National Action Plan of Antimicrobial Resistance in IRAQ

Ministry of Health / Environment & Ministry of Agriculture

Iraq Action Plan of

Antimicrobial Resistance (2018-2022)

Contents	Page No.

Abbreviations	
AMR	Antimicrobial Resistance
AMR –NCC	Antimicrobial Resistance-National Coordination Committee
AST	Antimicrobial Susceptibility Testing
CLSI	Clinical & Laboratory Standards Institute
CPHL	Central Public Health Laboratory
EMRO	Eastern Mediterranean Regional office
GLASS	Global Antimicrobial resistance Surveillance System
HAI	Healthcare Associated Infection
IPC	Infection Prevention & Control
IPCAT	Infection Prevention & Control Assessment Tool
IT	Information Technology
KAP	knowledge, Attitude and Practice
KIMADIA	The State Company for Marketing Drugs and Medical Appliances
MDROs	Multi Drug Resistance Organisms
MOA	Ministry Of Agriculture
MOD	Ministry Of Defence
MOE	Ministry of Education
MOH	Ministry Of Health
MOHE	Ministry Of Higher Education & Scientific research
NAP	National Action Plan
NCC	National Coordinating Center
NRL	National Reference Laboratory
OIE	World Organization for Animal Health
PCR	Polymerase chain reaction
SWOTs	Strengths, Weaknesses Opportunities & Threats
UN	United Nations
UTI	Urinary Tract Infections
WHO	World Health Organization

Forward

The growing problem of Antimicrobial Resistance (AMR) has emerged as a major health crisis in almost all countries of the world including Iraq, resulting in an alarming increase in the burden of infections due to multi-resistant bacteria and limiting the choice of Antimicrobials for treatment. Hence, the problem concerns the entire world and requires action at national, regional and global levels. AMR cannot be eradicated but a multi-sector approach involving a wide range of partners will limit the risk of AMR and minimise its impact on individual's wellbeing, now and in the future.

In line with the global aims, Iraq prepared a plan to fight the antimicrobial resistance. This includes the 'One-Health' approach which requires co-ordination of all the sectors involved with the use of antimicrobials (sectors that are involved with human health, animal health, and food and agriculture). Therefore, it is essential to implement the preventive measures and actions to strengthen and enforce health and veterinary legislations to prevent irrational use of antimicrobials and development of antimicrobial resistance.

The action plan includes five strategic objectives with targeted interventions and activities to address AMR in various sectors by promoting collaboration and information sharing and developing activities to raise awareness and promote the optimal use of existing and future antibiotics through stewardship measures should go with infection prevention and control activities. This will contribute to the establishment of an evidence base and target our efforts to address the gaps and to ensure appropriate policies and programs are in place to limit the development of antimicrobial resistance.

We appreciate all the sectors that contributed in preparing this action plan and their ongoing support in implementing it.

Minister of Health/Environment

Dr. Ala Al-Alwan

Minister of Agriculture

Saleh Hussein Jebur

Executive Summary

Following the high-level meeting of the UN General Assembly on antimicrobial resistance held in September 2016 which called for national, regional and international political commitment to address the issue, member countries agreed on the importance of moving forward to develop national action plans by May 2017.

Iraq; represented by the Ministry of Health (MOH) and Ministry of Agriculture (MOA); responded by developing a comprehensive plan to control AMR by analysing the current situation of health, veterinary and environment and determining the strategic priorities for Iraq, which are in accordance with the WHO Global Action Plan objectives; as follows:

I. Development and implementation of a national strategy to raise awareness about the concept of antimicrobial resistance;
II. Establishment of an integrated national AMR surveillance system to monitor and provide a national database regarding antimicrobial resistance.
III. Improving infection prevention & control program in health care institutes, community, animal health, food, agriculture and environment;
IV. Updating and enforcing regulations for human and veterinary antimicrobial utilization.
V. Building and developing the medical and veterinary personnel regarding the optimal use of antimicrobials**.**
VI. Promoting community preventive measures by access to safe water, sanitation and hygiene
VII. Encourage strategic researches to identify priority, methodology and knowledge gaps in the field of antimicrobial resistance.

This National Action Plan (NAP) establishes comprehensive national programs for awareness and communicates with multi-sector to educate the public, professionals and policy makers about the ways to prevent and treat infections appropriately and conserve antimicrobials. As well as to strength the education curriculum in all educational sectors and to train human and animal health care workers to be aware of the threat of AMR and to participate in limiting AMR spread.

The NAP will also involve the need of laboratory diagnostic capabilities, as they form the basis for treatment decisions for human and animal healthcare professionals as well as support the decisions regarding antimicrobial use.

Implementation of this plan will take a staged approach over the period 2018–2022. The Plan can be updated in response to the emerging issues and/or as new evidence becomes available. A monitoring plan is being developed by the AMR team to identify indicators and set targets to monitor progress of the of the National AMR Strategy objectives regarding human and animal health.

Improving the knowledge about health associated infection (HAI) in health institutions contributes to support and identify the need for infection prevention, improving the management of health practices, as well as enhancing biosecurity measures in veterinary

institutions, thereby reducing the development of antimicrobial resistance and limiting the spread of MDROs.

Promoting the understanding of (One Health) concept in antibiotic stewardship for the different sectors ensures prudent and appropriate use of antimicrobials and rapid diagnostics by taking the appropriate measures to ensure consistent and sustained access to quality medicines and to strengthen procurement systems, supply chains and antibiotics storage facilities. There is a need for quality control of veterinary medicines as well as improving the scope of practice for veterinary paraprofessionals to control antimicrobials users and dealers by legislating the laws that regulate their handling.

The plan acknowledges the need of researches to be carried out to understand the links for AMR development and spread among human, animal and environment to find alternative therapies through research activities carried by the ministry of higher education and scientific research in coordination with MOH and MOA.

Implementers

1- Ministry of Health / Environment.
2- Ministry of Agriculture.

Contributors

1- Ministry of Higher Education & Scientific Research.
2- Ministry of Municipalities and Public Works.
3- Ministry of Defense.
4- Ministry of Interior.
5- Popular Mobilization Forces.
6- The Ministry of Industry.
7- Pharmacists Syndicate.
8- Medical Syndicate.
9- Veterinaries Syndicate.

Introduction

For decades, antimicrobial resistance (AMR) has been a constant and growing threat to a range of infections caused by bacteria [1,2]. This threat is a major problem for individual and community health where pathogenic bacteria can be resistant to many antimicrobials. Besides the incorrect use of broad-spectrum antibiotics in clinical practice [3,4] . For example, increased urinary tract infection (UTI), caused by bacteria resistant to modern-day antibiotics and difficult to control, as well as the economic cost burden of medical services [5,6].

Recent studies have shown that a number of important factors include lack of medical and health awareness, lack of surveillance programs, lack of antibiotic stewardship in health institutions serving the community, lack of infection prevention & control policy, limited detection of new antibiotics, lack of global surveillance , The lack of rapid clinical diagnosis of infectious diseases has played a major role in promoting the emergence and spread of drug resistance[7]

Patients with antimicrobial resistance are more likely to stay longer in hospitals for poor progress in treatment[6]. In September 2017, the Iraqi government evaluated and analyzed the reality of antimicrobial resistance and in collaboration with an external team of experts for EMRO and using evaluation tools for the WHO. In Iraq, there were indicators of misuse of antimicrobials by health care providers and poor control programs resulting in the rapid spread of resistant microbes and to control antimicrobial resistance, there is a need for a common approach and well integrated and coordinated efforts at the global, regional & national levels. This requires a comprehensive response strategy to be developed on the basis of mutual cooperation between stakeholders and decision-makers.

An analysis of strengths, weaknesses, opportunities and threats (SWOTs) was performed to achieve a clear strategy for the development of a national action plan and priority gaps were identified as:

1. Poor public awareness and weak coordination of AMR awareness activities by the government and partners.

2. No ‘One Health’ approach of animal and human national disease surveillance systems, non-existence of a national AMR laboratory surveillance system and no dedicated funding for AMR surveillance activities.

3. Inactive and old guidelines of Infection Prevention and Control (IPC) program as well as poor budgetary support for its activities in health facilities

4. Lack of antimicrobial stewardship in both private and public health sectors.

Our goal is to prevent, slow down, and contain the spread of AMR through the continuous availability of safe, effective, and quality-assured antimicrobials and sets out a comprehensive roadmap to deal with AMR in Iraq.

Governance

In April 2017, the Iraqi Ministry of Health approved the establishment of AMR National Coordinating Committee (AMR-NCC) comprising policy makers from human health, animal health and environment sectors in addition to the private sector. Its role is to determine the outline of the national action plan to contain AMR as a society issue to create a healthy nation with adequate access to quality medical services and effective medicines aimed at preventing the emergence and spread of AMR among the Iraqi people.

