



UNOFFICIAL TRANSLATION

# **NATIONAL ACTION PLAN**

## **FOR MANAGEMENT OF ANTIBIOTIC USE AND CONTROL**

### **OF ANTIBIOTIC RESISTANCE IN LIVESTOCK PRODUCTION**

#### **AND AQUACULTURE**

(Issued in accordance with Decision No. 2625 /QĐ-BNN-TY dated 21/ 6 /2017 by the Minister of Ministry of Agriculture and Rural Development)



Ha Noi, June 2017



**NATIONAL ACTION PLAN**  
**FOR MANAGEMENT OF ANTIBIOTIC USE AND CONTROL**  
**OF ANTIBIOTIC RESISTANCE IN LIVESTOCK PRODUCTION**  
**AND AQUACULTURE**

(Issued in accordance with Decision No. 2625 /QĐ-BNN-TY  
dated 21/ 6 /2017 by the Minister of Ministry of Agriculture  
and Rural Development)

Ha Noi, June 2017

The National Action Plan for Management of Antibiotic Use and Control of Antibiotic Resistance in Livestock Production and Aquaculture during the period of 2017-2020 is developed with the technical assistance of the Food and Agriculture Organization of the United Nations (FAO) and financial support of the United States Agency for International Development (USAID) and the United Nations Joint Programme.



No: 2625/QD-BNN-TY

Ha Noi, 21 June 2017

## **DECISION**

**On issuance of the “National Action Plan for Management of Antibiotic Use and Control of Antibiotic Resistance in Livestock Production and Aquaculture (2017-2020)”**

### **MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT**

Pursuant to the Animal Health Law dated June 19, 2015.

Pursuant to the Decree 35/2016/ND-CP dated May 15, 2016 by the Government regulating in details the implementation of some articles of the Animal Health Law.

Pursuant to the Decree 15/2016/ND-CP dated February 17, 2017 by Government regulating mandates, responsibilities and organizational structure of the Ministry of Agriculture and Rural Development.

Consideration of the request made by the Director General of Department of Animal Health.

### **DECIDES**

**Article 1:** Attachment to this decision is the National Action Plan for Management of Antibiotic Use and Control of Antibiotic Resistance in Livestock Production and Aquaculture (2017-2020).

**Article 2:** The decision takes effectiveness since its issued date.

**Article 3:** Chief of Ministry Office, Director of Department of Animal Health, leaders of relevant departments under MARDs, leaders of Departments of Agriculture and Rural Development in the provinces, and cities under the central government are requested to execute the decision.

#### **Receivers**

- As per the article 3;
- Government Office (for report);
- Provincial/ Municipal People's Committees;
- Directorate of Fishery, Ministry Inspection Office;
- Departments of Finance, Planning, Science technology and Environment, Legal;
- Department of Animal Health and their sub-agencies
- National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD) and Department of Livestock Production (DLP);
- Departments of Agriculture and Rural Development, Sub-departments of Animal Health (SDLP&AHs) of the provinces and cities;
- Manufacturers and trading enterprises on animal feeds and veterinary drugs, and raw materials for veterinary drugs;
- Archives: administration office.

**ON BEHALF OF THE MINISTER  
VICE MINISTER**



**Vu Van Tam**



## TABLE OF CONTENTS

<b>PART I: NECESSITY FOR PLAN DEVELOPMENT.....</b>	<b>2</b>
<b>FOREWORD.....</b>	<b>3</b>
I. RATIONALE.....	5
1. Antibiotic resistance situation.....	5
2. Antibiotics and AMR in livestock production and aquaculture in Viet Nam.....	5
3. Factors contributing to AMR in Viet Nam.....	7
4. AMR burden.....	8
II. LEGAL BASIS.....	8
<b>PART II: PLAN CONTENT.....</b>	<b>10</b>
I. GOAL AND OBJECTIVES.....	11
1. Goal.....	11
2. Specific Objectives.....	11
II. ACTIVITIES.....	11
1. Strengthen governance for AMU management and AMR control.....	11
2. Improve legal documents for AMR and AMU management.....	11
3. Monitor implementation of regulations.....	12
4. Increase awareness on AMU and risks on occurrence of AMR.....	12
5. Implement good practices in animal treatment, animal feed production and livestock production and aquaculture.....	12
6. Monitor AMR, AMU and antibiotic residues.....	13
7. Strengthen inter-sectoral collaboration in AMR management.....	15
<b>PART III: IMPLEMENTATION ARRANGEMENT.....</b>	<b>16</b>
I. ASSIGNMENT OF RESPONSIBILITIES.....	17
1. Department of Animal Health.....	17
2. Directorate of Fisheries.....	18
3. Department of Livestock Production.....	19
4. National Agro-Forestry-Fishery Quality Assurance Department (NAFIQAD).....	19
5. Department of Legislation.....	20

6. Department of Science, Technology and Environment.....	20
7. Department of Finance.....	20
8. National Agriculture Extension Centre.....	20
9. Research Institutes for Aquaculture, National Institute for Veterinary Research.....	20
10. Departments of Agriculture and Rural Development in provinces and cities.....	20
11. Provincial Sub-departments of Livestock Production and Animal Health.....	21
12. Sub-departments of Fishery.....	21
13. Antibiotic import companies.....	21
14. Animal antibiotic producers.....	21
15. Veterinary drug shops and agencies.....	21
16. Livestock production and aquaculture farms.....	22
II. IMPLEMENTATION ACTIVITIES AND TIMELINES: .....	22
<b>Part IV: IMPLEMENTATION BUDGET</b> .....	24
1. Central budget.....	25
2. Provincial budget.....	25
3. Funding from other sources.....	25
REFERENCES AND APPENDIX.....	26
APPENDIX.....	29
Implementation activities and timelines.....	29

**Part I**

**NECESSITY FOR PLAN  
DEVELOPMENT**

## Part I

# NECESSITY FOR PLAN DEVELOPMENT

### FOREWORD

The discovery of antibiotics in 1928 was one of the great achievements in modern medicine, especially for infection treatment. Previously fatal infections can now be treated with antibiotics. Since then, a number of antimicrobials such as antibiotics and anti-bacterial agents have been developed. Antibiotics have not only been used for treatment in humans but were also widely used in agriculture. It has been used in livestock and aquaculture to prevent and treat diseases. By 1940s, however, antibiotics were discovered to promote growth in livestock and aquaculture animals. Since then, there is a growing trend of antimicrobial resistance (AMR) in humans, animals and the environment. AMR refers to the evolution of micro-organisms, such as bacteria, fungi, viruses and parasites, to become resistant to antimicrobial substances such as antibiotics. It occurs naturally, however, the excessive use of antibiotics in medical treatment for humans, livestock and aquaculture has led to the growing threat of AMR.

