

Resource mobilisation for
AMR: Getting AMR into
plans and budgets of
government and
development partners

Nepal country report

Table of Contents

ABBREVIATIONS	3
EXECUTIVE SUMMARY	5
AIMS OF COUNTRY CASE STUDY FOR MOBILISING RESOURCES FOR AMR	8
CONTEXT AND BACKGROUND TO AMR IN NEPAL	9
a. Context	9
b. Background to the development of the AMR policy in Nepal	10
c. Health sector structure in Nepal.....	11
d. Agriculture sector in Nepal	14
e. Environment sector	15
KEY FINDINGS FOR AMR ENTRY POINTS	16
ENTRY POINTS OF AMR.....	17
AMR STAKEHOLDERS.....	29
a. Health sector stakeholders.....	29
b. Agriculture sector stakeholders.....	32
c. Development partners and key funders	35
d. Civil society organizations.....	41
APPENDIX A : THE METHODOLOGY	44
APPENDIX B: KEY STAKEHOLDERS INTERVIEWED IN NEPAL	45
References.....	46

ABBREVIATIONS

ADS	Agricultural Development Strategy
AFSP	Agriculture and Food Security Project
AMR	Antimicrobial Resistance
AMS	Antimicrobial Stewardship
APP	Agriculture Perspective Plan
ARV	Antiretroviral Therapy
CVL	Central Veterinary Laboratory
CB-IMCI	Community Based Integrated Management of Childhood Illness
DDA	Department of Drug Administration (DDA)
DFID	Department for International Development
DFTQC	Department of Food Technology and Quality Control
DHS	Department of Health Services
DLIs	Disbursement Linked Indicators
DPT	Diphtheria Pertussis and Tetanus vaccine
DLS	Department of Livestock Services
DoEnv	Department of Environment (DoEnv)
EDCD	Epidemiology and Disease Control Division
EDP	External Development Partners
ESBL	Extended Spectrum Beta Lactamase (ESBL) producing E. coli
EQA	External Quality Assurance
FAO	Food and Agricultural Organisation
FHD	Family Health Division
GARP	Global Antibiotic Research Partnership
GAVI	Global Alliance for Vaccines and Immunization
GCP	Good Clinical Practice
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GoN	Government of Nepal
GTA	Group for Technical Assistance
HPAI	Highly Pathogenic Avian Influenza
HIV	Human Immunodeficiency Virus
JAR	Joint Annual Review
HMSP	Hospital Management and Strengthening Programme
HDC	Hospital Development Committee
ICDDR-B	International Centre for Diarrhoeal Research- Bangladesh
IDA	International Development Association
IMAM	Integrated Management of Acute Malnutrition
INGOs	International Non Governmental Organization
IPV	Inactivated Poliovirus Vaccine
IPC	Infection Prevention Control
JE	Japanese Encephalitis
JAR	Joint Annual Review
JFA	Joint Financial Assistance
KISAN	Feed the Future (KISAN)
LMIC	Low and Middle Income Countries
LMP	Livestock Master Plan
LSC	Livestock Service Centre

MCH	Maternal and Child Health
MICS	Multiple Indicator Cluster Survey
MIS	Management Information System
MR	Measles Rubella
MRSA	Methicillin Resistant Staphylococcus aureus (MRSA)
MSNP	Multi Sector Nutrition Plan
MoA	Ministry of Agriculture
MoF	Ministry of Finance
MoHP	Ministry of Health and Population
MoLD	Ministry of Agriculture, Land Management and Cooperative (Livestock Development)
MoSTE	Ministry of Science, Technology and Environment
MPDSR	Maternal and Perinatal Death Surveillance and Response
NAP	National Action Plan
NEQAS	National External Quality Assessment Scheme
NHFS	Nepal Health Facility Survey
NHEICC	National Health Education Information and Communication Council
NHSS	Nepal Health Sector Strategy
NHTC	Nepal Health Training Centre
NGO	Non- Government Organization
NHRC	National Health Research Council
NPHL	National Public Health Laboratory
NTD	Neglected Tropical Diseases
PACT	Project for Agricultural Commercialization and Trade
PCV	Pneumococcal Conjugate Vaccine
PforR	Programme for Results
RVV	Rota Virus Vaccine
SAARC	South Asian Agency for Regional Cooperation
SABAL	Sustainable Action for Resilience and Food Security
SAFANSI	South Asia Food and Nutrition Security Initiative
SHD	Sunaula Hazar Din– Community Action for Nutrition Project
SRH	Sexual and Reproductive Health
SWAp	Sector Wide Approach
SDG	Sustainable Development Goal
SF	Substandard and Falsified
SMH	Safe Motherhood and Newborn Health
SPS	Sanitary and Phyto-Sanitary
STG	Standard Treatment Guidelines
TB	Tuberculosis
TBA	Trained Birth Attendants
UHC	Universal Health Coverage
UNDP	United Nations Development Programme
UNGA	United Nations General Assembly
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WTO	World Trade Organization

EXECUTIVE SUMMARY

Nepal has only recently started its journey on the path to an integrated response to the challenge of antimicrobial resistance (AMR). Despite this, it is notable that the Nepal Health Sector Strategy Plan (HSSP)-2 mentions growing antibiotic resistance as a public health challenge.

Prerequisites for implementing AMR activities in Nepal are stabilization of the new federal governance structures and clear demarcation of national and local level functions. Other strategic priorities to address AMR include:

1. Tapping into donor interests in governance and reform, agriculture, poverty alleviation, employment generation and disaster prevention and reconstruction by highlighting the impact of AMR-sensitive¹ policies in these domains (human, animal and environmental).
2. Establishing role clarity for interventions in each domain (human, animal, environment) and collaborating mechanisms.
3. Building efficient systems of accountability for each stakeholder and specifying key performance indicators to monitor progress
4. Establishing comprehensive and coordinated (inter-ministerial, inter-departmental) plans for oversight.

At present, there is little or no incorporation of AMR aspects in existing programmes and activities. However, opportunities do exist within programmes such as Quality of Care, universal health coverage and disaster mitigation.

Integration of AMR in existing programmes can be planned in the following:

1. The Pilot Universal Health Coverage scheme is generating a wealth of data that can be used to design and fund AMR-responsive clinical care packages, antibiotic stewardship policies and AMR surveillance.
2. Maternal, child and reproductive health care programmes could integrate AMR-related modules for clinical care practices and awareness into their service protocols and institute research to document the impact on AMR.
3. The Quality of Care programme, being rolled out in select districts, is a critical entry point for stewardship activities in health care facilities.
4. The *Maternal and Perinatal Death Surveillance and Response (MPDSR)* programme can be reviewed to ensure appropriate antibiotic use.
5. Leverage and expand the communicable disease control programmes' extensive experience in developing drug treatment protocols, ensuring access

¹ AMR-specific actions are those that are done primarily because of the need to address AMR. AMR-sensitive actions may be just as important and cost effective in addressing AMR, but are done for broader reasons and benefits e.g infection prevention and control, water, sanitation and hygiene.

to quality medicines with stewardship and laboratory surveillance for drug resistance to include AMR and antibiotic surveillance activities.

