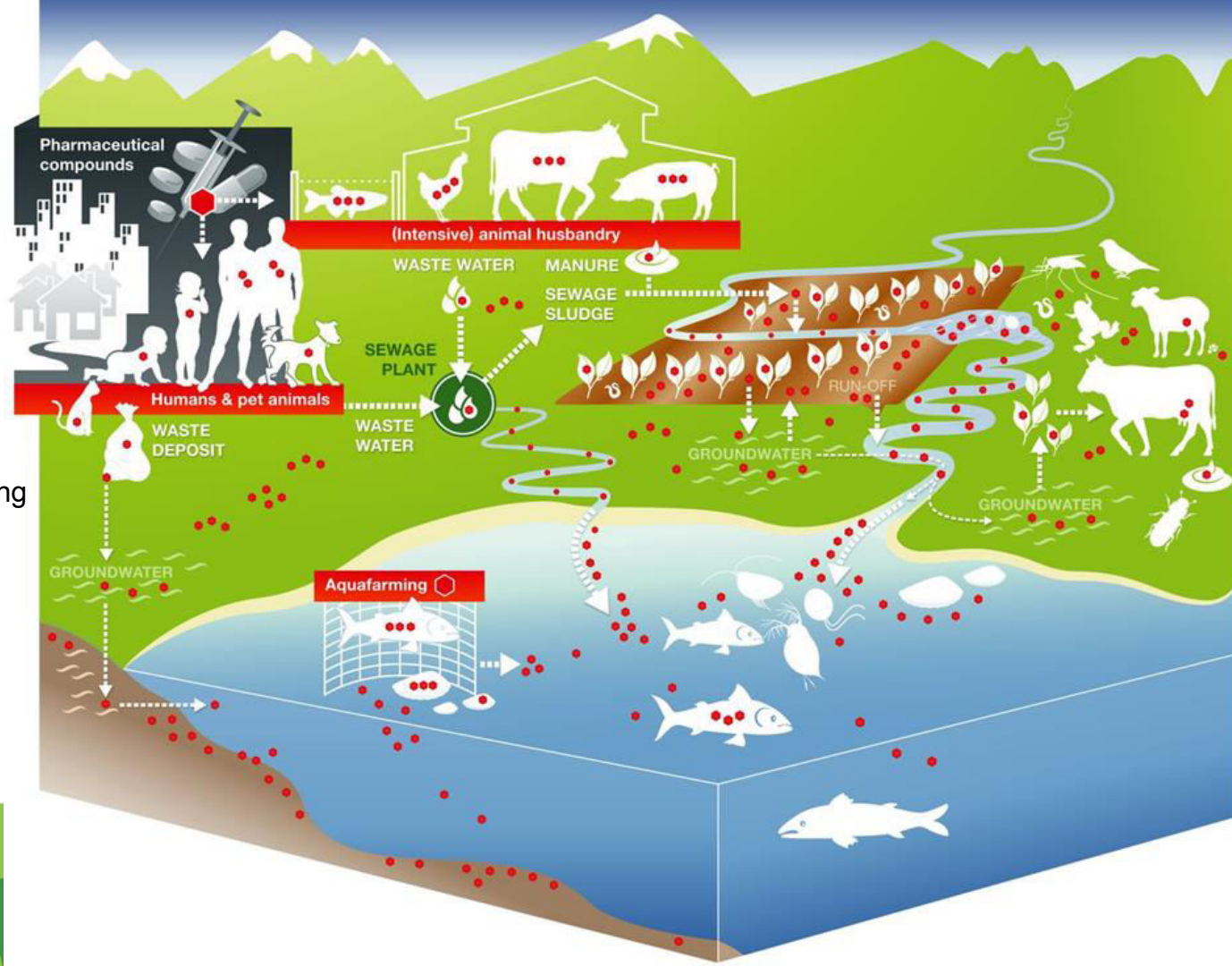
# Meat production is growing



# Megacities 2013



Antimicrobial usage in humans, animals and agriculture, and resulting dispersion of antimicrobial residues into aquatic and terrestrial environments (●●●)  
(Berkner et al., 2014)

