Food and Agriculture Organization of the United Nations

FMM/RAS/298: Strengthening capacities, policies and national action plans on prudent and responsible use of antimicrobials in fisheries Final Workshop in cooperation with AVA Singapore and INFOFISH

12-14 December, Concorde Hotel, Singapore

# VIETNAM: Development of National Action Plan on AMR

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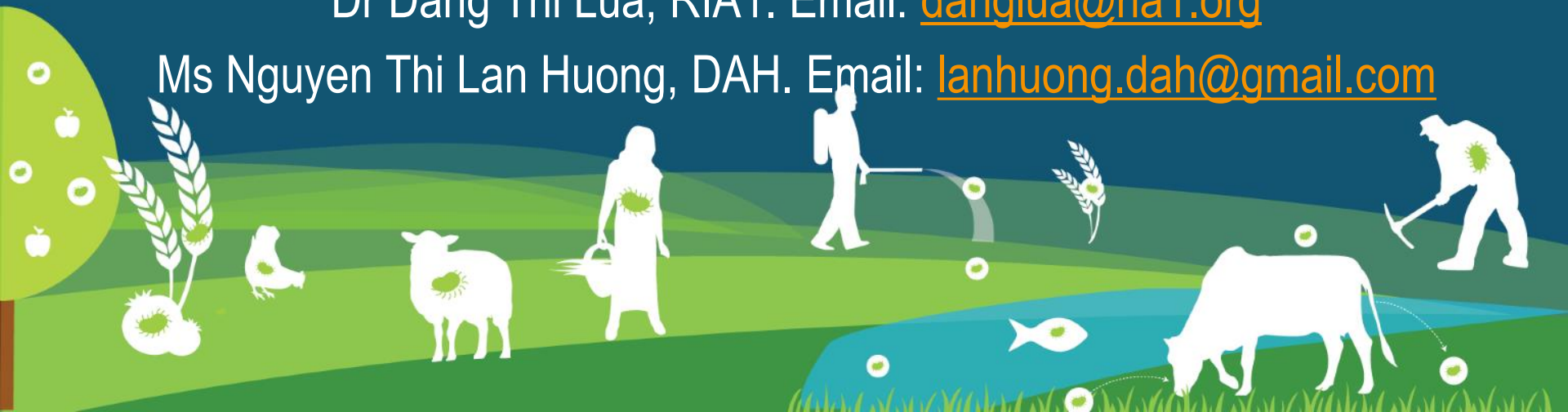

# PRESENTATION OUTLINE

I. Status of the National Action Plan (NAP)
II. Progress of Aquaculture Component of the NAP
III. Result of AMU & AMR survey under FAO project
IV. Recommendation

# I. NAP under One Health approach

- Issued Decision No.2174/QĐ-BYT dated 21/6/2013 on "National Action Plan on Drug Resistance 2013-2020" (leading by Ministry of Health (MoH), strongly involved by MARD).
- Main objective: improvement of the people's health care through preventing and controlling drug resistance, raising the quality and effectiveness of medical examination.

# I. NAP under One Health approach (6 activities)

- Raising awareness of community and health staff about drug resistance.
- Strengthening and improving the capacity of the national surveillance system on AMU and AMR.
- Ensure the supply of essential drugs of high quality.
- Promoting the safe, prudent and responsible use of drugs.
- Strengthening the control of the infection.
- Strengthening the prudent and responsible use of antibiotics in crop, livestock production and aquaculture

# I. NAP under One Health approach (have done)

Established National Committee for AMU & AMR

- Leading by Deputy Prime Minister
- 32 members from relevant ministries

# I. NAP under One Health approach (have done)

- Organized communication activity/meeting on AMU & AMR in November, every year since 2013.
- Developed regulations and technical guidance on clinical pharmacological activity, drug use in treatment; drug description …
- Standardized professional materials/protocols related to diagnostics and treatment with antibiotics…

# I. NAP under One Health approach (have done)

- Implemented the Aide Memoire on ‘Multi-stakeholder Engagement to combat AMR in Vietnam’ (leading by DAH (MARD) and Drug Administration of Vietnam (MoH)).
- Increased awareness of AMU and the risks of AMR.
- MARD issued Decision No. 2625/QĐ-BNN-TY dated 21/6/2017 on “NAP for controlling AMU & AMR in livestock production and aquaculture (2017-2020)”.

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# II. Progress of Aquaculture component

- MARD issued Decision No. 2625/QĐ-BNN-TY dated 21/6/2017 on "NAP for controlling AMU & AMR in livestock production and aquaculture (2017-2020)".
- Overall objective:

Mitigate the risk of antibiotic resistance in public health through controlling the antibiotic usage in livestock production and aquaculture in Vietnam.

# Main Activities of NAP in Livestock and Aquaculture

- Strengthen/consolidate the state management of AMU & AMR.
- Improve the legal basis for AMU and AMR management.
- Enforce the regulations and technical guidelines in place.
- Increase awareness of AMU and the risks of AMR.
- Implement good treatment and husbandry practices in livestock feed manufacturing and livestock production and aquaculture.
- Monitor AMU, AMR and antibiotic residues;
- Strengthen inter-sectoral collaboration in AMR management.