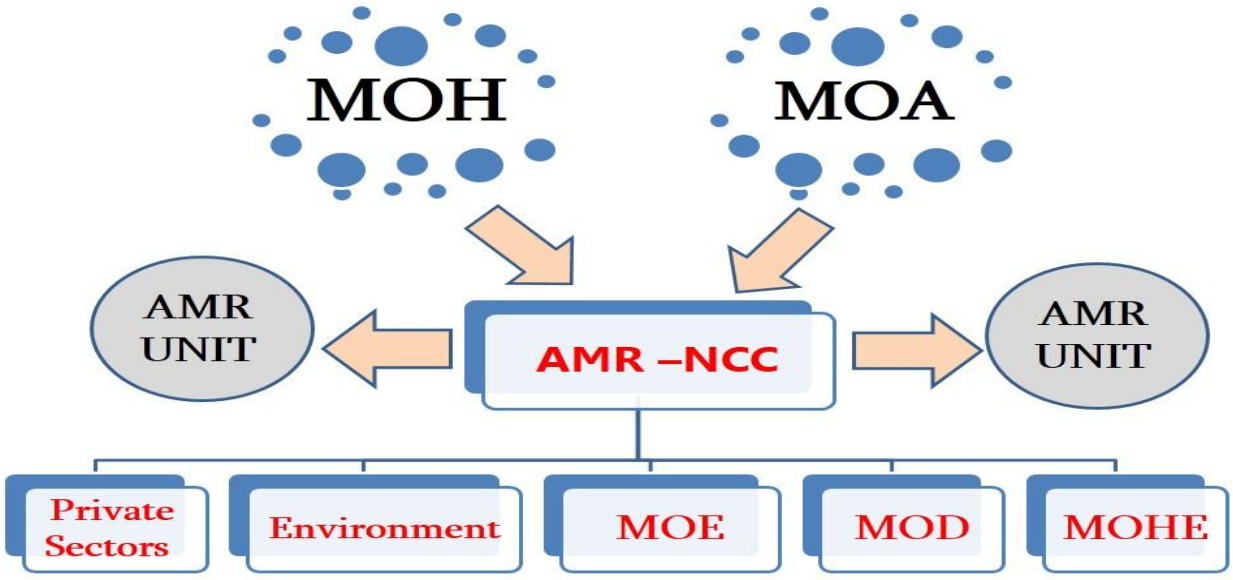

Figure 1. Communication channels for multisectors coordination

For the purpose of follow-up and teamwork among the ministries implementing the national action plan, AMR units were established in each of the ministries of health and agriculture involving the specialties concerned with implementing and following up the national action plan items and to communicate with the AMR-NCC which is in charge of implementing the AMR national action plan and also works on drafting guidelines and policies to ensure a comprehensive approach involving all levels of the government, as well as monitoring the progression and participating in developing the annual progress report.

AMR Unit and in coordination with the WHO organised and was engaged in two consultation workshops with a group of specialists under ‘one health’ approach and sought input to address the five strategic objectives and associated activities, as well as implementing point prevalence survey as Iraq is the first country in the middle east to adapt this action . This is considered a very important step to establish baseline for HAI, prescribing and using antimicrobials, as well as the microbiological description for the causes of infection. Preliminary data focuses on establishing future goals to straighten the national monitoring system.

Implementing the national strategy requires a national program of action through the analysis and evaluation of the current situation, together with the strategic and operational plan to enable both AMR units to make the most progress towards implementation of the NAP by monitoring and evaluation, to achieve the five global objectives (Figure 2).

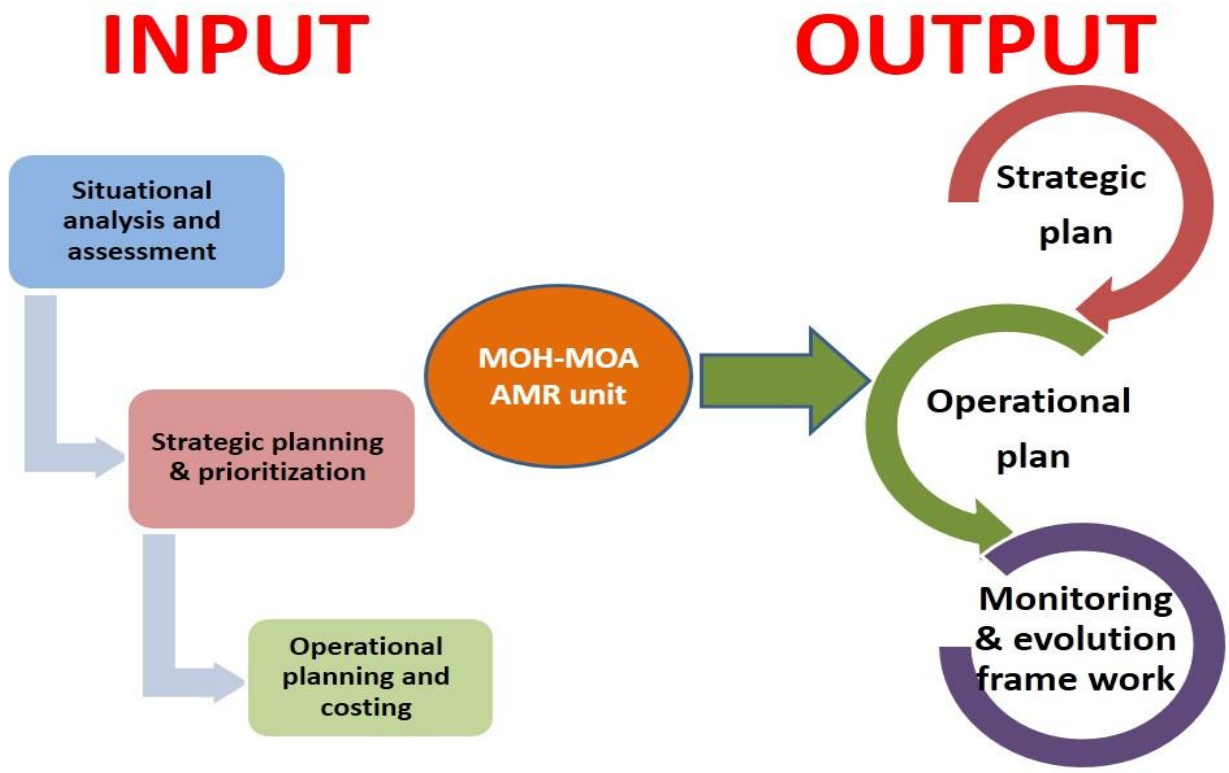

Figure 2: An explanatory structure for the national strategy

The Iraqi Strategic Plan for Combating AMR

National strategy is focus on promoting awareness and education of the AMR phenomenon among the public, health care workers and veterinarians who represent the backbone stone of the plan, proactive control of the resistant bacteria, straightening infection prevention and control, introducing health care associated infection monitoring system, and applying regulations that control the use of antibiotics in both the human and animal health sectors and the proactive monitoring of drug resistance, as well as the good management of antimicrobials, infection prevention and control program in hospitals, veterinary institutions and poultry fields with encouraging researches are solutions that can significantly reduce the antimicrobial resistance as shown in figure (3).