6. Develop integrated AMR surveillance indicators using existing institutions (NPHL, CVL, EDCD) and antibiotic quality standards from Department of Drug Administration laboratories.
7. Increase awareness among farmers and the public by adding modules to projects implemented by the MoLD (Livestock Development) and the Department of Agriculture.

Additional investments are recommended to:

1. Create awareness and generate commitment among the political leadership and external development partners.
2. Conduct pilot antimicrobial stewardship projects such as those by Group for Technical Assistance that can be scaled up.
3. Enhance the capacity of the DDA as the National Regulatory Authority.
4. Encourage greater involvement of private sector clinical and laboratory services, and specialized, regional and district hospitals in the national AMR surveillance programme with standardized clinical and laboratory protocols.
5. Support the agriculture (veterinary) sector to scale up their response to AMR.
6. Establish active sentinel site surveillance in farms (ante-mortem period) and in food markets (post-mortem period for animal-origin food) as well as standards for antibiotic residue in animal-food products and the environment.
7. Surveillance of food quality can provide entry points for AMR indicators in the food safety paradigm - critical for the One Health approach.
8. Conduct research studies to showcase the impact of new vaccines (Hib-containing Pentavalent and PCV) on AMR. Use these services as entry points for awareness on AMR.
9. Increase the involvement of private sector stakeholders in healthcare policies and practices relevant to AMR.

AMR entry points in donor-supported programmes

Nepal's health sector receives substantial contributions from pooled donor funds and implementation of the NAP AMR will require adding an AMR lens to current donor-supported areas. GIZ support to universal health coverage, reconstruction of health facilities and training and mentoring of traditional birth attendants can be channelled to include AMR activities. Similarly, USAID could include AMR-related stewardship and antibiotic access indicators in the quality of care programme. Fleming Fund support to the country is likely to improve AMR surveillance. The World Bank could support AMR-related activities in the agriculture and livestock sector by supporting both infrastructure and human resources on farms and in animal health laboratories. Nepal has a large private sector which currently has only a limited involvement in implementing AMR-related activities in the country. The Joint Annual Review (JAR) provides an effective mechanism to review and strengthen programmes implemented by health sector partnerships and should be expanded to the animal health sector too to be truly "One Health"-oriented.

The following factors should be considered for integrating AMR into existing and new programmes:

- Donor efforts to support monitoring of antibiotic use should be aimed at strengthening health systems and the capacity of national regulatory authorities to make available quality laboratory and medicine quality surveillance data.
- Establishment of AMR-specific² indicators in the quality of care paradigm.
- Use available data (checklist of quality of care indicators) to analyse the impact of WASH and IPC projects on AMR, especially in health care facilities. This may be attractive to donors such as GIZ.
- Establish if data from the new health insurance scheme (supported by GIZ) can be used for making an economic case for AMR.

² The World Bank describes AMR policy measures as “AMR-specific” or “AMR-sensitive.” AMR-specific actions are those whose primary purpose is combating AMR (though they may bring other benefits, too). An example is tightening legislation and enforcement on the sale of antimicrobials without a prescription. AMR-sensitive measures are those whose main purpose is not actually AMR-related, but which can be designed and implemented in such a way that they contribute indirectly to AMR containment. Expanding access to clean water and sanitation, thus reducing the incidence of infections, is an example. Both AMR-specific and AMR-sensitive measures are needed now to contain the spread of drug-resistant pathogens. Source: World Bank *Drug-resistant infections. A threat to our economic future*, World Bank Group, March 2017.
<http://www.worldbank.org/en/topic/health/publication/drug-resistant-infections-a-threat-to-our-economic-future>

AIMS OF COUNTRY CASE STUDY FOR MOBILISING RESOURCES FOR AMR

Nepal completed a Situational Analysis of AMR in 2013 and the National Antimicrobial Resistance Containment Action Plan (NAP) in 2016. Time is upon them to begin mobilizing the proposed actions, resources and support needed to implement the proposed actions. However, AMR cannot be positioned as another silo programme and it will be necessary to leverage resources from within existing ministerial and development partner programmes, strategic plans and budgets to achieve implementation.

The overall objectives of the work conducted in Nepal, on enhancing investment in AMR, are:

1. To assist teams working on AMR in Nepal to explore the scope to scale up delivery of AMR activities through integration within existing programmes and projects, including those under development.
2. To identify any funders with an interest in funding AMR-related work.
3. To understand how development partners view efforts to mobilize resources for AMR in the country.

The methodology to achieve these objective is described in Appendix B.

CONTEXT AND BACKGROUND TO AMR IN NEPAL

a. Context

Situated in the South-East region of Asia, Nepal is a land-locked, designated low-income country with a population of about 29 million people. 80 percent of the population resides in rural areas while 66 percent are engaged in agriculture. It shares an open border with India to the south, east and west and with China to the north. Administratively until 2015, Nepal was divided into 5 development regions—including eastern, central, western, mid-western, and far-western—14 zones and 75 districts. Nepal is one of the poorest countries in the world and the 2013 UNDP Human Development Report ranked Nepal in 157th position, with a Human Development Index of 0.463. The Nepalese economy is based largely on agriculture which makes up 34.3 percent of the GDP with livestock accounting for 26.9 percent of agricultural GDP (Department of Livestock Services [DLS] 2011). Of the population engaged in agriculture, 70 percent keeps livestock, and a large proportion of the labour is provided by women.

In recent years, Nepal has made significant progress in raising the health status of its citizens. Under-five mortality has been reduced by 72% and infant mortality by 67% between the period of 1996 and 2014. Life expectancy at birth is 69.2 years with 30% of the population under the age of 15. The routine immunization coverage has achieved >90% since 2011 for DPT3 and Polio and >80% for measles and has recently (2016) included three new vaccines - IPV, PCV and MR vaccine. Similarly, maternal mortality has been reduced by 76% between the period of 1996 and 2014. The country has achieved polio eradication and measles elimination is targeted for 2019. The “Full Immunization Declaration” approach aims at immunizing all children through strong community engagement. Leprosy is at the elimination stage and malaria is in pre-elimination phase. Considerable efforts have been made to halt and reverse the trends of tuberculosis (TB) and HIV though TB remains a public health concern. It has introduced free health care programmes, targeted health package schemes and a safe delivery incentive scheme to minimize the equity gap. However, despite this, the country still faces many health challenges. The recent “Nepal Health Facility Survey” clearly shows challenges in delivering quality health services, retaining appropriate skilled human resources, and maintaining regular availability of essential commodities to deliver basic health care.