# II. Progress of Aquaculture component

## 1. Governance

MARD established National Steering Committee for Prevention and Control of Aquatic Animal Disease, AMU and AMR in aquaculture.

# II. Progress of Aquaculture component

## 1. Governance (cont.)

- MARD issued 11 Circulars on disease control, AMU and AMR; more than 20 official letters to direct and enforce controlling AMU, AMR.
- New Veterinary Law has been effective since 01/7/ 2016.
- Amended Fisheries Law passed by the National Assembly on 21st Nov 2017.
- New Degree 39/2017/ND-CP dated 4/4/2017 on animal feeds without addition of antibiotics from 2020.

# II. Progress of Aquaculture component

## 1. Governance (cont.)

- Organized a number of workshops/meetings between government agencies, companies, associations on AMU and AMR to identify current problems, gaps and difficulties in the control of AMU and AMR.
- Inspected all importers (28 companies) for veterinary medicine products and raw materials, especial for raw antibiotics to identify how did they import, use and sell antibiotic products and raw materials of antibiotics.

# II. Progress of Aquaculture component

## 1. Governance (cont.)

- Inspected veterinary drug shops to check whether they sell the registered antibiotic products and all shops are not allowed to sell antibiotic raw materials directly to farmers.

# II. Progress of Aquaculture component

## 2. Awareness

- DAH established collaborative program with VTV1, VTV16, newspapers to develop mass media program on AMU and AMR.
- Conducted communication campaigns to increase AMR awareness.

# II. Progress of Aquaculture component

## 2. Awareness (cont.)

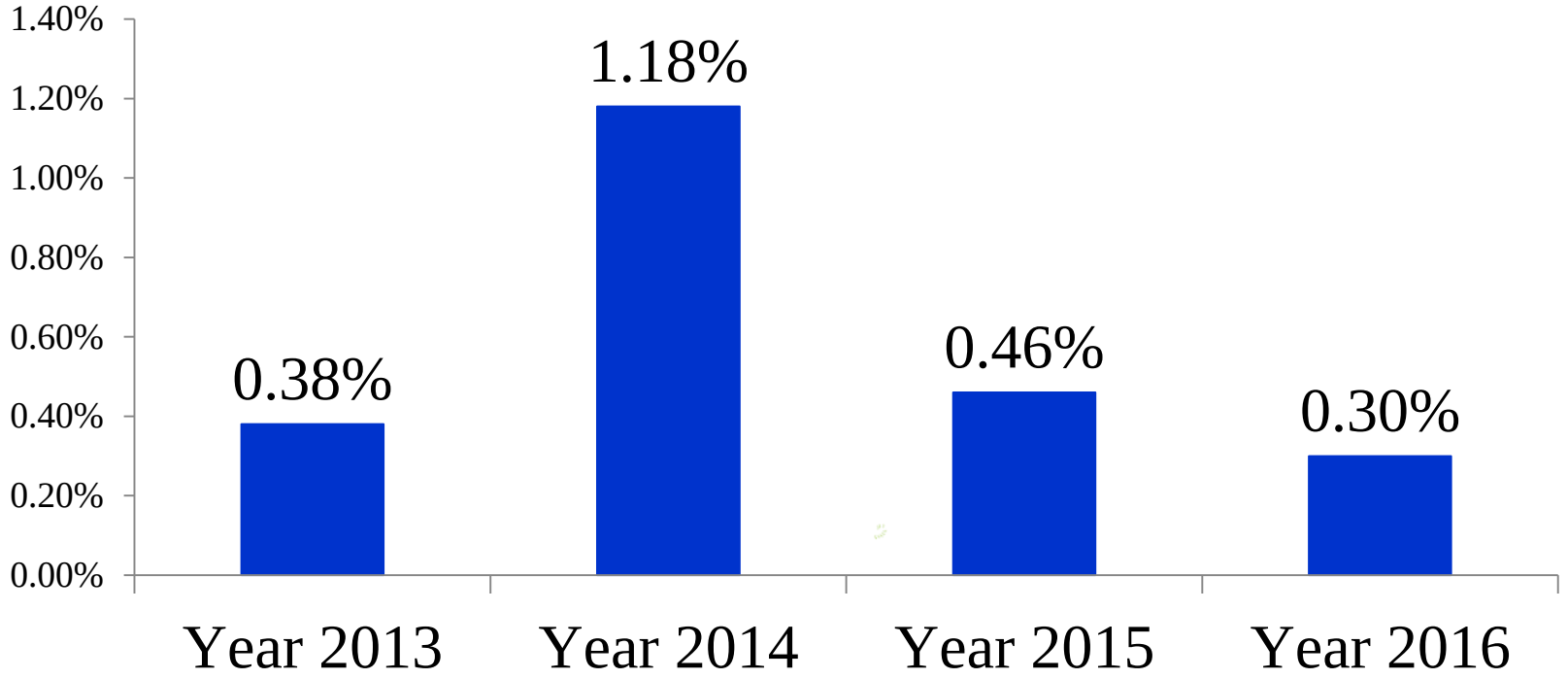
- Guided the surveyed farmers on proper AMU and conveyed key message on AMR during the surveys of AMU & AMR in shrimp, pangasius, tilapia and traditional fish aquaculture.
- Participated in national, regional and international workshops/meetings on AMU and AMR to share and improve the awareness (such as participated in this FAO project).