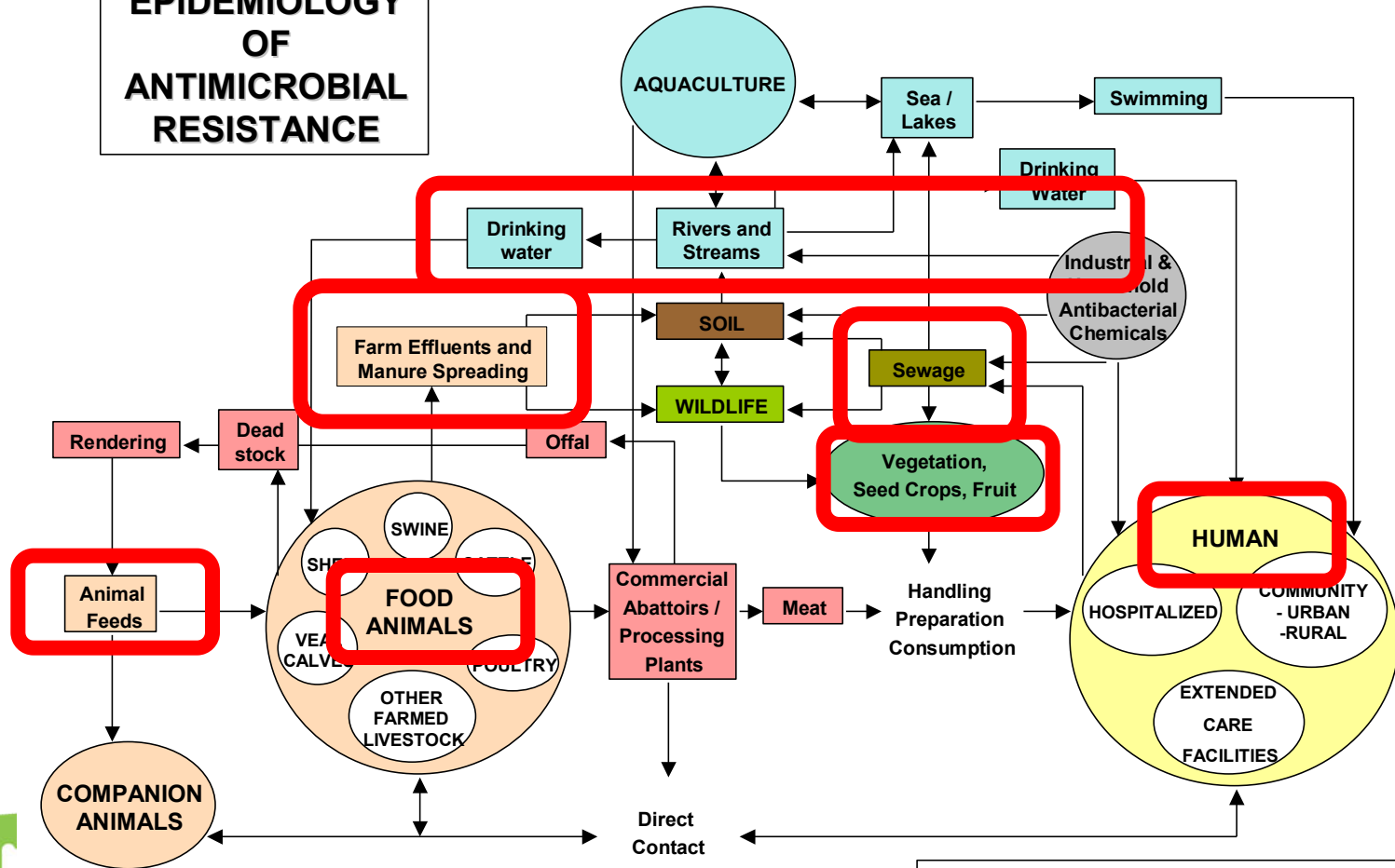


# Abuse Overuse Misuse





# EPIDEMIOLOGY OF ANTIMICROBIAL RESISTANCE



after Linton AH (1977), modified by Irwin RJ

# FAO-OIE-WHO Tripartite



## The FAO-OIE-WHO Collaboration

Sharing responsibilities  
and coordinating global activities  
to address health risks at the  
animal-human-ecosystems interfaces

A Tripartite Concept Note



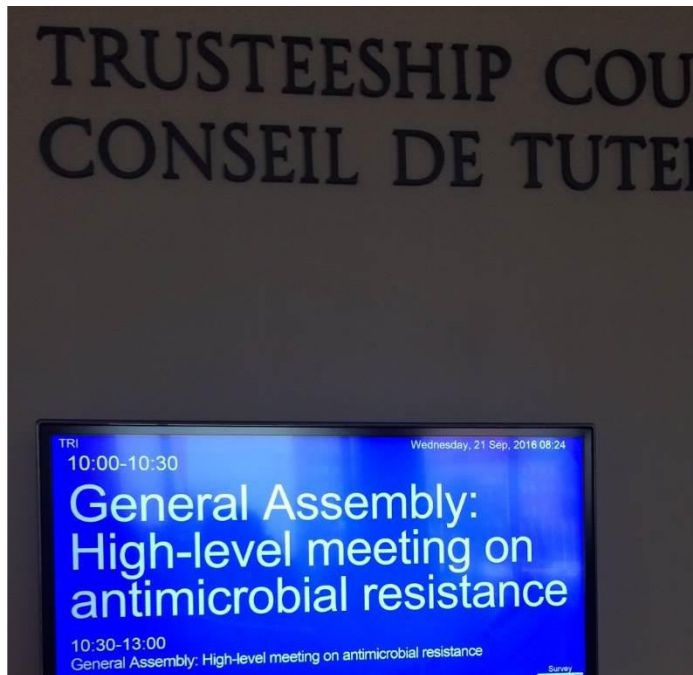
April 2010







# General Assembly of the United Nations - High-Level Meeting on Antimicrobial Resistance



# FAO Action Plan on AMR - supporting the Global Action Plan in addressing the food and agriculture sectors

1. Improve **awareness** on AMR
2. Develop capacity for **surveillance** and monitoring of AMR and AMU
3. Strengthen **governance**
4. Promote **good practices** in food and agricultural systems