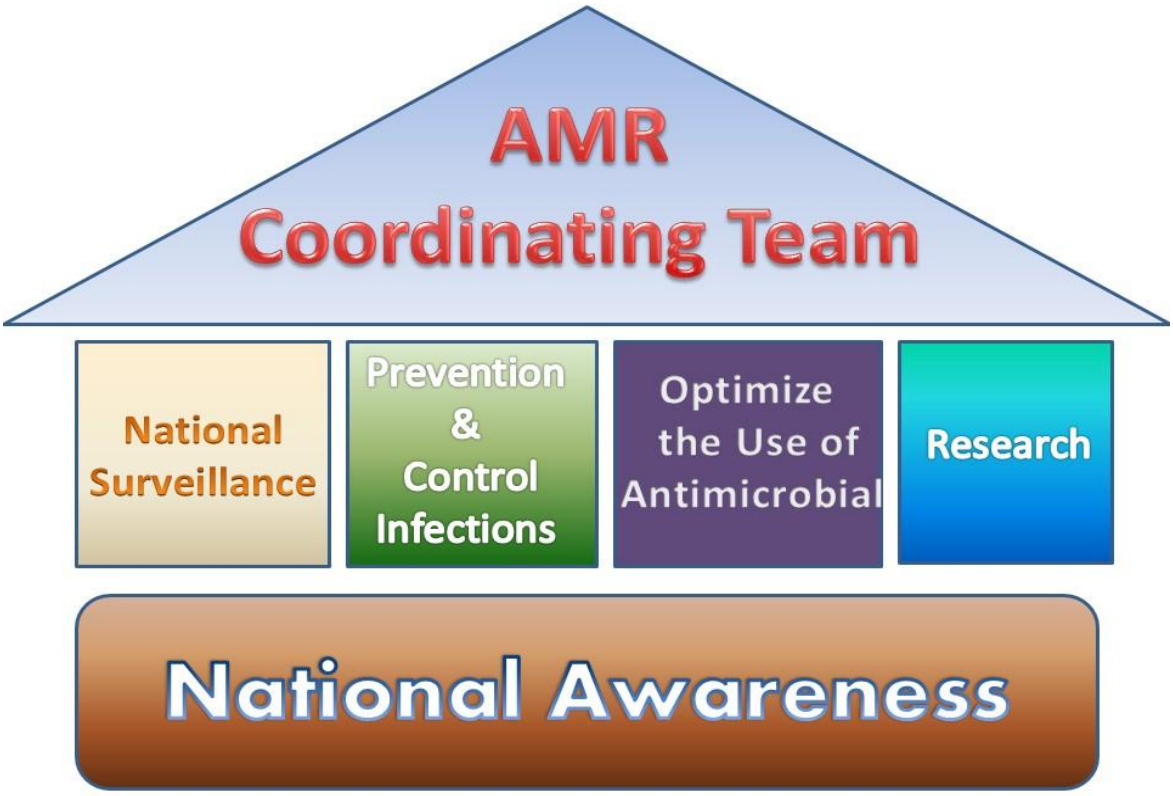

Figure 3: Iraqi National Action frame work for combating AMR

Objective One

Improve awareness and understanding of Antimicrobial Resistance through effective communication, education and training

Steps need to be taken urgently in order to raise awareness of AMR and this is to be done through promotion of behavioral changes by supporting public communication programs that target different sectors (human and animal health).

In one aspect, raising awareness of AMR in school curricula will promote better understanding and awareness from an early age, and on the other side using "one health" concept to combat AMR as core component of professional education, training, continuing education and development in both human and animal health. So, to cover different society groups starting with general population and going through health professionals.

The improvement that we seek in national awareness and knowledge of AMR will be established through an evidence-based public communication health program that targets community, health and veterinary care providers.

The priority actions in this strategic objective are as follows:

- Increase national awareness and behavioural change of the general public and professionals in both human and animal health on AMR.
- Encouraging sustained behaviour change for infection control, biosecurity measures and for antibiotics stewardship programmes.
- Increase community awareness on hygiene and vaccination.
- Advocating for developing and enforcing plan to combat AMR.
- Improve knowledge of AMR and related topics.

NAP Objective (1): Increase National awareness and behavioral change of the general public and professionals in both human and animal health on antimicrobial resistance.	
Strategic interventions	**Activities**
1. 1: Design and implement programmes to raise awareness and change behaviour	**1.1.1:** Develop strategy change behavior and increase awareness. ✓ Conducting AMR situational analysis that supports awareness and behavior change programming. ✓ Identify suitable target audiences ✓ Identify appropriate tools and channels ✓ Implementing mass communication awareness campaigns ✓ Implementing community mobilization activities ✓ Identifying a theory of behaviour change that fits the Iraqi context ✓ Messaging and content drafting ✓ Identify the needed human and financial resources ✓ Setting a timeline for developing a strategy and implementing a set of activities to increase national awareness. **1.1.2** Training and capacity building of those who implement the strategy.

	1.1.3 Monitoring and Evaluation of awareness and behavioural change activities.
1.2: Evidence base to encourage better understanding of antibiotic use and AMR.	**1.2.1:** Conduct knowledge, Attitude and Practice (KAP) studies on AMR in different social and professional groups. **1.2.2:** Developing awareness programs that promote and support the optimal use of antibiotics in human and animal health.

NAP Objective (2) Encouraging sustained behavior change for infection control, biosecurity measures and for antibiotics stewardship programmes	
Strategic interventions	**Activities**
2.1: Insert behavior change within infection control programs, biosecurity measures and antibiotic stewardship.	**2.1.1:** Raising awareness and behaviour change in all training and programmes of IPC, bio-security measures and antibiotics stewardship of both human and animal health.

NAP Objective (3): Increase community awareness on hygiene and vaccination	
Strategic interventions	**Activities**
3.1: promote public awareness programs about hygiene and immunization program	**3.1.1:** Conduct awareness campaigns to promote the importance of hygiene and immunization activities (for human and animal health). **3.1.2:** Integrating AMR related messages into hygiene and immunization program.

NAP Objective (4) Advocating for developing and enforcing plan to combat AMR	
Strategic interventions	**Activities**
4.1: Government project to adopt a policy addressing the phenomenon of AMR.	**4.1.1:** Prepare a comprehensive national policy initiative to address the phenomenon of antimicrobial resistance.
4.2: Develop a plan for sharing and communicating with stakeholders to support community awareness and participation in the implementation of the strategy.	**4.2.1:** Raise awareness of stakeholders about strategic contents to take actions to reduce the impact of AMR. **4.2.2:** Customize a page of 'one health' concept on websites for both MOH and MOA to ensure the access to reliable sources of information on antibiotics and AMR and to facilitate the coordination of activities. **4.2.3:** Add awareness week of antibiotics to the national calendar. **4.2.4:** Multimedia awareness campaigns: • Cooperate with media departments of ministries to conduct awareness programs that demonstrate the optimal use of antibiotics and the risk of using them without consulting doctors and veterinarians. • Cooperate with syndicates and professional unions to engage the private sector in raising awareness of AMR and the way to control them. • Using social networking sites.

NAP Objective (5): Improve Knowledge of AMR and related topics	
Strategic interventions	**Activities**
5.1: Embedding AMR as a core component of education.	**5.1.1:** Review and update current curricula on human and animal health. **5.1.2:** Integrate hygiene, infection prevention control, and rational use of antibiotics into education and training program. **5.1.3:** Take advantage of international and national events to highlight AMR
5.2: Promoting understanding and awareness of the AMR phenomenon at early age.	**5.2.1:** Training of school health coordinators and teachers on AMR- related issues. **5.2.2:** Using visual aids and educational materials dealing with the causes of drug resistance to AMR and ways to avoid them among school children. **5.2.3:** Implement extracurricular activities in schools by students and teachers regarding AMR.

Objective Two

Strengthen the knowledge and evidence base through surveillance and research

Surveillance of AMR is very critical for providing data regarding the extent and trends of the AMR problem. In Iraq, there is no AMR surveillance in the context of one health approach, which in turn limits any national efforts to tackle AMR. So, the future goal is to establish a national surveillance system for microbes that have resistant strains, work on the training of laboratory personnel, support these personnel to conduct scientific researches and to make sure that the laboratories are adequately equipped with all the devices and related consumables in order to have reliable data that support the process of AMR surveillance.

Moreover, a coordinated mechanism for AMR reporting will be established in order to share information within the one health approach.

The national surveillance process also include the creation of the National Coordinating Center (NCC), which consolidates the national data and sends it electronically to the international (GLASS) website (these data are only sent after being confirmed by the Reference Laboratory (Central Public Health Laboratory), these data also include the identifying sites for antimicrobial surveillance (hospitals, health centers and veterinary health institutions) in which it was diagnosed.

The strategic interventions under surveillance and research include the following priority actions:

- Establish a national surveillance system for AMR.
- Build laboratory capacity to produce high quality data.
- Identify research priorities.

NAP Objective (6): Establish a national surveillance system for AMR	
Strategic interventions	**Activities**
6.1: Establish antimicrobial surveillance system in human, foods, animals, and environment	**6.1.1:** Establish NCC. **6.1.2:** Place the Antimicrobial Susceptibility Testing (AST) on KIMADIA priority list of MOH and import list of MOA. **6.1.3:** Building an epidemiological database to identify the national priority microorganisms. **6.1.4:** Generate a multi-sector AMR information sharing system in humans, animals and environment.
6.2: Identify and develop a national reference laboratory (NRL).	**6.2.1**: Designate NRL **6.2.2:** Assess the existing capacities according to the international standards **6.2.3:** Participate in laboratory quality assurance system (internal and external).
6.3: Designate AMR surveillance sites.	**6.3.1:** Assess the existing laboratories' capacity to carry out AMR surveillance. **6.3.2:** Conduct training, and supportive supervision for laboratory personnel on national surveillance of AMR.
6.4: Establish IT system for communication.	**6.4.1:** Develop an e-mail system for bacterial surveillance between all surveillance sites and NCC.
6.5: Participate in global surveillance system WHO-GLASS.	**6.5.1:** Identify focal points. **6.5.2:** Update and develop a priority list of antimicrobials and antibiotics.
6.6: Establish antibiotics residual test.	**6.6.1:** Establish residues of antibiotics test in food. **6.6.2:** Establish residues of antibiotics test in meat.

