

National Strategic Plan on Antimicrobial Resistance

(2018-2020)

MoPH

Democratic People's Republic of Korea

Abbreviations

AMR	Antimicrobial Resistance
AMS	AMR Stewardship
APIs	Active pharmaceutical ingredients
AMU	Antimicrobial Use
GLASS	Global AMR Surveillance System
NRA	National Regulatory Authority
SDHS	Socio-Economic, Health and Demographic Survey
MTSP	Mid-term Strategic Plan
IPC	Infection Prevention and Control
HAI	Healthcare Associated Infection
HCS	Health Care Setting

Preface

Recently, Antimicrobial Resistance has been a serious issue in the health sector.

Antimicrobial agents have saved millions of lives and significantly contributed to treatment of diseases and health promotion of human beings in the past, but the emergence of those antimicrobial drugs has simultaneously caused difficulties and barriers to treatment and the cost for treatment has been dramatically increased.

The emergence and transmission of AMR are not newly raised issue and these have been resulted from the misuse of antibiotics by prescribers, patients and community who don't have the right understanding on AMR.

Particularly, widespread and constant AMR become a leading cause of HAI occurred by high resistant bacteria in healthcare settings.

Prescription of antibiotics in livestock and fishery sectors is very important to overcome AMR activities.

In many cases, antimicrobial drugs are using routinely in those sectors with the purpose of prevention and growth promotion as a feed-additives regardless of health condition of a large number of animals and fishes.

Activities for prevention of AMR have been thought to be very complicated because of influence from various factors, so that it requires relevant sectors' cooperation.

DPR Korea committed Jaipur declaration on AMR prevention in 2011 and has fulfilled the mission and role as a member of WHO SEARO.

National Strategic Plan (2018-2020) was jointly developed by MoPH in close collaboration with SEARO and WCO DPRK.

Executive Summary

In DPR Korea, several AMR control activities have been conducted.

MoPH recognized that rational use of antimicrobial drugs and AMR control activities are one of the important issues for improving health of the human being and cost-effectiveness of the health work and has been organized various activities for AMR control.

Multi-sectoral coordination committee was established including stakeholders from MoPH, MoA, MoF, Education Committee, State Quality Control Committee and Mass Media with a focal point from MoPH and has been organizing activities on AMR control nationwide.

For continuous monitoring and evaluation of the emergence of AMR in nationwide, National surveillance system on AMR has already been established and operationalized with National AMR reference laboratory in Pyongyang Medical College under **Kim Il Sung** University and provincial and county level laboratories.

In Provincial level laboratories, AMR testing have been conducted routinely and the results submitted to NRL, and the final results from NRL submitted to MoPH after aggregating and analyzing those data every 6 months.

EQA for the different level of AMR laboratories also have been routinely conducted.

Through the surveillance system, all collected information can be sent regularly to MoPH and hospitals and it helps health workers and residents to use antimicrobials rationally.

For dissemination of AMR information, tele-medicine system from central level to city/county level takes an important role. Information on rational use of antimicrobials, technical problems for AMR control and challenges has been disseminated in a regular basis.

Important tasks for quality and quantity improvement in national AMR prevention and control activities for rational prescription and use of antimicrobials and effective response to newly emerging AMR issues have been remained with further strengthening of the above achievements.

National AMR control programme, DPRK established Multi-sectoral coordination committee with the stakeholders from MoPH, MoA, MoF, Education Committee, State Quality Control Committee and Mass Media and developed National AMR Action Plan (2018-2020) in order to achieve the targets described in Global AMR Action Plan adopted in 2015 and further strengthen the AMR control activities in nationwide.

National AMR Action Plan 2018-2020 set the targets in detail aiming at successful prevention and treatment of infectious diseases through effective and safe use of high-quality antimicrobials.

During the period for developing National AMR Action Plan 2018-2020, National AMR situations have been fully deliberated and analyzed between technical assistants from SEARO, WCO DPRK, and FAO DPRK with stakeholders from MoPH, MoA, MoF, Education Committee, State Quality Control Committee and Mass Media and the way-forward for National AMR Action Plan 2018-2020 have been set up based on it.

The following 5 strategic targets described in Global AMR Action Plan adopted in 2015 have been set in National AMR Action Plan 2018-2020 as major targets;

- Improve awareness and understanding of antimicrobial resistance,
- Strengthen knowledge through surveillance and research,
- Reduce the incidence of infection,
- Optimize the use of antimicrobial agents in health, animal and food sectors,
- sustainable investment for AMR management

National AMR Action Plan 2018-2020 has been developed as a key strategic document for National AMR Control Programme to further strengthen and implement the activities on AMR control effectively for 3 years from 2018 to 2020.

Background

1. Country context

The Democratic People's Republic of Korea is situated in northeast Asia with an entire land area of 120 thousand square kilometers of which 80% are mountains. To the North, DPRK has land borders with China along the Amnok River and with Russia along the Tuman River. The climate is temperate with winter season during when temperature usually goes below zero Degree Celsius, summer months with average rainfall of more than 1200 mm during when as well as spring and autumn months. The DPRK's population is ethnically homogenous, they speak one national language.

Administratively, DPRK is divided into 9 provinces and 3 municipalities; Pyongyang, Nampho and Rason City. Provinces are divided into 210 and more cities or counties. A county is further subdivided into smaller geographic areas called *ri*, (*gu*, *dong*) and the county town called *up*. Cities (districts) consist of administrative areas known as *dong*. In big cities, the *dongs* are grouped into administrative units called districts.

DPRK is committed to the philosophy of Juche Idea, which describes the idea of independence, self-reliance and self-defense created President **Kim Il Sung**, and all the laws and regulations are adopted together with implementation of all the activities relying on which.

Demography

According to the 2014 Socio-Economic, Health and Demographic Survey (SDHS), the estimated total population is 24 894 878, about 61.2% of them live in urban areas.

The Ministry of Public Health (MoPH) in DPRK

The central MoPH reports to the cabinet and is directly in charge of implementation of the Public Health Policy and is responsible for treatment, prevention, central and specialist hospitals. Sub-nationally, there are Health Bureaus at Provincial People's Committee and the

Health department at the County and Ri People's Committee.

The DPRK commitment to Primary Health Care

The people-oriented Juche philosophy underpins the national health policy.

It is regarded by the government that good health is fundamental right to human beings and thus guaranteed both politically and by laws.

Universal and free health care has been enforced since 1950 and it is legally guaranteed by the Socialist Constitution of DPR Korea under the article 72(The state bears full responsibility for the life and health of all citizens of the DPR Korea and guarantees: 1) implementation of universal free medical care for people; 2) that priority is given to preventive medicine; and 3) establishment of a well-regulated health system from central to Ri level, and a predominant section doctor system.) and which was adopted in 1972 following when amendment in the Public Health Law was made in 1980.

Main areas covered by the laws are care and education of children, prevention of infectious diseases, drug management and environmental protection. Special priority has also been given to the needs of women and children by the Law.

The commitment of the DPR Korea to the development and maintenance of the primary health care system has been substantial. The health system workforce has developed into 242 341 staff of all categories, one of the highest health workforce to population in the Region.

The DPRK commitment to AMR

Recently, the Medium Term Strategic Plan (MTSP) 2016-2020 has been developed

1) Political framework on AMR

In DPR Korea, there are several policies, regulations and protocols to control AMR. "Law on drug management in DPR Korea", "Regulation on prescription" and "Guidelines on Pharmacy work" describe principles on production, distribution; handle, sale and prescription of drugs including antimicrobials, and 5-year strategic plan for National Economic Development (health

sector) outline measures for reduction rate of HAI due to antimicrobial resistant bacteria by establishing nationwide surveillance system for patient safety.

Animal food is one that can cause AMR in human being, so that AMR control on animal food has been strengthening aggressively in veterinary sector.

There are veterinary & anti-epizootic centers and veterinary & anti-epizootic units from central level to provincial, county/city and Ri level with veterinary department of MoA as a center, and veterinarians do not only for veterinary work but also for AMR control.

“Veterinary and anti-epizootic Law in DPR Korea”, “Law on veterinary drugs, DPR Korea”, “Guideline on veterinary and anti-epizootic work by disease” contain regulations on rational use of antimicrobials for animals, and policy on slaughter and processing has been enforcing that an animal can be used as a food 15 days after antimicrobial use even for treatment to eradicate the source of AMR for human being.

STGs have developed and distributed and IPC committees had been organized and running in all hospitals to control infectious diseases effectively and correctly.

2) Engagement of community into AMR control

AMR is an important problem not only for health workers but also for community using antimicrobials. It must be also well known among medical students who will become health workers in the future.