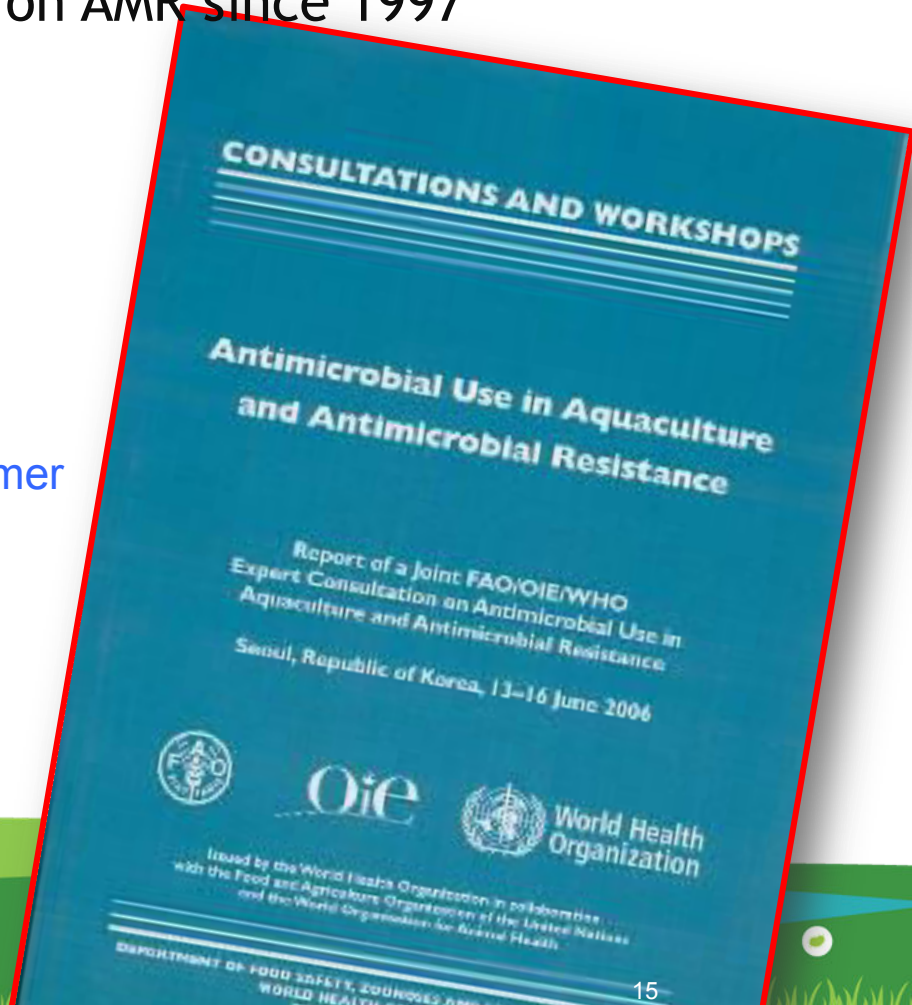
# AMR and One Health at FAO

FAO implements an integrated **“One Health”** and **“food chain”** approach when addressing AMR as a cross-sectoral issue



# FAO/OIE/WHO work on AMR since 1997

- International collaboration established
  - **Codex Alimentarius** (1963)
  - FAO, WHO and OIE
- > 40 expert meetings and consultations
- Roles
  - Codex and OIE: normative work
  - **FAO**: raise public awareness, consumer confidence, practical guidance and capacity building
  - **OIE**: professional awareness
  - **WHO**: raise public awareness, monitoring, leading the debate
- Publications





# Codex

## ○ Main texts:

- Code of Practice to **Minimize and Contain** Antimicrobial Resistance (CAC/RCP 61-2005)
- Guidelines for **Risk Analysis** of Foodborne Antimicrobial Resistance (CAC/GL 77-2011)

## ○ Other Codex texts relevant to AMR includes:

- Code of Practice on **Good Animal Feeding** (CAC/RCP 54-2004)
- General Principles of **Food Hygiene** (CAC/RCP 1-1969)
- Several Codes of hygienic practices for different commodities (e.g. milk and milk products, fish and fishery products)