NAP Objective (7) Build laboratory capacity to produce high quality data	
Strategic interventions	**Activities**
7.1: Update current capabilities.	**7.1.1:** Conduct training for laboratory staff on standard diagnostic methods of AMR. **7.1.2:** Unify and update the international standards (CLSI) that are used by all labs for interpretation the results of AST. **7.1.3:** Update a master list of materials / reagents / items that are required for testing AMR and ensure continuous availability. **7.1.4:** Strengthen quality control and assurance system for AMR surveillance.

	7.1.5: Identify the types of resistant bacteria and the responsible gene using an advance technique of PCR.

NAP Objective (8) Identify Research priorities	
Strategic interventions	**Activities**
8.1: Establishment of AMR operational research plans.	**8.1.1:** Engage relevant stakeholders to identify current gaps in knowledge and potential research areas. **8.1.2:** Establish a mechanism of sharing AMR research findings between universities, health and veterinary institutions. **8.1.3:** Enrollment AMR within priority research list for postgraduate studies.

Objective Three

Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures.

Better hygiene and infection prevention measures are essential to reduce the infection and cutdown the emergence and spread of resistant bacteria in both human and animals.

In addition, the effective measures of sewage treatment and processing also very important in reducing the spreading of infection.

Proper training and education of health personnel about the Infection Prevention and Control (IPC) is required to combat AMR. On the aspect of community level there is a need to strengthen the national infection prevention and control programme with the use of vaccines.

Overall practicing of IPC will generally lead to better health outcome in human and animal health, while overall treatment costs will be reduced.

To address these challenges, three priorities have been identified:

- Infection Prevention and Control in both humans and animals' health.
- Strengthen Health Waste Management system at all levels.
- Promote community-based prevention through access to safe drinking water, sanitation and hygiene.

NAP Objective (9): Infection Prevention and Control in both human and animal health	
Strategic interventions	**Activities**
9.1 : Promote a national programme for IPC in all levels of human health care.	**9.1.1:** Conduct a national survey to assess the current program of infection control in health institutions. **9.1.2:** Develop the national IPC guidelines with implementation for infection prevention and control in all health care settings according to WHO assessment. **9.1.3:** Establish and design IPC programme in all primary healthcare setting. **9.1.4:** Restructure current infection control units in health institutions and promoting the role of the public health and epidemiology specials to participate in managing the unit. **9.1.5:** Plan a national training for all IPC employee at all levels.
9.2: Establish a system of healthcare associated infection (HAI).	**9.2.1:** Conduct HAI survey to identify a national baseline. **9.2.2:** Prepare HAI plan. **9.2.3:** Identify a number of hospitals to implement (HAI). **9.2.4:** Train IPC professionals on surveillance data collection.
9.3: Develop and design IPC programme in animals.	**9.3.1:** Prepare a specific structure of infection control at all veterinary institutions. **9.3.2:** Produce IPC guidance according to OIE standard. **9.3.3:** Training the technical staffs (especially employee of Epidemiological Departments in all provinces) on (IPC) programme and its implementation. **9.3.4:** Apply cleaning and sterilization protocols in Abattoir.
9.4: Promote the use of vaccine for animals' health	**9.4.1:** Expand immunization programme for the target animal species.

NAP Objective (10): Strengthen Health Waste Management system at all levels.	
Strategic interventions	**Activities**
10 .1: Improve and strengthen Health Waste Management systems in both human and animal sectors.	**10.1.1:** Develop a management plan for medical wastes in all healthcare facilities for both human and animal. **10.1.2:** Develop a monitoring system for medical waste management and proper disposal of dead livestock .

NAP Objective (11): Promote community-based prevention through access to safe drinking water, sanitation and hygiene	
Strategic interventions	Activities
11.1: Improving access to safe water for human consumption and sanitation.	**11.1.1:** Assess access to safe drinking water and sanitation **11.1.2:** Rehabilitation of drinking water stations projects. **11.1.3:** Sewage treatment in veterinary institutions and Abattoir.

Objective Four

Optimize the use of antimicrobial medicines in human and animal health.

The emergence of multidrug-resistant bacteria has led to continue demand for new antibiotics which are always expensive and cannot be provided in many health institutions, this will lead to increased morbidity in society and in order to maintain the effectiveness of antibiotics and to postpone the spread of the bacterial resistant phenomenon to antibiotics, we are obligated to follow the scientific and rational use of antibiotics.

This can be done through monitoring the use of antibiotics and keep an eye on the resistance of bacteria, and on the other aspect we can organize a regular feedback protocol with all doctors who are in charge of prescribing antibiotics. This can increase control of bacterial resistance and prevent infection at all levels of health care (primary, secondary and tertiary).

The excessive use of antimicrobial agents in animals as growth promoter and non-compliance with safety period following the use of antibiotics ,in addition to the irrational use of antimicrobial agents in animals has a negative impact on human due to the occurrence of antibiotic residues in the food of animal origin such as meat, milk and egg. There is a need to develop antimicrobial control programs to address this problem and not only to reduce inappropriate use but also to improve antimicrobial selection, dosage, route, and duration of treatment to maximize clinical treatment or prevent infection, while minimizing unintended consequence.

The following priorities have been identified:

- Regulated access to high-quality antimicrobial agents.
- Ensure optimal use of antimicrobial agents in both human and animal

NAP objective (12): Regulated access to high-quality antimicrobial agents	
Strategic interventions	**Activities**
12.1: Strengthen legislation to regulate prescription and dispensing of antimicrobials (human and animals)	**12.1.1:** Prevent dispensing of antimicrobials without prescription and deliberation of antimicrobial as a growth promoter by farmers and breeders of poultry and fish, with updating the Iraqi standard of feed free of growth promoters including antimicrobials and hormones. **12.1.2:** Setting regulations regarding the use of antibiotics in the private sector for human health and non-therapeutic purposes in animal health. **12.1.3:** Control the distribution of antibiotics by unauthorized medical practitioners. **12.1.4: a-** Prevent the deliberation of unauthorized antimicrobials from the Ministries of Health and Agriculture in the private sector. **b-**Monitor the safety of new antimicrobials through pharmacovigilance activities

	12.1.5: Issue instructions to ensure animal's meat and their products are free from antibiotics residue. **12.1.6:** Regulate the optimal use of antibiotics in animal treatment.
12.2: Strengthen the supply chain of antibiotics (selection, procurement, storage and distribution)	**12.2.1:** Place antibiotics agent on KIMADIA priority importing list. **12.2.2:** Study the organization of the supply mechanism for antimicrobials. **12.2.3:** Strengthening the control system of importing of antibiotics of the veterinary side and its registration mechanisms.

NAP objective (13): Ensure optimal use of antimicrobial agents in both human and animal	
Strategic interventions	**Activities**
13.1: Establish a management committee of antibiotics in human and animal health	**13.1.1:** Formation of a Central Committee to administer antibiotics with assignments and duties. **13.1.2:** Set up a plan to administer antibiotics for all levels of health care. **13.1.3:** Setting up a survey to optimize the use of antibiotics. **13.1.4:** Prepare guidelines of optimal use of antibiotics. **13.1.5:** Choose hospitals to be ideal in implementing of antibiotics management. **13.1.6:** Prepare a plan for the management of antibiotics in veterinary field. **13.1.7:** Prepare guidelines of optimal use of antibiotics in veterinary field.
13.2: Introduce the concept of surgical prevention.	**13.2.1:** Prepare surgical prevention guidelines. **13.2.2:** Training employees on applying of vocabulary of guidelines.
13.3: Building the capacity of medical and veterinary personnel on optimal use of antibiotics.	**13.3.1:** Prepare a training programme on the correct description of antibiotics (hospitals and health centres and veterinary institutions). **13.3.2:** Training employee of medical and veterinary at all levels

Objective Five

Develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions

A strong research and development agenda are needed to fill gaps that still exist in understanding of prevalence, patterns of AMR and to understand the epidemiological impact of AMR on human, animal and even the pathogens. A better understanding of these issues will create the base for ensuring the best to treat, prevent and contain them in the future.

New medicines, diagnostic technologies and vaccines are needed to limit emerging and spreading antimicrobial resistant pathogens.

To estimate the burden of AMR on health, studies must be carried out to determine its clinical and economic impact on increasing morbidity and mortality in Iraq.

<u>This will be done by taking the following action:</u>

- Strategic research to determine priority, methodology and knowledge gaps in the field of AMR.