The phenomenon of AMR threatens the sustainability of food and agriculture production systems, the environment as well as the health and lives of the people. In public health, it makes treatment of simple infections harder and more expensive. In livestock and aquaculture production, AMR can be transmitted from food animals to humans. It is difficult to quantify the magnitude of the problem, due to a lack of adequate surveillance systems, but some estimate that by 2050 AMR could be responsible for killing 10 million people a year globally with half of those estimates occurring in Asia. The estimate is equivalent to one person every 3 seconds or more than cancer kills today. In recent years, there have been various evidences showing that there is a growing threat of AMR in Viet Nam. The World Health Organization (WHO) has ranked Viet Nam in the group of countries having the highest AMR rate in the world.

At the international level, the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE), and WHO collaborating in a Tripartite Agreement have identified AMR as one of the three priority topics for joint actions [6] and developed a Global Action Plan on AMR. Following a 'One Health' approach, the Global Action Plan provides a framework for national action plans to combat AMR. It sets out key actions, structured around five strategic objectives that the various actors involved should take to combat AMR. Strategic objectives include i) to improve awareness and understanding of AMR, ii) to strengthen knowledge and evidence base through surveillance and research, iii) to reduce the incidence of infection through effective

sanitation, hygiene and infection prevention measures, iv) to optimize the use of antibiotic medicines in human and animal health and v) to increase investment in new medicines, diagnostic tools, vaccines and other interventions.

During the World Health Assembly held in May 2015, WHO Member States committed to have in place, by May 2017, a national action plan on AMR that is aligned with the Global Action Plan. The FAO Action Plan on AMR 2016-2020 was developed to support the food and agriculture sectors in achieving this goal [5].

At regional level, the development and implementation of comprehensive national plans to contain AMR was identified as one of the three priority actions of the WHO Action Agenda for AMR in the Western Pacific Region [4].

At national level, Viet Nam is the first country in WHO's Western Pacific Region that has passed a National Action Plan on combating antibiotic resistance. This plan, consisting of six specific objectives, highlights proper use of antibiotics in cultivation, livestock production and aquaculture. In June 2015, the Aide Memoire on 'Multi-stakeholder Engagement to combat AMR in Viet Nam' was jointly signed by the Ministry of Health (MOH), Ministry of Agriculture and Rural Development (MARD), Ministry of Industry and Trade (MOIT) and the Ministry of Natural Resources and Environment (MONRE), including other development partners such as WHO, FAO and OUCRU (Oxford University Clinical Research Unit) (MoH/MARD/MOIT/MONRE, 2015). All stakeholders committed to implement the actions provided under the National Action Plan using a One Health approach. It aims to develop a national AMR surveillance system and to better educate the public on antibiotic use and AMR.

To further support the multi-sectorial approach of the control of AMR in Viet Nam, the MoH established in October 2016 a National Steering Committee on the prevention of AMR serving from 2016 to 2020 (Decision 5888/QD-BYT dated 10/10/2016). The Committee includes 31 members from the four Ministries that supported the Aide Memoire including external partner institutions. AMR was also identified as a key component of the Global Health Security Agenda of Viet Nam, which established a five-year plan to prevent and control the emergence and spread of AMR through effective and rational use of antibiotics in humans and animals, in cooperation between Vietnamese Government and international partners [26].

Another initiative to further support the AMR campaign in agriculture is the establishment of the "Drug resistance in agriculture" sub-committee. This is one of the nine sub-committees under the National Steering Committee for Prevention and Control of Drug Resistance (Decision No 2888/QD/BYT, 5/8/2014) implemented by

the MOH. The sub-committee's duties include the drafting of a "National Action Plan for the control of AMU and AMR in livestock production and aquaculture from 2017-2020". The plan will be based on general international and regional principles and in accordance with Viet Nam's context. Major activities will be designed to achieve the general objectives as well as specific objectives as agreed by stakeholders.

## I. RATIONALE

### 1. Antibiotic resistance situation

Antibiotics are compounds that can kill or inhibit the growth of micro-organisms such as bacteria, viruses, fungi or protozoa [9]. They have been extensively used in the recent decades and allowed us to achieve extraordinary improvements in human and veterinary medicine. Being an essential tool to prevent and control infectious diseases, they also contributed to the improvement of animal productivity, food security as well as food safety [22]. However, the efficacy of antibiotics has been hampered by the development of resistance among bacteria originating from humans, animals, food and the environment [7].

Infections with antibiotic resistant (ABR) bacteria lead to treatment failures, worse clinical outcomes and deaths. It was estimated that each year across the world, 700,000 people die because of infections with AMR strains of common bacterial infections and human immunodeficiency virus (HIV) [18]. This number could increase up to 10 million deaths by 2050 assuming a continued rise in AMR, including 4,730,000 deaths in Asia [18]. The associated societal costs are substantial and the world's gross domestic product could be 2 to 3.5% lower than projections in 2050 [18].

The exact level of AMR in Viet Nam is unknown; however, previous AMR surveillance showed that there is high level of AMR in Viet Nam and it is steadily increasing [16]. A study conducted in Ho Chi Minh City showed 43.8% of extended-spectrum beta-lactamase (ESBL) producing bacteria amongst hospitalized patients, and up to 81% ESBL amongst Enterobacteriaceae in intensive care units [10]. This means that most bacteria are now resistant to antibiotics such as penicillins and cephalosporin.

Resistance to fluoroquinolones in *Salmonella typhi* isolates was reported to have increased from 4% to 97% between 1993 and 2005 [4]. An increase in tetracycline and chloramphenicol resistance, as well as an increase in the occurrence of multi-drug resistance was also observed in *Streptococcus suis* (leading cause of bacterial meningitis in adults in Viet Nam) between 1997 and 2008. This means Typhoid fever, which can normally be treated with antibiotics, is becoming harder to treat.

## 2. Antibiotics and AMR in livestock production and aquaculture in Viet Nam

In livestock production, antibiotics are used for prevention, disease treatment and growth promotion. As preventive measure, antibiotics are given to healthy animals to protect them if they are exposed to infectious diseases or might be in contact with other sick animals in the same herd. As disease treatment, sick animals are readily given antibiotics once animals show symptoms of any infectious disease [1]. Antibiotics are being used for growth promotion by mixing with animal feed with lower doses than actual treatment doses. Doing this apparently increases food digestion, shorten production time in livestock production, thus, decreasing the total feed cost.

Livestock production represents 30% of total agricultural output in Viet Nam, with small-scale household production accounting for about 70% of the total livestock production. An estimated 29.1 million pigs and 364.5 million poultry (duck and chicken) are produced annually in Viet Nam [8]. Aquaculture has been developing very quickly in Viet Nam in the recent years (1.3 million tons of catfish and 400,000 tons of shrimps produced in 2010) [19].

Previous studies have shown that antibiotics are extensively used in Vietnamese livestock and aquaculture production. A survey among 208 chicken farms in Tien Giang province showed high levels of antibiotic usage, with 84% of antibiotics being used for prophylactic purposes [3]. The use of feed medicated with antibiotics is very high. During each production cycle, 72% of farms use at least one antibiotic for therapy or growth promotion. The use of antibiotics in pig production has also been abused (286.6 mg of active substance/kg of live pig produced). Particularly, some critically important antibiotic classes for humans have also been used in animal production [25].