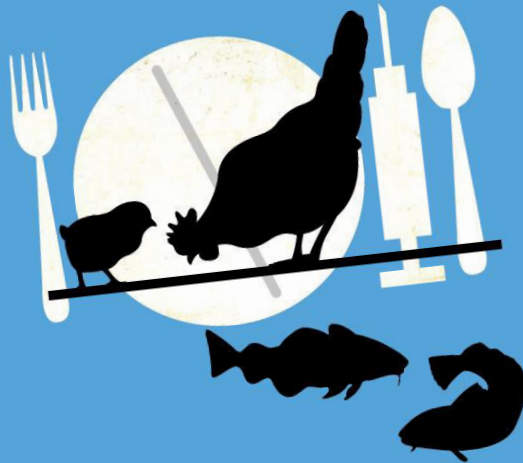
## ○ The 39<sup>th</sup> Session of the Codex Alimentarius Commission (June 2016)



## AMR: Key Messages for Countries



### Tackling antibiotic resistance from a food safety perspective in Europe



1. Improve overall coordination
2. Improve regulatory framework
3. Reduce the need for and promote prudent use of antibiotics
4. Improve surveillance
5. Advocate and communicate
6. Build capacity and provide training
7. Address knowledge gaps and research needs





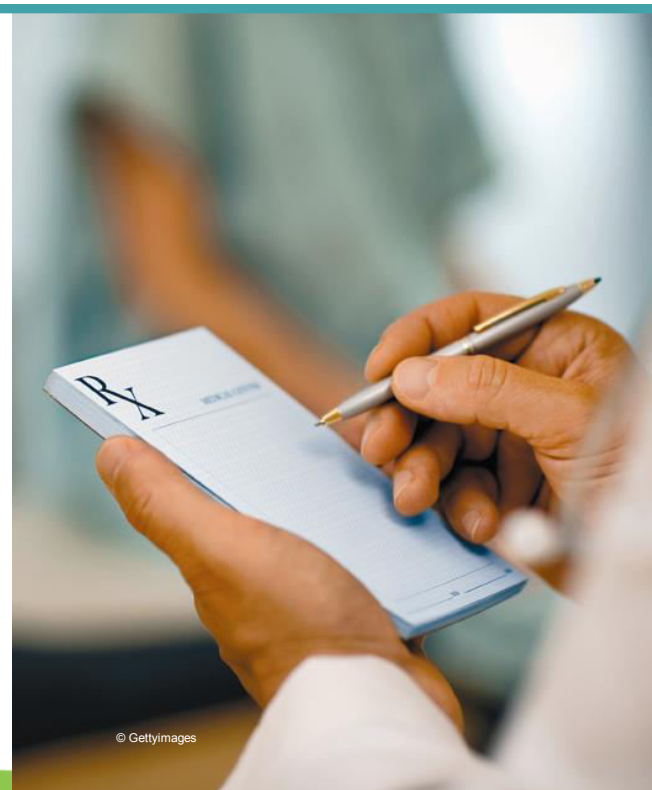
# 1. Intersectoral Coordination



- National interdisciplinary cooperation
- National intersectoral
  - holistic strategy
  - action plan
  - intergovernmental steering committee or task force
- Formal mechanism between health and food/feed safety/veterinary authorities.
- Environment
- Private sector (pharmaceutical, food production)

## 2. Improved Regulatory Framework

- Reducing and **eliminating** antimicrobials/antibiotics for growth promoters
- Requiring that antibiotics be administered to animals only when **prescribed** by a veterinarian
- Requiring that antibiotics identified as **critically important** in human medicine - especially fluoroquinolones and third/fourth generation cephalosporins - only be used in food animals when justified



## Legislation

working at country level on animal, plant health and food safety legislation.



[www.fao.org/legal](http://www.fao.org/legal)

Identification of  
legal elements and  
areas relevant for  
AMR and AMU

Recommendations to  
mainstream AMU-  
related obligations  
and responsibilities in  
the relevant  
legislation

Support to  
participatory  
processes for legal  
reform



**LEGAL INFORMATION – FAOLEX ([faolex.fao.org/faolex](http://faolex.fao.org/faolex))**



### 3. Reduce Usage and Promote Prudent Use

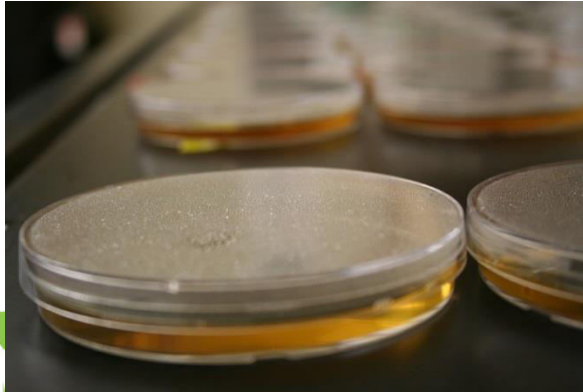
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- Reducing the need by improving animal health through **biosecurity** measures, **disease prevention** (including vaccine use), and good **hygienic and management** practices
- Eliminating economic incentives that facilitate the inappropriate prescription of antimicrobials