Government has been strengthening information, education and communication(IEC) to control AMR through rational use among community in several ways. Program “Yaksaem 2.0” presenting in intranet “Naenara” contains information on method of AMU and AMR control, so that the information on AMR could be disseminated through the intranet. Also, IEC materials were developed including “Don’t use antibiotics thoughtlessly” and “Let’s often use Koryo antibiotics”, and health workers strengthen their hygienic campaign among community.

Intentional campaigns on AMR control have been conducted through the several occasions including “World TB Day” event, and special program “Antibiotics” was casted through

Ryongnamsan channel on TV.

Curriculum on resistance were developed and integrated into clinical pharmacology to educate the medical students on AMR, and inserting information on AMU into hygienic of middle school's curriculum has been in discussion with Education committee.

3) Research on AMR

The research has been proceeded to develop the Koryo antibiotics that are suited to the constitutions of Koreans and are full of resources, in substitution for antimicrobials such as penicillin, which cause the antimicrobial resistance due to long-term use.

The research on AMR is being conducted. The research has been undertaken for review the antibiotic resistance against 11 kinds of bacteria including E. coli, streptococcus pneumonia, and mycobacterium tuberculosis in National Reference Laboratory and it was found that the resistance was remarkably high in antibiotics such as penicillin which was developed long time ago and used for a long time.

The research data on AMR was printed in national journals including "Information on Medical Science", "Korea Pharmacology" and "Information on Koryo Technology" and attained a wide circulation.

4) Issues arising in combating against AMR

The important issues for strengthening the struggle against AMR are especially to raise the awareness on AMR among health workers and peoples for stimulating social interests in interventions of AMR. And training and control for clinicians should be enhanced in order to make them do the curative and preventive works in compliance with STG including treatment guideline on infectious disease and timely correct their shortcomings through regular check of prescription.

The scientific evidence on AMR is obtained in lab and the quality of surveillance on the resistance is decided by its capacity. Therefore, it is critical to strengthen human and material resources for ensuring the quality of lab test for AMR.

And the conference and platform on AMR should be organized for sharing the updated information on AMR and popularizing their practical experiences.

2. Situation analysis on AMR and Conclusions

The situation analysis on AMR has been conducted using instruments developed for South East Asia Region and each indicator by focus areas has been reviewed to define the status at which phase the country situation on AMR is. Upon agreement reached by all stakeholders and participants who were invited to review the tools as reflected in the annex 3, assessment has been undertaken to provide situation details in relation to AMR and AMU status within the country presenting the following results by indicators as reflected in each focus- area.

Even though currently ongoing TB program under GF New Funding Model 2015-2018 along with previously undertaken TB programs either by GF or other NGO-driven ones had tried to cover AMR related activities such as small scale DR survey and the support in the field of diagnosis, these activities were meant to be limited only towards TB and thus AMR related many other areas are still in need to be addressed if situation analysis on AMR has to be conducted. The below results are therefore tried to reflect overall situation on AMR rather than narrowing the area only to TB.

Focus Area 1. National AMR Action Plan

NAP in line with GAP-AMR

It has been brought to light that the national AMR action plan should be in line with Global Action Plan – AMR mandating multi-sectoral involvement.

Remarkable public health gains which may be attributed to the committed public health policy that incorporates preventive and curative approach has been made in many areas.

But AMR related activities currently being in place were found to be limited to the area of TB and involvement of other line ministries such as agricultural and veterinary sectors in which antimicrobial use is frequent were lacking. Given the above situations which are foreseen to be improved, it has been agreed that current situation with regards to the Focus area of “National AMR Action Plan” are at **phase I** of “**Exploration and adoption**”.

It has been proposed to update the currently available the National AMR action plan should be upgraded within the framework of **Global Action Plan –AMR** requiring inputs from other non-health sectors and which will be expected to result in integrated comprehensive National AMR Action Plan ensuring the “one health” engagement approach.

Focus Area 2. Awareness raising

1) Awareness campaigns to the public

As pointed out above, the currently existing National Action Plan is in need to be upgraded providing improvements in some lacking areas or including sector-wise activities as non-health sectors such as fishery and agricultural ones were proposed to be incorporated in line with “One Health Approach”.

One of the AMR-related activities which were actively led by the government previously could be exemplified as raised awareness on AMR targeting the audience like community-based population as well as the professionals. But the topics covered were only TB related AMR. Many of the AMR-related other activities led by the government such as curriculum development and nation-wide campaigns targeting general public as well as professionals were mainly limited to the area of human sector and the area of non-human sectors could not be given enough attention to with regards to the AMR-related campaigns.

From this point of view, it has been agreed upon which nation-wide campaigns on AMR need to be broadened beyond TB and the involvement of non-human sectors like fishery, agricultural and veterinary may need to be more prioritized.

Given such context where the country is facing, it has come to a decision to be at between phase 1 and phase 2 in the focus area 2 of “Awareness campaigns to the public”.

2) Education and training strategies for professionals

It has also been advised that key element such as coordination between sectors is lacking as the previously organized trainings and education programme on AMR were happening only in the area of human health. Even the relevant policies developed were lacking in the field of non-human sectors.

It has been agreed upon that integrated education and training strategies need to be developed ensuring effective coordination between sectors and making the strategic plan to be comprehensive including sector-wise reflections.

Phase 2 of “**Program installation**” regarding the focus area 2 of “Awareness campaigns to the public” has been suggested.

Focus Area 3. National AMR surveillance system

1) National human AMR surveillance

The great gains achieved in the field of public health thanks to the universal and free health care system will be strengthened if evidence-based approach is going to be adopted and which can be seen to be into practices through the improved surveillance system. Even the currently developed MTSP 2016-2020 is addressing MDR-TB as one of the most concerning area and which seems to be indicative of the urgent need to establish the surveillance system on human AMR.

It has been suggested that phase 1 of **“Exploration and adoption”** regarding the focus area 3 of **“National AMR surveillance system; National human AMR surveillance”** would be marked addressing pressing needs to expedite the pace in terms of guideline development, data analysis to turn into the actual installation steps.

2) National Laboratory Network strengthening

The limited capacity of laboratory may have an impact on the strengthening of the surveillance system and thus improvement in the capacity including establishment of reference laboratory, thorough capacity in providing EQA along with the capability in delivering the quality diagnosis are suggested to be addressed as key areas to ensure laboratory networking in place.

The agreement has been reached to say at between phase 1 of **“Exploration and adoption”** and phase 2 of **“Program installation”** with regards to the focus area 3 of **“National AMR surveillance system; National Laboratory Network strengthening”**.

3) Early warning systems

It has been suggested that laboratory capacity with well-equipped and thus able to be undertake identification of genotyping and other molecular diagnostic tests should be pre-requested to establish early warning systems.

It has been suggested to expedite the movements toward the further steps as the country is currently settling at phase 1 of **“Exploration and adoption”** regarding the focus area 3 of **“National AMR surveillance system; Early warning systems”**.

Focus Area 4. Rational use of antimicrobials and surveillance of Use/Sale (community-based)

1) A national AMR containment policy for control of human use of antimicrobials; AMR

Stewardship (AMS)

Many of the achievement made in the field of rational use of antimicrobials and surveillance of Use/Sales can be addressed as follows; 1) The national AMR containment policy for control of human use of antimicrobials in place, 2) The National AMS Program (AMSP) planned and under implementation for the period of more than 2 years, 3) M&E system to implement and monitor AMS progress & impact in place in a limited number of sites.

Given such progresses made, it has been jointly reviewed and agreed upon which to be at phase 3 of **“Initial implementation”** regarding the **focus area 4** of **“Rational use of antimicrobials and surveillance of Use/Sale; A national AMR containment policy for control of human use of antimicrobials; AMR Stewardship (AMS)”**

2) National Regulatory Authorities (NRA) or Drug Regulatory Authorities (DRA)

The continuous efforts were made by the government to strengthen the capacity of NRA /DRA prioritizing quality of the health service which is foreseen to be guaranteed by the provision of qualified pharmaceutical products. In spite of such labors, limited capacity of NRA /DRA is still addressed as a main concern to make a further progress towards the AMR related activities.

It has been suggested that the situation should be mentioned to be at **phase 2** of **“Program installation”** regarding the **focus area 4** of **“Rational use of antimicrobials and surveillance of Use/Sale; A national AMR containment policy for control of human use of antimicrobials; National Regulatory Authorities (NRA) or Drug Regulatory Authorities (DRA)”**

3) Surveillance of antimicrobial use (AMU) and sales in humans

The policy in place with regards to “the Surveillance of antimicrobial use (AMU) and sales in humans” is providing legal commitment to this work even though surveillance of AMT sales may need to be more strengthened.