# II. Progress of Aquaculture component

## 3. Evidence

- Carried out the national programme on monitoring chemical/antibiotic residues on aquatic animals every year.
  - Monitored species: shrimp, pangasius, tilapia, climbing perch, crab, snaked-head carp.
  - Monitored parameters: antibiotics, pesticides/chemicals residues.

# Proportion (%) of shrimp products that were positive with one of any listed antibiotics




| Year | Year 2013 | Year 2014 | Year 2015 | Year 2016 |
|---|---|---|---|---|
| Number of positive /tested samples | 09/2365 | 25/2104 | 08/1751 | 06/1692 |

# II. Progress of Aquaculture component

## 3. Evidence (cont.)

- During 2013-2014, conducted the pilot surveillance for AMR in catfish aquaculture, sponsored by WHO
  - Sampling at 75 catfish ponds belonging to 6 big catfish farms;
  - Focusing AMR in enteric bacteria (*E. coli* and *Salmonella* sp.) and aquatic bacteria (*Aeromonas* spp. and *Vibrio* spp) isolated from pond water, suply water, pond sediment and catfish.

# II. Progress of Aquaculture component

## 3. Evidence (cont.)

- During 2015-2016, carried out 03 surveys on AMU of 714 aquaculture farming households, including:
  - 3 pangasius production provinces (Ben Tre, Dong Thap, and An Giang).
  - 2 shrimp production provinces (Soc Trang, Bac Lieu).
  - These surveys were funded by the government.

# II. Progress of Aquaculture component

## 3. Evidence (cont.)

During this year 2017, carried out 2 surveys:

- The survey of AMU & AMR on tilapia and traditional fish fish in Hai Duong province (sponsored by this FAO project).
- The survey on the use of antibiotics along the whole value chain of pangasius catfish aquaculture (from hatchery, grow-out and post-harvest) (sponsored by FAO/NACA project).

# II. Progress of Aquaculture component

## 4. Best practice

- National programme for prevention and control of disease in Pangasius between 2015 and 2020 (Decision 4995/QD-BNN-TY dated 20/11/2014).
- National programme for establishment of disease free compartments and zones for shrimp production (Decision 4088/QD-BNN-TY dated 01/10/2016).

# II. Progress of Aquaculture component

## 4. Best practice (cont.)

- National programme for active surveillance of diseases in shrimp and pangasius to be exported between 2017 – 2020 (Decision 1038/QD-BNN-TY dated 29/3/2017).
- Annually, both National and Local government issues the National and Local action plan for aquatic animal disease control.

# II. Progress of Aquaculture component

## 4. Best practice (cont.)

- Improved aquaculture practices in shrimp, pangasius, tilapia and others: VietGAP, GlobalGAP…
- Organized training activities on good antibiotic use principles in aquaculture.
- Encouraged research and evaluation of alternative treatment measures to AMU (probiotic products, herbal/plan extract products).

# II. Progress of Aquaculture component

## 5. Plans for 2018

- Develop a national AMU surveillance program on aquaculture, focusing on shrimp, pangasius catfish and tilapia.
- Conduct inspection of relevant stakeholders involved in the sales or use of antibiotics in livestock and aquaculture, from importer, down to the farm level.
- Review and develop legal documents on managing and monitoring the use and import of antibiotics.

# II. Progress of Aquaculture component

## 5. Plans for 2018 (cont.)

- Develop communication kit (including leaflets, posters...on AMU/ AMR) to increase awareness on AMR and AMU
- Disseminate the IEC (information, education and communication) materials.
- Conduct communication campaigns to increase AMR awareness for livestock and aquaculture farmers and the general public.

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# III. AMU & AMR survey in Hai Duong province

## 1. OBJECTIVE:

To assess current status of AMU and AMR in tilapia and traditional fish in Hai Duong province.

## 2. ACTIVITIES:

- To investigate status of culture, disease and AMU for freshwater fish production in selected districts
- Collect samples for isolating pathogens (*Streptococcus* spp. and *Aeromonas* spp.) and testing for AMR.

**On – going works for Data analysis**

# III. 1. AMU survey in Hai Duong province

- **Survey method**
  - Training for field investigators before implementing survey
  - Applying face-to-face interview through the questionnaires
- **Data analysis**
  - Descriptive analyses are carried to summarize the main features and identify variables for statistical analyses.
  - Multivariate analyses were carried out to determinate the odd ratios of AMU and associated factors.

