



Better lives through livestock

Advancing One Health Action to Optimize Chemical, Antimicrobial Use and contain AMR in Lao PDR

Vannaphone PUTTHANA

Veterinary Medicine

Faculty of Agriculture, National University of Laos

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Outlines

One health networks in Lao PDR.

Capacity building and human resource development

Chemical, AMU & AMR Introduction, and poultry production at village models



One Health Network in Lao PDR.



National One Health Committee (2024) .



Laos One Health University Network (LAOHUN) (2019)



One Health Symposium (years ago)

One health and approach

- One Health is the integrative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, and the environment.
- An approach for preventing and mitigating health threats at the Animal-Human-Plant-Environment interface with the objective of achieving public health and wellbeing.



The historical and recent assessments of the OH implementation



2017

1st Joint External Evaluation

Baseline health security and zoonotic disease capacity; highlighted need for multisector coordination; first structured OH-relevant assessment

2023

National Bridging Workshop for One Health

Assessed multisectoral coordination for zoonotic disease prevention and response; identified gaps and opportunities for collaboration between human and animal health sectors

2024

National One Health Committee

Established to serve as a formal multisectoral mechanism for coordinating human, animal, wildlife, and environmental health activities, enhancing surveillance, outbreak response, risk assessment, and the implementation of One Health initiatives in Lao PDR.



2nd Joint External Evaluation

Progress in national health security; recommendations: multisector coordination, workforce expansion, sustainable financing

One Health Assessment Tool Workshop (OHAT)

Comprehensive national OH assessment; identified gaps, defined targets; supports National OH Action Plan development

National Action Plan for Health Security

Provides the roadmap for strengthening health security and One Health capacities, including workforce development, risk communication, and multisectoral coordination

National Risk Profile

Identifies and prioritizes health risks and hazards across sectors to inform One Health preparedness, planning, and resource allocation

One Health National Strategic Plan

Defines national priorities, strategic objectives, and implementation roadmap for operationalizing One Health coordination and integrated action across sectors

National Biodiversity Strategy and Action Plan (NBSAP)

Provides strategic guidance for integrating biodiversity conservation with One Health activities, supporting coordination between environmental and health sectors

Capacity building and human resource development

- Tran-disciplinary approach is necessary
- Human resource in Lao context (7.8M, \approx 500 vet, <5% under DLF).
- The veterinary services are centered around three core sectors including
 - 1) private sector veterinary services
 - 2) stakeholders, institutions, organizations
 - 3) public sector veterinary services (the veterinary administration)
- However, After AMR strategy 2019-23 finished and 2026-30 was approved, 15 staffs in three provinces were started for TOT and local staff training support by FAO, WHO... (382 participants)
- AMR Awareness campaign through country