It has been addressed that the country situation is said to be at phase 2 of “**Program installation**” regarding the focus area 4 of “**Rational use of antimicrobials and surveillance of Use/Sale; Surveillance of antimicrobial use (AMU) and sales in humans**”

(1) Regulation of finished antibiotic products and active pharmaceutical ingredients (APIs)

(2) Regulation of pharmacies on over the counter sale and inappropriate sale of antibiotics and APIs

Focus Area 5. Infection Prevention Control & AMR Stewardship program

1) AMR stewardship program in Healthcare setting

Phase 2 of “**Program installation**” regarding the focus area 5 of “**Infection Prevention Control & AMR Stewardship program; AMR stewardship program in Healthcare setting**”

2) IPC program in health care setting (HCS)

Phase 4 of “**Full operation**” regarding the focus area 5 of “**Infection Prevention Control & AMR Stewardship program; IPC program in health care setting (HCS)**”

3) National HAI and related AMR surveillance

Phase 2 of “**Program installation**” regarding the focus area 5 of “**Infection Prevention Control & AMR Stewardship program; National HAI and related AMR**”

surveillance”

4) Sanitation & Hygiene and Vaccination

Phase 4 of **“Full operation”** regarding the **focus area 5 of “Infection Prevention Control & AMR Stewardship program; Sanitation & Hygiene and Vaccination”**

Focus Area 6. Research and Innovation

R&D and innovation on AMR prevention and containment (+ Research funding)

Phase 2 of **“Program installation”** regarding the **focus area 6 of “Research and Innovation**

;R&D and innovation on AMR prevention and containment (+ Research funding)”

Focus Area 7. One Health Engagement

- 1) A national AMR containment policy and regulatory framework for control of animal use, and their registration for use

Phase 2 of **“Program installation”** regarding the **focus area 7 of “One Health engagement; A national AMR containment policy and regulatory framework for control of animal use, and their registration for use”**

- 2) National surveillance of AMR, and use and sales of antimicrobials at national level in the veterinary sector

Phase 2 of **“Program installation”** regarding the **focus area 7 of “One Health engagement**

;National surveillance of AMR, and use and sales of antimicrobials at national level in the veterinary sector”

- 3) Infection prevention and control in the animal sector

Phase 4 of “Full Operation” regarding the focus area 7 of “One Health engagement ; Infection prevention and control in the animal sector”

- 4) AMR awareness generation & education in the animal sector

Phase 1 of “Exploration and adoption” regarding the focus area 7 of “One Health engagement; AMR awareness generation & education in the animal sector”

DRAFT

Country response

1. Strategic AMR Framework 2018-2020

1) Vision

- To promote public awareness campaign on AMR emergence and spreading.
- To improve the rational use of antimicrobial medicines which are accessible to the public.
- To prevent emergence of antimicrobial resistance ensuring the rational use of antimicrobial medicines as well as the appropriate mobilization of other resources.
- To bring behavioral changes toward the rational use of antimicrobial medicines among the professionals in public health sector and the population.
- To ensure effective prevention and containment of antimicrobial medicines through renovation, development of new medicines along with the prompt introduction to the public population.
- To ensure one health engagement involving public health, veterinary and fishery sectors to bring effective prevention and control of AMR in collaboration with relevant sectors.

2) Strategic Objectives

(1) Global goal

To ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them.

(2) Strategic objectives

The overall goal of the action plan is to ensure, for as long as possible, continuity of the ability to treat and prevent infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them.

To achieve this overall goal, five strategic objectives have been identified.

- Improve awareness and understanding of AMR through education and training
- Strengthen knowledge and evidence base through surveillance and research
- Reduce the incidence of infection through effective hygiene and IPC measures
- Optimize the use of antimicrobial medicines in human and animal health
- Ensure sustainable investment through research and development

2. National strategic plan on AMR 2018-2020

Strategic AREA 1: Improve awareness and understanding of AMR through education and training

Strategic AREA 1 is focused on intensifying the Government's political commitment for the national sustainable and effective AMR management and improvement of awareness and understanding of AMR in community through various types of education and trainings and the following activities will be implemented accordingly.

Objective 1. Intensify the political commitment for effective AMR management

High-level policy makers from relevant organizations will organize activities for intensifying political commitment for improvement of awareness and understanding on AMR and its sustainable implementation. Also National level multi-sectoral coordination committee on AMR and sub committees will be established and conduct activities which can support reliably making national policies and its successful implementation. The workshops and trainings between all relevant stakeholders from various organizations will be conducted in order to raise awareness and understanding on rational use of antimicrobials in human being, plants and animals so as to reduce national economic burden owing to AMR. On the other hand, activities for setting up new medium, long term targets of National Action Plan on AMR will be conducted. On the occasion of the International AMR awareness week, posters on AMR will be developed and broadly disseminated through Mass Media like TV and radio to raise awareness and understanding on AMR in community.

Objective 2. Improve awareness and better understanding on AMR through Education and training.

National AMR control programme will conduct discussions with relevant sectors to reflect AMR related knowledge on curriculum in the educational institutions covering medicine, veterinary and fishery and update the curriculum so as to raise awareness and understanding on AMR among students. Also technical trainings on AMR for professionals in relevant sectors will be conducted.

Strategic objective 1: Improve awareness and understanding of AMR through education and training		
Objective 1	Increase national awareness of AMR	
	Strategic interventions	Activities
	1.1. Formation of national AMR steering committee	1.1.1.Arrangement of Multi-sectoal meeting for the formation of National multi-sectoral steering committee on AMR
		1.1.2.Arrangement of Intra/Inter-sectoal meeting for the formation of National technical working groups (sub-committees of IPC, awareness raising, Surveillance & AMU)
	1.2. Organize evidence-based awareness campaigns on AMR targeting professionals in human and non-human health sectors	1.2.1.Orientation meeting with multi-sectoral partners including MoPH, MoA, MoV and other relevant organizations to issue the final version of NSP upon joint-review of draft version NSP
		1.2.2.Organizaion of workshop with relevant stakeholders to develop the national guideline on AMR (human, veterinary& agriculture)
		1.2.3.Organizaion of workshop with relevant stakeholders to revise the national guideline on AMU (human, veterinary& agriculture)
		1.2.4.Conduct KAP survey on AMR among professionals working in the fields of human health, veterinary and agriculture
		1.2.5.Conduct KAP survey on AMR among community-based population
	1.3. Improve public awareness	1.3.1.Orientation meeting with relevant section, authorities and agencies to improve public awareness(literature, publishing, broadcasting, etc) on AMR
		1.3.2.Development of TV broad-casting film on AMR appearance/spreading/impact on human

		and animals
		1.3.3.Film broadcasting on AMR on a regular basis
		1.3.4.National AMR awareness week launching
Objective 2	Education and training	
	2.1. Include AMR and related topics as core component for professional training in the field of health, veterinary and agricultural practices	2.1.1.Organization of workshop to revise the medical school curricula/in-service training materials incorporating AMR as core component
		2.1.2.Organization of workshop to revise the school curricula/in-service professional training materials available in veterinary sector
		2.1.3.anization of workshop to revise the school curricula/in-service professional training materials available in agricultural sector
		2.1.4.Oraganization of workshop on AMR for professionals

Strategic AREA 2: Strengthen knowledge and evidence-base through surveillance and research

Strategic area 2 is focused on fully understanding on the structure of national AMR control programme and activities for addressing effective responses will be conducted.

Objective 1. Establish integrated surveillance system on AMR trends

National AMR control Programme will conduct activities to collect detailed information on current AMR trends in nationwide through further strengthened national AMR surveillance system with National AMR reference laboratory in Pyongyang Medical College under **Kim Il Sung** University.

National AMR control Programme will finalize national AMR guideline through the training for development of national AMR guideline and technical materials and references for relevant professionals will be developed, printed and disseminated. Also the survey for identifying the AMR trends in widely used antimicrobials will be conducted in a small scale.

Objective 2. Establish integrated surveillance system on AMU trends

National AMR control programme will set the basis for effective use of antimicrobials with the correct understanding on the use of antimicrobials in relevant sectors by developing protocols on the use of antimicrobials in human being, plants and animals.

Objective 3. Integration of Modern and traditional medicines ensuring the sustainability maintaining

National AMR control programme will further conduct researches on the use of traditional medicines which has already been used from generation to generation instead of antimicrobials.

Objective 4. Facilitate research on AMR

National AMR control programme will actively conduct researches on effective AMR management locally during the period of National AMR Action Plan 2018-2020.