## 4. Surveillance



- Establishing a surveillance system for the **use of antimicrobials** food animals, in feed, and environment
- Establishing an integrated (among public health, food and veterinary sectors) surveillance system to **monitor** antimicrobial resistance in selected food-borne bacteria



## 5. Advocacy and Communication

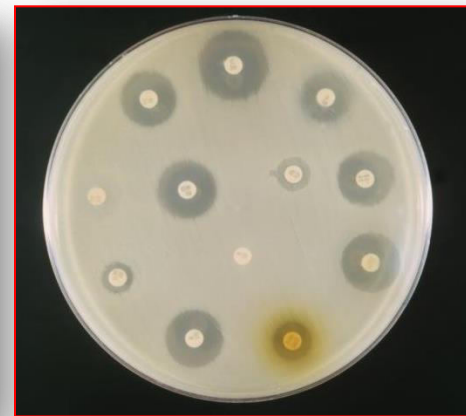
- Basic information for **stakeholders**
- Videos and infographics
- Stakeholder events at national level
- Internal **technical networks** – raise awareness among all FAO staff
- External events – **Private sector** (IDF, IFIF, Pharma ...), Academia, **professional associations** ... OIE and WHO,





## 6. Training and Capacity Building

- Develop **guidelines** on the prudent use of antimicrobials in food animals
- Provide the **training** needed to **implement** them



# 7. Opinion, Knowledge gaps and research needs

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- **Evidence vs. confounding results**
  - Precautionary Principle / precautionary approach
  - Science based
- **Food and Agriculture** – contribution to the problem?
  - “Finger Pointing” – not helpful
  - 20% of the problem: 80% of the knowledge gap
- Studies to provide comparable data on antibiotic resistance and usage for risk assessment and risk management
- Strengthen research on the epidemiology of resistance
- Development of new medicines
- Alternative approaches to antibiotic therapy
- Vaccine development. improved vaccines, strengthened vaccinations regimes
- Point-of-care diagnostics - affordable



# From global commitment to local action

- **Cambodia, Ghana, Kenya, and Zimbabwe** currently under implementation, to assist targeted countries to develop relevant sections of a National Action Plan to reduce the threat of AMR related to agriculture, livestock production, fisheries and food under the 'One Health' approach.
- **35 countries in Asia and sub-Saharan Africa** in a 3-year project (2016-2019) on AMR, to be implemented by the WHO/FAO/OIE Tripartite.
- **China, India, Viet Nam, Thailand, Indonesia** in a USAID funded project (2016-2018) “*Addressing Antimicrobial Usage in Asia’s Livestock Production Industry*” as a part of the *Emerging Pandemic Threats program*. (Inception workshop, Bangkok, January 2016).
- **Armenia, Belarus, Kazakhstan, Kyrgyzstan, Tajikistan and Russia** (pipeline 3-year project on AMR to be funded by the Russian Federation).



# Integrated Surveillance



# The Food and Agriculture Sector

## - Antimicrobial Use and in Antimicrobial Resistance -

# 14

## S E C T O R S

- Aquaculture fish
- Crustaceans
- Mollusks
- Dairy
- Beef
- Sheep, mutton and lamb
- Goat
- Swine

- Poultry – layers
- Poultry – broilers
- Turkey
- Rabbit
- Fruit
- Crops
  - Legumes
  - Grains
  - ...



# The Food and Agriculture Sector

## - Antimicrobial Use and in Antimicrobial Resistance -

# 3

SECTORS

- Smallholder farms
- Medium commercial operators – local markets
- Intensive, large commercial entities – national and international scope





# The Food and Agriculture Sector

## - Antimicrobial Use and in Antimicrobial Resistance -

# 42

## S E C T O R S

- Aquaculture fish
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  - ...