Along with surveys about antibiotic use, studies on AMR bacteria on animals and animal products have also been carried out. All of 202 *Campylobacter* spp isolates originating from 343 pig and poultry farms in the Mekong delta of Viet Nam showed resistance against erythromycin. About 99% of these samples showed resistance against sulfamethoxazole–trimethoprim and another 92% against nalidixic acid and ofloxacin; and, 20.8% against ciprofloxacin [2]. In addition, 20% and 32.5% of 895 *Escherichia coli* isolates collected from 208 small-scale chicken farms in the same region showed resistance to gentamicin and ciprofloxacin, respectively. Ciprofloxacin resistance was significantly associated with quinolone usage on the farm [17]. At retail, a study conducted on *Salmonella* spp isolated from 318 pork and 268 chicken meat samples in North Viet Nam showed high resistance rates to tetracycline (58.5%), sulphonamides (58.1%), streptomycin (47.3%), ampicillin (39.8%), chloramphenicol (37.3%), trimethoprim (34.0%) and nalidixic acid (27.8%) [23]. A prevalence of 18% of ESBL

producing *Escherichia coli* was also observed among 60 shrimp samples collected at a local market in Nha Trang, with 55% of them being multi-drug resistant [20]. Overall, AMR is becoming prevalent in Viet Nam's livestock and aquaculture industries and, thus, is a threat to food safety.

### **3. Factors contributing to AMR in Viet Nam**

#### **3.1. AMR from public health and agriculture**

- a) The irrational use of antibiotics such as overdose, below dose or antibiotic abuse has led to AMR, facilitate favourable conditions for drug resistant micro-organisms to occur, change and spread; Buying of antibiotics without professional oversight for treatment (without prescriptions provided by doctors in treatment for human disease and by veterinarians animal disease treatment) [5]; Medicine used for treatment is inappropriate to types of bacteria, viruses, parasites; irrational use of medicine regarding doses, contents and time.
- b) Assurance and control activities of medicine quality is limited; quality assurance and control systems do not meet the actual demand and unable to assure quality of different drugs/medicine which are available in the market.
- c) Ineffective prevention and control of infectious diseases in humans and animals has led to the spread of AMR bacteria. Patients, sick animals and aquaculture serve as potential sources to transmit AMR bacteria to other people, animals and environment.

#### **3.2. AMR from livestock production and aquaculture**

- a) Inadequate regulations on management of antibiotic use for purposes of treatment, prevention and control of diseases and growth promotion, control of bacterial contamination, control of the spread of drug resistant bacteria in livestock production and aquaculture in Viet Nam [5].
  - The enforcement of legal regulations is not strong.
  - A surveillance system of AMR in livestock production and aquaculture has not been established. The AMR surveillance has been carried out only been implemented in some researches and projects and has not been carried out regularly.
  - There has not been a linkage between the antibiotics surveillance systems in health care and agriculture.
  - Lack of testing labs capable of identifying resistant microorganism has caused difficulties in detecting new emerging resistant microorganism.
  - Antibiotic abuse in disease prevention and control in livestock production and

aquaculture as well as in growth promotion; antibiotic use with lower doses has increased AMR capacity of bacteria and these microorganism can easily be transmitted to human via direct contacts with animals or indirectly transmitted through the consumption of animal-originated food or contacts with resistant bacteria which the animals disperse to the environment [11].

- Limited awareness on AMU and AMR of both professional and the community.

#### **4. AMR burden**

The relationship between the use of antibiotics in animals and the increasing burden of AMR in public health have yet to be clearly established but there are increasing evidence to support this. There are evidences pointing to similar resistance characteristics between humans and animals using similar types of antibiotics. Ninety years since antibiotics were discovered, people are now threatened with ineffective antibiotics making treatment of bacterial contamination relating to cancer chemotherapeutic treatment, implant of tissue and human organs an almost impossible task.

The prevention and treatment of infectious diseases in humans and animals will be much more difficult if antibiotics are inefficient or ineffective. Social and financial costs in treatment of drug-resistant contaminated diseases have put remarkable burden on everyone, family and the society due to longer treatment, bad anticipation and wastefulness due to financial spending to inappropriate drugs.

## **II. LEGAL BASIS**

- Law on Pharmacy No 105/2016/QH13 dated 6 April 2016.
- Law on prevention and control of infectious diseases No. 03/2007/QH12 dated 21 November 2007.
- Law on animal health No. 79/2015/QH13 dated 19 June 2015.
- Decision No 2174/QĐ-BYT dated 21 June 2013 by the Minister of Health approving the National Action Plan against Drug Resistance.
- Decision 5888/QĐ-BYT dated 10 October 2016 on the establishment of the National Steering Committee on the prevention of AMR for the period 2016-2020.
- Decision No 2888/QĐ-BYT dated 5 August 2014 on the establishment of 09 Sub-committees on drug resistance surveillance.
- Circular No 04/2016/TT-BNNPTNT dated 15 May 2016 regulating the prevention and control of fisheries diseases.
- Circular No 26/2016/TT-BNNPTNT dated 30 June 2016 regulating the quarantine of animals and animals and fisheries products.

- Circular No 25/2016/TT-BNNPTNT dated 31 May 2016 regulating the quarantine of terrestrial animals and terrestrial animal products.
- Circular No 13/2016/TT-BNNPTNT dated 2 June 2016 regulating the veterinary drug management.
- Circular No 09/2016/TT-BNNPTNT dated 6 January 2016 regulating the control of slaughtering and examination of veterinary hygiene.
- Circular No 07/2016/TT-BNNPTNT dated 31 May 2016 regulating the prevention and control of terrestrial animal diseases.
- Decision No 2803/QĐ-BNN-TY dated 7 July 2016 developed by the MARD on the issuance of a “Plan for management and supervision of imported antibiotic materials for production of veterinary medicine during 2016-2020 period”.

## **Part II**

# **PLAN CONTENT**

## Part II

# PLAN CONTENT

## I. GOAL AND OBJECTIVES

### 1. Goal

Mitigate the public health risk of AMR by controlling the antibiotic usage in livestock production and aquaculture in Viet Nam.

### 2. Specific Objectives

- 2.1. Review, revise and enforce policy and governance related to AMR and AMU in livestock production and aquaculture.
- 2.2. Increase awareness on AMU and the risk of AMR occurrence among agriculture and food professionals; producers and consumers.
- 2.3. Implement good practices in treatment, animal feeding production and livestock production and aquaculture.
- 2.4. Monitor AMR, antibiotic residues and AMU in livestock production and aquaculture.
- 2.5. Facilitate inter-sectoral collaboration activities related to AMR control.

## II. ACTIVITIES

### 1. Strengthen governance for AMU management and AMR control

Mitigate the public health risk of AMR by controlling the antibiotic usage in livestock production and aquaculture in Viet Nam.

- 1.1. Strengthen the sub-committee of AMR control in livestock production and aquaculture under the multi-sectoral National Steering Committee for AMR prevention and control in human, animals and environment.
- 1.2. Establish a MARD Steering Committee for prevention and control of AMR in livestock production and aquaculture.
- 1.3. Strengthen activities to implement this National Action Plan by the MARD National Steering Committee for prevention and control of AMR in livestock production and aquaculture.