Strategic Objective 2: Strengthen knowledge and evidence-base through surveillance and research		
Objective 1	Establish integrated surveillance system on AMR trends	
	1.1. Strengthen the political/administrative commitment to AMR through the formation of AMR sub-committee	1.1.1.Orientation meeting with relevant stakeholders to form the AMR committee with issuance of ToR (Public health sector, veterinary and agriculture)
	1.2. Development of guideline on AMR incorporating both of human and non-human sectors	1.2.1.Organization of multi-sectoral body meeting on the development of national guideline on the surveillance of AMR trends in human and non-human sectors
		1.2.2.Publication of AMR-related references (upon completion of translation and editing)
	1.3. Conduct survey	1.3.1.Small-scale Pilot National survey on medicine prescribing practices /AMU/AMR trend within the country (in limitation only to a few key items belonging to the national EML)
		1.3.1.Small-scale survey on the resistance-acquired profile among commonly detected pathogenic bacteria
	1.4. Establish M&E system on AMR	1.4.1.Development of Reporting and recording forms to collect human AMR data by respective level of health facilities
		1.4.2.Organization of workshop on Human AMR data processing and analysis for core staff from respective level of HAIE
		1.4.3.Development of Reporting and recording forms by sectors to collect non-human AMR data
	1.5. Strengthen the capacity of laboratory to provide with	1.5.1.Rebovation of National standard reference laboratory (Pyongyang medical college, Kim Il Sung University)

	AMR-related evidences	1.5.2.Procurement of Lab equipment for undertaking profaning
		1.5.3.Prouement of Lab diagnostic kit/consumables
		1.5.4.Strengthening of laboratory networking -establishment of mechanism to detect emerging resistance and exchange AMR-related information between laboratories and health facilities (at central/provincial/county level)
		1.5.5.Annual inter-sectoral meeting on AMR emergence /way-forwards (MoPH, MoA, MoF)
Objective 2	Establish integrated surveillance system on AMU trends	
	2.1. Strengthen the political/administrative commitment to AMR through the formation of AMR sub-committee	2.1.1.Orientation meeting with relevant stakeholders to form the AMU committee with issuance of ToR
	2.2. Development of guideline on the surveillance of AMU in both human and non-human sectors	2.2.1.Organization of multi-sectoral body meeting on the update of national guideline on the surveillance of AMU incorporating related activities in veterinary and agricultural sectors
	2.3. Conduct survey on AMU	2.3.1.Small-scale survey on antibiotic use among animals whether it was from an intention of treatment or non-treatment
		2.3.2.Nation-wide survey on AMU/AMR trend/triggering factors in relation to the AMR evoking /disease and economic burden resulting from AMR/assess impact of interventions
		2.3.3.Organization of post-survey de-briefing meeting with stakeholders
		2.3.4.Publication of final survey result

	2.4. Establish surveillance system on AMU	2.4.1.Development of Reporting and recording forms to collect human and non-human AMU data by respective level of facilities in human/veterinary/agricultural sectors
		2.4.2.Organization of workshop on Human AMU data processing and analysis for core staff from respective level of human and non-human sectors
		2.4.3.Development of Reporting and recording forms by sectors to collect non-human AMU data
		2.4.4.Organization of international training for core staff to be involved in the national survey /data analysis/
		2.4.5.Procurement of vehicles for undertaking M&E activities on AMR/AMU
Objective 3	Integration of Modern and traditional medicines ensuring the sustainability maintaining	
	3.1.Foster environment on facilitation of traditional Koryo medicine	3.1.1To improve treatment effectiveness through enraging right mix of Koryo and modern medicine
		3.1.2Integration of traditional and modern medicine with regards to the provision of treatment
Objective 4	Facilitate research on AMR	
	4.1.Strenthen knowledge on AMR through research	4.1.1Research on AMR-evoking non-pharmaceutical factors
		4.1.2Conduct clinical trials on the effect of mixed treatment approach

Strategic AREA 3: Reduce the incidence of infection through effective hygiene and IPC measures

Objective 1.Promote healthy and hygienic behaviors at community level

Objective 2.Improve infection control in health care settings

Objective 3.Reduce the antibiotics use in non-health sectors

Strategic Objective 3: Reduce the incidence of infection through effective hygiene and IPC measures		
Objective 1	Promote healthy and hygienic behaviors at community level	
	1.1.Develop and promote good practices related to infection reduction at community level	1.1.1.Orientation meeting with multi-sectoral/inter-sectoral stakeholders (Ministry of City management, MoPH, Printing & TV broad-casting, MoE) on promotion of hygiene and sanitation activities
		1.1.2.TV broad-casting on hygiene and sanitation related topics
		1.1.3.Printing of vaccination posters/flyers
	1.2 School curricula revision in cooperating AMR-related topics	1.2.1.Workshop with relevant stakeholders to revise school curricula including hygiene and sanitation related ones(MoPH & MoE)
Objective 2	Improve infection control in health care settings	
	2.1. Formation of national technical sub-committee for IPC	2.1.1.Arrangement of Multi-sectoral /Intra-sectoral meeting for the formation of National technical sub- committee for IPC
	2.2.Development, Printing and Distribution of STGs/OP/guidelines/Protocols on IPC/AMR	2.2.1.Develop, print and distribute AMR/AMR related IPC guidelines/Protocols by different level of HCS
		2.2.2.Develop, print and distribute guidelines for hospitals to mandate on HAI and related AMR surveillance
	2.3. Establishment of surveillance system on HAI and related AMR along with Database establishment	2.3.1.Form development to collect HAI/related AMR data
		2.3.2.Organization of training for hygiene and anti-epidemic Institute staff on data processing, analysis and reporting on HAI surveillance

		related ones
	2.4. Conduct survey on safe injection practices	2.4.1.Small scale survey on safe injection practices within limited number of health facilities
	2.5. Promote effective hand hygiene practices among HCS staff	2.5.1.Printing of Hand-washing posters
	2.6.Physical renovation of infrastructures within HCS	2.6.1.Renovation of infra-structure to enhance sanitation status within health facilities (Sites and number needs to be decided)
		2.6.2.Procurement of IPC protection equipment
Objective 3	Reduce the antibiotics use in non-health sectors	
	3.1.Development, Printing and Distribution of STGs/OP/guidelines/Protocols on IPC/AMR in veterinary and agricultural sectors	3.1.1.Develop, print and distribute guidelines/Protocols on control/reduction of antibiotics in veterinary and agricultural sectors
	3.2. Establish surveillance system	3.2.1.Establish model surveillance system in 10 sites to aggregate and report AMR/AMU data in veterinary sector

Strategic AREA 4: Optimize the use of antimicrobial medicines in human and animal health

Objective 1.Ensure the qualified antimicrobials to be accessed for all consumers

Objective 2.Facilitate the rational use of antimicrobial medicines in human and animals

Objective 3.Strengthen the monitoring system on side-effects from drug use(mainly from antimicrobial medicines)

Strategic Objective 4: Optimize the use of antimicrobial medicines in human and animal health		
Objective 1	Ensure the qualified antimicrobials to be accessed for all consumers	
	1.1.Strengthen the technical capacity of Drug regulation and authority	1.1.1.Provide technical assistance to upgrade the technical capacity of NRA/NCL
		1.1.2.Provision of equipment, instrument and reagents for quality control
		1.1.3.Physical renovation of Pyongyang medical college hospital laboratory to ensure quality of drugs as a reference laboratory
		1.1.4.Strengthening exchange and collaboration with other quality control institutes in the region
Objective 2	Facilitate the rational use of antimicrobial medicines in human and animals	
	2.1.Equip HCS staff with updated information on essential medicines ensuring good practices among practitioners	2.1.1.Adapt, print and distribute WHO guidelines on Essential medicines
		2.1.2.Organize workshop on rational use of drugs for practitioners
	2.2.Revision of school curricula on rational use of antimicrobial	2.2.1.Update the currently available school curricula incorporating the topics on control of antimicrobial for animal use & registration if

	medicines	used
		2.2.2.Update the medical college/in-service training course training material incorporating AMR-related topics as well as the one for control of human use of antimicrobial medicines
	2.3.Ensure evidence-based prescribing and dispensing of antimicrobial medicines	2.3.1.Conduct survey on influencing factors to develop sub-/non-standard prescribing/dispensing habits
		2.3.2. Conduct KAP survey on behavioral determinant factors for self-prescribing attitudes among drug consumers
		2.3.3.Publication of references on survey design and organization
Objective 3	Strengthen the monitoring system on side-effects from drug use(mainly from antimicrobial medicines)	
	3.1. Establish data-base on side-effects from drug use	3.1.1.Renew the R&R forms to collect data on side effects from drug use
		3.1.2.Organize the workshop on how to use the updated R&R forms, data processing and analysis

Strategic AREA 5: Ensure sustainable investment through research and development

National AMR control activities in DPRK have been conducted by MoPH and relevant sectors with concerns. In the past, these activities have not been conducted in a unifying way but partially in some disease control programs so sustainable investment could not be ensured.