NAP objective (14): Strategic research to determine priority, methodology and knowledge gaps in the field of AMR.	
Strategic interventions	**Activities**
14.1: Identify research areas that needed for implementation of the comprehensive national plan of action to control AMR using "one health" approach.	**14.1.1:** Forming a multi-sectoral committee from the relevant ministries (Health, Agriculture, Higher Education and Scientific Research, Industry) and private sector. **14.1.2:** Urge universities to conduct research on AMR. **14.1.3:** Support research on alternatives of antibiotics.
14.2: Estimate the economic impact of AMR.	**14.2.1:** Conduct a study to assess the impact of the economic burden of antibiotics on human health. **14.2.2:** Building an information base of antibiotics consumption and its economic burden.
14.3: Encourage the national pharmaceutical factories to support the NAP.	**14.3.1:** Conduct a study to measure the effectiveness of local production of antibiotics on resistance by national pharmaceutical factories.

Operational Plan

NAP Objective (1): Increase National awareness and behavioral change of the general public and Professionals in both human and animal health on antimicrobial resistance.

Activity	Unit	Quantity	Date	Responsible entity	Source of funding	Cost	Indicator
1.1.1: Develop strategy change behavior and increase awareness	Strategy	1	Fourth Semester 2018	AMR Unit+ Media and Health Awareness Department	External funder	23.594.000	Strategic
1.1.2: Training and capacity building of those who implement the strategy	Training	6	2 per each year (2019-2020) + 1 per year (2021-2022)	AMR Unit+ Media and Health Awareness Department	MOH	81.975.000	Number of Executed Courses
		6		MOA/ Directorate of Agricultural Extension and Training	MOA	60 000 000	Number of Executed Courses
1.1.3: Monitoring of awareness and behavioral change activities	Monitoring & Evaluation	4	One per each year (2019-2022)	MOH +MOA			List of Supervisors
Evaluation of awareness and behavioral change activities		2	Fourth Semester of 2020 and 2022				Questions

1.2.1: Conduct knowledge, Attitude and Practice (KAP) studies on AMR in different social and professional groups.	Study	2	Fourth semester of 2018 and 2022	Media and Health Awareness Department + Popular Mobilization Forces	MOH + External funder	21.000.000	Implementation of the study
		2	Fourth Semester / one each year of 2019 and 2022	MOA/ Directorate of Agricultural Extension and Training	MOA	21 000 000	Implementation of the study
1.2.2: Developing awareness programs that promote and support the optimal use of antibiotics in human and animal health.	Training	4	2019-2022	AMR Unit+ Media and Health Awareness Department	MOH	40.974.000	Implementation of course
				MOA	MOA	30 000 000	Implementation of course

NAP Objective (2): Encouraging sustained behavior change for infection control, biosecurity measures and for antibiotics stewardship programmes

2-1-1: Raising awareness and behavior change in all training and programmes of IPC, bio-security measures and antibiotics stewardship of both human and animal health	Central Meeting	4	2019-2022	AMR Unit+ Media and Health Awareness Department + Infection Control Department	MOH		implementation of meeting

				AMR Unit+ Media and Health Awareness Department + Infection Control Section	MOA		implementation of meeting

NAP Objective (3): Increase community awareness on hygiene and vaccination

3-1-1: Conduct awareness campaigns to promote the importance of hygiene and immunization activities (for human and animal health)	Awareness campaign	4	2019-2022	AMR Unit+ Media and Health Awareness Department + Media Department + Immunization Section + Municipal Council	External funder	270.000.000	Implementation of campaign
				AMR Unit+ Directorate of Agricultural Extension and Training + Media Department + Epidemiology Department + Municipal Council	External funder	60 000 000	

3-1-2: Integrating AMR related messages into hygiene and immunization program	Health messages	1.000.000 Folders + 3500 Posters + 2 Spots TV	2019-2022	AMR Unit+ Media and Health Awareness Department + Immunization Section	External funder	300.000.000	Number of printed out and folders
				AMR Unit+ Directorate of Agricultural Extension and Training + Media Department	External funder	100 000 000	

NAP Objective (4) Advocating for developing and enforcing plan to combat AMR

4-1-1: Prepare a comprehensive national policy initiative to address the phenomenon of antimicrobial resistance.	National policy	1	1st Semester/2018	AMR Unit	MOH		Legislation law
4-2-1: Raise awareness of stakeholders about strategic contents to take actions to reduce the impact of AMR.	Educational Seminars	4	2019-2022	AMR Unit+ Media and Health Awareness Department	MOH	2.400.000	Implementation of a symposium
				AMR Unit+ Directorate of Agricultural Extension and Training + Media Department	MOA	4 000 000	Implementation of a symposium

4-2-2: Customize a page of 'one health' concept on websites for both Ministries of health and agriculture to ensure the access to reliable sources of information on AMR and to facilitate the coordination of activities.	Webpage	1	2019	AMR Unit+ Media and Health Awareness Department + IT Section	MOH		Access Page
				AMR Unit+ Directorate of Agricultural Extension and Training + IT Section	MOA	1 000 000	
4-2-3: Add awareness week of antibiotics to the national calendar	Awareness Week within the National Schedule	1	2018-2022	AMR Unit+ Media and Health Awareness Department	MOH		Include awareness week within the national events
	National event to celebrate Awareness Week	5	2018-2022		MOH +Externa l funder	75.000.000	Implementation of the event
	National event to celebrate Awareness Week	5	2018-2022	AMR Unit+ Directorate of Agricultural Extension and Training	MOA	5 000 000	Implementation of the event

4-2-4: multimedia awareness campaigns:	Awareness program in all Ministries	5	2019-2022	AMR Unit+ Media and Health Awareness Department	MOH		
	Awareness materials on social media sites of syndicates	Ongoing	2019-2022	AMR Unit+ (Medical ،Dental ، Pharmacists) Syndicates			
	Awareness materials on social media sites of syndicate + Seminars	Continuous awareness materials + seminar	2018-2019	MOA + Veterinary Medicine Syndicate		4 000 000	
	social site	1	2018-2019	AMR Unit			

NAP Objective (5): Improve Knowledge of AMR and related topics

5-1-1: Review and update current curricula on human and animal health	Educational Curriculum	1	2020-2022	AMR Unit+ MOHE			

5-1-2: Integrate hygiene, infection prevention control, and rational use of antibiotics into education and training program.	Educational Curriculum	1	2020-2022	AMR Unit+ MOHE			
5-1-3: Take advantage of international and national events to highlight AMR.	Educational Seminars	Ongoing	2019-2022	AMR Unit + School Health Sector + Media and Health Awareness Department + MOE	MOH		Number of seminars
5-2-1: Training of school health coordinators and teachers on AMR- related issues.	Training	4	2019-2022	AMR Unit+ School Health Sector + MOE	MOH		Number of Executed Courses
5-2-2: Using Visual aids and educational materials dealing with the causes of AMR and ways to avoid them among schoolchildren.	Visual aids and educational materials	One Teaching Material per year	2019-2022	AMR Unit+ Media and Health Awareness Department+ School Health Sector + MOE	MOH	55.000.000	Number of Educational Materials
5-2-3: Implement extracurricular activities in schools by students and teachers regarding AMR.	Activity	20 school per year	2019-2022	MOH/School Health Sector + MOE			

NAP Objective (6): Establish a national surveillance system for antimicrobial resistance

6-1-1: Establish a National Coordinating centre (NCC)	NCC	1	2018	AMR Unit	MOH		Ministerial Approvals
6-1-2: Place the antibiotic sensitivity test (AST) on KIMADIA priority list	AST	1	2018	AMR Unit+ KIMADIA	MOH		Availability of test
				Import list	MOA		

6.1.3: Building an epidemiological database to identify the national priority microorganisms	PPS	3	2nd Semester /2018 and 2020 and 2022	AMR Unit	MOH + External funder		Number of surveys carried out
6-1-4: Generate a multi-sector AMR information sharing system in humans, animals and environment	Electronic System	1	2020	AMR Unit	MOH + MOA	600 000 000	Application system
6-2-1: Designate an NRL	Reference Lab	1	2018	AMR Unit	MOH		Y/N
6-2-2: Assess the existing capacities according to international standards	Evaluation and follow-up	1	2018	AMR Unit	MOH		Evaluation form
6-2-3: Participate in laboratory quality assurance system (internal and external)	Evaluation Report	1	2019	MOH	MOH + External funder		Number of Reports
6-3-1: Assess the existing laboratories' capacity and appoint laboratories to carry out AMR surveillance.	Evaluation and follow-up	23	2018-2022	MOH	MOH		Evaluation form
6-3-2: Conduct training, and supportive supervision for laboratory personnel on national surveillance of AMR	Training	5	2018-2022	AMR Unit + CPHL	MOH + External funder	34.634.000	Number of courses
				AMR Unit	MOA	50 000 000	
6-4-1: Develop an e-mail system for bacterial surveillance between all surveillance sites and NCC	Email	1	2019	AMR Unit			Y/N
6-5-1: Identify focal points.	Focal Point	2	2018	AMR Unit			Official approval