### 2. Improve legal documents for AMR and AMU management

- 2.1. Identify gaps and irrelevant elements in the national legislation for the management and monitoring of AMU in livestock production and aquaculture.

- 2.2. Gradually eliminate and eventually ban the AMU for animal growth promotion purpose (according to Circular 06/2016 / TT-BNNPTNT).
- 2.3. Develop regulations to limit and toward ban AMU in prevention of diseases for animals.
- 2.4. Review and amend the regulations related to prescription and sales of prescribed antibiotics including guidance and control of sales of prescription and antibiotics in veterinary activities.
- 2.5. Review regulations on monitoring of antibiotics from import to management of antibiotic usage in agriculture (including AMU database and reporting).

### **3. Monitor implementation of regulations**

- 3.1. Conduct inspection/audits of relevant stakeholders involved in sales or use of antibiotics in livestock and aquaculture, from import to farm level.
- 3.2. Enhance monitoring of antibiotic residues in animal-originated food produced for both export and domestic consumption, publish the monitoring results.

### **4. Increase awareness on AMU and risks on occurrence of AMR**

- 4.1. Assess the current level of awareness on AMR and AMU by conducting a study (e.g. Knowledge, Attitudes and Practices survey) among targeted groups (such as livestock and aquaculture professionals, producers and consumers).
- 4.2. Develop advocacy and communication tools and programs to increase awareness of AMR and AMU.
  - 4.2.1. Develop communication packages (including leaflets, posters on AMU/AMR) to increase awareness on AMR and AMU.
  - 4.2.2. Organize AMU and AMR advocacy campaigns with key representatives from the animal, livestock and aquaculture sectors.
  - 4.2.3. Increase participation of livestock and aquaculture sectors in annual AMR awareness week events.
  - 4.2.4. Conduct communication campaigns to increase AMR awareness for livestock and aquaculture farmers and the public (consumers) via mass media (TV, newspapers and radio), social media (Facebook, Twitter and Zalo) via the communication toolkit and awareness events.

### **5. Implement good practices in animal treatment, animal feed production and livestock production and aquaculture**

- 5.1. Implement good antibiotic use practices
  - 5.1.1. Develop guidelines for AMU in livestock production and aquaculture using a risk-based approach.
  - 5.1.2. Organize education and training activities on good antibiotic use principles in livestock production and aquaculture for the following targeted groups:

- Technicians and professionals.
- Key trainers (veterinarians) who will be able to train veterinary medicine shop owners and livestock producers.
- 5.1.3. Develop a public-private partnership to implement good AMU practices; semi-industrial farms should be targeted first.
- 5.1.4. Integrate content of AMU and AMR in veterinary education programmes in universities and colleges as well as in-service training programme for technicians and professionals.
- 5.2. Facilitate/ encourage use of alternatives instead of antibiotics
  - 5.2.1. Promote good production practices to reduce needs for antibiotic treatments at farm level, improve application of biosecurity, vaccination, good hygiene practices through the food supply chain.
  - 5.2.2. Enhance usage of diagnostic tools and pathogens identification before prescribe/ use of antibiotics for treatment purposes.
  - 5.2.3. Facilitate research activities as well as evaluation of alternative treatment measures to AMU such as probiotic products.

## **6. Monitor AMR, AMU and antibiotic residues**

- 6.1. Quantify and characterize the occurrence of AMR in animals and along the food chain
  - 6.1.1. Assess the current level of laboratory capacity in microbiology and AMR testing in food and animals using the laboratory mapping tool.
  - 6.1.2. Establish a list of accredited laboratories to be involved in the AMR national surveillance programme in food and animals, including private laboratories (hereafter referred to as accredited pharmaceutical laboratories list); identify the national leading laboratory for this activity.
  - 6.1.3. Develop standardized protocols for AMR testing and reporting (based on ISO and CLSI standards); organize trainings among participating laboratories to ensure standard and harmonized procedures are used.
  - 6.1.4. Strengthen quality assurance activities for AMU and AMR testing, with priority given to the national leading laboratory and then other laboratories in the accredited laboratory list.
  - 6.1.5. Implement a national programme for the surveillance of AMR in animals and food:
    - a) Objective: estimate the prevalence of AMR bacteria and detect AMR genes.
    - b) Targeted population and time:
      - Livestock: pigs and chicken.
      - Production scale: large and small-scale farms.
      - Sample collection time: at slaughtering stage.

- Priority bacteria species: E. coli and Salmonella spp.
  - Priority antibiotic agents: chloramphenicol, tetracyclines, cephalosporins and tylosin.
- 6.1.6. Implement a national programme for the surveillance of AMR in aquaculture:
- a) Objective: estimate the prevalence of AMR bacteria and detect AMR genes.
  - b) Targeted population and time:
    - Priority target population: Pangasius, tilapia, giant tiger shrimp, white shrimp.
    - Priority bacteria species: E. Coli, Salmonella spp., Vibrio spp. and Aeromonas spp.
    - Priority antibiotic agents: Ampicillin, Amoxicillin, Florfenicol, Oxytetracycline, Enrofloxacin, Offloading, Trimethoprim-sulfamethoxazole, Sulfadimicine, Gentamycin
- 6.1.7. Implementation: Explore possible synergies with the current food safety surveillance programmes; Use a risk-based approach to regularly update the AMR national programme.
- 6.1.8. Develop a central database to facilitate the management and analysis of AMR data.
- 6.1.9. Share the results of the national AMR surveillance programme among all participating laboratories using quarterly paper-based or online reports, together with annual meetings.
- 6.1.10. Establish cooperation with research partners to further investigate and characterize AMR bacteria in food and animals (e.g. farm-level surveys).
- 6.2. Quantify and characterize AMU in livestock and aquaculture production
- 6.2.1. Develop and implement a national programme for the surveillance of AMU in livestock production and aquaculture; antibiotic imports data to be used as a starting point.
  - 6.2.2. Develop a central database to facilitate the management and analysis of AMU data and at the same time used as a basic parameter of OIE on global AMU management in farmed animals.
  - 6.2.3. Share the results of the national AMU surveillance programme among all relevant stakeholders using quarterly paper-based or online reports, together with annual meetings.
  - 6.2.4. Establish cooperation with research partners to provide additional knowledge on AMU practices in livestock production and aquaculture (e.g. farm-level surveys).
- 6.3. Quantify the association between AMU in livestock/aquaculture and the burden of AMR in Viet Nam
- 6.3.1. Quantify the association between AMU in livestock/aquaculture and the

occurrence of AMR in animals and food to inform future AMR mitigation strategies using a risk-based approach.

- 6.3.2. Quantify and characterize the occurrence of antibiotic residues in animal-derived food.
- 6.3.3. Perform routine monitoring of antibiotic residues in animal-derived food intended both for export and for national consumption.
- 6.3.4. Share the results of the antibiotic residues surveillance programme among all relevant stakeholders using quarterly paper-based or online reports, together with annual meetings.