National AMR control programme will conduct activities for ensuring sustainable investment for effective management on AMR by enhancing the research and development on this area.

Objective 1. Develop the economic case for sustainable investment

The activities for introducing recommended AMR responses and approaches globally in line with national situation will be conducted by organizing study tours and trainings on effective AMR management.

Objective 2. Ensure evidence-based input taking account of economic impact

In nationwide, the operational researches for measuring AMR related financial burden will be conducted to lay out the baseline data for the further AMR management.

Objective 3. Ensure ABT prescribers to be accessible to the information on pathogen susceptibility to ABTs

The activities for increasing the efficacy of antimicrobials will be conducted by collecting and informing the data on emerging AMR related pathogens health workers and populations through National AMR surveillance system.

Strategic Objective 5: Ensure sustainable investment through research and development		
Objective 1	Develop the economic case for sustainable investment	
	1.1. Straitening of governance in health economics	1.1.1 Organize fellowships in health economics
		1.1.2 Study tour for health managers
		1.1.3 Organize inter-sectoral meeting with relevant stakeholders to develop the economic case to assess the needs in the area of human resource allotment,

		evidence-based use of interventions, effective mobilization of non-human resources, etc.
	1.2. Strengthening of governance in non-human health sector economics	<p>1.2.1 Research on affecting factors to human in case of the antimicrobial use in animals or in agricultural sector</p> <p>1.2.2 Organize inter-sectoral meeting with relevant stakeholders to develop the economic case on the needs for the evidence-based use of interventions, effective mobilization of human/non-human resources, organization of training, etc.</p>
Objective 2	Ensure evidence-based input taking into account of economic impact	
	2.1. Measure the economic impact from AMR burden	<p>2.1.1 Undertake study to measure the economic burden of AMR in the sector of human health</p> <p>2.1.2 Undertake study to measure the economic burden of AMR in the non-human health sector</p>
Objective 3	Ensure ABT prescribers to be accessible to the information on pathogen susceptibility to ABTs	
	3.1. Introduction of diagnostic tools to provide information on pathogen susceptibility to available ABTs	<p>3.1.1 Provide point-of-care diagnostic tools to inform pathogen susceptibility to ABTs prescribed in a pilot sites health facilities</p>

3. Operational and budget Plan

Operational Plan & Budget								
Sub-activity	Unit	Quantity	Date	Location	Responsible Entity	Cost (USD)	Source of funding	Indicator
Strategic objective 1: Improve awareness and understanding of AMR through education and training								
Objective 1: Increase national awareness of AMR								
Strategic intervention 1.1. Formation of national AMR steering committee								
Activity 1.1.1. Arrangement of Multi-sectoral meeting for the formation of National multi-sectoral steering committee on AMR								
	Consultative Meeting	1	2017-Sep	Pyongyang	MoPH, MoE, MoA, relevant sectors			
Activity 1.1.2. Arrangement of Intra/Inter-sectoral meeting for the formation of National technical working groups (sub-committees of IPC, awareness raising, Surveillance & AMU)								
Sub-activity 1.1.2.1 Arrangement of Intra-sectoal meeting for the formation of sub-committee of IPC	Consultative Meeting	1	2017-Sep		MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.1.2.2 Arrangement of Intra-sectoal meeting for the formation of sub-committee of awareness raising	Consultative Meeting	1	2017-Sep		MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.1.2.1 Arrangement of Intra-sectoal meeting for the formation	Consultative Meeting	1	2017-Sep		MoPH, MoE, MoA, relevant sectors		MoPH	

of AMR sub-committee								
Sub-activity 1.1.2.1 Arrangement of Intra-sectoeal meeting for the formation of AMU sub-committee	Consultative Meeting	1	2017-Sep		MoPH, MoE, MoA, relevant sectors		MoPH	
Strategic intervention 1.2. Organize evidence- based awareness campaigns on AMR targeting professionals in human and non-human health sectors								
1.2.1.Orientation meeting with multi-sectoral partners including MoPH, MoA, MoV and other relevant organizations to issue the final version of NSP upon joint-review of draft version NSP								
	Consultative Meeting	1	2017-Sep	Pyongyang	MoPH, MoE, MoA, relevant sectors	2838	WHO	
1.2.2.Organizaion of workshop with relevant stakeholders to develop the national guideline on AMR (human, veterinaray& agriculture)								
	Consultative Meeting	1	2017-Sep	Pyongyang	MoPH, MoE, MoA, relevant sectors		MoPH	
1.2.3.Organizaion of workshop with relevant stakeholders to revise the national guideline on AMU (human, veterinaray& agriculture)								
	Consultative Meeting	1	2017-Sep	Pyongyang	MoPH, MoE, MoA, relevant sectors		MoPH	
1.2.4.Conduct KAP survey on AMR among professionals working in the fields of human health, veterinary and agriculture								
Sub-activity 1.2.4.1. Development of questionnaire/indicators/guideline	Awareness survey	1		Limited sites	MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.2.4.2. Software development for data management	Awareness survey	1			MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.2.4.3. Survey implementation (survey team	Awareness survey	1			MoPH, MoE, MoA, relevant sectors		MoPH	

formation, administrative preparation, actual implementation)								
Sub-activity 1.2.4.4. Issuance of final Report	Awareness survey	1			MoPH, MoE, MoA, relevant sectors		MoPH	
1.2.5. Conduct KAP survey on AMR among community-based population								
Sub-activity 1.2.5.1. Development of questionnaire/indicators/guideline	Awareness survey	1		Limited sites	MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.2.5.2. Software development for data management	Awareness survey	1			MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.2.5.3. Survey implementation (survey team formation, administrative preparation, actual implementation)	Awareness survey	1			MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.2.5.4. Issuance of final Report	Awareness survey	1			MoPH, MoE, MoA, relevant sectors		MoPH	
Strategic intervention 1.3. Improve public awareness								
1.3.1. Orientation meeting with relevant section, authorities and agencies to improve public awareness (literature, publishing, broadcasting, etc) on AMR								
	Consultative Meeting	1		Pyongyang	MoPH, TV broadcasting, MoE, MoA, relevant sectors		MoPH	
1.3.2. Development of TV broad-casting film/literature/Reference on AMR appearance/spreading/impact on human and animals								
Sub-activity 1.3.2.1. Development/publication of AMR poster	Development /publication	1000			MoPH, TV broadcasting, MoE, MoA, relevant sectors			

Sub-activity 1.3.2.2. Development/publication of juvenile literature on AMR	Development /publication	1000			MoPH,TV broadcasting, MoE, MoA, relevant sectors			
Sub-activity 1.3.2.3. Development of Scientific documentary film on AMR	Development	1		Pyongyang	MoPH,TV broadcasting, MoE, MoA, relevant sectors			
1.3.3.Film broadcasting on AMR on a regular basis								
	TV broadcasting	On a quarterly basis		Nationwide	TV broadcasting agency			
1.3.4.National AMR awareness week launching								
		Annually			MoPH, MoE, MoA, relevant sectors			
Objective 2: Education and training								
Strategic intervention 2.1. Include AMR and related topics as core component for professional training in the field of health, veterinary and agricultural practices								
2.1.1.Organization of workshop to revise the medical school curricula/in-service training materials incorporating AMR & the topic on control of human use of antimicrobial medicines								
	Consultative Meeting	1		Pyongyang	MoPH, MoE		MoPH	
2.1.2.Organization of workshop to revise the school curricula/in-service professional training materials available in veterinary sector (incorporating the topics on control of antimicrobial for animal use & registration if used, and AMR/AMU)								
	Consultative Meeting	1		Pyongyang	MoA, MoE		MoA	

2.1.3.Organization of workshop to revise the school curricula/in-service professional training materials available in agricultural sector (incorporating the topics on control of antimicrobial for animal use & registration if used, and AMR/AMU)								
	Consultative Meeting	1		Pyongyang	MoA, MoE		MoA	
2.1.4.Oraganization of workshop on AMR for professionals								
Sub-activity 2.1.4.1. Organization of workshop on AMR for professionals in public health sector	Workshop			Nationwide	MOPH			
Sub-activity 2.1.4.2. Organization of workshop on AMR for professionals in agricultural sector	Workshop			Nationwide	MoA			
Sub-activity 2.1.4.3. Organization of workshop on AMR for professionals in fishery/veterinary sectors	Workshop			Nationwide	MoF			
Strategic Objective 2: Strengthen knowledge and evidence-base through surveillance and research								
Objective 1: Establish integrated surveillance system on AMR trends								
1.1. Strengthen the political/administrative commitment to AMR through the formation of AMR sub-committee								
1.1.1.Orientation meeting with relevant stakeholders to form the AMR committee with issuance of ToR (Public health sector, veterinary and agriculture)								
Sub-activity 1.1.1.1. Formation of Human-AMR subcommittee	Consultative Meeting	1			MoPH			
Sub-activity 1.1.1.2. Formation of Non human-AMR subcommittee	Consultative Meeting	1			MoA, MoE, MoF, other relevant agencies			