6-5-2: Update and develop a priority list of antimicrobials and antibiotics.	Meetings	4	2019-2022	AMR Unit+ MOA	MOH	80.000	Develop a priority list
6-6-1: Establish residues of antibiotics test in food.	Meetings	4	2019-2022	AMR Unit	MOH	80.000	Priority list
				MOA	MOA	500 000	
6-6-2: Establish residues of antibiotics test in meat.	Instructions	1	2019	MOA			Issuing instructions

NAP Objective (7): Build laboratory capacity to produce high quality data

7-1-1: Conduct training for laboratory staff on standard diagnostic methods of AMR	Training	4	2019-2022	CPHL	MOH	34.634.000	Number of Executed Courses
				Department of veterinary laboratories and researches	MOA	50 000 000	
7-1-2: Unify and update the international standards (CLSI) that are used by all labs for interpretation the results of (AST).	List	5	2018-2022	AMR Unit + CPHL	MOH + External funder	2.000.000	Updated list
7-1-3: Update a master list of materials / reagents / items that are required for testing AMR and ensure continuous availability	List of estimates needed	4	2019-2022	CPHL	MOH		Supply ratio
				Veterinary lab.	MOA	300 000 000	

7-1-4: Strengthen quality control and assurance system for AMR surveillance	Feedback	Ongoing	2018-2022	CPHL+ Laboratory Department / Directorate of Technical Affairs			Number of Reports
7-1-5: Identify the types of resistant bacteria and the responsible gene using an advance technique of PCR.	PCR	1	2019	CPHL + Department of veterinary laboratories and researches	MOH + External funder + MOA	240 000 000	PCR available

NAP Objective (8): Identify Research priorities

8-1-1: Engage relevant stakeholders to identify current gaps in knowledge and potential research areas	Meetings	4	2019-2022	AMR Unit + CPHL	MOH		Number of Meetings
8.1.2: Establish a mechanism of sharing AMR research findings between universities, health and veterinary institutions	Electronic system	1	2020	MOH + MOHE + MOA			Y/N
8.1.3: Put AMR on priority research list for postgraduate studies.	Priority list	5	2018-2022	MOH + MOHE			Y/N

NAP Objective (9): Infection Prevention and Control in both human and animal health

9-1-1: Conduct a national survey to assess the current program of infection control in health institutions.	survey	1	2019	AMR Unit+ IPC Section	MOH + External funder	46.529.000	Implementation

9-1-2: Develop the national IPC guidelines with implementation for infection prevention and control in all health care settings according to WHO assessment	Guidelines	1	2018-2019	IPC Section	MOH		Updated Copy
9.1.3: Establish and design IPC programme in all primary healthcare setting.	IPC Unit	1200	2018-2022	Directorate of Public Health	MOH		Number of establishing units
9-1-4: Restructure current infection control units in health institutions and promoting the role of the public health and epidemiology specials to participate in managing the unit.	Structure	1	2019	AMR Unit+ IPC Section			Updated structure
9-1-5: Plan a national training for all IPC employee at all levels.	Training Program	4	2019-2022	IPC Section	MOH		Y/N
9-2-1: Conduct HAI survey to identify a national baseline	Survey of PPS	2	One per each year of 2018 and 2020	AMR Unit+ IPC Section	MOH + External funder	57.020.000	Implementation
9-2-2: Prepare HAI plan	Workshop	1	2019	AMR Unit	MOH + External funder	20.038.000	Preparing a booklet
9-2-3: Identify a number of hospitals to implement (HAI).	Hospital	23	2020-2022	AMR Unit+ IPC Section	MOH		Number of hospitals applying the system
9-2-4: Train IPC professionals on surveillance data collection.	Training	3	2020-2022	AMR Unit	MOH + External funder	40.974.000	Number of Executed Courses

9-3-1: Prepare a specific structure of infection control at all veterinary institutions.	Structure	1	2019	MOA	MOA		Set up the structure
9-3-2: Produce IPC guidance according to OIE standard.	Guidelines	1	2020	MOA	MOA	30 000 000	Issuing guidance
9-3-3: Training the technical staffs (especially employee of Epidemiological Departments in all provinces) on (IPC) programme and its implementation.	Training	2	2019	MOA	MOA	10 000 000	Number of Executed Courses
9-3-4: Apply cleaning and sterilization protocols in Abattoir.	Training	8	2019-2022	MOA	MOA	30 000 000	Number of Executed Courses
9-4-1: Expand immunization programme for the target species.	Vaccination campaigns	8	2019-2022	MOA	MOA	72 000 000 000	Number of implemented campaigns

NAP Objective (10): Strengthen the Health Waste Management system at all levels

10-1-1: Develop a management plan for medical wastes in all healthcare facilities for both human and animal	Plan	1	2019	MOH/ IPC Section + Environment Sector + Veterinary Directorate	MOH		Y/N
10-1-2: Develop a monitoring system for medical waste management and proper disposal of dead livestock.	System	1	2020	MOH + Environment Sector+ Municipality of Baghdad + MOA			Applying system

NAP Objective (11): Promote community-based prevention through access to safe drinking water, sanitation and hygiene

11-1-1: Assess access to safe drinking water and sanitation	Evaluation	15 Governorates	2018	UNICEF + Ministry of Municipalities and Public Works	UNICEF		Rate of Completion
11-1-2: Building the capacity of workers in sanitation plants.	Project	1	2020	UNICEF + Ministry of Municipalities and Public Works	UNICEF		Rate of Completion
11-1-3: Sewage treatment in veterinary institutions and Abattoir.	Treatment Unit	6	2020-2022	MOA + Environment Sector	MOA		Rate of Completion

NAP objective (12): Regulated access to high-quality antimicrobial agents

12-1-1: Prevent dispensing of antimicrobials without prescription and deliberation of antimicrobial as a growth promoter by farmers and breeders of poultry and fish, with updating the Iraqi standard of feed free of growth promoter including antimicrobials and hormones	Instructions	Ongoing	2019-2022	MOH			Y/N
				MOA			Y/N
12-1-2: Setting regulations regarding the use of antibiotics in the private sector for human health and non-therapeutic purposes in animal health.	Law	1	2020	MOH			Y/N
				MOA			

12-1-3: Control the distribution of antibiotics by unauthorized medical practitioners.	Inspection campaigns	16	2019-2022	MOH/ Inspector General Office			Rate of Completion
12-1-4: a- Prevent the deliberation of unauthorized antimicrobials from the Ministries of Health and Agriculture in the private sector. **b-**Monitor the safety of new antimicrobials through pharmacovigilance activities	a- Inspection campaigns b- Notification forms and Reports	Ongoing	2019-2022	MOH / Inspector General Office+ Pharmacovigilance Department+ Pharmacists Syndicate			Number of forms
12-1-5: Issue instructions to ensure animal's meat and their products are free from antibiotics residue.	Instructions	Ongoing	2019-2022	MOA			Execute instructions
12-1-6: Regulate the optimal use of antibiotics in animal treatment.	Instructions	Ongoing	2019-2022	MOA			Execute instructions
12-2-1: Place antibiotics agent on KIMADIA priority importing list.	Official Approvals	1	2019	MOH			Implementation
12-2-2: Study the organization of the supply mechanism for antimicrobials.	Forming a committee	1	2019	MOH/ Needs Assessment Department	MOH +External funder		Recommendations list
12-2-3: Strengthening the control system of importing of antibiotics of the veterinary side and its registration mechanisms.	Instructions	Ongoing	2019-2022	MOA			Execute instructions

NAP Objective (13): Ensure optimal use of antimicrobial agents in both human and animal

13-1-1: Formation of a Central Committee to administer antibiotics with assignments and duties.	Central Committee	1	2018	MOH			Recommendations
13-1-2: Set up a plan to administer antibiotics for all levels of health care.	Workshop	1	2019	AMR Unit+ Directorate of Technical Affairs	MOH + External funder	196.000	Preparing the plan
13-1-3: Setting up a survey to optimize the use of antibiotics.	Survey	1	2020	AMR Unit+ Directorate of Technical Affairs	MOH + External funder	46.529.000	Implementation
13-1-4: Prepare guidelines of optimal use of antibiotics.	Guidelines	1	2019	AMR Unit+ Directorate of Technical Affairs	MOH + External funder	17.077.650	Issuing guidance
13-1-5: Choose hospitals to be ideal in implementing of antibiotics management.	Hospital	12	2019-2022	AMR Unit+ Directorate of Technical Affairs			Number of hospitals applying the system
13-1-6: Prepare a plan for the management of antibiotics in veterinary field.	Workshop	1	2019	MOA	MOA	10 000 000	Preparing the plan
13-1-7: Prepare guidelines of optimal use of antibiotics in veterinary field.	Guidelines	1	2020	MOA	MOA	60 000 000	Issuing guidance
13-2-1: Prepare surgical prevention guidelines.	Guidelines	1	2020	AMR Unit+ Directorate of Technical Affairs	MOH + External funder	5.692.550	Issuing guidance
13-2-2: Training employees on applying of vocabulary of guidelines.	Training	3	2020-2022	AMR Unit+ Directorate of Technical Affairs	MOH + External funder	40.974.000	Number of Executed Courses

13-3-1: Prepare a training programme on the correct description of antibiotics (hospitals and health centres and veterinary institutions).	Workshop	1Central	2020	MOH + Central Antibiotic Management Committee	MOH + External funder	330.000	Training Program
				MOA	MOA	60 000 000	
13-3-2: Training employee of medical and veterinary at all levels	Training	1 Central + 19 Terminals	2020	Ministry of Health / Public Health Directorate / Health Centers Department + Directorate of Technical Affairs / Patient Safety Department	MOH +External funder	13.658.000	Number of Executed Courses
				MOA	MOA	60 000 000	

NAP objective (14): Strategic research to determine priority, methodology and knowledge gaps in the field of antimicrobial Resistance (AMR).