# Result of AMU survey in Hai Duong province

## 1. Baseline information

| No. | Category | Number of households | Proportion of total number of household |
|---|---|---|---|
| 1 | Gender | **60** | |
| | Male | 47 | 78.3 |
| | Female | 13 | 27.7 |
| 2 | Year of starting production | 60 | |
| | Oldest | 1988 | |
| | Newest | 2016 | |
| 3 | Participated in training courses on disease control | 60 | |
| | **Yes** | **47** | **78.3** |
| | No | 13 | 21.7 |
| 4 | Participated in training courses on use of antibiotics | 60 | |
| | **Yes** | **43** | **71.7** |
| | No | 17 | 28.3 |

# 1. Baseline information (cont.)

| No. | Category | Number of households | Proportion of total number of household |
|---|---|---|---|
| 5 | Survival rate of fish at the harvest time | 60 | |
| | **No information** | **38** | **63.3** |
| | 40 | 2 | 3.3 |
| | 50 | 1 | 1.7 |
| | 60 | 2 | 3.3 |
| | 70 | 1 | 1.7 |
| | **80** | **9** | **15.0** |
| | **90** | **8** | **13.3** |
| | 95 | 3 | 5.0 |
| | 98 | 2 | 3.3 |
| 6 | Detection of diseased fish during production period | 60 | |
| | **Yes** | **57** | **95.0** |
| | No | 3 | 5.0 |
| | Unknown | 0 | 0.0 |

## 2. Knowledge on using antibiotics

| No. | Category | Number of households | Proportion of total number of household |
|---|---|---|---|
| 1 | Antibiotics can be used for viral diseases | 60 | |
| | **Yes** | **8** | **13.3** |
| | No | 32 | 53.3 |
| | Unknown | 20 | 33.3 |
| 2 | Antibiotics can be used for bacteria diseases | 60 | |
| | Yes | 46 | 76.7 |
| | No | 2 | 3.3 |
| | Unknown | 12 | 20.0 |
| 3 | Antibiotics can be used for growth promotion | 60 | |
| | **Yes** | **10** | **16.7** |
| | No | 39 | 65.0 |
| | Unknown | 11 | 18.3 |

# 3. Practice of using antibiotics at fish farms

| No. | Category | Number of households | Proportion of total number of household |
|---|---|---|---|
| 1 | Households used antibiotics | 60 | |
| | **Yes** | **55** | **91.7** |
| | No | 5 | 8.3 |
| | Unknown | | 0.0 |
| 2 | Purpose of using antibiotics | 60 | |
| | Treatment | 37 | 61.7 |
| | Prevention | 2 | 3.3 |
| | Both treatment and prevention | 17 | 28.3 |
| 3 | Known about antibiotics used | 60 | |
| | Yes | 31 | 51.7 |
| | Do not know/No information available | 29 | 48.3 |

# 3. Practice of using antibiotics at fish farms (cont.)

| No. | Category | Number of households | Proportion of total number of household |
|---|---|---|---|
| 4 | Number of times using antibiotics per year for prevention | 60 | |
| | No information | 45 | 75.0 |
| | 1 | 2 | 3.3 |
| | 2 | 3 | 5.0 |
| | 3 | 7 | 11.7 |
| | 4 | 3 | 5.0 |
| 5 | Duration for using antibiotic (days) | 60 | |
| | **Average** | **3.5** | |
| | Min | 1 | |
| | Max | 6 | |
| 6 | Testing for antibiotic diffusion | 60 | |
| | Yes | 1 | 1.7 |
| | **No** | **54** | **90.0** |
| | Unknown | 5 | 8.3 |

# 3. Practice of using antibiotics at fish farms (cont.)

| No. | Category | Number of households | Proportion of total number of household |
|---|---|---|---|
| 7 | Length of using antibiotics for treatment | 60 | |
| | No information | 5 | 8.33 |
| | Up to fishes are fully recovered | 1 | 1.67 |
| | 3-5 days | 10 | 16.67 |
| | 5 - days | 7 | 11.67 |
| | **Manufacture's instruction** | **37** | **61.67** |
| | Other | 0 | 0.00 |
| 8 | Source of antibiotics | 60 | |
| | No information | 5 | 8.33 |
| | **Vet shop** | **47** | **78.33** |
| | Medical drug shop | 1 | 1.67 |
| | Both vet and medical drug shop | 7 | 11.67 |
| 9 | Reasons to buy antibiotics from medical drug shop | 60 | |
| | No information | 49 | 81.7 |
| | **Cheaper** | **7** | **11.7** |
| | More effective | 2 | 3.3 |
| | Easy to buy | 1 | 1.7 |

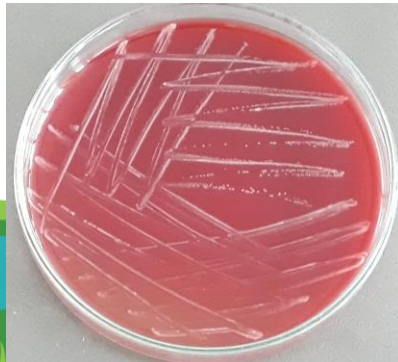
# 3. Practice of using antibiotics at fish farms (cont.)

| No. | Category | Number of households | Proportion of total number of household |
|---|---|---|---|
| 10 | Who provided instruction of using antibiotics ? | 60 | |
| | No information | 9 | 15.0 |
| | **Drug seller** | **23** | **38.3** |
| | Drug seller and manufacture | 2 | 3.3 |
| | **Manufactures** | **20** | **33.3** |
| | Manufactures and self experience | 6 | 10.0 |
| 11 | How did farmer use antibiotics | 60 | |
| | No information | 5 | 8.3 |
| | Directly used for fish | 0 | 0.0 |
| | **Mixed with feed** | **55** | **91.7** |
| | Other | 0 | 0.0 |

# Result of Status of AMR in tilapia and traditional fish aquaculture

# 1. Isolation and Identification of bacterial pathogen from tilapia and traditional fish

- A total of 177 bacterial samples were collected from kidneys, livers and brains of tilapia and traditional fish (common carp, grass carp, climbing perch…) derived from 60 fish farms in Hai Duong province.
- Only 6 *Aeromonas hydrophila* strains and 2 *Streptococcus* spp. (*Streptococcus* sp. and *S. agalactiae*) strains were identified.