1.2. Development of guideline on AMR incorporating both of human and non-human sectors								
1.2.1.Organizational multi-sectoral body meeting on the development of national guideline on the surveillance of AMR trends in human and non-human sectors								
Sub-activity 1.2.1.1. Development of national guideline on Human AMR trends surveillance	Guideline development	1			MoPH			
Sub-activity 1.2.1.2. Development of national guideline on Non-human AMR trends surveillance	Guideline development	1			MoA, MoE, MoF, other relevant agencies			
1.2.2.Publication of AMR-related references (upon completion of translation and editing)								
Translation/editing of AMR related references	Translation	1			MoPH		WHO	
Publication of AMR related references	Publication	500			MoPH		WHO	
1.3. Conduct survey								
1.3.1.Small-scale Pilot national survey on medicine prescribing practices /AMU/AMR trend/triggering factors in relation to the AMR evoking /disease and economic burden resulting from AMR/assessment on impact of interventions within the country (in limitation only to a few key items belonging to the national EML)								
Sub-activity 1.3.1.1. Development of questionnaire/indicators/guideline	AMR/AMU survey	1		Nationwide	MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.3.1.2. Software development for data management	AMR/AMU survey	1		Nationwide	MoPH, MoE, MoA, relevant sectors		MoPH	
Sub-activity 1.3.1.3. Survey implementation (survey team)	AMR/AMU survey	1		Nationwide	MoPH, MoE, MoA, relevant sectors		MoPH	

formation, administrative preparation, actual implementation)								
Sub-activity 1.3.1.4. Issuance of final Report	AMR/AMU survey	1		Nationwide	MoPH, MoE, MoA, relevant sectors		MoPH	
1.3.2.Small-scale survey on the resistance-acquired profile among commonly detected pathogenic bacteria								
Sub-activity 1.3.2.1. procurement of diagnostic kit-	Procurement				MoPH			
Sub-activity 1.3.2.2. Technical assistance	Consultancy				MoPH/WHO			
1.4. Establish M&E system on AMR								
1.4.1.Development of Reporting and recording forms to collect human AMR data by respective level of health facilities								
Sub-activity 1.4.1.1. Development of R&R forms on AMR surveillance for central level health facilities	Form development			central level	MoPH			
Sub-activity 1.4.1.2. Development of R&R forms on AMR surveillance for provincial/county level health facilities	Form development			regional/ sub-central/ level	MoPH			
1.4.2.Organization of workshop on Human AMR data processing and analysis for core staff from respective level of HAIE								
	Workshop			Limited sites	MOPH			
1.4.3.Development of Reporting and recording forms by sectors to collect non-human AMR data								
Sub-activity 1.4.3.1. Development of R&R forms on AMR surveillance in	Form development				MoA, MoF			

agricultural/veterinary/fishery sector								
1.5. Strengthen the capacity of laboratory to provide with AMR-related evidences								
1.5.1. Renovation of National standard reference laboratory (Pyongyang medical college, Kim Il Sung University)								
	Construction				MoPH			
1.5.2. Procurement of Lab equipment for undertaking profaning								
	Procurement				MoPH			
1.5.3. Procurement of Lab diagnostic kit/consumables								
	Procurement				MoPH			
1.5.4. Strengthening of laboratory networking - establishment of mechanism to detect emerging resistance and exchange AMR-related information between laboratories and health facilities (at central/provincial/county level)								
Sub-activity 1.5.4.1. Organization of intra-sectoral consultative meeting on establishment of reporting/feedback mechanism on AMR-related information	Workshop				MoPH			
1.5.5. Annual inter-sectoral meeting on AMR emergence /way-forwards (MoPH, MoA, MoF)								
	Workshop	Annually			MoPH, MoA, MoF			
Objective 2: Establish integrated surveillance system on AMU trends								

2.1. Strengthen the political/administrative commitment to AMR through the formation of AMR sub-committee								
2.1.1.Orientation meeting with relevant stakeholders to form the AMU committee with issuance of ToR								
Sub-activity 2.1.1.1. Formation of Human-AMU subcommittee	Consultative Meeting	1			MoPH			
Sub-activity 2.1.1.2. Formation of Non human-AMU subcommittee	Consultative Meeting	1			MoA, MoE, MoF, other relevant agencies			
2.2. Development of guideline on the surveillance of AMU in both human and non-human sectors								
2.2.1.Organization of multi-sectoral body meeting on the update of national guideline on the surveillance of AMU incorporating related activities in veterinary and agricultural sectors								
Sub-activity 2.2.1.1. Development of national guideline on Human AMU trends surveillance	Guideline development	1			MoPH			
Sub-activity 2.2.1.2. Development of national guideline on Non-human AMU trends surveillance	Guideline development	1			MoA, MoE, MoF, other relevant agencies			
2.3. Conduct survey on non-human AMR/AMU								
2.3.1.Small-scale survey on antibiotic use among animals whether it was from an intention of treatment or non-treatment								
Sub-activity 2.3.1.1. Development of questionnaire/indicators/guideline	non-human AMR/AMU survey	1		Limited sites	MoE, MoA, relevant sectors			
Sub-activity 2.3.1.2. Software development for data management	non-human AMR/AMU	1		Limited sites	MoE, MoA, relevant sectors			

	survey							
Sub-activity 2.3.1.3. Survey implementation (survey team formation, administrative preparation, actual implementation)	non-human AMR/AMU survey	1		Limited sites	MoE, MoA, relevant sectors			
Sub-activity 2.3.1.4. Issuance of final Report	non-human AMR/AMU survey	1		Limited sites	MoE, MoA, relevant sectors			
2.4. Establish surveillance system on AMU								
2.4.1. Development of Reporting and recording forms to collect human and non-human AMU data by respective level of facilities in human/veterinary/agricultural sectors								
Sub-activity 1.4.3.1. Development of R&R forms on AMU in human	Form development				MoPH			
Sub-activity 1.4.3.2. Development of R&R forms on AMU in agricultural/veterinary/fishery sector	Form development				MoA, MoF			
2.4.2. Organization of workshop on Human AMU data processing and analysis for core staff from respective level of human and non-human sectors								
Sub-activity 2.4.3.1. Organization of workshop on Human - AMU data aggregation/analysis	Workshop	1			MoPH,			
Sub-activity 2.4.3.2. Organization of workshop on Non human - AMU data aggregation/analysis	Workshop	1			MoE, MoA, relevant sectors			

2.4.4.Organization of international training for core staff to be involved in the national survey /data analysis/								
	International training	1			MoPH			
2.4.5. Procurement of vehicles for undertaking M&E activities on AMR/AMU								
	Procurement	1			MoPH			
Objective : Integration of Modern and traditional medicines ensuring the sustainability maintatining								
3.1.Foster environment on facilitation of traditional Koryo medicine								
3.1.1.To improve treatment effectiveness through enraging right mix of Koryo and modern medicine								
	Research	1			MoPH			
3.1.2. Integration of traditional and modern medicine with regards to the provision of treatment								
	Research	1			MoPH			
Objective 4: Facilitate research on AMR								
4.1.Strenthen knowledge on AMR through research								
4.1.1.Research on AMR-evoking non-pharmaceutical factors								
	Research	1			MoPH			
4.1.2.Conduct clinical trials on the effect of mixed treatment approach								
	Research	1			MoPH			

Strategic Objective 3: Reduce the incidence of infection through effective hygiene and IPC measures								
Objective 1: Promote healthy and hygienic behaviors at community level								
1.1. Develop and promote good practices related to infection reduction at community level								
1.1.1. Orientation meeting with multi-sectoral/inter-sectoral stakeholders (Ministry of City management, MoPH, Printing & TV broad-casting, MoE) on promotion of hygiene and sanitation activities								
	Workshop	1			MoPH			
1.1.2. TV broad-casting on hygiene and sanitation related topics								
	TV broadcasting	On a quarterly basis			MoPH			
1.1.3. Printing of vaccination posters/flyers								
	publication	5000			MoPH		WHO	
1.2 School curricula revision in corporation AMR-related topics								
1.2.1. Workshop with relevant stakeholders to revise school curricula including hygiene and sanitation related ones (MoPH&MoE)								
	Workshop	1			MoPH, MoE			
Objective 2: Improve infection control in health care settings								
2.1. Formation of national technical sub-committee for IPC								
2.1.1. Arrangement of Multi-sectoral /Intra-sectoral meeting for the formation of National technical sub-committee for IPC								