## **7. Strengthen inter-sectoral collaboration in AMR management**

- 7.1. Develop an inter-sectoral approach for the governance and coordination of activities relating to control of AMR, management of AMU, antibiotics residues.
- 7.2. Participate in regular meetings of the National Steering Committee to facilitate communication, sharing of experience and coordination of ongoing and future activities.
- 7.3. Conduct joint advocacy and communication activities between the public health and animal health sectors to increase awareness on AMR, e.g. organization of the annual AMR awareness week.
- 7.4. Foster public-private partnership in increasing awareness on AMU and AMR among livestock and aquaculture professionals, e.g. in the promotion of good practices and dissemination of educational materials.
- 7.5. Share data on AMR, AMU and residues monitoring between public health, animal health and environmental sectors. Joint monitoring could be developed for antibiotic classes imported for being used both in human and animal sectors.
- 7.6. Disseminate results of AMR and AMU monitoring in a joint report between public health and animal health sectors.
- 7.7. Integrate national AMR and AMU activities into regional and international context.
- 7.9. Participate to regional and international activities on AMR and AMU in livestock and aquaculture (e.g. training, sharing of experience with neighbouring countries).
- 7.10. Share data on AMR and AMU in Viet Nam with international partners, e.g. contributing to the OIE global database on AMU.

## **Part III**

# **IMPLEMENTATION ARRANGEMENT**

## Part III

# IMPLEMENTATION ARRANGEMENT

## I. ASSIGNMENT OF RESPONSIBILITIES

### 1. Department of Animal Health

- 1.1. Act as the executing agency in coordinating with relevant agencies in providing instructions as well as guidance for implementation; collecting results of activities within the Plan to report to leaders of the Ministry of Agriculture and Rural Development.
- 1.2. Submit to leaders of Ministry of Agriculture and Rural Development (MARD) for approval of a decision for the establishment, functions and duties, funding of the national steering sub-committee against AMR in livestock production and aquaculture.
- 1.3. Coordinate with legal department to carry out annual review to identify current gaps, shortages, overlapping and needs in the national legislation for the management and monitoring of AMU in livestock production and aquaculture.
- 1.4. Develop MARD guidelines for antibiotic prescription in animal treatment.
- 1.5. Manage, monitor the use, import, production of antibiotics.
- 1.6. Carry out researches, studies to assess the level of AMU and AMR management awareness.
- 1.7. Act as the executing agency in coordination with the Department of Livestock Production, the Directorate of Fisheries to build an AMU and AMR communication kit.
- 1.8. Coordinate with the Directorate of Fisheries, the Department of Livestock Production and the National Agricultural Extension Centre to organize communication campaigns on AMU and AMR management, increasing AMR awareness of major representatives from the animal health, livestock production, aquaculture sectors and consumers.
- 1.9. Coordinate with the Directorate of Fisheries and the Department of Livestock Production to build AMU guideline for treatment, livestock production and aquaculture.
- 1.10. Participate in the annual AMR awareness week.
- 1.11. Develop public-private partnership to carry out policy and legislation formulation activities, AMU information sharing activities.
- 1.12. Develop content frame and propose to include AMU and AMR in livestock production and aquaculture into the veterinarian education programmes at relevant universities and colleges as well as additional educational programs for technicians and professionals, including those in the private sector.

- 1.13. Strengthen the management of professional veterinary certificates for prevention and treatment of animal diseases.
- 1.14. Support diagnostic measures and encourage the use of diagnostic tools to test whether antibiotics are needed.
- 1.15. Develop a plan to control major infectious diseases in livestock and fisheries (diseases which require antibiotics for treatment).
- 1.16. Encourage the evaluation of alternative treatment measures to AMU and application of alternative measures.
- 1.17. Assess the current capacity of laboratories regarding the testing of AMR microorganism.
- 1.18. Identify leading laboratories and establish a list of laboratories accredited for testing AMR bacteria.
- 1.19. Standardized AMR sensitivity test and organize training courses for participating laboratories.
- 1.20. Build and implement a national AMU surveillance program on animals, food and aquaculture products.
- 1.21. Build a central database to facilitate management and analysis of AMR data; share AMR surveillance program results to involved stakeholders.
- 1.22. Establish cooperation programs with research partners to continue surveying and characterizing AMR bacteria in food and animals.
- 1.23. Implement monitoring of antibiotic residues in terrestrial animal-originated food.
- 1.24. Participate in meetings of the National Steering Committee on AMR prevention and control.
- 1.25. Organize joint AMR communication activities between the public health and animal health sectors.
- 1.26. Strengthen awareness on AMR in livestock production and aquaculture for organizations and individuals.
- 1.27. Share AMU and AMR management results to include in the joint report of the public health and animal health sectors; facilitating analysis of factual situation and general risk assessment.
- 1.28. Participate in regional and international activities on AMU and AMR management in livestock production and aquaculture; share data on AMU and AMR management in Viet Nam to international partners.
- 1.29. Build and implement a national program on AMU management in livestock production and aquaculture.

## **2. Directorate of Fisheries**

- 2.1. Coordinate with the Department of Animal Health, the Department of Livestock Production and the National Agricultural Extension Centre to carry out communication campaigns on AMU and AMR management, increasing AMR

awareness for aquaculture farmers and consumers.

- 2.2. Coordinate with the Department of Animal Health to build AMU guidance in aquaculture.
- 2.3. Participate in the annual AMR awareness week.

### **3. Department of Livestock Production**

- 3.1. Gradually eliminate and eventually ban the use of antibiotics for growth promotion for cattle and poultry.
- 3.2. Gradually eliminate and eventually ban the use of antibiotics for prevention of diseases for animals.
- 3.3. Coordinate with the Department of Animal Health to build an AMU and AMR communication package; guidance on the use of antibiotics in disease treatment and production of animal feed.
- 3.4. Coordinate with the Department of Animal Health and the National Agricultural Extension Centre to carry out communication campaigns on AMU and AMR management, increasing AMR awareness for farmers and consumers.
- 3.5. Participate in the annual AMR awareness week.
- 3.6. Conduct inspections/audits and deal with violations made by organizations, individuals involving in the production, trading, import-export of feed for animals medicated with antibiotics for growth promotion.
- 3.7. Work together with the Department of Animal Health to instruct animal health sub-committees in the management and monitoring of livestock production farms using antibiotics for prevention and treatment of diseases in accordance with legal regulations.
- 3.8. Inform those livestock production farms that commit violations to the Department of Animal Health.

### **4. National Agro-Forestry-Fishery Quality Assurance Department (NAFIQAD)**

- 4.1. Perform routine monitoring of antibiotic residues in fisheries-derived food.
- 4.2. Instruct agencies under the National Agro-forestry-fishery Quality Assurance Department to participate in the AMR surveillance programme in livestock production and aquaculture.
- 4.3. Instruct agencies under National Agro-forestry-fishery Quality Assurance Department to retrieve, investigate the reasons when fisheries batches are found to contaminate with prohibited chemicals/antibiotics or exceed the limits and are alerted by imported markets in accordance with legal regulations.
- 4.4. Inform precisely investigation results regarding names and addresses of providers of prohibited chemicals/antibiotics/antibiotics materials to the Department of Animal Health for treatment of violations in accordance with legal regulations.