# 1. Isolation and Identification of bacterial pathogen from tilapia and traditional fish

Why?

- Most of sampled fish were normal, few were diseased fish (climbing perch, grass carp).
- Farmers used probiotics/antibiotics during culture.

# 2. Antibiotic susceptibility testing

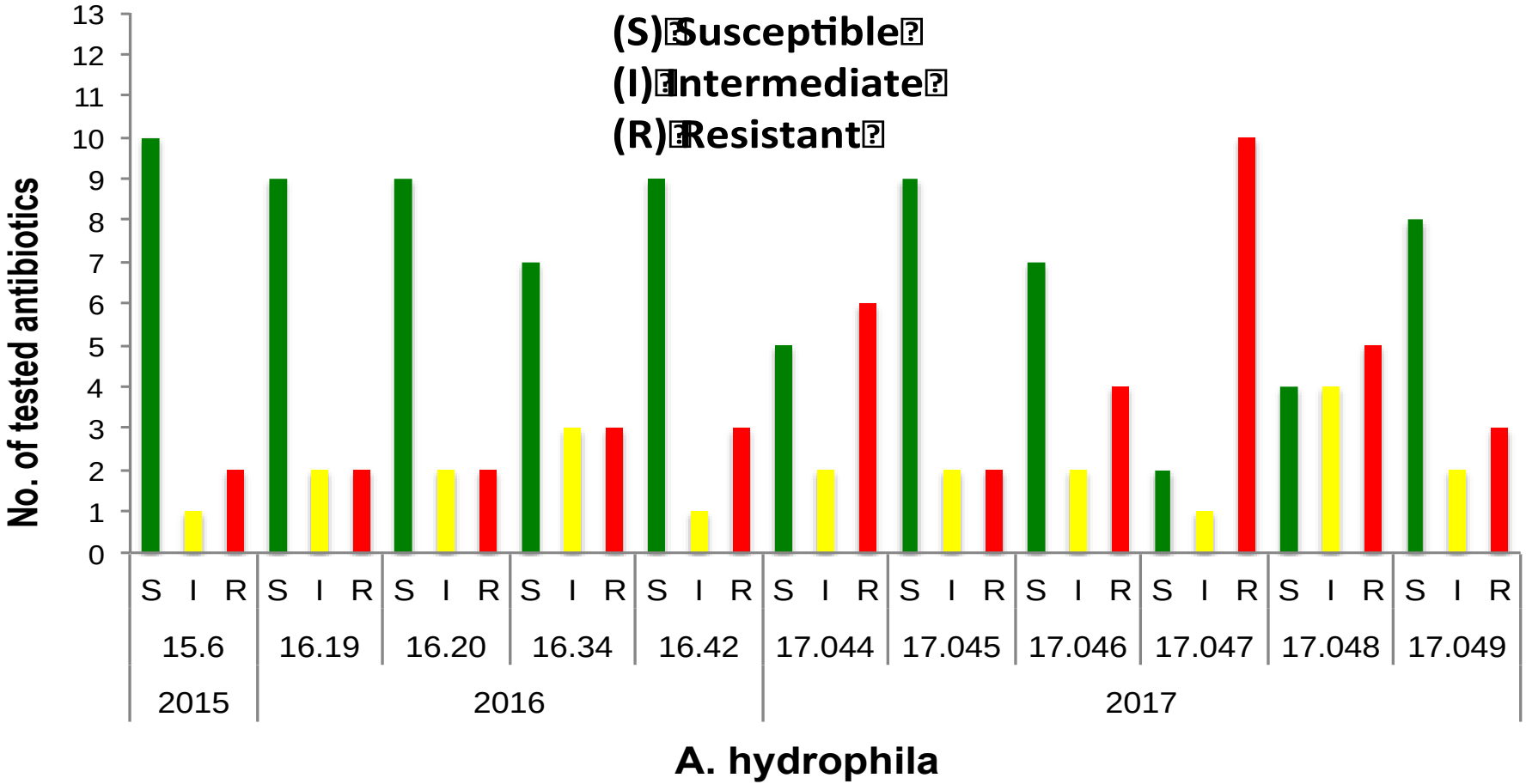
| No | Antibiotic | Disk content | No | Antibiotic | Disk content |
|---|---|---|---|---|---|
| 1 | Ampicillin | 10 µg | 8 | Chloramphenicol | 30 µg |
| 2 | Doxycycline | 30 µg | 9 | Ciprofloxacin | 5 µg |
| 3 | Novobiocin | 5 µg | 10 | Oxacilline | 1 µg |
| 4 | Neomycin | 30 µg | 11 | Erythromycin | 15 µg |
| 5 | Rifampicin | 30 µg | 12 | Streptomycin | 10 µg |
| 6 | Trimethoprim/Sulfamethoxazole | 1.25/23.75 | 13 | Tetracycline | 30 µg |
| 7 | Florphenicol | 30 µg | 14 | Vancomycin | 30 µg |