	Consultative Meeting	1			MoA, MoE, MoF, other relevant agencies			
2.2.Development, Printing and Distribution of STGs/OP/guidelines/Protocols on IPC/AMR								
2.2.1.Revise, print and distribute AMR/AMR related IPC guidelines/Protocols by different level of HCS								
Sub-activity 2.2.1.1. Organization of workshop on development of AMR/AMU related IPC guidelines/Protocols to be used at referral unit (central/provincial level health facilities)	Guideline development	1			MoPH			
Sub-activity 2.2.1.2. Organization of workshop on development of AMR/AMU related IPC guidelines/Protocols to be used at county level health facilities	Guideline development	1			MoPH			
Sub-activity 2.2.1.3. Organization of workshop on development of AMR/AMU related IPC guidelines/Protocols to be used at peripheral level (Ri/Dong clinics)	Guideline development	1			MoPH			
Sub-activity 2.2.1.4. Publication of IPC guidelines/Protocols to be used at different levels peripheral level (Ri/Dong clinics)	Publication	1			MoPH			

2.2.2.Develop, print and distribute guidelines for hospitals to mandate on HAI and related AMR surveillance								
Sub-activity 2.2.2.1. Organization of workshop on development of guidelines for hospitals to mandate on HAI and related AMR surveillance	Guideline development	1			MoPH			
Sub-activity 2.2.2.2. Publication of guidelines for hospitals to mandate on HAI and related AMR surveillance	Publication	500			MoPH			
2.3. Establishment of surveillance system on HAI and related AMR along with Database establishment								
2.3.1.Form development to collect HAI/related AMR data								
Sub-activity 1.4.3.1. Development of HAI/related AMR data management form	Form development	1			MoPH			
Sub-activity 1.4.3.2. Publication of HAI/related AMR data management form	Form publication	1000			MoPH			
2.3.2.Organization of training for hygiene and anti-epidemic Institute staff on data processing, analysis and reporting on HAI surveillance related ones								
	Workshop	1			MoPH			
2.4. Conduct survey on safe injection practices								
2.4.1.Small scale survey on safe injection practices within limited number of health facilities								
Sub-activity 2.4.1.1. Development of questionnaire/indicators/guideline	Survey	1		Limited sites	MoPH			

Sub-activity 2.4.1.2. Software development for data management	Survey	1		Limited sites	MoPH			
Sub-activity 2.4.1.3. Survey implementation (survey team formation, administrative preparation, actual implementation)	Survey	1		Limited sites	MoPH			
Sub-activity 2.4.1.4. Issuance of final Report	Survey	1		Limited sites	MoPH			
2.5. Promote effective hand hygiene practices among HCS staff								
2.5.1. Printing of Hand-washing posters								
	Publication	5000		Nationwide	MoPH		WHO	
2.6. Physical renovation of infrastructures within HCS								
2.6.1. Renovation of infra-structure to enhance sanitation status within health facilities								
	Construction	10		Limited area	MoPH			
Objective 3: Reduce the antibiotics use in non-health sectors								
3.1. Development, Printing and Distribution of STGs/OP/guidelines/Protocols on IPC/AMR in veterinary and agricultural sectors								
3.1.1. Develop, print and distribute guidelines/Protocols on control/reduction of antibiotics in veterinary and agricultural sectors								
Sub-activity 3.1.1.1. Development of guidelines/Protocols on control/reduction of antibiotics in veterinary	Guideline development	1			MoA			

Sub-activity 3.1.1.2. Development of guidelines/Protocols on control/reduction of antibiotics in agricultural sector	Guideline development	1			MoA			
Sub-activity 3.1.1.3. publication of guidelines/Protocols on control/reduction of antibiotics in agricultural sector	Publication	1			MoA			
3.2. Establish surveillance system								
3.2.1. Establish model surveillance system in 10 sites to aggregate and report AMR/AMU data in veterinary sector								
Sub-activity 3.2.1.1. Provide training on how to aggregate/process/analyze AMR/AMU data using newly developed R&R forms	Workshop	1			MoA			
Strategic Objective 4: Optimize the use of antimicrobial medicines in human and animal health								
Objective 1: Ensure the qualified antimicrobials to be accessed for all consumers								
1.1. Strengthen the technical capacity of Drug regulation and authority								
1.1.1. Provide technical assistance to upgrade the technical capacity of NRA/NCL								
Sub-activity 1.1.1.1. International TA	Technical assistance	1			MoPH, WHO			
1.1.2. Provision of equipment, instrument and reagents for quality control								

	Procurement				MoPH, WHO			
1.1.3.Physical renovation of Pyongyang medical college hospital laboratory to ensure quality of drugs as a reference laboratory								
	Construction	1			MoPH			
1.1.4.Strengthening exchange and collaboration with other quality control institutes in the region								
Sub-activity 1.1.4.1. Organize study tour		1			MoPH, WHO			
Objective 2: Facilitate the rational use of antimicrobial medicines in human and animals								
2.1.Equip HCS staff with updated information on essential medicines ensuring good practices among practitioners								
2.1.1.Adapt, print and distribute WHO guidelines on Essential medicines								
	Publication				MoPH, WHO			
2.1.2.Organize workshop on rational use of drugs for practitioners								
Sub-activity 2.1.2.1. Organize workshop on rational use of drugs for practitioners from central level	Training				MoPH			
Sub-activity 2.1.2.1. Organize workshop on rational use of drugs for practitioners from peripheral level	Training				MoPH			
2.2. Ensure evidence-based prescribing and dispensing of antimicrobial medicines								

2.2.1. Conduct survey on influencing factors to develop sub-/non-standard prescribing/dispensing habits								
	Survey	1			MoPH			
2.2.2. Conduct KAP survey on behavioral determinant factors for self-prescribing attitudes among drug consumers								
	Survey	1			MoPH			
2.2.3. Publication of references on survey design and organization								
	Reference publication	500			MoPH			
Objective 3: Strengthen the monitoring system on side-effects from drug use (mainly from antimicrobial medicines)								
3.1. Establish data-base on side-effects from drug use								
3.1.1. Renew the R&R forms to collect data on side effects from drug use								
	Workshop				MoPH			
3.1.2. Organize the workshop on how to use the updated R&R forms, data processing and analysis								
	Workshop				MoPH			
Strategic Objective 5: Ensure sustainable investment through research and development								
Objective 1: Develop the economic case for sustainable investment								
1.1. Strengthening of governance in health economics								

1.1.1. Organize fellowships in health economics								
	International training				MoPH, WHO			
1.1.2. Study tour for health managers								
	International training				MoPH, WHO			
1.1.3. Organize inter-sectoral meeting with relevant stakeholders to develop the economic case to assess the needs in the area of human resource allotment, evidence-based use of interventions, effective mobilization of non-human resources, etc.								
	Workshop				MoA, MoE, MoF			
1.2. Strengthening of governance in non-human health sector economics								
1.2.1. Research on affecting factors to human in case of the antimicrobial use in animals or in agricultural sector								
	Research				MoA			
1.2.2. Organize inter-sectoral meeting with relevant stakeholders to develop the economic case on the needs for the evidence-based use of interventions, effective mobilization of human/non-human resources, organization of training, etc.								
	Workshop				MoA, MoE, MoF			
Objective 2: Ensure evidence-based input taking into account of economic impact								
2.1. Measure the economic impact from AMR burden								
2.1.1. Undertake study to measure the economic burden of AMR in the sector of human health								
	Research				MoPH			

2.1.2. Undertake study to measure the economic burden of AMR in the non-human health sector								
	Research				MoPH			
Objective 3: Ensure ABT prescribers to be accessible to the information on pathogen susceptibility to ABTs								
3.1. Introduction of diagnostic tools to provide information on pathogen susceptibility to available ABTs								
3.1.1. Provide point-of-care diagnostic tools to inform pathogen susceptibility to ABTs prescribed in a pilot sites health facilities								
Sub-activity 3.1.1.1. Procurement of point-of-care diagnostic tools	Procurement				MoPH, WHO			

4. Monitoring and Evaluation Plan

The monitoring and evaluation plan is under development.

The plan will be developed through the analysis of all evaluation indicators because the baseline data on indicators have still not been collected and analyzed.