# The Food and Agriculture Sector

## - Antimicrobial Use and in Antimicrobial Resistance -

- Food production chain – critical control points for surveillance
- Feed Industry
- Effluents and waste management
- Rivers, streams, ponds, lakes
- Pharmaceutical Companies

> 50  
SECTORS



# The Food and Agriculture Sector

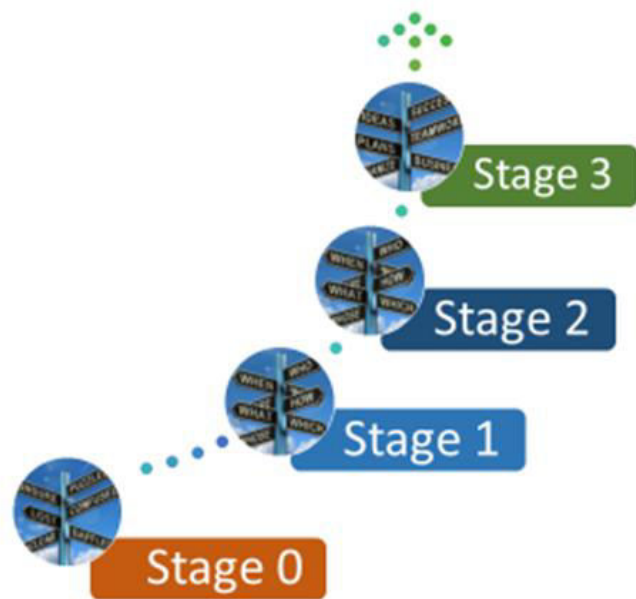
## - Antimicrobial Use and in Antimicrobial Resistance -

- Integrated surveillance? ... a **sound** idea
  - Complex implementation
  - Mosaic of understanding
  - Difficult compliance
- 
- Need to start somewhere



# Progressive Management Pathway (PMP) on AMR





## Focus areas

Aw	Evi	Prac	Practices
			Governance

## Objectives

1	2	3	4	5	Cross
IEC	SMR	RED	LEG	ALT	CCI
Responsible use of antimicrobials and monitoring of antimicrobial resistance in place					
Implementation of national action plan					
Understanding of current situation and gaps					
None or Low					



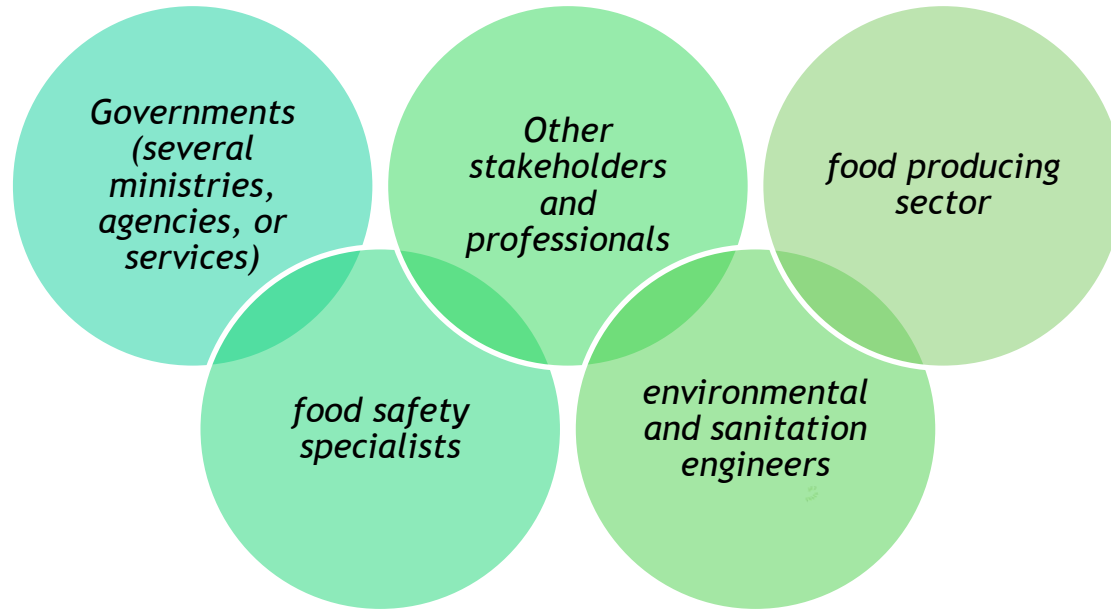
# Why are we developing this?

*“To assist and guide countries in undertaking concrete steps towards developing and implementing a “One Health” National Action Plan on AMR (in line with what is stated in the GAP)”*





# Who is PMP for?



# Why are we developing this?

- ✓ provides a status (or stage) in which a particular sector or country is in terms of addressing AMU and AMR regarding the GAP objectives
- ✓ Promotes the institution of inter-sectoral collaboration, public-private collaboration, stakeholder consultations, timely information sharing, including collation and dissemination
- ✓ and information to enhance their process towards judicious use of antimicrobials in all sectors



# Progressive Management Pathway - PMP (1/2)

Experience with roadmaps and progressive work on infectious diseases (i.e., foot-and-mouth disease and peste des petits ruminants, brucellosis, rabies)

## Based on the following principles:

- **Baseline** and **Vision** or target (international standards?)
- Active monitoring for AMU and AMR detection, better understanding the epidemiology of AMR and transmission risks
- Foundation for a management program
- The improved information generated is of benefit nationally (and regionally).
- The monitoring of outcomes (indicators of effectiveness), within a national management system, is included at the higher stages;



# Progressive Management Pathway - PMP (2/2)

- Activities in each PMP stage are appropriate to the required reduction or incidence of AMR and judicious AMU;
- Activities and their impacts are measurable in each Stage, comparable between countries, and generate information and potential benefits to national as well as international stakeholders;
- Need targets and measures in the various food/agriculture systems and critical risk points where the impact on management will be greatest.
- The PCP parallels a HACCP approach applied to antimicrobial use/management, focussing on the surveillance or intervention points most critical to success and then measuring their performance and outcome.