# 2. Antibiotic susceptibility testing

- 11 *A. hydorphila* & 7 *Streptococcus* spp. strains were tested
- Medium: Mueller-Hinton Agar (MHA)
- Reference bacterial strain: *E. coli* ATCC 25922
- Bacterial concentration: $10^8$ cfu/ml
- Temp. incubation: 29$^o$C
- CLSI breakpoint guidelines

| No | Antibiotics | Zone diameter (mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Streptococcus sp. HĐPT15.7 | | Streptococcus sp. N3-15 | | Streptococcus sp. CED16.30 | | Streptococcus sp. CED16.31 | | Streptococcus sp. CED17.042 | | Streptococcus agalactiae CED17.043 | |
| | | Repeat 1 | Repeat 2 | Repeat 1 | Repeat 2 | Repeat 1 | Repeat 2 | Repeat 1 | Repeat 2 | Repeat 1 | Repeat 2 | Repeat 1 | Repeat 2 |
| 1 | Ampicillin | 23 | 21 | 0 | 0 | 21 | 21 | 26 | 28 | 24 | 25 | 30 | 32 |
| 2 | Doxycycline | 30 | 28 | 25 | 27 | 25 | 25 | 30 | 29 | 26 | 25 | 28 | 30 |
| 3 | Novobiocin | 0 | 0 | 0 | 0 | 10 | 9 | 0 | 0 | 0 | 0 | 20 | 20 |
| 4 | Neomycin | 6 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | Rifampicin | 32 | 30 | 17 | 19 | 25 | 23 | 25 | 25 | 31 | 30 | 30 | 30 |
| 6 | Trimethoprim-sulfamethoxazole | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 17 | 19 | 20 |
| 7 | Florphenicol | 30 | 28 | 26 | 26 | 26 | 28 | 30 | 30 | 20 | 21 | 26 | 26 |
| 8 | Chloramphenicol | 30 | 30 | 24 | 25 | 23 | 25 | 28 | 26 | 32 | 30 | 31 | 30 |
| 9 | Ciprofloxacin | 21 | 23 | 20 | 18 | 22 | 24 | 25 | 23 | 22 | 20 | 23 | 21 |
| 10 | Oxacillin | 0 | 0 | 0 | 0 | 19 | 21 | 0 | 0 | 20 | 20 | 25 | 26 |
| 11 | Erythromycin | 24 | 22 | 19 | 17 | 25 | 25 | 27 | 29 | 30 | 28 | 22 | 24 |
| 12 | Streptomycin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | Tetracycline | 24 | 25 | 23 | 23 | 20 | 23 | 30 | 28 | 30 | 27 | 28 | 27 |
| 14 | Vancomycin | 22 | 23 | 24 | 24 | 20 | 20 | 19 | 21 | 21 | 23 | 22 | 24 |