## **5. Department of Legislation**

Identify current gaps, shortages, irrational overlapping in the national legislation for the management and monitoring of AMU in livestock production and aquaculture.

## **6. Department of Science, Technology and Environment**

Give priority to projects involving in studying and researching alternative treatment method to antibiotics (study, policy to support studies, alternative products) and application of alternative measures.

## **7. Department of Finance**

Balance, provide additional funding to enable central and local agencies to implement the National Action Plan to minimize AMU and prevention and control of AMR in livestock production and aquaculture.

## **8. National Agriculture Extension Centre**

8.1. Disseminate good husbandry practices to reduce demands for antibiotic treatment in farms through agricultural extension programs and related activities.

8.2. Coordinate with the Department of Animal Health, the Department of Livestock Production and the Directorate of Fisheries to organize training courses on AMU in disease treatment, livestock production and aquaculture.

8.3. Coordinate with the Department of Animal Health, the Department of Livestock Production and the Directorate of Fisheries to carry out communication campaigns on to increase AMU and AMR awareness for poultry, cattle and aquaculture farmers and consumers.

## **9. Research Institutes for Aquaculture, National Institute for Veterinary Research**

9.1. Participate in AMR surveillance programme in livestock production and aquaculture; share AMR surveillance results to relevant stakeholders.

9.2. Join in researches to assess awareness on AMU and AMR management.

9.3. Participate in development of the AMU and AMR communication and guidance package.

9.4. Participate in quantifying the impacts of AMU management in livestock production and aquaculture and the occurrence of AMR in livestock production and aquaculture.

## **10. Departments of Agriculture and Rural Development in provinces and cities**

10.1. Instruct agencies under the sub-departments to manage and monitor the trading and use of antibiotics in their localities.

10.2. Instruct agencies under the sub-departments to promote and disseminate AMU

and AMR guidance to farmers.

### **11. Provincial Sub-departments of Livestock Production and Animal Health**

- 11.1. Responsible for managing and monitoring the trading of antibiotics in their localities.
- 11.2. Responsible for managing and monitoring the use of antibiotics at livestock production farms.
- 11.3. Communicate and disseminate guidance on AMU and AMR to livestock production and aquaculture farmers.

### **12. Sub-departments of Fishery**

- 12.1. Responsible for managing and monitoring the use of antibiotics at aquaculture farms.
- 12.2. Communicate and disseminate guidance on AMU and AMR to aquaculture farmers.

### **13. Antibiotic import companies**

- 13.1. Fully document and record the import and sale of antibiotics.
- 13.2. Provide quarterly reports with accurate data to Department of Animal Health, Regional Animal Health Offices on quantity of antibiotics imported, sold, in stock, as well as names and addresses of their antibiotic buyers. Reports should be submitted on 20th of the last month of each quarter.

### **14. Animal antibiotic producers**

- 14.1. Establish filling system including documents and records of all the purchase and use of antibiotic materials.
- 14.2. Provide reports with accurate data including quantity of antibiotics materials bought and used for production of veterinary antibiotics; quantity of finished antibiotics produced and exported to the Department of Animal Health, Regional Animal Health Offices. Reports should be submitted on 20th of the last month of each quarter.

### **15. Veterinary drug shops and agencies**

- 15.1. Fully document and record of import and sale of antibiotics.
- 15.2. Provide reports with accurate data including quantity of antibiotics imported and sold to provincial Sub-Department of Animal Health.
- 15.3. Veterinary medicine shops and agencies are not permitted to purchase and sales of antibiotic materials.
- 15.4. Only sell antibiotics with prescription from animal health professionals.

**16. Livestock production and aquaculture farms**

- 16.1. Record AMU during livestock production and aquaculture process.
- 16.2. Provide correct, sufficient documents regarding their providers of antibiotics upon requests by authorized agencies.
- 16.3. Only use antibiotics as per prescriptions and guidance by animal health professionals.

**II. IMPLEMENTATION ACTIVITIES AND TIMELINES: Enclosed appendix**



## **Part IV**

# **IMPLEMENTATION BUDGET**

## Part IV

### IMPLEMENTATION BUDGET

#### 1. Central budget

- a) MARD is responsible for allocating budget to the assigned agencies under MARD to implement activities listed in the Appendix.
- b) National agencies assigned with responsibilities in this plan are responsible for mobilizing resources in their system to implement the assigned activities.

#### 2. Provincial budget

Every year, based on this National Action Plan and the provincial food safety surveillance program, provincial Sub-Departments of Agriculture and Rural Development take leading role, in coordination with relevant provincial agencies, to develop provincial action plans and submit to provincial People's Committee for approval and financial allocation.

#### 3. Funding from other sources

External funding resources will be mobilized from international organizations such as Food and Agriculture Organization of the United Nations, the United States Agency for International Development, World Health Organization, World Bank and non-government organizations.

# REFERENCES AND APPENDIX

## REFERENCES

1. Anses, 2014. Assessment of the risks of emergence of AMR associated with modes of antibiotic use in the field of animal health.
2. Carrique-Mas, J.J. et al., 2014. An epidemiological investigation of *Campylobacter* in pig and poultry farms in the Mekong delta of Viet Nam. *Epidemiol. Infect.* 142, 1425–36.
3. Carrique-Mas, J.J. et al., 2015. Antibiotic usage in chicken production in the Mekong delta of Viet Nam. *Zoonoses Public Health* 62, 70–78.
4. Chau, T.T. et al., 2007. Antibiotic drug resistance of *Salmonella enterica* serovar typhi in asia and molecular mechanism of reduced susceptibility to the fluoroquinolones. *Antimicrob. Agents Chemother.* 51, 4315–23.
5. FAO, 2016. The FAO Action Plan on AMR 2016-2020. Supporting the food and agriculture sectors in implementing the Global Action Plan on AMR to minimize the impact of AMR.
6. FAO/OIE/WHO, 2011. High-Level Technical Meeting to Address Health Risks at the Human-Animal- Ecosystems Interfaces.
7. GARP, 2010. Situation Analysis: Antibiotic Use and Resistance in Viet Nam. The GARP - Viet Nam National Working Group.
8. General Statistics Office of Viet Nam, 2010. The husbandry survey results. URL [http://www.gso.gov.vn/default\\_en.aspx?tabid=508&ItemID=10853](http://www.gso.gov.vn/default_en.aspx?tabid=508&ItemID=10853).
9. Giguère, S. et al, 2013. Antibiotic therapy in veterinary medicine, John Wiley. Ed.
10. Kiratisin, P et al., 2012. Comparative in vitro activity of carbapenems against major Gram-negative pathogens: results of Asia-Pacific surveillance from the COMPACT II study. *Int. J. Antimicrob. Agents* 39, 311–316.
11. Linton, A.H., 1977. AMR: the present situation reviewed. *Vet. Rec.* 100, 354–60.
12. Marshall, B.M. et al., 2011. Food animals and antibiotics: impacts on human health. *Clin. Microbiol. Rev.* 24, 718–33.
13. MoH, 2013. National Action Plan on Combating Drug Resistance in the period 2013-2020.
14. MoH/MARD/MOIT/MONRE, 2015. Aide Memoire: Multi-stakeholder Engagement to Combat AMR in Viet Nam.
15. Nga, D.T.T. et al., 2014. Antibiotic sales in rural and urban pharmacies in northern Viet Nam: an observational study. *BMC Pharmacol. Toxicol.* 15, 6.
16. Nguyen, K. et al., 2013. Antibiotic use and resistance in emerging economies: a situation analysis for Viet Nam. *BMC Public Health* 13, 1158.
17. Nguyen, V.T. et al., 2015. Prevalence and risk factors for carriage of antibiotic-resistant *Escherichia coli* on household and small-scale chicken farms in the Mekong Delta of Viet Nam. *J. Antimicrob. Chemother.* 70, 2144–52.