Following 10 years of civil war, elections to the Constituent Assembly in Nepal were held in 2008 but the Constituent Assembly was dissolved in mid-2012. New elections having taken place in November 2013, the Constituent Assembly promulgated a new constitution on 20th September 2015. Subsequently, general elections were held in December 2017 and the new constitution defines Nepal as a Federal Democratic Republic. With the formulation of the new constitution, Nepal is now migrating to a federal state structure with autonomous subnational governments. One major impact of the transition is the redundancy of the district offices and their sub offices to be replaced by the newly elected local governments. The country now has seven States

and 753 Municipalities. Funds, functions, and functionaries hitherto managed through the 75 District Development Committees are moving to new local governments. While the 753 Municipalities are expected to provide better outreach and services, they will likely take significant time to become fully operational. In addition to fresh general elections, Nepal has elected a new provincial tier of Government with decentralization and reorganization of provinces and the new system is currently under implementation. In principle, this provides opportunities to decentralize development benefits and make service delivery more effective and accountable. **However, the risks of jurisdictional overlap between the three tiers of Government, lack of clarity and coherence between policies and devolved powers, and duplication of efforts will remain high during the coming few years.** This has potential to significantly impact progress made to implement AMR NAP.

Notably, in April-May 2015, the central and surrounding regions of Nepal were ravaged by major earthquakes which cost nearly 10,000 lives and caused massive damage to physical infrastructure. The country is still struggling with post-disaster recovery and reconstruction. The disaster still has huge impact on Nepal's already frail economy. Nepal experienced incessant rainfall from 11-14 August 2017, resulting in widespread floods across 35 of the country's 77 districts. Several districts experienced the heaviest rainfall in over 60 years. This led to the inundation of about 80 percent of the land in substantial parts of the Terai region. According to the Post Flood Recovery Needs Assessment led by the National Planning Commission, the total damage and losses caused by floods is reported as NPR 60,716.6 (USD 584.7 million). This does not include personal household losses.

b. Background to the development of the AMR policy in Nepal

Nepal has been one of the forerunners in the Asian subcontinent in recognising the dangers of AMR. However, it has had a bumpy journey in putting together a comprehensive response to address AMR.

In the country, laboratory surveillance for AMR started as early as 1999 with a limited number of participant laboratories and organisms under surveillance. The programme spearheaded by NPHL expanded to a network of 20 laboratories with WHO support (all public sector and in practice only 13 sites reported consistently). It has limited private sector representation (KIST medical college, Kathmandu Model Hospital, Manimal teaching Hospital and Bayalpata Hospital) and some semi-government institutes (TUTH and Patan Hospital). It does not include any private sector laboratories and collects data for eight pathogens of interest viz. *Salmonella* species, *Shigella* species, *Vibrio cholerae*, *Streptococcus pneumoniae*, *Neisseria gonorrhoeae*, *Haemophilus influenzae type b*, Extended Spectrum Beta Lactamase (ESBL) producing *E. coli* and Methicillin Resistant *Staphylococcus aureus* (MRSA) from public sector laboratories.

An AMR situation analysis was conducted by the Global Antibiotic Resistance Partnership (GARP) and published in May of 2015. This recommended establishing a national strategic plan for the use of antibiotics that preserves their effectiveness into the future and gains the maximum health benefits from their appropriate use. Following the UN General Assembly Resolution on AMR, Nepal published its National Antimicrobial Resistance Containment Action Plan in 2016 under the Ministry of Health and Population, Department of Health Services led by the National Public Health Laboratory (NPHL) and supported by WHO, Nepal.

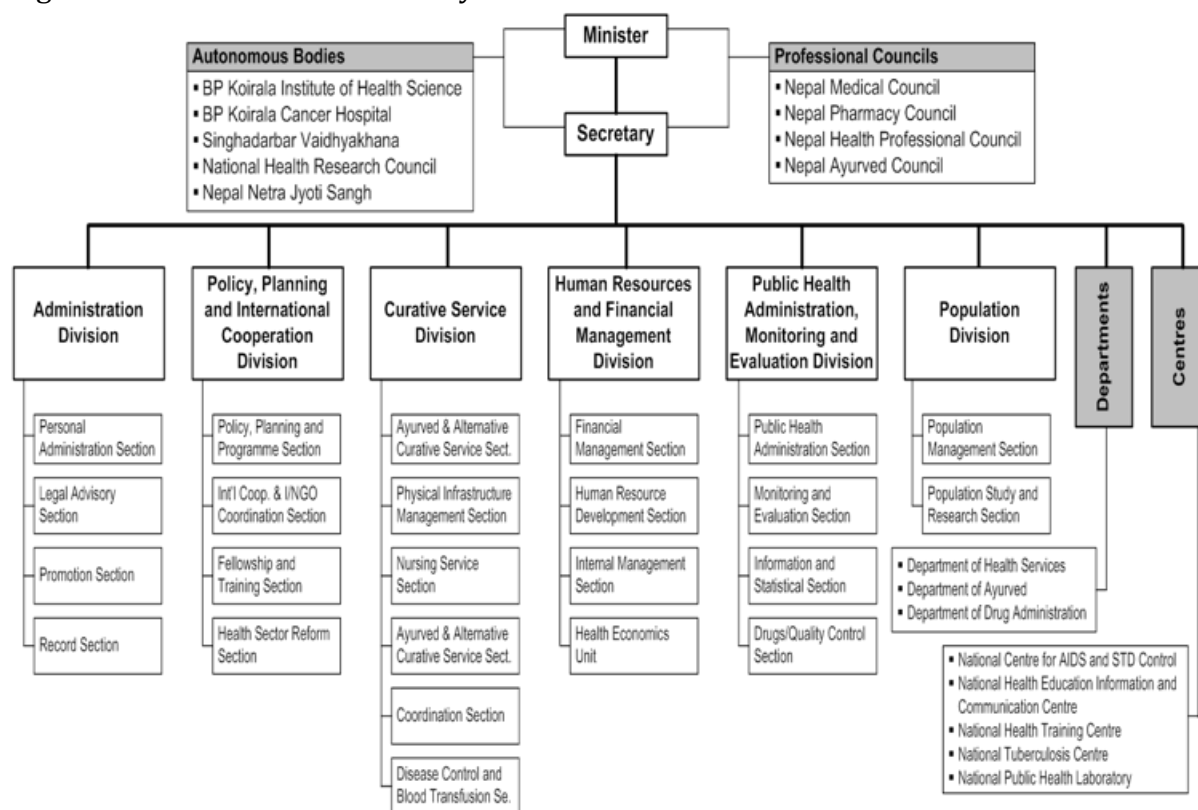
The operationalisation of the NAP is led by a National Multi Sectoral Steering Committee, chaired by the Health Secretary with the Chief of Curative Division as Member Secretary and representation from several departments in Ministry of Health and Population (MoHP), Ministry of Agriculture, Land Management and Cooperative (Livestock Development), NGOs and Pharmacy council. However, in the context of AMR there seems to be varying opinion among the policy makers regarding the need for an AMR Policy which provides the legislative and regulatory backing for devising and implementing a National Action Plan. Though the Drugs Act 1978 (published in 1986), provides the legislative power to control use of antibiotics it may not provide support to implement the NAP-AMR in Nepal. Thus, first there must be in place at least a Cabinet Resolution (policy) on AMR which will then pave the way for developing and implementing the National Action Plan on AMR. Nepal has not conducted its Joint External Evaluation for implementation of International Health Regulations (IHR) which is likely due in late 2018. The NAP currently establishes the role of the MoHP in implementation, though the focal ministry for one health surveillance in Nepal is the MoLD (Livestock Development). The NAP lays down targets for 2020 and 2025 for each of the 5 AMR pillars.