# 2. Antibiotic susceptibility testing



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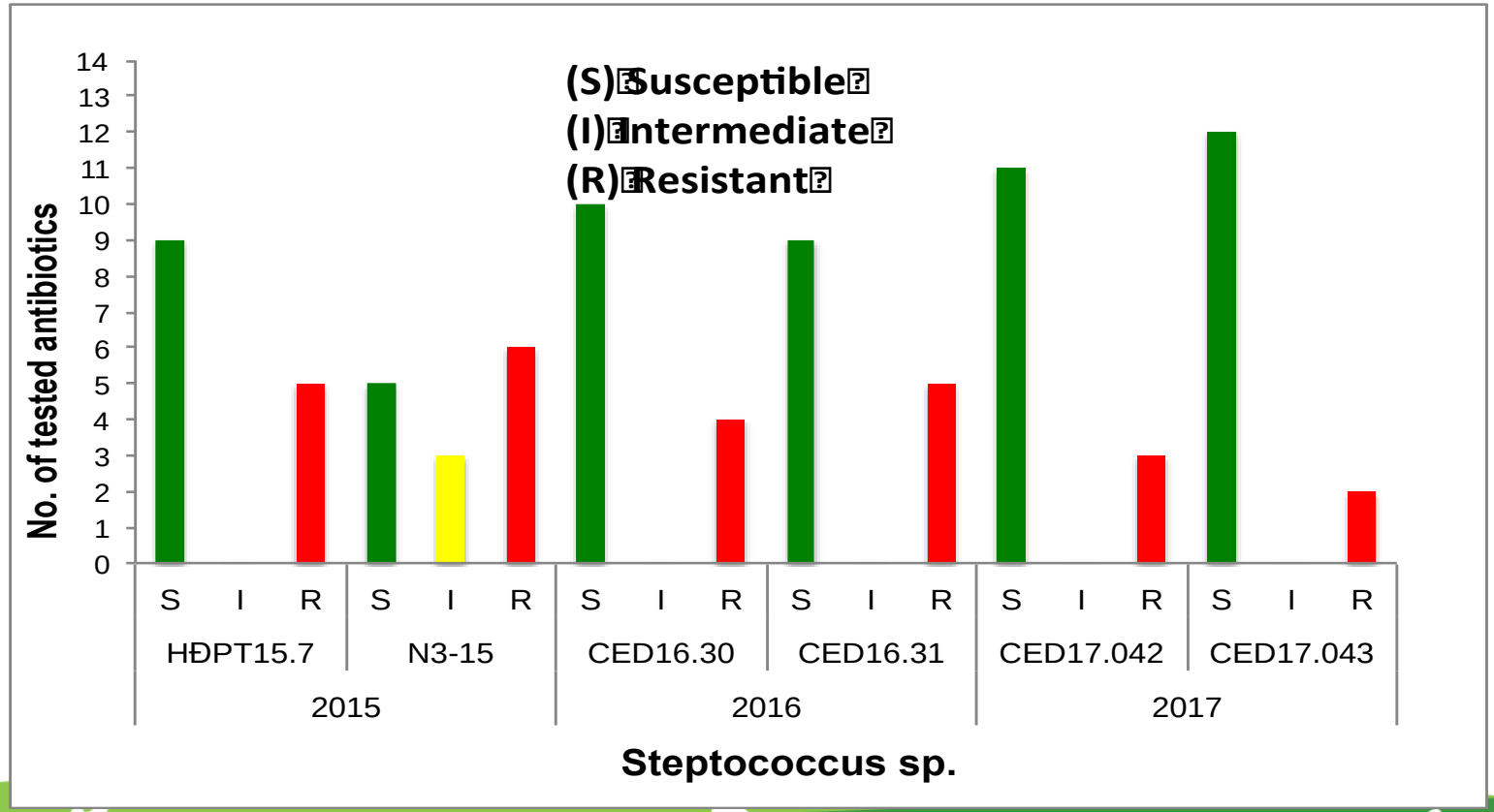

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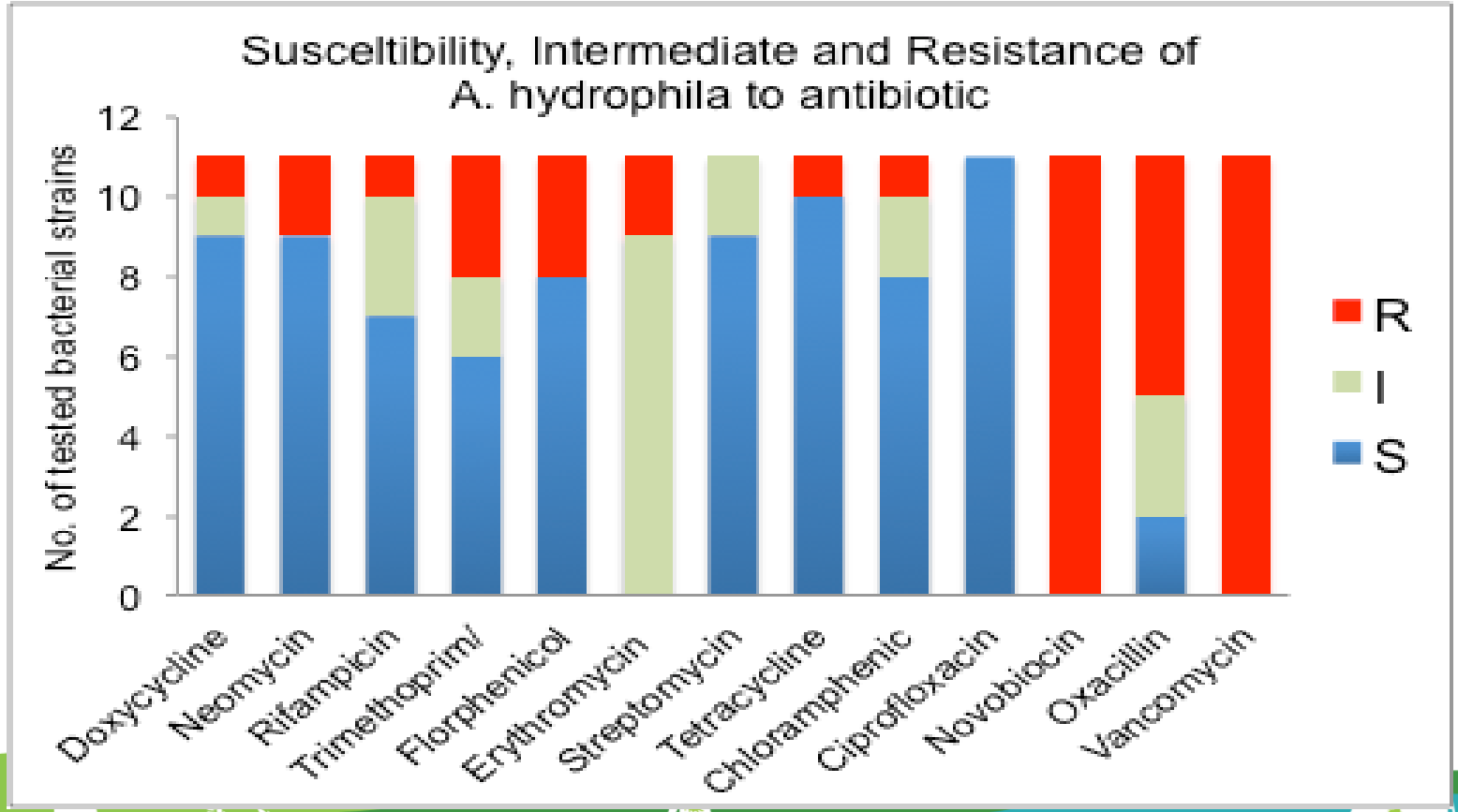