18. O'Neill, J., 2014. AMR: Tackling a crisis for the health and wealth of nations. The Review on AMR.
19. Pham, D.K. et al., 2015. Monitoring Antibiotic Use and Residue in Freshwater Aquaculture for Domestic Use in Viet Nam. *Ecohealth* 12, 480–489.
20. Quoc, P.L. et al., 2015. Characteristics of Extended-Spectrum Beta-Lactamase-Producing *Escherichia coli* in Retail Meats and Shrimp at a Local Market in Viet Nam. *Foodborne Pathog. Dis.* 12, 719–725.
21. Robert C. Moellering 2010, NDM-1 A Cause for Worldwide Concern Jr., M.D., *N Engl J Med*; 363: 2377-2379 dated 16 December 2010 DI: 10.1056 / NEJMp101171.
22. Rushton, J. et al., 2014. AMR. OECD Publishing.
23. Thai, T.H. et al., 2012. AMR profiles of *Salmonella* serovars isolated from retail pork and chicken meat in North Viet Nam. *Int. J. Food Microbiol.* 156, 147–151.
24. Thu, T.L., 2016. Baseline situation analysis of Viet Nam current legal documents related to management of antibiotic usage and surveillance and monitoring of AMR. Project (UNJP/VIE/050/UNJ).
25. Van Cuong, N. et al., 2016. Antibiotic Consumption in Medicated Feeds in Vietnamese Pig and Poultry Production. *Ecohealth* 13, 1–9.
26. WHO, 2016b. Global Health Security Agenda Roadmap Viet Nam 2015/2016 – 2019/2020.
27. WHO, 2015a. Global Action Plan on AMR.
28. WHO, 2015b. Action Agenda for AMR in the Western Pacific Region.

## APPENDIX

### IMPLEMENTATION ACTIVITIES AND TIMELINES

No	Activities	Leading agency	Participating agencies	Implementing time
1	Submit to Ministry of Agriculture and Rural Development (MARD) for approval of establishment, assignment of functions, responsibilities and budget estimation for the national Steering Sub-committee for Antimicrobial resistance (AMR) control in livestock production and aquaculture.	Department of Animal Health	Directorate of Fisheries, Department of Livestock Production	2017
2	Identify irrelevant and overlapping policies in the national legislation, including gaps, for management of Antimicrobial use (AMU) and monitoring of AMR in livestock production and aquaculture.	Legal Department	Department of Animal Health, Department of Livestock Production, Directorate of Fisheries, National Agro-Forestry-Fishery Quality Assurance Department	2017 - 2020
3	Gradually eliminate and eventually ban the AMU for animal growth promotion purpose (Circular 06/2016/TT-BNNPTNT)	Department of Livestock Production	Department of Animal Health	2017
4	Introduce a legal document for limiting and eventually banning AMU for prevention of animal diseases.	Department of Livestock Production	Department of Animal Health	2017 - 2020
5	Develop guidelines on prescription and sales of antibiotics with prescription.	Department of Animal Health	Legal Department	2018
6	Review and develop legal documents on managing and monitoring usage, import and production of antibiotics	Department of Animal Health	Department of Livestock Production, Directorate of Fisheries	2017-2020

7	Conduct inspection/audits of relevant stakeholders involved in sales or usage of antibiotics in livestock and aquaculture, from import to farm level.	Department of Animal Health	Department of Livestock Production, Directorate of Fisheries	Annually
8	Enhance monitoring of antibiotic residues in food of animal origin targeted both for export and for domestic consumption and publish the findings.	Department of Animal Health, National Agro - Forestry - Fishery Quality Assurance Department		Annually
9	Assess current level of awareness on AMR and AMU by conducting a study among selected target groups (such as livestock and aquaculture professionals, producers and consumers).	Department of Animal Health	National Institute for Veterinary Research, Research Institute for Aquaculture, Sub-departments for livestock production and animal health, Sub-departments for Fisheries.	2017-2018
10	Develop communication tools (including leaflets, posters on AMU/ AMR) to increase awareness on AMR and AMU.	Department of Animal Health, National Agricultural Extension Centre	Directorate of Fisheries, Department of Livestock Production.	2018
11	Organize AMU and AMR advocacy campaigns with key representatives from the animal health, livestock and aquaculture sectors.	Department of Animal Health, Directorate of Fisheries, Department of Livestock Production, National Agricultural Extension Centre	National Agro-Forestry-Fishery Quality Assurance Department; Provincial Sub-departments of agriculture and rural development, Sub-departments for livestock production and animal health, Provincial Sub-department for Agro-Forestry-Fishery Quality Assurance and Sub-departments for Fisheries, Veterinary drug producing and trading companies, animal feed producing and trading companies, Associations, Mass media agencies.	2018 - 2020

NATIONAL ACTION PLAN

For management of antibiotic use and control of antibiotic resistance in livestock production and aquaculture

12	Conduct communication campaigns to increase AMR awareness for livestock and aquaculture farmers and the public	Department of Animal Health, Directorate of Fisheries, Department of Livestock Production, National Agricultural Extension Centre.	National Agro-Forestry-Fishery Quality Assurance Department; Provincial Sub-departments of agriculture and rural development, Sub-departments for livestock production and animal health, Provincial Sub - department for Agro - Forestry -Fishery Quality Assurance and Sub-departments for Fisheries, Veterinary drug producing and trading companies, animal feed producing and trading companies, Associations, Mass media agencies.	2018 - 2020
13	Develop guidelines for good AMU practices in livestock production and aquaculture.	Department of Animal Health	Department of Livestock Production, Directorate of Fisheries, National Institute for Veterinary Research, Research Institute for Aquaculture	2018 - 2020
14	Organize training activities on good AMU practices in treatment, livestock production and aquaculture.	National Agricultural Extension Centre	Department of Animal Health, Department of Livestock Production, Directorate of Fisheries	2018 - 2020
15	Develop a public-private partnership to implement good antibiotic use.	Department of Animal Health, Department of Livestock Production, Aquaculture Department	Veterinary drug producing and trading companies, animal feed producers; Animal Feed and Veterinary Drug producing and trading association.	Annually
16	Integrate content of AMU and AMR in livestock production and aquaculture in veterinary education programmes in universities and colleges as well as in-service training programme for technicians and professionals.	Department of Animal Health	Sub-department for livestock production and animal health, Companies involving in producing and trading of veterinary drugs and animal feed.	2020
17	Strengthen management of veterinary practitioners' licenses, provide additional training for good AMU practices.	Department of Animal Health	Animal Health Association, Provincial Sub-department for livestock production and animal health.	2019 - 2020