14-1-1: Forming a multi-sectoral committee from the relevant ministries (Health, Agriculture, Higher Education and Scientific Research, Industry) and private sector.	Committee	1	2019	MOHE			Meeting's Recommendations
14-1-2: Urge universities to conduct research on antimicrobial AMR	College or university	Ongoing	2018-2022	MOHE			Number of published Research

14-1-3: Support research on alternatives of antibiotics.	Research center	3 8	2018-2020	MOHE + MOH + MOA	MOH MOA	20.000.000 80 000 000	Number of published Research
14-2-1: Conduct a study to assess the impact of the economic burden of antibiotics on human health.	Study	1	2020	MOH / Economic Planning Section	MOH + External funder		Y/N
14-2-2: Building an information base of antibiotics consumption and its economic burden	Data	1	2021	MOH / Economic Planning Section			Y/N
14-3-1: Conduct a study to measure the effectiveness of local production of antibiotics on resistance by national pharmaceutical factories	Study	2	2018-2020	Samarra Drug Factory + ACAI			Rate of Completion

Monitoring and Evaluation

Planning element	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
NAP Objective (1) Increase National awareness and behavioral change of the general public and professionals in both human and animal health on AMR.	60% of population have knowledge about AMR	Outcome	%	Twice	AMR Unit+ Media and Health Awareness Department+ MOA	Questionnaire	Baseline
	40% of population have knowledge about the use of antibiotics						
	70% of health professionals are aware of the best practices related to AMR						
1.1: Design and implement programmes to raise awareness and change behavior	100% Design of awareness and behavior change programs planned for 2019	Output	%	Every 3 years	AMR Unit+ Media and Health Awareness Department	Report	Baseline
	25% Implementation of behavior change programs			Annually	AMR Unit+ Media and Health Awareness Department	Field visits + campaigns	Baseline

1.1.2: Training and capacity building of those who implement the strategy	25% employees	Input	%	Annually	AMR Unit + Media and Health Awareness Department	Training	Baseline
1.2: Evidence base to encourage better understanding of antibiotic use and AMR.	number of implemented activities	Output	Number	Every 2 years	AMR Unit	Report	Baseline
1.2.1: Conduct KAP studies on AMR in different social and professional groups.	2 studies conducted	Input	Number	2 During 3 Years	AMR Unit + Media and Health Awareness Department	Survey	Baseline
NAP Objective (2) Encouraging sustained behavior change for infection control, biosecurity measures and for antibiotics stewardship programmes	50% of targeted employees have improved measures related to AMR	Outcome	%	Annually	IPC unit+ Antibiotic Management Committee	Evaluation forms	Baseline
2.1: Insert behavior change within infection control programs, biosecurity measures and antibiotic stewardship	Number of hospitals integrating programme	Output	Number	Annually	AMR Unit	Report	Baseline
2.1.1: Raising awareness and behavior change in all training and programmes of IPC, bio-security measures and antibiotics stewardship of both human and animal health	Number of trainees	Input	Number	Annually	Directorate of Technical Affairs/IPC section	Training programme	Not available

NAP Objective (3): Increase community awareness on hygiene and vaccination	60% Improving community awareness of hygiene + increase vaccination coverage	Outcome	%	2 During 3 Years	AMR Unit + Media and Health Awareness Department	Report	Baseline
3.1: Promote public awareness programs about hygiene and immunization program	Number of activities and initiative implemented	Output	Number	Annually	AMR Unit + Media and Health Awareness Department +WHO + MOA	Report	Baseline
3.1.1: Conduct awareness campaigns to promote the importance of hygiene and immunization activities (for human and animal health)	Number of campaigns conducted	Input	Number	Annually		Report	Baseline
NAP Objective (4) Advocating for developing and enforcing plan to combat AMR	Number of new policies and legislations adopted by the government	Outcome	Number	During 3 Years	General Secretariat of the Council of Ministers + MOH	National policy initiative	Not available
4.1: Government project to adopt a policy addressing the phenomenon of AMR	Meetings	Output	Number	Twice a year	AMR Unit	Policy option form	Not available
4.1.1: Prepare a comprehensive national policy initiative to address the phenomenon of antimicrobial resistance.	Percentage of completion	Input	%	During 3 Years	General Secretariat of the Council of Ministers + MOH	National Policy Initiative evaluation Form	Not available

4.2: Develop a plan for sharing and communicating with stakeholders to support community awareness and participation in the implementation of the strategy.	Meetings	Output	Number	During 3 Years	AMR unit	Report	Base line
4.2.1: Raise awareness of stakeholders about strategic contents to take actions to reduce the impact of AMR.	Seminars	Input	Number	1 every year	AMR unit	Report	Base line
NAP Objective (5): Improve Knowledge of AMR and related topics	Number of (universities, institutes and schools) that adopt the curriculum of AMR	Outcome	Number	During 3 Years	MOHE+MOE	Report	Not available
5.1: Embedded AMR as a core component of education	AMR integrated within curricula	Output	Y/N	During 3 Years	MOHE+MOE	Report	Not available
5.1.1: Review and update current curricula on human and animal health.	Review and update implemented	Input	Y/N	During 3 Years	MOHE+MOE	Report	Not available
5.2: Promoting understanding and awareness of the AMR phenomenon at early age.	Events	Output	Number	4 every year	AMR unit+ School Health Sector +MOE	Lectures & Awareness material	Base line
5.2.2: Using Visual aids and educational materials dealing with the causes of drug resistance to AMR and ways to avoid them among school children.	Awareness material	Input	Number	Ongoing	AMR unit+ School Health Sector +MOE+ Media and Health Awareness Department	Visual aids	Base line

NAP Objective (6): Establish a national surveillance system for AMR	Participate in GLASS	Outcome	Y/N	Ongoing	AMR unit	Report	Not available
6.1: Establish antimicrobial surveillance system in human, foods, animals, and environment	Multi-sector data collection	Output	Number	Ongoing	AMR unit	Report	Not available
6.1.3: Building an epidemiological database to identify the national priority microorganisms	Data sharing	Input	Number	Ongoing	AMR Unit+ CPHL+ MOA	Report	Not available
6.2: Identify and develop a national reference laboratory (NRL)	National reference lab designated	Output	Y/N	Once	MOH	Reports	CPHL
6.2.2: Assess the existing capacities according to international standards	Laboratory fulfills the elements of ISO system	Input	Y/N	Ongoing	MOH	External assessment report	Baseline
6.3: Designate AMR surveillance sites	Number of surveillance sites	Output	Number	Annually	MOH	Report	Al Kindi Teaching Hospital + Teaching laboratories+ Imam Al Kadhimin Teaching Hospital

6.3.1: Assess the existing laboratories' capacity and appoint laboratories to carry out AMR surveillance.	% of planned sites assessed	Input	%	Annually	MOH	Evaluation forms	Not available
6.4: Establish IT system for communication	% of sites sharing electronic information	Output	%	Ongoing	MOH	Data & Reports	Not available
6.4.1: Develop an e-mail system for bacterial surveillance between all surveillance sites and NCC	Contact E-mail	Input	Number	Once	MOH+MOA	Official approval	Not available
6.5: Participate in global surveillance system WHO-GLASS	Number of sites participate in the system	Output	Number	Ongoing	MOH/NCC	Data & Reports	Not available
6.5.1: Identify focal points.	Official approval	Input	Y/N	Once	AMR Unit	Report	1.Dr_Hussain Ali 2.Dr_Rana A. Mahdi
6.6: Establish antibiotics residual test.	50% of the abattoirs applying antibiotic residues test	Output	%	During 3 Years	MOA	Data	Baseline
6.6.1: Establish residues of antibiotics test in food.	Applying antibiotic residues test	Input	Y/N	Annually	MOH+MOA	Meetings	Baseline