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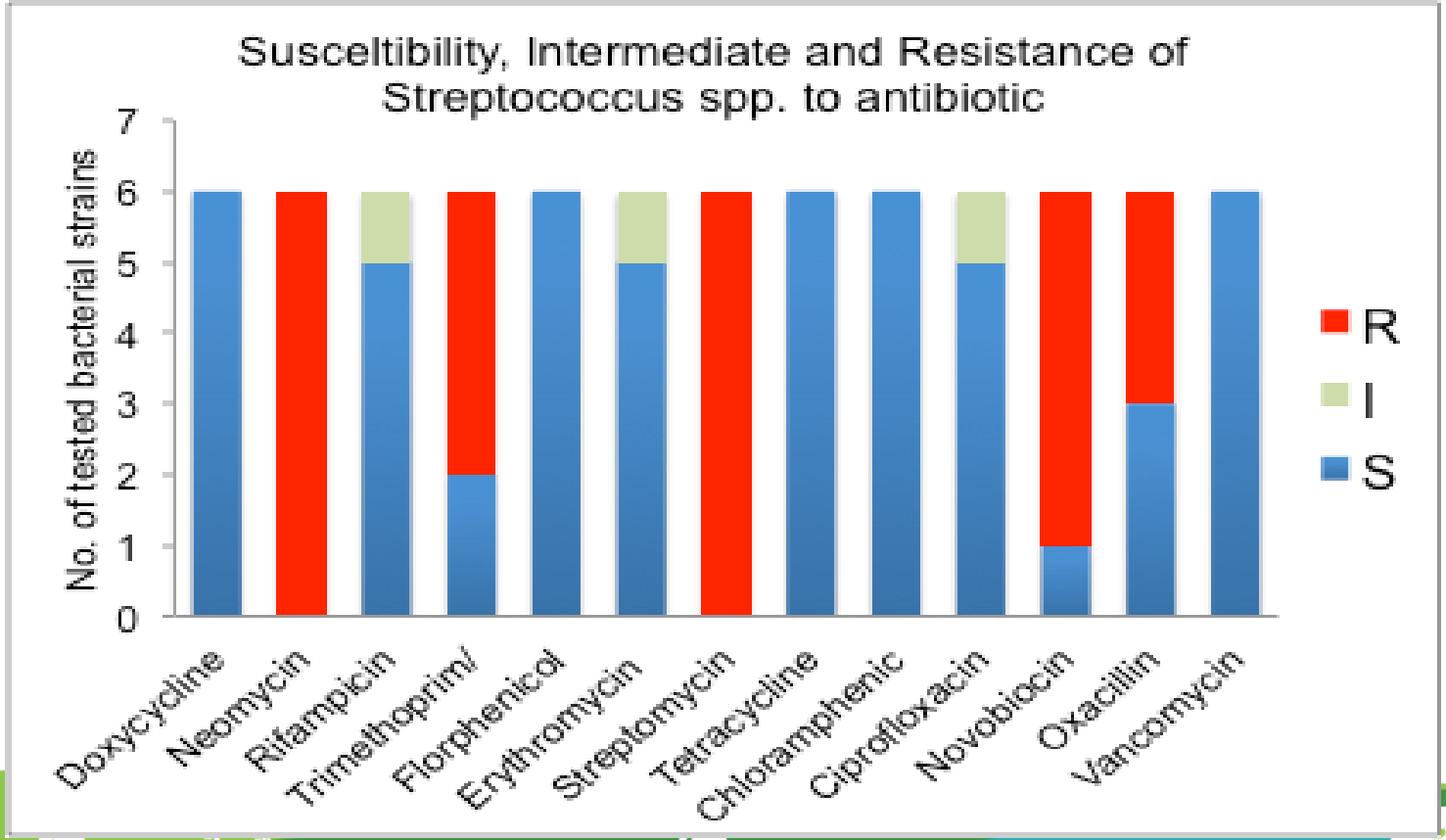

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# IV. Recommendation

- The AMU and AMR survey should be implemented for different cultured species and in different aquaculture systems (cage and integrated aquaculture…) to have better understanding the status of AMU and AMR.
- Need more international supports for AMR works in aquaculture (development of internationally standard methods, data analysis and interpretive guidelines, ect…).
- Support to raise awareness of local agencies, farmers and drug sellers in AMU&AMR through trainings and broader propaganda campaigns (such as intensive public media).
- More regional and international workshops/meetings on AMU and AMR to share and improve the awareness.

# Thank you for your attention!