Sample collection from farms training



Some finding from chemical and antimicrobial used

Environmental contamination



Impact on human, animal, aquaculture, and wildlife

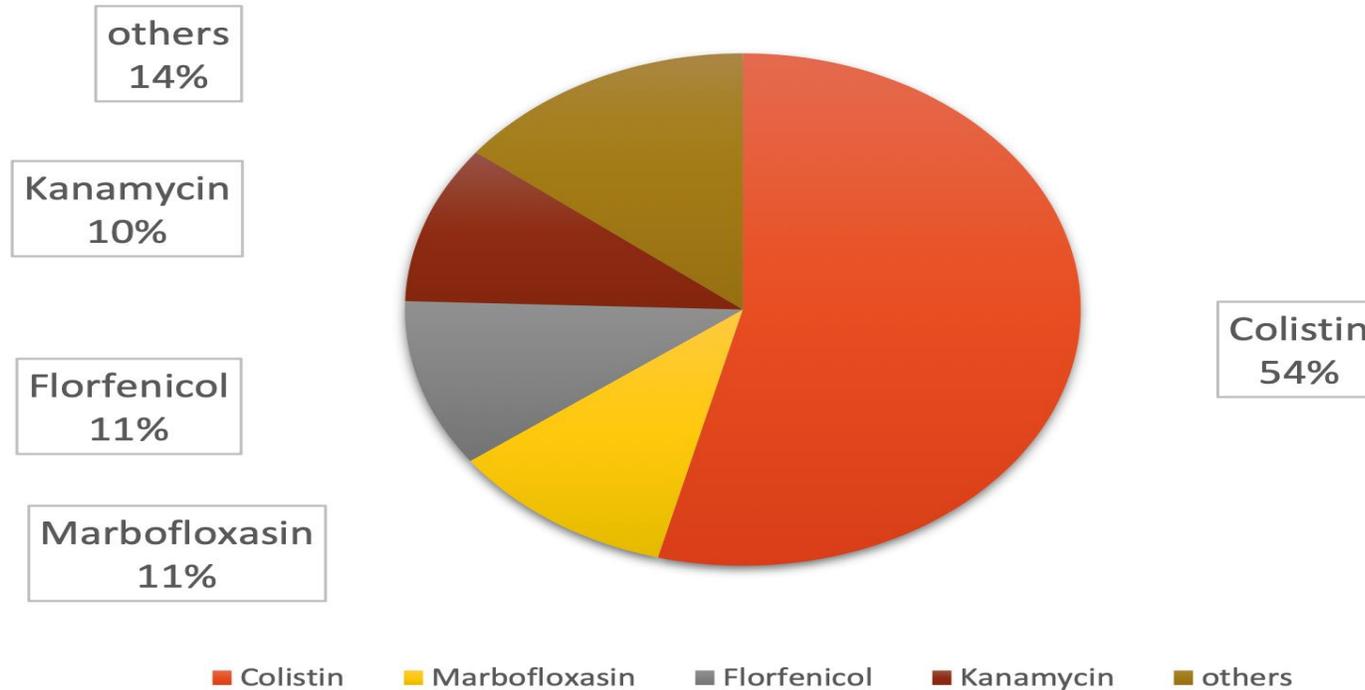


Antimicrobial used in livestock and fisheries in Lao PDR

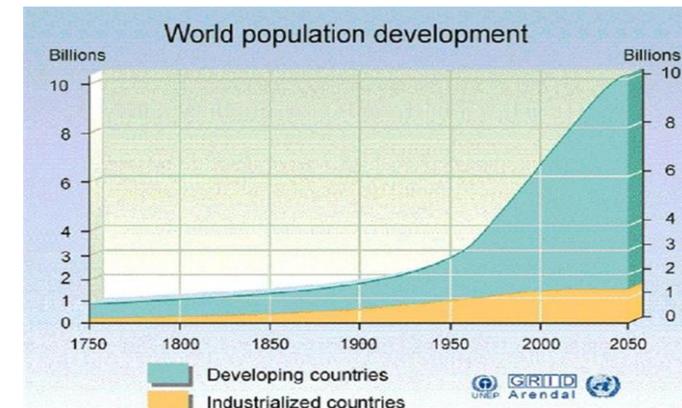
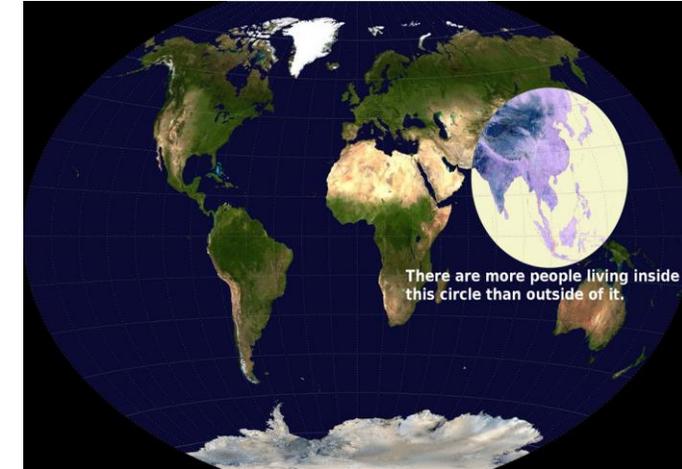
Data from importing company	Data from survey results		
	Pig	Poultry	Fish
For injection: <ul style="list-style-type: none"> • Benzylpenicillin procaine 200,000 IU • Dihydrostreptomycin sulphate 200 mg • Benzathine benzyl penicillin 80,000 IU • Procaine benzylpenicillin 120,000 IU • Dihydrostreptomycin sulphate 200 mg • Oxytetracycline 200 mg • Oxytetracycline 50mg • Amoxicillin 15 g/100ml • Doxycycline HCL 100 mg • Tylosin 200 mg • Gentamicin 40 mg • Tylosin Tartrate 100 mg • Gentamicin 50 mg • Kanamycin Sulfate 25 mg/100ml • Trimethoprim 40 mg • Sulfadoxine 200 mg • Water-soluble powder • Oxytetracycline HCL 10,000 mg • Sulfadimidine 21, 3 g • Diaveridine 2, 6 g • Spiramycin Adipate 8,000,000 IU • Oxytetracycline HCL 6,000 mg • Bromhexine HCL 150 mg • Doxycycline HCL 50,000 mg • Colistin Sulfate 50,000,000 IU • Enrofloxacin 5,000 mg 	For injection: <ul style="list-style-type: none"> • Amoxicillin • Penicillin • Penstrep • Gentamicin • Kanamycin • Streptomycin • Oxytetracycline • Florfenicol injection • Lincomycin • Tiamulin Water-soluble powder <ul style="list-style-type: none"> • florfenicol powder • Colistin • Enrofloxacin • Oxytetracycline • Norfloxacin • Streptomycin • Tetracycline 	For injection: <ul style="list-style-type: none"> • Amoxicillin • Ampicillin • Gentamicin • Oxytetracycline Water-soluble powder <ul style="list-style-type: none"> • Amprolium • Chlortetracycline • Colistin • Enrofloxacin • Erythromycin • Erythromycin + Chlortetracycline • Gentamycin • Gentamycin + Tylosine • Neomycin • Oxytetracycline • Norfloxacin • Sulfadiazine + Trimethoprim • Sulfadiazine + diaveridin • Spiramycin + Tylosin + Colistin 	Water-soluble powder <ul style="list-style-type: none"> • Amoxicillin • Enrofloxacin • Oxytetracycline

AMU & AMR Introduction and surveillance in Lao PDR

Percentage of medicine use in fattening pig farms



The total use of active ingredient (AI) of antimicrobial agents was 6,326,468,903 mg, the total number of fattening pigs was 118,489, and the total AI of antimicrobial use calculated was 53,393 mg/ fattening pig.