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Annex: Instrument for Situation Analysis and Monitoring of Antimicrobial Resistance in-country

Focus Areas	Indicators/Phases	Exploration and adoption(Ph1)	Program installation(Ph2)	Initial implementation(Ph3)	Full operation(Ph4)	Sustainable Operation(Ph5)
1. National AMR Action Plan	NAP In line with GAP-AMR	No Action Plan or No nat. multisectoral committee or AMR committee established but involving one ministry	AMR working group established and National action plan underway	GAP-aligned Action plan* including operational plan with defined activities and respective budget available	Action plan includes operational plan being rolled out & scaled up with defined activities and respective budget	Action plan includes operational plan being rolled out & scaled up with defined activities and respective budget
2. Awareness raising	Awareness campaigns to the public	Government not involved in awareness-raising activities on antibiotic resistance	Some government-led activities in parts of the country to raise awareness about AMR and actions to address it	Nationwide, government-led antibiotic awareness campaign targeting the general public OR professionals**	Nationwide, government-led antibiotic awareness campaign targeting public AND professionals	Impact of government led awareness campaigns assessed over behavior changes in public and professionals
	Education and training strategies for professionals	No policy or strategy	Relevant policies developed but ad-hoc training courses in some disciplines	AMR in some pre service training and/or some special courses OR Continuous professional development and regular audit of learning	AMR in some pre service training and/or some special courses AND Continuous professional development and regular audit of learning	AMR incorporated into pre service training for all relevant cadres. Regular continuing professional development

3. National AMR surveillance system	National human AMR surveillance	No capacity for AMR laboratory and/or limited reporting; or no surveillance guidelines	Guidelines developed but not fully implemented – limited quality data and analysis and/representativeness	Standardized national AMR surveillance in place and representative of country but limited number of op. sites	Surveillance in place and functional to monitor AMR trends accurately and timely but no contributing data to GLASS*	National AMR surveillance regularly assessed and adjusted; and contributing to GLASS
	National Laboratory Network strengthening	No national network developed	A national network with testing according to the international standards is planned	Nat. Ref. Lab identified and quality assured laboratory networks developed only at few surveillance sites	A national network of EQA health laboratories developed in most /ALL surveillance sites	Lab network established, EQA measures in place, and demonstrated capacity of reference lab for research
	Early warning systems	No system in place or planned	System planned, in keeping with international standards	System is implemented in pilot mode, or if implemented on a national scale either not fully functional (not sensitive to reportable events)	Demonstrated functional capacity: data centralized and analyzed with reports	Demonstrated functional capacity and proof of response from detection
and surveillance of Use/Sale of antimicrobials; AMR Stewardship	A national AMR containment policy for control of human use of antimicrobials; AMR Stewardship	No/weak national policy & plan, regulations for antimicrobial use and availability	National AMS Program (AMSP) planned and under development	National AMS Program (AMSP) is developed Including tools to implement and monitor AMS progress & impact	AMSP implemented by relevant institutions. Regulations for antimicrobial use and availability implemented in limited capacity	A national AMSP for control of human use of antimicrobials implemented and enforced >2 years

	(AMS)					
	National Regulatory Authorities (NRA) or Drug Regulatory Authorities (DRA)	No official NRA/DRA or existing with limited capacity	NRA/DRA with limited capacity but strategic planning in place for capacity building and appropriate budgeting	NRA/DRA system set up for oversight but not fully functional	Tools for quality assurance & registration of antibiotics in place and inspection implemented but limited capacity for enforcement of policies and regulation	Competent and functional NRA/DRA with capacity to ensuring/enforcing antibiotic quality standards and taking measures against substandard products and Inspecting pharmacies
	Surveillance of antimicrobial use (AMU) and sales in humans	No guidelines for surveillance of use and/or sales of antimicrobials	National policy & plan on surveillance of use of antimicrobials under development or developed & approved but not implemented (surveillance in individual facilities and national level sales)	Monitoring sales of antimicrobials at national level not implemented. Monitoring of use limited to few facilities that are not representative and irregularly	On a regular basis (every year/two-years) sales data at national level are collected. Use data in individual healthcare facilities are collected from a small & not representative sample. No established analysis with national AMR lab-based surveillance	On a regular basis (every year/two-years) sales data at national level are collected and AMU surveys are conducted in a representative sample of facilities & translated into actions. And links with national AMR surveillance data analyzed and reported
	Regulation of finished antibiotic products and active	No official regulation on import, export, production, distribution	Regulation with limited capacity but strategic planning in	Regulatory authority and system set up for oversight with a limited	Regulatory authority and system in place and inspection implemented	Regulatory authority and system in place and are fully and effectively

	pharmaceutical ingredients (APIs)	and use of finished antibiotic products and APIs or existing with limited capacity	place for capacity building and appropriate budgeting	functional capability	but limited capacity for enforcement of policies and regulation	implemented
	Regulation of pharmacies on over the counter sale and inappropriate sale of antibiotics and APIs	No official regulation on over the counter sale and inappropriate sale of antibiotics and APIs	Regulation with limited capacity but strategic planning in place for capacity building and appropriate budgeting	Regulatory authority and system set up for oversight with a limited functional capability	Regulatory authority and system in place and inspection implemented but limited capacity for enforcement of regulation	Regulatory authority and system in place and are fully and effectively implemented
5. Infection Prevention Control & AMR Stewardship program	AMR stewardship program in Healthcare setting	No national AMR stewardship policy, or operational plan is available or approved	A national IPC/AMR policy, or operational plan, is available but weak SOPs, guidelines and protocols not available to all hospitals (limited updates)	Nat. IPC/AMR plan-aligned IPC/AMR plans implemented in limited number of HCS	Nat. IPC/AMR plan-aligned IPC/AMR plans are implemented in about all HCS	IPC/AMR measures and the effectiveness is widely implemented and regularly evaluated and shared
	IPC program in healthcare setting (HCS)	No national IPC policy, guidelines or action plans to mandate IPC in HCS	A national capacity building program, or operational plan, is developed; SOPs, guidelines and	IPC program and capacity building plans implemented in selected HCS	IPC program and capacity building plans implemented nationwide	IPC Capacity building and program effectiveness are regularly evaluated and shared

			protocols developed and available But not implemented			
	National HAI and related AMR surveillance	No policies, limited national plan and guidelines to mandate hospitals for HAI surveillance	Few public and private facilities have HAI surveillance but data not centralized at national level	Few public and private facilities have HAI surveillance and share data with national level	Centralized data on HAI from several hospitals but with limited data analysis and detection capacity	Monitoring and response frameworks established to identify critical HAI events, especially related to emergence of AMR indicator bacteria against critical drugs
	Sanitation & Hygiene and Vaccination	No formal campaign on sanitation & hygiene and vaccination	Formal campaign to enhance on sanitation & hygiene and vaccination being developed	Formal campaign to enhance on sanitation & hygiene and vaccination is implemented in small scale	Formal campaign to enhance on sanitation & hygiene and vaccination is implemented in large scale	Formal campaign to enhance on sanitation & hygiene and vaccination is implemented in large scale & associated with M&E system
6. Research and Innovation	R&D and innovation on AMR prevention and containment (+ Research funding)	No policies fostering research environment although capacity exists for research	Policies planned and existing structure has a plan to foster research and innovation on AMR	Presence of policies and investments to foster research and innovation on AMR	Research consortium, dynamic research programs are on-going thanks to government led agenda	Gov.-led research outputs related to AMR global research agenda
Health engagement	A national AMR containment policy and regulatory framework for	No national policy & plan to reduce use of antibiotics	National policy & plan on use of antimicrobials developed & approved or	Implementation of policy & plan but limited capacity for monitoring of use and quality of drugs	Policy & plan implemented with some capacity for monitoring but limited capacity for	Policy & plan implemented with proper capacity for monitoring capacity and

	control of animal use, and their registration for use		Regulatory framework for control of animal use, and their registration for use developed but not implemented		enforcement	increased capacity for enforcement
	National surveillance of AMR, and use and sales of antimicrobials at national level in the veterinary sector	No/weak national policy & guidelines	Limited capacity for surveillance in any of sales, AMR, AMU	Some capacity and data generated from sales, AMR or AMU	Some comparative analysis of surveillance data between AMR and AMU	Comprehensive approach of surveillance with coordinated analysis between humans and animals
	Infection prevention and control in the animal sector	No policy and national guidelines developed for biosecurity to reduce infection rates in food and both large producers and small holders	Policies and National guidelines in line with international standards planned including vaccination policy and <i>Codex Alimentarius</i> standards	Limited implementation particularly in large producers	Full implementation particularly in large producers	Fully implemented in multiple areas with a monitoring framework in place
	AMR awareness generation & education in the animal sector	No Policies or Strategies or only planned	Policies or Strategies developed	AMR in some pre service training and/or some special courses Or	AMR in some pre service training and/or some special courses AND continuous	Impact of education program assessed over behaviour changes

				Continuous professional development and regular audit of learning	professional development and regular audit of learning	
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