c. Health sector structure in Nepal

The MoHP plays a dual role - regulating the health sector and delivering health services:

- *The regulatory function* has been carried out mainly by divisions within the MoHP and through central level by professional and institutional councils, such as the Nepal Medical Council (Department of Drug Administration) which also functions as a regulatory body for production and supply of medicines and other health products and the NPHL for regulatory functions related to laboratory licensure and quality assurance.
- *The delivery of health services* is under two departments of the MoHP, namely the Department of Health Services (DHS) and the Department of Ayurveda. They manage delivery of health services at the central level. At the district level, (public) health offices and a wide network of public health facilities, including autonomous and semi-autonomous hospitals, deliver health services to the people. National-level centres work closely with district health offices to deliver a wide range of health services directly to the people.

Fig 1: Structure of Health Ministry



The relevant departments within DHS with a role in AMR NAP include:

- **Curative Services Division (CSD)** oversees delivery of clinical services in hospitals
- **Department of Health Services** - divisions of epidemiology and disease control including TB, Leprosy and HIV programme, Family Health Division, National Public Health Laboratory, Child Health Division (immunization programme)
- **Department of Drug Administration**
- **National Public Health Laboratory:** responsible for laboratory surveillance for AMR licensure and quality assurance of laboratories in the Government and private sector.

Healthcare service delivery has become complex in Nepal given the greater role played by the expanding private sector. 62.5% of healthcare is financed by the private sector and almost half of out-patient department (OPD) visits for acute illnesses in children and adults are to the private sector (including pharmacies) together with one quarter of the facility based deliveries which also take place in the private sector. Beds in the private sector far surpass those in the public hospitals. Most private hospitals are concentrated in urban areas (67 of them are in Kathmandu valley) though private health service utilization has also increased in rural areas where people increasingly visit private pharmacies that also provide basic medical consultation. There is a need to establish strategic partnerships with the private sector.

In the public sector, health services are provided at the peripheral level through 203 Primary Health Care Centres, 3809 Health Posts and 111 Urban Health Clinics. There are 75 secondary-level district hospitals, 21 tertiary-level hospitals (zonal and above) and 8 specialized hospitals (all located in the Kathmandu Valley) with 5 Regional hospitals in each of Five Development Regions of Nepal. All government health institutions operate their own pharmacy on their premises.

Government policies such as the Drug Act 1978, National Health Policy 1991, and National Drug Policy 1995 promise universal access to essential medicines and health services. The National Health Policy in 1991 guided the National Health Sector Strategy 2003-04 and the National Health Programme I and II. Subsequently, the National Health Sector Strategy 2015 - 2020 guides the current overall health plans for Nepal and puts Universal Health Coverage at the centre of all programmes while stressing the need for quality equitable access to health care. It prioritizes the health system improvement in Human Resources for Health (HRH), public financial management, infrastructure, procurement and health governance. Both health policy and health strategy are in line with the major priorities focused on in the SDGs. The results framework of NHSS 2015 -2020 has indicators at goal, outcome and output levels and are not only focused on traditional SDG-related indicators, but also include indicators identified for addressing mental health, injuries, and financial hardship in accessing health care.

The National Drug Policy was updated in 2007 but remains to be endorsed by the parliament due to the constitutional crisis. It elaborates an improved regulatory environment with periodic updates to an Essential Medicines List (EML), quality assurance, Good Manufacturing Practice (GMP), Good Clinical Practice (GCP) and a pharmacovigilance programme in the country. The government health system distributes selected (almost 75) essential drugs free of charge since 2006, including drugs to all district hospitals, primary health care centres (PHCs) and to health posts (HPs). In addition, in response to the Interim Constitution, the MoHP provides essential health care (emergency and in-patient services) free of charge to targeted groups at the level of sub-health posts (SHPs), HPs), PHCs and district hospitals (DHs).

Standard Treatment Guidelines (STG) which include antibiotic use were issued in 2014 by the Curative Division, MoHP, but have hardly been used. There have been no updates to it after 2014 and there is no surveillance system to monitor antibiotic consumption in the country. The NPHL conducts surveillance for AMR from 10 sites (reduced from earlier 22 sites) but there is a lack of standardization and consistency in the reporting system.

Quality of care in health care services is currently a focus area in Nepal and WHO, UNICEF and several other EDPs are working together to address this. Curative services especially have suffered more from the quality issues and the HSSP recognizes the reports of increasing resistance to antimicrobial drugs in Nepal. The

strategy also identifies evidence-based policy planning and stresses the use of modern technologies for improved and informed planning and monitoring.

The Nepal National Drug Policy 1995 entrusts the MoHP to develop relevant legislation, guidance and monitoring tools to ensure prudent use of antibacterials in humans and animals. Within MoHP, the monitoring of antibiotic use is the responsibility of the DDA which is supported by the MoLD to regulate antibiotic use in animals.

d. Agriculture sector in Nepal

Nepal has a large agricultural industry which produces food mostly for personal or in-country consumption, and not for commercialization or exports. The Government of Nepal (GoN) promulgated the Agriculture Development Strategy (ADS) in 2015, to emphasize the role of livestock for sustained agricultural and economic growth, poverty reduction, and improving food and nutrition security. Key elements envisaged as livestock development strategies comprise productivity enhancement, strengthening extension and outreach services to graduate farmers from subsistence farming systems, institutional capacity development, and following a value chain approach with space for private sector engagement.