Resource: FAO



Antimicrobial consumption in fattening broiler chicken farms

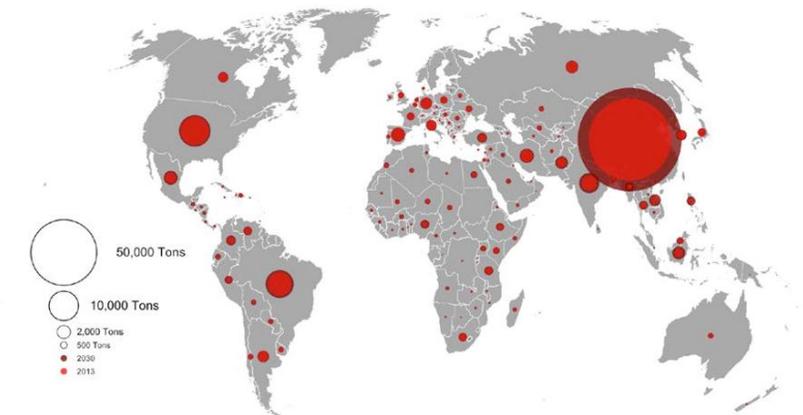
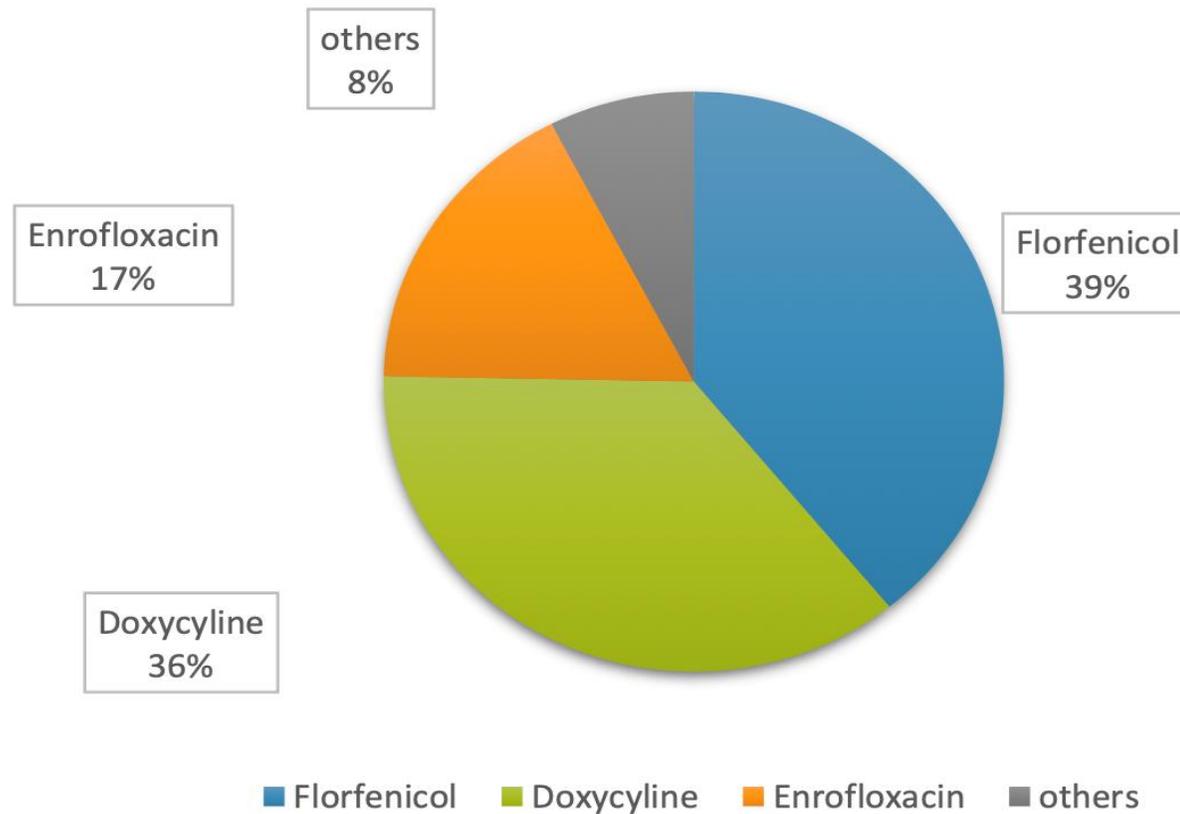
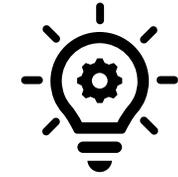
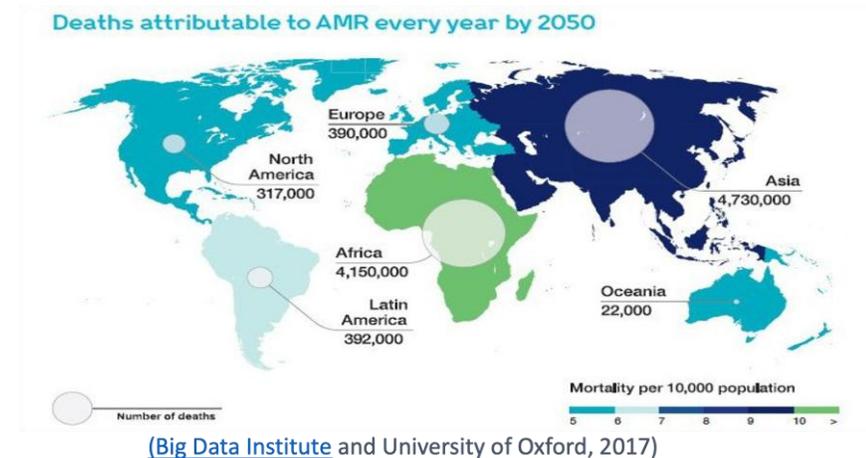


Fig. S9. Antimicrobial consumption for food animal production by country, in 2013 (light red) and projected for 2030 (dark red).