# Prudent use of antimicrobials in agriculture production systems

In terrestrial animal production systems and health and animal feed

- Good husbandry and Good hygiene practices
- Improved biosecurity
- Animal welfare, proper animal handling and stress avoidance to decrease susceptibility to diseases
- Feed processing/presentation and use of appropriate feed ingredients to promote growth
- Infection control
- Vaccination regimes



# Prudent use of antimicrobials in agriculture production systems

In aquatic animal production systems and health

- Biosecurity a priority for the work of COFI/SCA
- AMR as a priority research topic
- CCRF Technical Guidelines: Prudent and Responsible Use of Veterinary Medicines
- Bacterial diseases in Aquaculture





# Prudent use of antimicrobials in agriculture production systems

In crop  
production  
and health

- Good Agriculture Practice
- Regulation of antimicrobials used for crop production
- Integrated Pest Management (IPM) for reducing use of antimicrobials
- Management and use of microbial pesticides (pesticide life-circle management)
- Management and use of pesticides including microbial pesticides
- Registration of pesticides including assessment of microbial pesticides



# AMR module in Laboratory Mapping Tool

To (self)assess individual laboratories on their capacity of:

- ✓ pathogen isolation & identification
- ✓ antimicrobial resistance testing

Focusing on 6 major categories:

- Technical capacities
- Data and biological material management activities
- Quality Assessment
- Governance
- Prospective

Qualitative  
questionnaire

Scored  
questionnaire

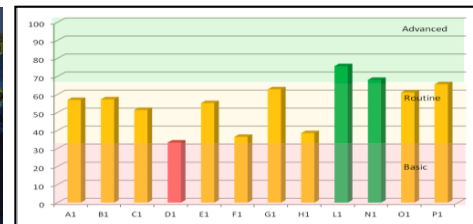
The screenshot displays the FAO LMT-AMR Module interface, version 032016. It is a web-based questionnaire for assessing laboratory capacity. The top section is titled 'Qualitative questionnaire' and includes fields for 'Name assessé(s)', 'Assesseur's affiliation', 'Self assessment Y/N', 'Laboratory full name', 'Address/Contact details (page)', 'Self address level', and 'Check name of DLE and/or HAC or other Reference or Collaboration Centre'. Below this is a section for 'SELECT ONLY 1 OPTION per row THAT BEST DESCRIBES THE SITUATION and complete "Assessment Scores" for assessment C (Current assessment) scoring either 4,3,2 or 1 or check "no info" (column J if not available). If situation stands between two scores, please select one score and describe the reason for hesitation in the column for comments (column K). In case a given score is 4, 3, 2 or 3 compared to the previous score, please provide a comment (column K).'. The bottom section is titled 'Scored questionnaire' and is a table with columns for 'Category', 'Sub-Category', 'Assessment scores' (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z), 'Assessor's comments', and 'Additional information for the assessor'. The table contains rows for various categories such as 'Technical capacities', 'Data and biological material management activities', 'Quality Assessment', 'Governance', and 'Prospective'. The bottom of the screenshot shows a navigation bar with links to '7. INDEX AMR', '8. Questionnaire', '9. AMR Module', and '10. AMR SUMMARY'.



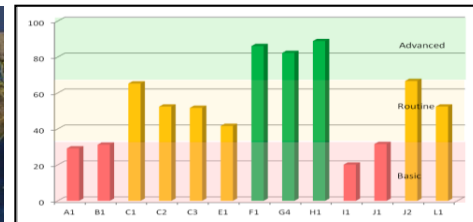
The information sheet is available at <http://www.fao.org/3/a-i5439e.pdf> and on FCC website [www.fao.org/food-chain-crisis](http://www.fao.org/food-chain-crisis)