The agriculture sector is an important component for achieving the “One Health” agenda. Initially housed within one ministry, in 2015 the MoLD split from the Ministry of Agriculture Development. As a joint ministry, they have implemented several World Bank IDA-financed projects in avian flu, zoonosis and PACT.

In the agriculture sector, institutional capacity is inadequate and extension and outreach services are weak. Due to the shortage of ground staff, there is a gap between farmers and extension centers. The Livestock Service Centers (LSCs) have been facing difficulty in meeting the demand for technical services due to inadequate basic diagnostic facilities, budget, and trained human resources. However, donors such as the World Bank predict that with the creation of 753 Municipalities, the new arrangement is expected to improve service delivery significantly especially at the grassroots level.

There are three major policies that pertain to antibiotic use and AMR within Nepal's agricultural sector: Animal Health and Livestock Services Act of 1999, Nepal Veterinary Council Act of 1999 and the National Drug Policy 1995. The MoLD has recently (2017) banned the use of growth promoters in pre-mix feeds. Though there are several efforts underway to strengthen surveillance in the animal health sector through a One Health approach, sustained support will be required to scale up AMR related policies and programme. Support for the establishment of a framework for collation of data through a One Health approach for AMU has been initiated by WHO recently. Passive surveillance programmes for animal diseases are already underway in Nepal and under the one health surveillance systems are in place for Highly Pathogenic Avian Influenza (HPAI) in the country. There are currently no surveillance systems in place for monitoring consumption of antibiotics and circulating resistance strains in animal sector farms.

e. Environment sector

The Department of Environment (DoEnv) has been established under the Ministry of Science, Technology and Environment (MoSTE), only in July, 2012. As an implementing organization of environmental laws, the department also provides technical assistance to MoSTE while formulating policies and laws on environment related issues. The department is also responsible for harmonizing environmental activities to comply with international obligations in collaboration with MoSTE.

a. Environmental sector structure in Nepal

In Nepal, sanitation services are still inadequate, with 38 percent of the population defecating in the open (MoHP) New ERA, and ICF International Inc., 2012). The 2014 Multiple Indicator Cluster Survey (MICS) shows that 82.2 percent of household members have E. Coli risk levels ≥ 1 cfu/100 ml in their household water. Even though access to drinking water (piped water) has increased to 93 percent in Nepal—96 percent in urban area and 93 percent in rural area—the quality of water is very poor. Only 48 percent children's stools (0–2 years) were disposed of safely, and 73 percent of households have a designated place for handwashing with soap. Just 60 percent of households have improved sanitation facilities.

According to government estimates, in 2004, the water supply coverage was 72 percent; only 25 percent of the population had sanitation coverage with access to sanitary latrines. Inadequate attention to sanitation and hygiene improvement—with sanitation coverage lagging far behind water supply coverage—impeded potential health gains from increased coverage of safe water. There is insufficient emphasis on environmental risks and water quality. Potential problems include landslides from gravity schemes, drainage around artesian wells and roadside tap stands, pollution of aquifers due to poor-quality well head construction and siting latrines close to well points, ponded wastewater around water points that become breeding grounds for mosquitoes and water-borne and water-related diseases, and arsenic in groundwater in many Terai districts.

The World Bank WASH-2 project (up to 2012) was useful in delivering sustainable health, hygiene, and productivity benefits to rural households. Selective impact studies showed a significant increase in the use of improved toilets and handwashing practices, and a decrease in the prevalence of diarrheal disease among young children from 78 percent at the beginning of the project to 14 percent at the end of the project. The hygiene awareness campaign under the project led to communities building more than 72,000 latrines at their own cost. All Water Supply and Sanitation User Groups had the minimum stipulated (three) women members in the Water Supply and Sanitation User Committees. The project succeeded in catering to about 54 percent of beneficiaries from marginalized groups (Dalits, indigenous people, and minorities); 51 percent were women.

KEY FINDINGS FOR AMR ENTRY POINTS

Nepal has only recently started its journey on the path to an integrated response to the challenge of AMR. Inter-ministerial and inter-departmental coordination will be key to a successful NAP implementation considering the multiple interfaces between the human, animal and environment domains in the country. Additionally, a horizontal integration between curative services and public health services in each of these domains is also vital for success. The Nepal NAP recognises NPHL (under the Department of Health Services) as the focal point for AMR activities while the Member secretary for the AMR Steering Committee is the Chief of the Curative Division, whose leadership is vital. Moreover, with a large private sector delivering health services, a clear roadmap for its involvement in AMR-related policies and programmes is needed.