The total number of broiler chickens in 53 farms was 441,550. The total amount of antimicrobial consumption calculated in active ingredients (AI) was 149,402,974 mg. Each animal received 341.61 mg of antimicrobial agent in average



Authorized route

Pharmaceutical companies/distributors in other countries (ex. Thailand, Vietnam, China, Germany etc)

Laos borders : veterinary ABO from Thailand, Vietnam, China

Legal-company importing

Drug retailers or agriculture shop

PLFO/DLFO (governor)

Private company (feed / contract companies)

Human pharmaceutical manufacturer

Pharmacies

Farms (Individual / Contract)

Unauthorized route

Drug retailers or agriculture shop

Middle man (drug sale person)

Illegal importing

Laos borders : Veterinary ABO from Thailand, Vietnam, China

Pharmaceutical companies/distributors in other countries (ex. Thailand, Vietnam, China, Germany etc)

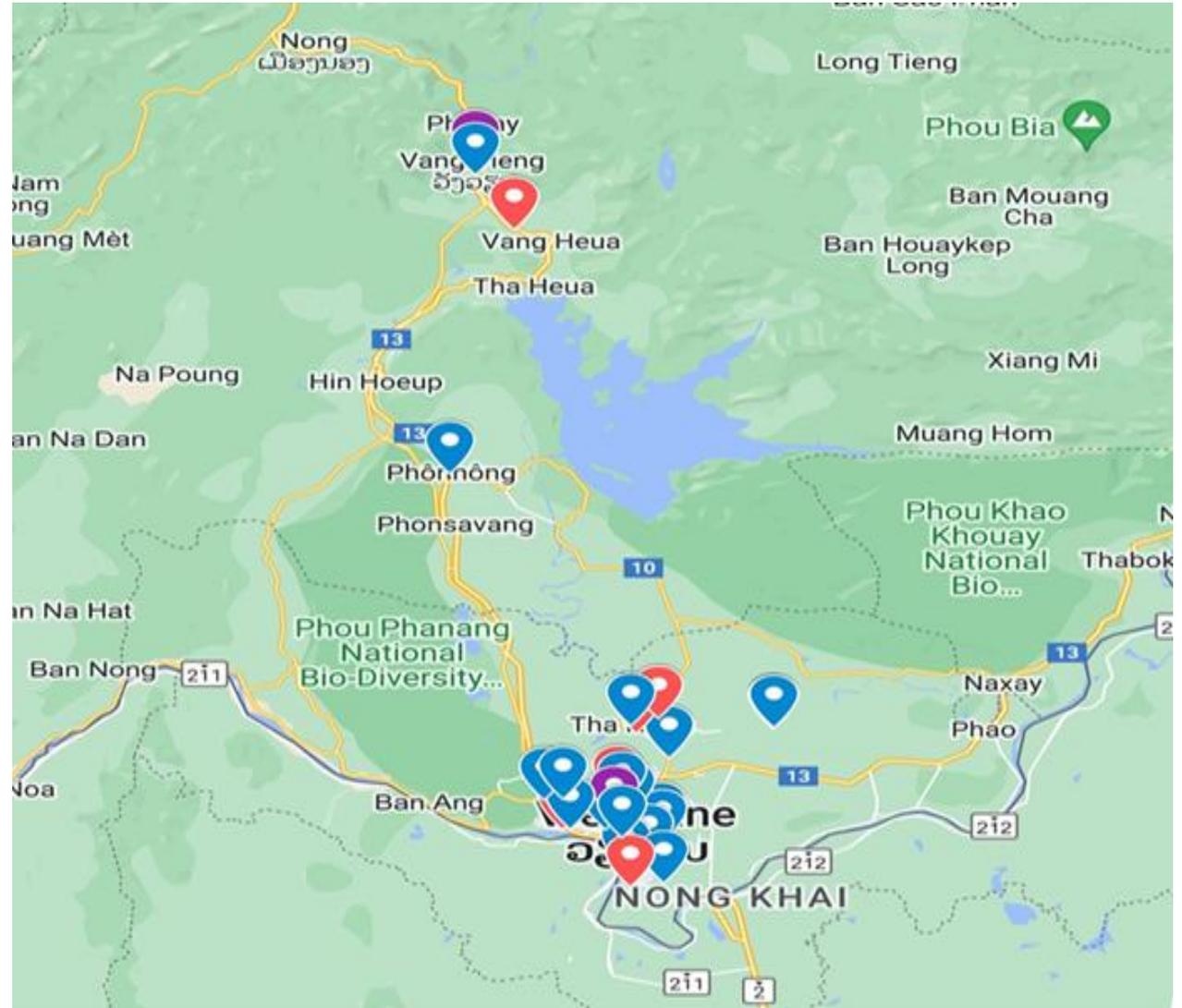


AMR information from preliminary researches

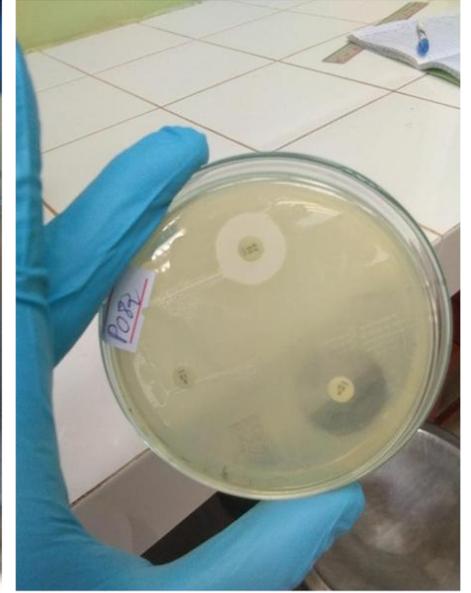
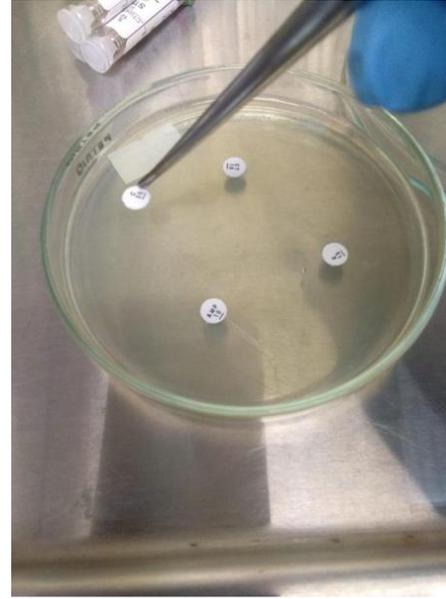
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Locations

- 7 districts in Vientiane capital:
Xaythany, Hatxaifong, Chanthabouly, Sysattanak, Xaysetha, Nasaythong and Sikhotabong,
- and 3 districts in Vientiane province such as Phonhong, Viengkham and ended at Vungvieng districts







Positive samples

Province	District	Sample	Samples	Salmonella spp.		E. coli	
				Positive	%	Positive	%
Vientiane Capital	Xaythany	Pig	32	0	0	27	84.37
		Poultry	34	0	0	29	85.29
		Fish	12	1	8.33	9	75
	Hatxaifong	Pig	33	1	3.03	24	72.72
		Poultry	24	0	0	20	86.95
		Fish	10	0	0	4	40
	Nasaythong	Pig	35	2	5.71	26	74.28
		Poultry	24	1	4.16	16	66.66
		Fish	5	0	0	3	60
	Sikhotabong	Pig	19	2	10.5	12	63.15
		Poultry	76	5	6.57	57	75
		Fish	35	0	0	24	68.57
	Chanthabouly	Pig	14	1	7.14	11	78.57
		Poultry	33	2	6.06	25	75.75
		Fish	19	1	5.26	11	57.9
	Sysattanak	Pig	0	0	0	0	0
		Poultry	42	0	0	31	73.8
		Fish	22	0	0	17	77.27
	Xaysetha	Pig	0	0	0	0	0
		Poultry	27	1	3.7	23	85.18
Fish		24	0	0	23	95.83	
Sub total			520	17	3.27	392	75.38
Vientiane province	Viengkham	Pig	38	0	0	25	65.78
		Poultry	12	0	0	8	66.66
		Fish	19	1	5.2	12	63.15
	Vungvieng	Pig	21	4	0	9	45
		Poultry	13	1	0	7	53.84
		Fish	12	0	0	7	63.63
	Phonhong	Pig	20	2	10	8	42.1
		Poultry	24	0	0	19	86.36
		Fish	11	2	18.18	9	81.81
Subtotal			170	10	5.88	104	61.18
Total			690	27	3.91	496	71.88