# FAO Laboratory Mapping Tool

LMT Category	L1*			G1			E1			C1			J1	
	2011	2012	2014	2011	2012	2014	2011	2012	2014	2011	2012	2014	2012	2014
Geographic location	88	77	99	88	89	100	88	78	89	88	67	78	55	44
Laboratory Budget	69	69	91	36	78	56	16	44	33	16	67	78	16	0
Basic supply	90	90	90	90	89	100	79	56	78	79	78	89	16	16
Organization	90	90	90	57	100	100	57	100	67	57	67	67	24	90
Infrastructure	57	44	69	34	54	54	29	48	46	27	33	38	0	0
Equipment	46	46	63	16	67	50	16	60	73	27	28	44	6	15
Reagent supply	58	53	62	45	67	63	28	48	88	26	42	46	8	18
Staff skills + availability	93	66	81	89	88	83	81	56	79	73	79	86	27	20
Sample accession	69	69	63	47	89	85	47	87	33	42	61	49	12	26
Available technology	61	54	64	58	59	52	50	60	71	30	26	41	0	17
Training , including IATA	81	49	69	41	71	67	41	47	38	41	33	38	39	15
Quality Assurance	87	87	87	67	83	88	67	67	71	51	8	29	31	17
Biosafety/Biosecurity	52	29	46	38	67	56	32	73	83	29	39	50	21	12
Staff Security/Health	45	45	45	45	67	44	45	33	67	33	56	56	0	0
Communication means	66	74	82	66	50	83	41	83	67	66	75	58	24	8
National lab networking	44	55	66	88	89	89	55	50	56	88	89	89	25	14
Laboratory collaboration	90	70	70	90	93	93	83	87	93	70	67	73	15	25
Use of databases/platforms	64	56	72	50	25	25	33	100	83	33	75	67	45	14
<b>Grand Total assessment</b>	<b>69</b>	<b>60</b>	<b>71</b>	<b>56</b>	<b>72</b>	<b>69</b>	<b>48</b>	<b>63</b>	<b>67</b>	<b>45</b>	<b>48</b>	<b>54</b>	<b>18</b>	<b>16</b>
<b>General laboratory profile</b>	83	80	93	70	87	87	61	63	67	61	70	80	29	27
<b>Infrastructure, equipment, supplies</b>	54	48	65	33	62	56	25	51	68	27	35	42	5	10
<b>Laboratory performance</b>	74	62	70	66	77	71	60	67	63	48	54	57	13	20
<b>QA,Biosafety/Biosecurity</b>	71	56	66	49	74	68	48	60	64	41	29	40	29	13
<b>Lab collaboration and networking</b>	69	65	73	74	65	73	55	82	78	63	75	71	27	16
	➡			➡			➡			➡			➡	



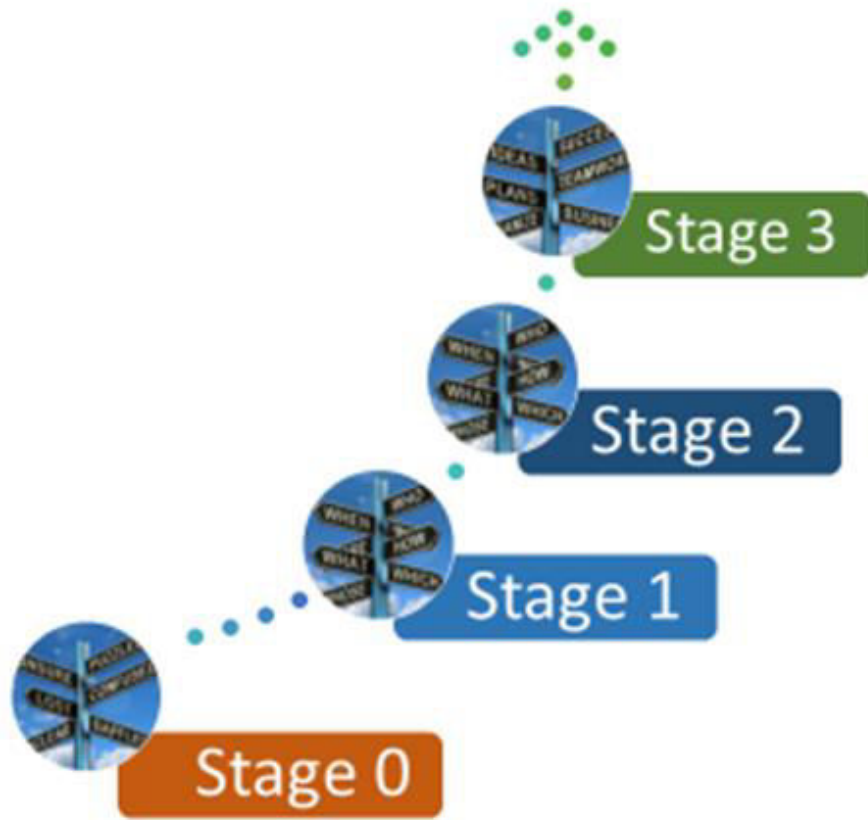
Annual Laboratory assessment data for 24 laboratories in the S/SE Asia region



Annual Laboratory assessment data for 13 laboratories in the Congo Basin region

+ LMT Biological risk and AMR modules. Also available Mobile App







[www.fao.org/antimicrobial-resistance](http://www.fao.org/antimicrobial-resistance)

Thank you