NAP Objective (7) Build laboratory capacity to produce high quality data	% of surveillance data applies to international quality standards	Outcome	%	Ongoing	MOH+MOA	Data	Not available
7.1: Update current capabilities	Number of labs applying the international standards	Output	Number	Ongoing	MOH	Evaluation reports	Not available
7.1.4: Strengthen quality control and assurance system for AMR surveillance	% of labs participated in external quality assurance system	Input	%	Ongoing	MOH	Evaluation reports	Not available
NAP Objective (8) Identify Research priorities	Number of published papers	Outcome	Number	Ongoing	Scientific journals	Publications published from Iraq	Not available
8.1: Establishment of AMR operational research plans.	Research agenda to include AMR operational research	Output	Number	Ongoing	MOH+MOA+MOHE	Report by NCC	Not available
8.1.2: Establish a mechanism of sharing AMR research findings between universities, health and veterinary institutions	Number of AMR researches shared	Input	Number	Ongoing	MOH+MOA+MOHE	Report by NCC	Not available
NAP Objective (9): Infection Prevention and Control in both human and animal health	Develop a functioning Infection control program (according to WHO standard)	Outcome	Y/N	Once	Program Evaluation according to WHO (IPCAT)	Assessment tools	Baseline

9.1: Promote a national programme for IPC in all levels of human health care	50% of hospitals apply IPC according to the global standards	Output	%	During 3 Years	Directorate of Technical Affairs/IPC section	Evaluation forms	Baseline
	50% of health care facilities establish IPC programme				Public Health Directorate / Health Centers Department	Report	
9.1.2: Develop the national IPC guidelines with implementation for infection prevention and control in all health care settings according to WHO assessment.	100% updated	Input	%	Once	Directorate of Technical Affairs/IPC section	Meetings	IPC Guideline
9.2: Establish a system of healthcare associated infection (HAI)	System exist	Output	Y/N	Once	AMR unit	Official approval	Not available
9.2.4: Train IPC professionals on surveillance data collection	% of surveillance sites that submit timely reports	Input	%	On going	MOH	Field visits + Reports	Not available
9.3: Develop and design IPC programme in animals.	Establish of an IPC program in veterinary institutions	Output	Y/N	Once	MOA	Official approval	Not available
9.3.2: Produce IPC guidance according to OIE standard.	Guidelines	Input	Number	Once	MOA	Workshop+ Meetings	Baseline
9.4: Promote the use of vaccine for animals health	Number of campaigns implemented	Output	Number	Annually	MOA	Report	Baseline
9.4.1: Expand immunization programme for target animal species coverage.	Coverage rate	Input	%	Annually	MOA	Report	Exist

NAP Objective (10): Strengthen Health Waste Management system at all levels.	Percentage of health-care institutions disposing of medical waste safely	Outcome	%	Ongoing	Health care institutions in MOH	Medical Waste Assessment Form	Update
10 .1: Improve and strengthen health waste management systems in both human and animal sectors	25% Percentage of institutions applying the system	Output	%	annually	Institutions applying the system	Reports	Exist
10.1.1: Develop a management plan for medical wastes in all healthcare facilities for both human and animal	management plan	Input	Y/N	Once	Directorate of Technical Affairs	Revision plan	Exist
NAP Objective (11): Promote community based prevention through access to safe drinking water, sanitation and hygiene	Percentage of population using safety drinking-water and sanitation	Outcome	%	Every 4 Years	UNICEF survey	Report	86.8
11.1: Improving access to safe water for human consumption and sanitation.	Percentage of population served by sewage network	Output	%	Every 4 Years	UNICEF survey	Report	38.4
11.1.2: Rehabilitation of drinking water stations projects.	Eligible projects	Input	Number	Every 4 Years	UNICEF survey	Report	191
NAP Objective (12): Optimize the Use of Antimicrobial Medicines	Number of instructions and legislation	Outcome	Number	Ongoing	MOH+MOA	Report	Baseline

12.1: Strengthen legislation to regulate prescription and dispensing of antimicrobials (human and animals)	Implemented legislations	Output	Y/N	Ongoing	MOH+MOA	Report	Baseline
12.1.2: Prevent dispensing of antimicrobials without prescription and circulation of antimicrobial as a growth promoter by farmers and breeders of poultry and fish, with updating the Iraqi standard of feed free of growth Promoter including antimicrobials and hormones	25% of implementation per year	Input	%	During 4 Years	MOH+MOA	Report	Not available
12.2: Strengthen the supply chain of antibiotics (selection, procurement, storage and distribution)	100% import priority list for antimicrobial	Output	%	During 4 Years	MOH+MOA	Report	Baseline
12.2.1: Place antibiotics agent on KIMADIA priority importing list.	100% Official approval	Input	%	Once	MOH	Report	Not available
NAP objective (13): Ensure optimal use of antimicrobial agents in both human and animal	50% implementing optimal use	Outcome	%	During 3 Years	MOH+MOA	Report	Baseline
13.1: Establish a management committee of antibiotics in human and animal health	50% human and animal health institutions that apply (antibiotic steward ship)	Output	%	During 2 Years	MOH+MOA	Report	Baseline

13.1.1: Formation of a Central Committee to administer antibiotics with assignments and duties.	100% Committee exist	Input	%	2018	MOH	Official approval	Exist
13.2: Introduce the concept of surgical prevention	% of health care institutions applied the concept of surgical prevention	Output	%	During 4 Years	MOH	Report	Baseline
13.2.1: Prepare surgical prevention guidelines.	50% Rate of Completion	Input	%	2019	MOH	Meetings	Not available
13.3: Building the capacity of medical and veterinary personnel on optimal use of antibiotics.	50% of health care institutions applying appropriate use of antibiotics.	Output	%	During 2 Years	MOH+MOA	Training courses	Baseline
13.3.2: Training employee of medical and veterinary at all levels	25% of medical and veterinary staff trained	Input	%	One year	MOH+MOA	Training courses	Baseline
NAP objective (14): Strategic research to determine priority, methodology and knowledge gaps in the field of AMR.	Number of completed researches	Outcome	Number	During 4 Years	MOHE	Research	Availabl e
14.1: Identify research areas that needed for implementation of the comprehensive national plan of action to control AMR using "one health" approach	Research agenda	Output	Number	Once	MOHE	Recommendatio ns	Not available

14.1.1: Forming a multi-sectoral committee from the relevant ministries (Health, Agriculture, Higher Education and Scientific Research, Industry) and private sector.	Committee exist	Input	Y/N	Once	MOHE	Reports	Not available
14.2: Estimate the economic impact of AMR	Number of studies conducted	Output	Number	Ongoing	MOH\Planning Directorate	Reports	Not available
14.2.1: Conduct a study to assess the impact of the economic burden of antibiotics on human health.	percentage of Completion	Input	%	During 2 Years	MOH\Planning Directorate	Research Evaluation Form	Not available
14.3: Encourage the national pharmaceutical factories to support the NAP	Samarra Drug Factory + ACAI	Output	Number	Ongoing	MOH	Official approval	Baseline
14.3.1: Conduct a study to measure the effectiveness of local production of antibiotics on resistance by national pharmaceutical factories	percentage of Completion	Input	%	During 2 Years	Drug factory	Research Evaluation Form	Not available

References:

1. Bush, K. "Improving known classes of antibiotics: an optimistic approach for the future." *Current opinion in pharmacology* 12.5,2012: 527-534.

2. Laxminarayan R, et al. "Antibiotic resistance—the need for global solutions." *The Lancet infectious diseases* 13.12 .2013: 1057-1098.

3. ZowawI H., Hosam M., et al. The emerging threat of multidrug-resistant Gram-negative bacteria in urology. *Nature Reviews Urology*, 2015, 12.10: 570.

4.Meier, Silvan, et al. "Extended-spectrum β-lactamase-producing Gram-negative pathogens in community-acquired urinary tract infections: an increasing challenge for antimicrobial therapy." *Infection* 39.4 (2011): 333-340.-340.

5. Liu, Yi-Yun, et al. Emergence of plasmid-mediated colistin resistance mechanism MCR-1 in animals and human beings in China: a microbiological and molecular biological study. *The Lancet infectious diseases*, 2016, 16.2: 161-168.

6. Zowawi, Hosam M., et al. "Stepwise evolution of pandrug-resistance in Klebsiella pneumoniae." *Scientific reports* 5 2015: 15082.

7. Marie K., Jean-Marc R. Emergence of resistance to carbapenems in Acinetobacter baumannii in Europe: clinical impact and therapeutic options. *International journal of antimicrobial agents*, 2012, 39.2: 105-114.