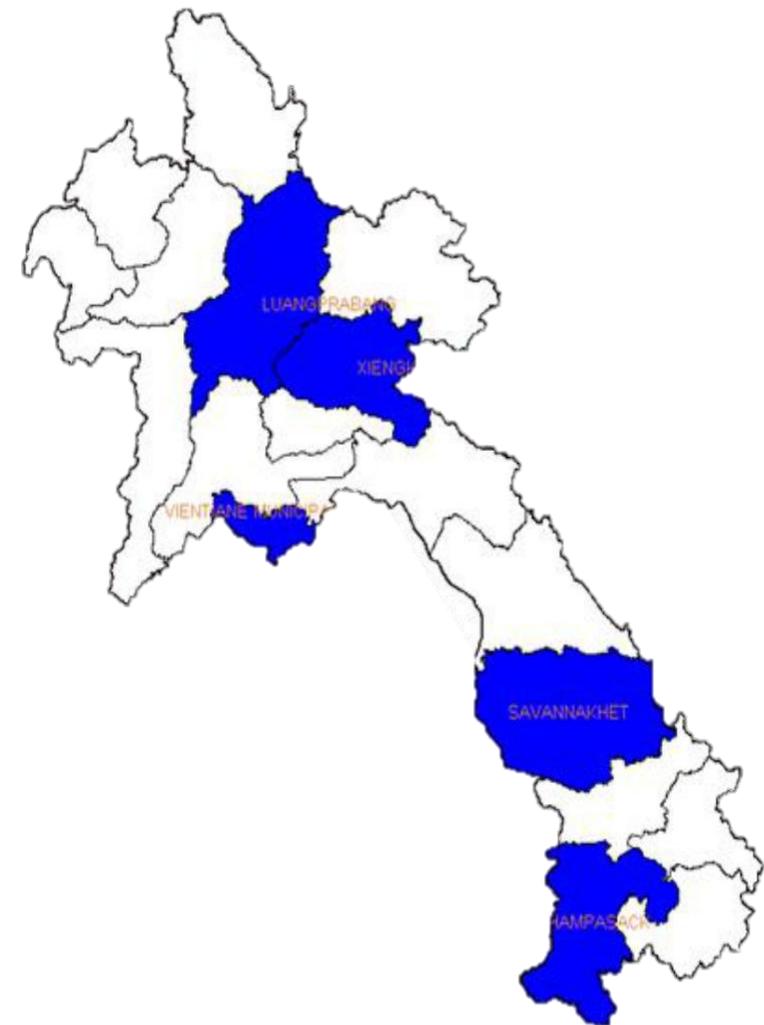
Prevalence of *Salmonella* spp. and *E. coli* were 6.5% and 51.8% respectively in the East Coast of Peninsular, Malaysia from 2018–2019 (Ibrahim *et al.*, 2021)

AMR results

Agents	Susceptible		Intermediate		Resistant	
	<i>E. coli</i>	<i>Salmonella</i>	<i>E. coli</i>	<i>Salmonella</i>	<i>E. coli</i>	<i>Salmonella</i>
Ampicillin (AMP)	10.7	18.5	1.2	11.1	88.1	70.4
Chloramphenicol (C)	31.3	44.4	9.3	0	59.5	55.6
Cephalothin (CL)	3.2	44.4	48	25.9	48.8	29.7
Colistin sulphate (CT)	1.4	3.7	58.3	77.8	40.3	18.5
Erythromycin (E)	0.6	0	1	0	98.4	100
Kanamycin (K)	69	88.9	6.7	0	24.4	11.1
Streptomycin (S)	21.2	62.7	9.9	3.7	69	33.3

Report from Ibrahim *et al.*, (2021) found 100% *Salmonella* and *E. coli* resistance towards erythromycin in poultry production farms in Malaysia.

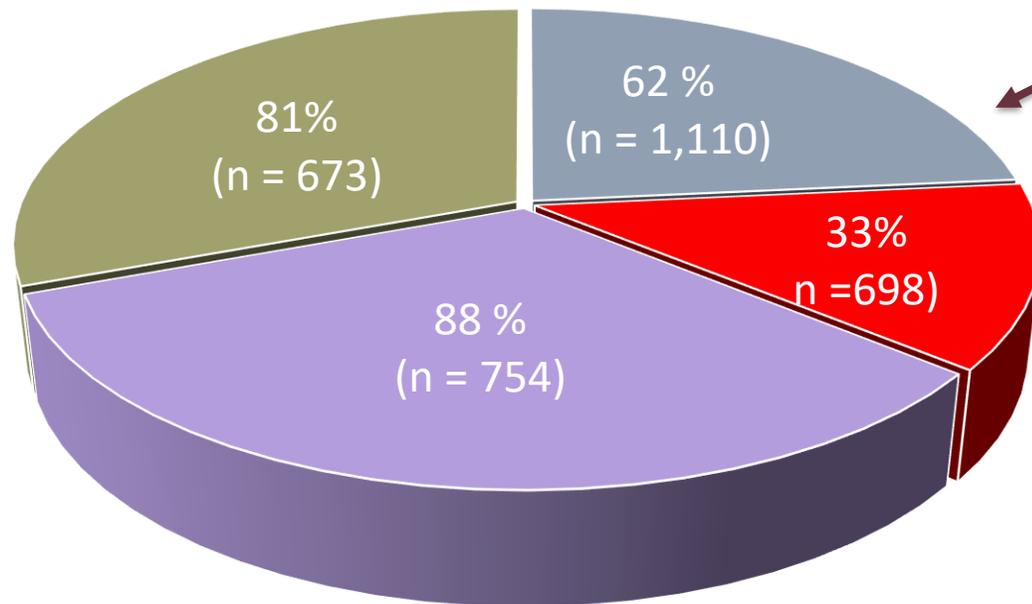
AMR surveillance in animal sector (DLF)



- In 2018-2019 conducted AMR surveillance of *E.coli* and *Salmonella spp* in Pigs at 3 provinces: VTE, SVN, CPS (772 samples)
- In 2020-2021 conducted AMR surveillance of *E.coli* and *Salmonella spp* in Pigs and chicken at 3 provinces: VTE, SVN, CPS (387 pig sample and 2,479 chicken samples)
- In 2022-2023 conducted conducted AMR surveillance of Enterococcus Campylobacter at 5 provinces: XK, LPB, VTE, SVN, CPS (684 pig samples)
- Researched on ESBL (extended spectrum beta-lactamase) of *E.coli* and *Salmonella spp.* from the previous AMR bacteria