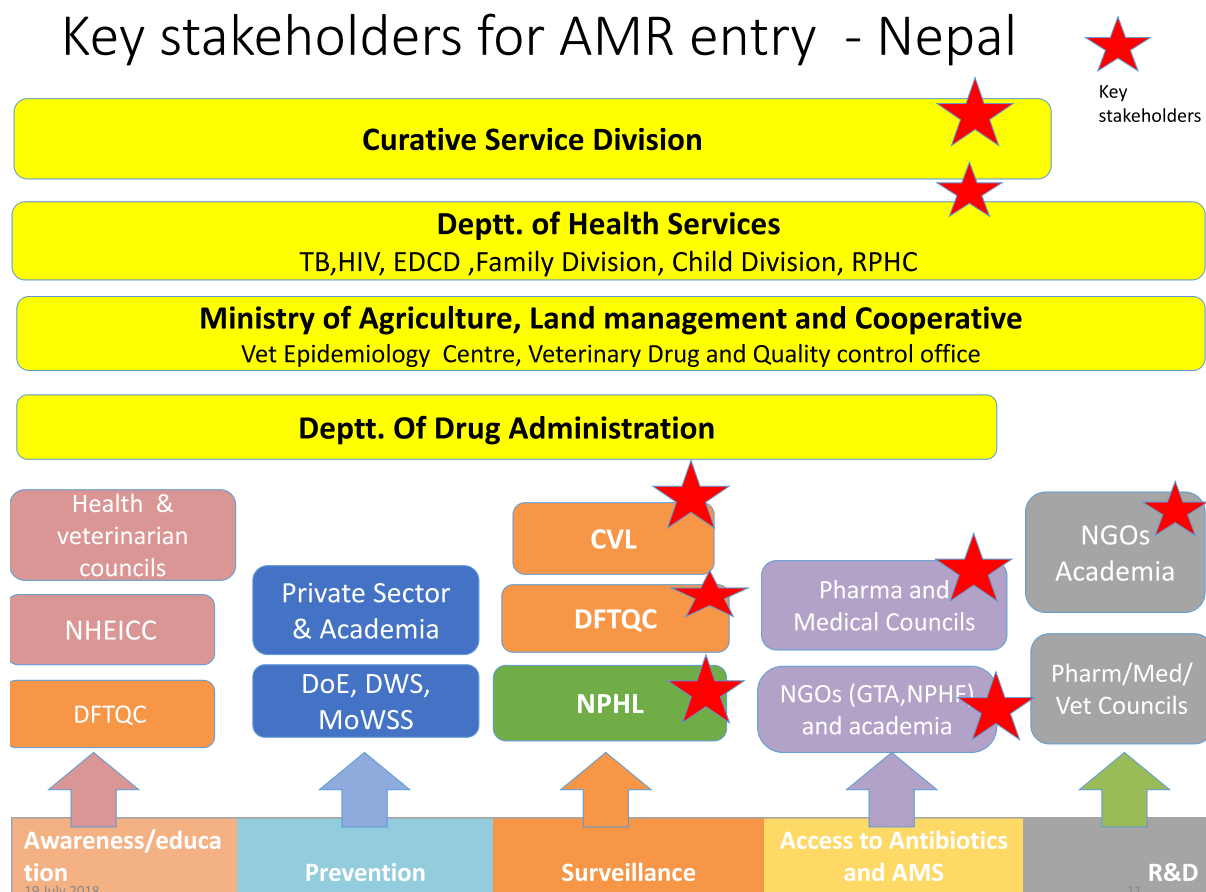
At present, there is little or no integration of AMR aspects in programmes and activities undertaken in the human or animal health sector. However, opportunities exist for integration of AMR NAP focussed activities in existing programmes. Prerequisites for implementing AMR activities in Nepal will first require stability in government structures and clear demarcation of national and local government functions with the implementation of federal structures. Additionally, the following will be key:

1. Tapping into donor funding interests in governance and reform, agriculture, poverty alleviation, employment generation and disaster prevention and reconstruction by providing evidence for AMR-sensitive policies in human, animal and environmental domains.
2. Establishment of role clarity for each domain (human, animal, environment) and support by each in selected intervention areas.
3. Building efficient systems of accountability for each stakeholder and specific key performance indicators to monitor progress in coordinated action plans
4. Establishment of comprehensive coordinated (inter-ministerial, inter-departmental) plans to oversee implementation.
5. Addition of AMR-responsive indicators to policy priority areas such as Quality of care, Universal Health coverage and Disaster mitigation.

ENTRY POINTS OF AMR

The map below illustrates the major stakeholders interviewed and how their main activities can be mapped against the five pillars of the AMR strategy. Details of each stakeholder and development partner interviewed or researched are available in the next section of this report.

Fig 2: Key stakeholders for AMR entry points in Nepal



The overarching key stakeholders for AMR who have activities which fall across most pillars are the Curative Services Division (CSD), Department of Health Services (DHS) and the Department of Drug Administration (DDA). The CSD manages the health facilities and DDA and DHS contain the essential divisions that deliver the activities within education, prevention, surveillance and antimicrobial stewardship. These three agencies are critical in the formulation of implementation actions.

Pillar: Awareness and education

While there are many opportunities, current efforts to address AMR are patchy and scattered across different departments such as DDA and civil society organizations. With support from GARP Nepal, the DDA has developed a community pharmacy training module that focused on drug prescription and distribution and has further plans to finalize a cohesive training manual for community pharmacies which

includes AMR awareness component. The DDA undertakes several activities to increase AMR awareness in the public through electronic boards, audio and visual materials. The DDA closely works with the National Health Education Information and Communication Council (NHEICC) on awareness, but there is no formal schedule or process on coordinating these initiatives.

Seamless integration of AMR in the efforts for awareness and education of the public in general and healthcare workers, through the media and Civil Society

Organizations can be done in existing programmes with some support to develop the training modules and communication material.

Efforts to add new vaccines such as PCV and RVV in the immunization programme and improving the quality of clinical care in health facilities through the HMSP in clinical facilities and MPDSR programme will help to address AMR. Both these programmes will require additional support to modify or add AMR-related indicators in their checklists.

As of Jan 2018, NHEICC is responsible for the implementation of Maternal and Child Health (MCH) and other related communication activities in print, mid and mass media but its existence is uncertain in the reorganization after the devolution of power to local bodies. The inclusion of Hib-containing Pentavalent and PCV vaccine (and soon RVV) will help in the reduction of AMR in respiratory and diarrhoeal diseases. Nepal has good immunization coverage of >88% and the reliable and consistent immunization services provide a gateway for rolling out awareness

Immunization and Water aid Project

Nepal has good immunization coverage of >88% and the reliable and consistent immunization services provide a gateway for rolling out awareness activities in consumers (families, children, opinion leaders) regarding antibiotic use. In April 2012, a scoping study was undertaken in Nepal to explore the feasibility and acceptability of incorporating hygiene promotion into immunization programmes and the study concluded that this is acceptable to stakeholders and the challenge was how, not whether, to proceed. As a result, a pilot project was initiated in 2014 by the Nepal Ministry of Health, Child Health Division with technical support from WaterAid within the Expanded Programme on Immunization in four districts. The hygiene promotion intervention package was developed through a creative process based on formative research. The package tools include a mix of innovative, creative, simple-to-use promotion and demonstration aids, games, story-telling, handwashing rituals, competitions, commitment-making and certification for mothers/carers who have completed the programme. An independent evaluation shows that the hygiene promotion intervention was effective in improving all key hygiene behaviors (from 2% during baseline to 53% after one-year implementation) as the primary outcome of interest, as well as increasing immunization coverage, reducing the drop-out and vaccine wastage rate and helping to reach the un-reached population as a secondary outcome. In addition, information on diarrhea prevalence in the intervention group was also captured as secondary outcomes.

activities in consumers (families, children, opinion leaders) regarding antibiotic use. (see box: Wateraid Immunization project).

In the animal sector, the work done by the World Bank PACT and other livestock sector projects provides an opportunity to engage with local community leaders, farmers and families to bring about awareness regarding antibiotic use in animals and for human illnesses.

Pillar: Surveillance

Surveillance is patchy but expected to be energized with support from Fleming Fund investments in both the human and animal health sector in Nepal. The key institutions providing "reference" laboratory-level services and research involved in AMR surveillance at a national level currently are NPHL and CVL. Teaching hospitals have their own microbiology labs, performing the required surveillance tests and providing diagnostic information to clinicians for patients and only few that are part of the surveillance network provide data to the NPHL. They however are not all using the same testing methods or criteria and a formalized referral system is not established. At present there is patchy, erratic reporting from surveillance sites, lack of a uniform MIS, lack of standardized drug-bug tests and very limited manpower at national and peripheral level.