18	Provide training on good production practices to reduce needs for antibiotic use in treatment via agriculture extension programs and relevant activities.	National Agricultural Extension Centre	Department of Livestock Production, Aquaculture Department, Provincial agricultural extension centres.	2018 - 2020
19	Enhance usage of diagnostic tools and pathogens identification before prescribe/ use of antibiotics for treatment purposes.	Department of Animal Health	Department of Science, Technology and Environment, MARD's Department of Planning; Provincial Sub-departments of animal health.	Annually
20	Develop a plan to control major infectious diseases in livestock and fisheries (diseases which require antibiotics for treatment).	Department of Animal Health	Animal Health Association, National Institute for Veterinary Research, Veterinary drug producing and trading companies.	2018 - 2020
21	Facilitate evaluation of alternative treatment measures to AMU such as probiotic products (research, policy to support research, alternative products) and application of alternative measures.	Department of Science, Technology and Environment Department of Animal Health	Aquaculture Department, Department of Livestock Production, research institutes, animal drug and feed companies.	2018 - 2020
22	Assess the current capacity of laboratories regarding the testing of AMR microorganism	Department of Animal Health	National Centre for Veterinary Hygiene Inspection (NCVHI), National Centre for Veterinary Diagnosis (NIVR)	2017 - 2018
23	Identify leading laboratories and establish a list of laboratories accredited for testing AMR bacteria	Department of Animal Health	National Centre for Veterinary Hygiene Inspection, relevant laboratories	2017 - 2018
24	Standardized AMR sensitivity test and organise training courses for identified laboratories.	Department of Animal Health	National Centre for Veterinary Hygiene Inspection (NCVHI), National Centre for Veterinary Diagnosis (NIVR), Department of Science, Technology and Environment	2018 - 2020
25	Implement quality assurance activities for AMR testing for the identified laboratories.	Department of Animal Health	Food and Agriculture Organization of the United Nations (FAO), laboratories participating accredited list.	2018 - 2020

## NATIONAL ACTION PLAN

For management of antibiotic use and control of antibiotic resistance in livestock production and aquaculture

26	Develop a national AMR surveillance program on animals and food.	Department of Animal Health	FAO, National Centre for Veterinary Hygiene Inspection (NCVHI)	2017
27	Implement a national AMR surveillance program on animals and food.	Department of Animal Health	National Centre for Veterinary Hygiene Inspection, National Institute for Veterinary Research, relevant laboratories.	2018 - 2020
28	Develop a national AMR surveillance program on fisheries and aquatics products.	Department of Animal Health	FAO, National Centre for Veterinary Hygiene Inspection (NCVHI)	2018
29	Implement a national AMR surveillance program on aquaculture products.	Department of Animal Health	National Centre for Veterinary Hygiene Inspection, National Agro-forestry-fishery Quality Assurance Department, relevant laboratories.	2019 - 2020
30	Develop a central database to facilitate management and analysis of AMR data.	Department of Animal Health	FAO, National Centre for Veterinary Hygiene Inspection, National Institute for Veterinary Research, relevant laboratories.	2018 - 2020
31	Develop reporting forms, mechanism to share results of AMR surveillance program to the identified laboratories and relevant stakeholders.	Department of Animal Health	FAO, National Centre for Veterinary Hygiene Inspection, National Institute for Veterinary Research, relevant laboratories.	2018
32	Establish cooperation programs with research partners to continue surveying and characterising AMR bacteria in food and animals, including the private sector.	Department of Animal Health	Ministry of Health, FAO, World Organisation for Animal Health (OIE), World Health Organization (WHO), Oxford University Clinical Research Unit (OUCRU), CDC and other organisations.	2017-2020
33	Develop and implement a national programme for surveillance of AMU in livestock production and aquaculture.	Department of Animal Health	Department of Livestock Production, Directorate of Fisheries, Veterinary drug producing and trading companies, animal feed, National Institute for Veterinary Research, Research Institute for Aquaculture, universities and colleges.	2018 - 2020

34	Establish cooperation with research partners to provide additional knowledge on AMU practices in livestock production and aquaculture.	Ministry of Agriculture and Rural Development	Department of Animal Health, Department of Livestock Production, universities and colleges, Research institutes.	2019 - 2020
35	Quantify impacts of AMU management in livestock/ aquaculture and AMR occurrence in livestock/ aquaculture.	Department of Animal Health	International organisations, Research institutes, universities and colleges.	2019 - 2020
36	Perform routine monitoring of antibiotic residues in animal-derived food.	Department of Animal Health National Agro - Forestry - Fishery Quality Assurance Department	Department of Livestock Production, Directorate of Fisheries, Sub-departments for livestock production and animal health, Sub-departments for Fisheries, Provincial Sub-departments of Agro - Forestry - Fishery quality assurance.	Annually
37	Share the results of the antibiotic residues surveillance programme.	Department of Animal Health, National Agro-Forestry-Fishery Quality Assurance Department	Relevant agencies, research institutes, universities and colleges	Annually
38	Participate in regular meetings of the National Steering Committee against drug resistance	Department of Animal Health	Ministry of Agriculture and Rural Development, Ministry of Health, Ministry of Industry and Trade, Ministry of Natural Resources and Environment	Annually
39	Conduct joint advocacy and communication activities between the public health and animal health sectors.	Department of Animal Health	Department of Livestock Production; National Agro - Forestry - Fishery Quality Assurance Department; Aquaculture Department; Ministry of Health; Ministry of Industry and Trade; Ministry of Information and Communications; National Agricultural Extension Centre.	Annually

NATIONAL ACTION PLAN

For management of antibiotic use and control of antibiotic resistance in livestock production and aquaculture

40	Foster public-private partnership to increase awareness on AMR in livestock and aquaculture through networks of technicians, professionals working in relevant professional groups.	Department of Animal Health	Associations; local authorities, National Agricultural Extension Centre.	Annually
41	Share data on AMR, AMU and residues monitoring between public health, animal health and environmental sectors.	Department of Animal Health, National Agro - Forestry - Fishery Quality Assurance Department	Department of Food Safety, Ministry of Health, Administration of Environment - Ministry of Natural Resources and Environment	Annually
42	Share results of AMU management and AMR control in the joint report of the public health and animal health sectors.	Department of Animal Health	Administration of Medical Services - Ministry of Health; Administration of Environment - Ministry of Natural Resources and Environment	Annually
43	Participate in regional and international activities on AMU and AMR management in livestock production and aquaculture.	Department of Animal Health	DLP, National Agro - Forestry - Fishery Quality Assurance Department, Aquaculture Department, Department of Science, Technology and Environment, Department of International Cooperation.	Annually
44	Share data on AMU and AMR management in Viet Nam to international partners.	Department of Animal Health	Research institutes, Universities and colleges, Ministry of Health	Annually