The initial data from the preliminary AMR surveillance of *E. coli* and *Salmonella spp.* In pigs and chickens during 2018-2021

% positive isolate (N = 3,235)



- *Escherichia coli* in chickens
- *Salmonella spp.* in chickens
- *Escherichia coli* in pig
- *Salmonella spp.* in Pigs

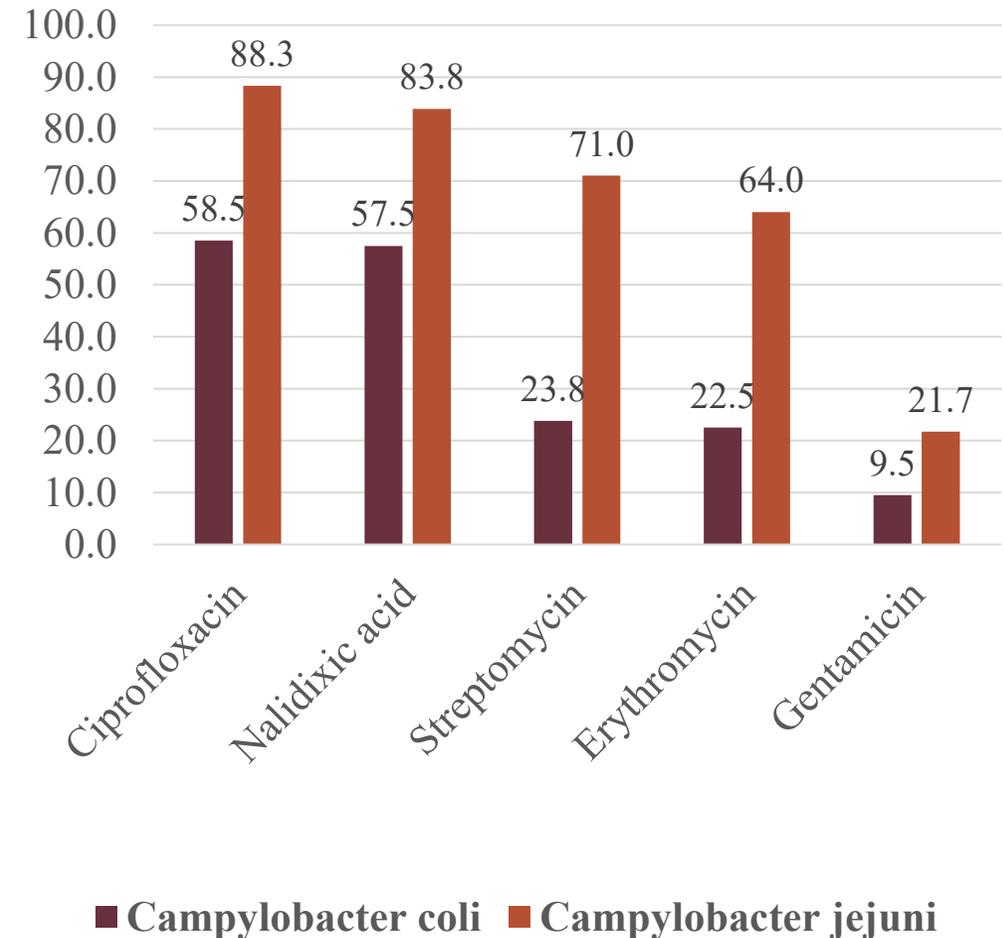
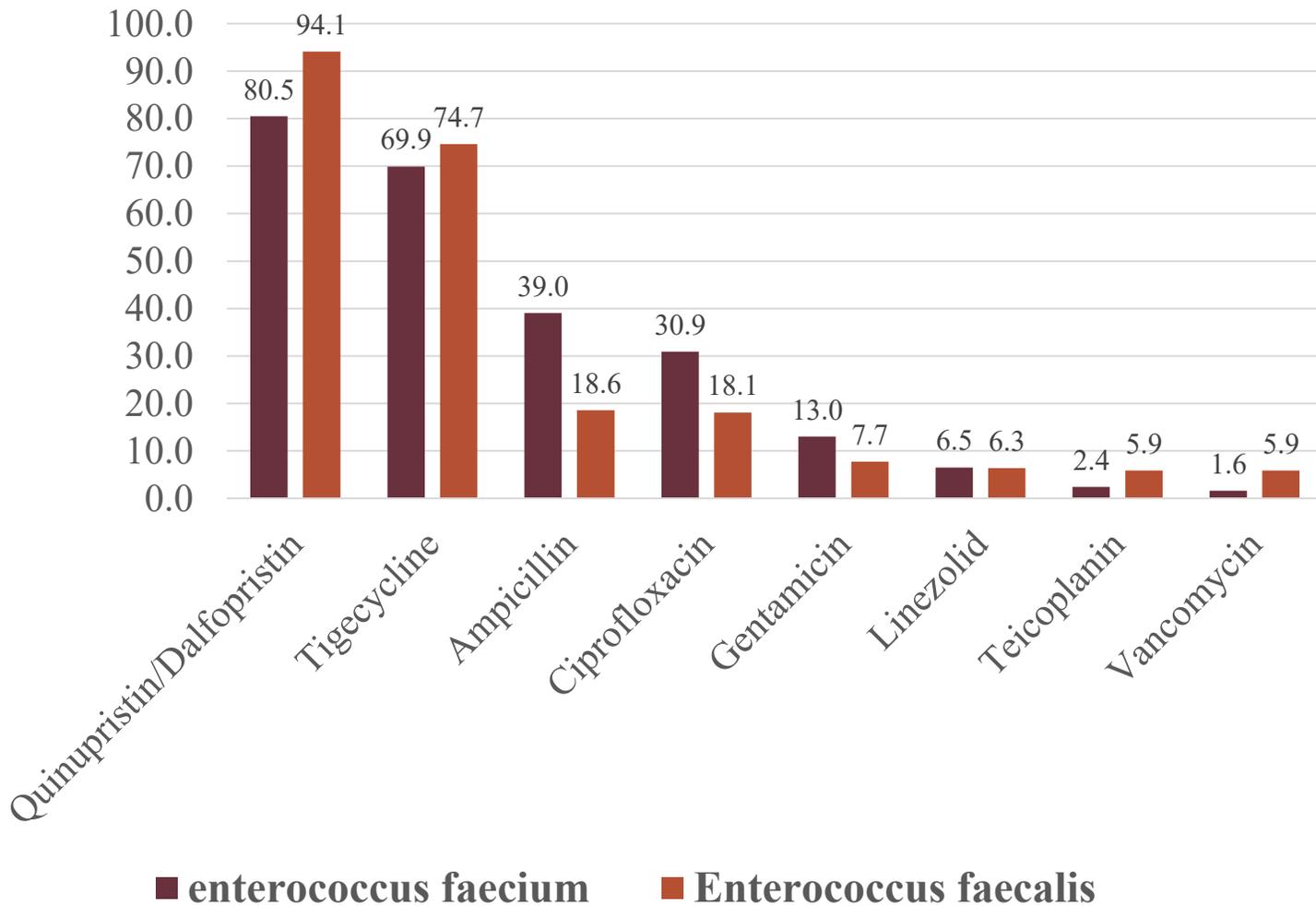
❖ Isolation:

- 1,371 *Salmonella spp.*
- 1,864 *E. coli*

❖ Remarkable: AMR surveillance in animal samples found that *Salmonella spp.* has been challenging for health sector:

- cefotaxime/ceftazidime,
- ciprofloxacin
- colistin

Initial data from AMR surveillance of some bacteria during 2022-2023



One health village model at Vientiane capital

ONE HEALTH FIELD SITE MODEL AT HATVIENKHAM, XAYTHANY DISTRICT, VIENTIANE CAPITAL



VANNAPHONE PUTTHANA
FACULTY OF AGRICULTURE, NUOL



One Health village model at Luang Prabang



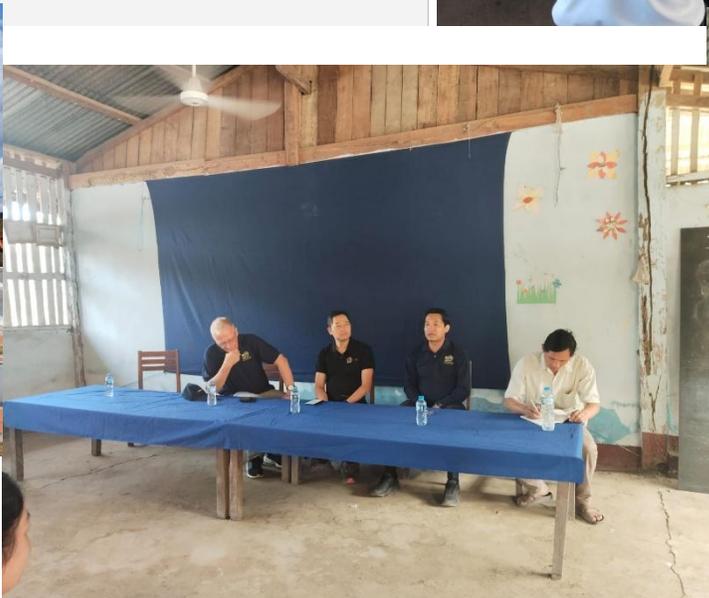
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ຫົວຂໍ້: ການຝຶກອົບຮົມວິທີການນຳໃຊ້ຢາສຳລັບສັດ ແລະ ການຕ້ານຕໍ່ຢາຕ້ານເຊື້ອ
ວັນທີ 9 – 11 ມີນາ 2026

One Health Village Model Campaign at Hat Khor Village, Pak-Ou District
Luang Prabang Province

Topic: Training on Antimicrobial Use in Animals and Antimicrobial Resistance (AMR)
Date: 9 – 11 March 2026

ສະໜັບສະໜູນໂດຍ: ແຜນງານ ASEAN-CGIAR Innovate for Food and Nutrition Security



World antimicrobial resistance awareness week in Lao PDR 16.11.2024



World antimicrobial resistance awareness week in Lao PDR 18.11.2025



ສະແດງຄວາມຂອບໃຈ





ສະແດງຄວາມຂອບໃຈ



Acknowledgement

Department of Livestock and Fishery (DLF)
Department of Disease control (DDC)
FAO Laos



LOMWRU.



Let's work together to building the next generation of OHW



ຂອບໃຈ/Thank you