Under the MoHP, Department of Health Services, the NPHL serves as the focal point of AMR surveillance activities. The formulation of the enhanced surveillance system began in 1998 with the development of an Infectious Disease Control programme initiated by the MoHP and USAID. This programme developed a sustainable national surveillance programme, enhanced education of AMR stewardship and IPC among health care professionals and established quality assurance and effective data collection and information sharing. The programme was implemented by ICDDR – Bangladesh and the rational Pharmaceutical Management programme till 2005. From 2006 onwards WHO has been supporting this system. A 2014 assessment of the sustainable AMR surveillance programme in Nepal identified some recent challenges and successes. The number of participating laboratories ultimately increased to 22 and the number of pathogens under surveillance was increased to 10. By 2012, data were available for over 17,000 bacterial isolates. During the programme, NPHL was able to observe changing trends among various species and an overall changing trend in AMR for all organisms. Additionally, the performance of the participating laboratories improved as shown by the annual EQA data evaluation. There is currently a lack of policy framework to take forward the development and implementation of an AMR National Action Plan in Nepal. Based on the discussions, it appears there is a need for an AMR policy approved by the cabinet which once enacted, will pave the way for implementation of the AMR NAP in the country. In the present scenario, the specific role of each of the involved ministries was not delineated and there is a need to define a coordination mechanism to implement in the NAP.

In the animal health sector, the CVL is responsible for surveillance but does not have any active or sentinel surveillance sites. There is easy import of food animals and meat from the open border with India and no specific mechanism for testing of food

animals for resistance. There is no established mechanism for surveillance of food samples from wet markets by the DFTQC which is responsible for food quality. The other departments of MoLD such as Veterinary Epidemiology Services will have a key role to support CVL in this sector.

Pillar: Access to antibiotics and antimicrobial stewardship

Antibiotics are freely available in Nepal like many Asian countries even without prescription. The licensure, use and quality of antibiotics (pharmacovigilance) in Nepal is the responsibility of the DDA. The DDA currently conducts several AMR activities that centre around personnel training and drug quality surveillance. With support from GARP Nepal, the DDA has developed a community pharmacy training module that focused on drug prescription and distribution and has further plans to finalize a cohesive training manual for community pharmacy which includes an AMR awareness component. The DDA has also undertaken several activities to increase AMR awareness in the public through electronic boards, audio and visual materials. The DDA closely works with NHIECC on awareness, but there is no formal schedule or process on coordinating these initiatives.

For post marketing surveillance, the DDA regularly audits samples from market (retail pharmacies) for substandard quality or counterfeits. It uses a risk-based post market surveillance approach and communicates recalls frequently to the manufacturers for recalling and also to the community or public through website and national daily newspaper. Better drug quality specifications and improved IT systems are needed for digital data sharing between the field and lab sites of DDA as well as the antibiotic suppliers. Use of the recall and test results of suppliers may be of limited use due to low awareness and use by prescribers (general physicians and specialists).

However, there is no active surveillance for quality of antibiotics or their appropriate prescription. As the National Regulatory Authority of Nepal, the DDA has limited capacity (human and economic resources) to undertake these activities. Additional human resources will be required at national and municipality levels to undertake any active efforts to curtail inappropriate antibiotic use. Though there is understanding of the efforts needed to ensure access to good quality drugs, essential medicine lists, Standard Treatment Guidelines, and stewardship efforts in hospitals (drug and therapeutic committees), a lot remains to be done.

Antimicrobial Stewardship Programme of GTA in Burn Hospital

GTA's research, training, and stewardship programme includes surveillance and stewardship programming for common hospital- and community-acquired infections, e.g., respiratory, urinary, intra-abdominal infections, and infections associated with wounds and burns. In terms of the latter, one of sites is the Kirtipur Hospital burn ward which is the only burn intensive care unit in Nepal. Development and implementation of an adapted Post Prescription Review and Feedback (PPRF) programme which meets the specific needs of hospital-based doctors in Kathmandu was done;

- Implementation of physician log books to document use of recommended changes in antibiotic prescribing in the programme hospitals. These log books help to determine the effectiveness of the PPRF programme, but also include portable versions of the antibiotic guidelines;
- Dissemination of information about AMR, stewardship, and PPRF programmes and engagement in advocacy to promote programmatic and policy changes which can decrease health risks associated with resistant pathogens.

There is much more work to be done in organising and addressing antibiotic use in the animal and environment sector in terms of infrastructure, human resource capacity and regulatory policy support.

It is worthwhile to note that in the case of TB, Malaria and HIV programmes the respective programme departments within the DHS have pre-determined arrangements with independent labs (local or international) to assure quality of drugs for the programme (Global Fund projects), their correct prescription by health workers and physicians in the public as well as private sector. Antibiotic quality assurance programmes can benefit from the experience already available to check for appropriate use as well as access to quality antibiotics by authorized personnel only.

The DDA is authorized to regulate antibiotics for both animal and human health. To support DDA, the Veterinary Standards and Drug Administration Office has been established under the Directorate of Animal Health, MoLD in Nepal to regulate the drug use and veterinary vaccines imported in the country

Recently (2017), the MoLD banned the use of antibiotics for growth promotion in pre-mix feed but the enforcement of this directive is limited by lack of capacity. There is however, no ban on preparation of antibiotic-containing feeds within the country and their further use.

The presence of antibiotics in products available in supermarkets such as meat, milk, fish etc is the responsibility Department of Food Testing and Quality Control (DFTQC) which has limited lab and human capacity and does not conduct any surveillance for antibiotics. Greater coordination is needed in synergising policies and programmes between antibiotic use in farms (MoLD) and updated detection of antibiotic residue and resistant organisms or genes in animal food (DFTQC).

Pillar: Infection Prevention and Control

Though there is little that has been done systematically to integrate AMR in existing programmes, several opportunities exist. Improving the quality of care at the point of delivery is one of NHSS's four strategic directions and the quality of care initiatives of MoHP, supported by UNICEF and other donors in select districts, can be a great entry point for installing and monitoring stewardship activities in healthcare facilities for tackling AMR. At present, the minimum standards of quality of care at the point of delivery include nine tracer 'items' which have an AMR focus including soap and running water or alcohol-based hand disinfectant, safe final disposal of infectious waste, equipment and knowledge of processing time, trained staff, quality assurance guidelines, clinical protocol, availability of all four tracer amenities, waiting room, tracer medicines (amoxicillin or cotrimoxazole and gentamycin amongst others). These parameters modified with an AMR lens can be assessed periodically for assessing progress in NAP implementation.

Additionally, the Maternal and Perinatal Death Surveillance and Response (MPDSR) programme of Child Health Division, regularly conducts maternal and perinatal death audits. However, the verbal autopsy form lacks a column for reporting results of laboratory testing for diagnosis or antimicrobial susceptibility or documentation of a resistant infection as a cause of death for maternal or perinatal sepsis in hospitals or outreach areas.

In the **Nepal Health Facility Survey**, 18 tracer medicines (including antibiotics such as amoxicillin selected for monitoring purpose covering different programmes) were checked for availability. 7 percent of zonal and above hospitals, 15 percent of district-level hospitals, 4 percent of PHCCs and less than 1 percent of health posts and urban health clinics (UHCs) stocked all 18 tracer medicines at time of monitoring. When assessed, the minimum standard of quality of care at the point of delivery concerning the presence of nine tracer 'items', less than one percent of the surveyed facilities had all nine items. The nine items include soap and running water or alcohol-based hand disinfectant, safe final disposal of infectious waste, equipment and knowledge of processing time, trained staff, quality assurance guidelines, clinical protocol, availability of all four tracer amenities, waiting room, tracer medicines (amoxicillin or cotrimoxazole and gentamycin and oral rehydration solution and zinc and at least three family planning methods and iron and folic acid and albendazole). Thus to monitor quality of Care parameters the Hospital checklist in Nepal includes AMR related indicators in the **Minimum Service Standards Checklist of the Hospital Strengthening and Management Project**.

The data from the IPC programme in facilities supported by UNICEF, especially IPC and WASH activities in health care facilities, can include parameters for AMR for monitoring effectiveness of implemented activities.

Addition of new vaccines such as PCV and RVV in the immunization programme helps to reduce the burden of AMR. Studies to assess the value of these vaccines from an AMR lens will be valuable.

On the animal side, the MoLD is responsible for training youth on taking up agriculture and animal husbandry as an industry within the country. The training and livelihood programme provided by DoLS needs to include training curriculum on WASH and IPC in farms, discourage antibiotic use and include incentives (cash/recognition) for good farming practices. Donor funds in the agriculture services within Nepal including for the Reconstruction programme after the earthquake in 2015, from the World Bank and GIZ are immense and must be tapped into by the MoLD and Ministry of Finance (MoF). The Village Health Coordination Committees formed to encourage farming practices can be the medium of change for such activities.

Pillar: Research and Economic case for AMR

There is limited research on AMR in the country with few publications like the Situational Analysis by GARP-Nepal in 2015. Overall, in the human health sector, it is the Nepal Health Research Council (NHRC) that is responsible for directing government funds towards documenting the burden of AMR, transmission dynamics, surveillance and impact of different government programmes on the burden. There are a few individual publications but lack of both academic as well as operational research on AMR in Nepal especially regarding the behavioural interventions that can help address the problem. Though there is a huge private sector in Nepal in delivery of health care services in rural as well as urban areas, there seems to be limited involvement of the sector in health care policies sensitive to AMR

The draft health sector State Non-state (private sector) Partnership Policy (2012) calls for improved partnerships between state and non-state actors and meaningful collaboration. The national immunization programme is a reliable source of service in both the government and the private sector. Nepal has included several new vaccines like Pentavalent, PCV, HPV (and is considering RVV) which has immense impact on the AMR profile of respiratory and diarrhoeal diseases. Studies need to be encouraged on the impact of vaccines on AMR and use the platform of vaccine programmes to deliver other services like awareness.

Seamless integration of AMR in existing programmes can be planned as follows:

1. The wealth of data being collected in the Pilot Universal Health Coverage scheme can be used to design and fund AMR responsive clinical care packages, institute antibiotic stewardship policies and AMR surveillance. This can include tapping into the government commitment to provide free of cost healthcare to select population. The existing Basic Health Services package is also being revised and expanded to ensure an agreed minimum level of quality

assured services to be delivered free of charge at all primary health care institutions in the public health sector. This landmark initiative needs to be leveraged for AMR containment through engagement from the design phase itself.

2. The traditional maternal, child health and reproductive health care programmes are well established with infrastructure, human resources and funding support already in place. Many such existing programmes such as the *national immunization programme, community and facility based Integrated Management of Neonatal and Childhood Illnesses (CB/FB-IMNCI)* , *IMAM (Integrated Management of Acute Malnutrition)* can easily integrate AMR related modules for awareness into their service protocols and fund research to document the impact on AMR.
3. Improving the quality of care at the point of delivery is one of Nepal Health Sector Strategy's four strategic directions. The Nepal Health Facility Survey (NHFS), 2015, for the first time, collected information on quality of care at health facilities in terms of meeting minimum standards at the point of delivery; compliance with service delivery standards, protocols, and guidelines; and the quality of service provision. The NHFS's overall findings indicate that additional efforts are needed to improve the quality of health services. The quality of care programme of MoHP supported by WHO, UNICEF and other development partners in select districts can be a great integration point for installing and monitoring stewardship activities in health care facilities for tackling AMR.
 - a. The training and mentoring programme for Health Workers and FCHVs that are regularly planned on family planning and reproductive health services can simply include modules to cover awareness of and access to antibiotics to curb indiscriminate use in the community and clinical facilities.
 - b. The *Hospital Management Strengthening Programme (HMSP)* has a Quality of care checklist with indicators for service delivery and medicines (including antibiotics such as Amoxicillin, Azithromycin) which can be rationalized (AWaRe classification) to ensure appropriate access without excess and monitored over time to assess impact on the AMR scenario.
4. The *Maternal and Perinatal Death Surveillance and Review (MPDSR)* programme for Maternal and perinatal death audits has indicators for antibiotic availability in different health care levels which can be reviewed from an AMR lens to ensure appropriate antibiotic use. In addition to some of these existing AMR relevant indicators, few others can be added to ensure a comprehensive assessment of the quality of care (prescription and clinical audits, antibiotics administration auditing, indicator book, standards and guidelines) to tackle AMR.
5. The communicable disease control programmes led by Epidemiology and Disease Control Department (EDCD), Tuberculosis, Malaria and HIV Divisions have extensive experience in developing drug treatment protocols, ensuring access to quality medicines and ensuring laboratory data for

surveillance of drug resistance. This experience must be leveraged to expand the activities of these departments to include AMR and antibiotic surveillance activities of NAP.

6. Integrated AMR surveillance systems may be developed with NPHL, CVL EDCD and labs in DDA for surveillance of antibiotic quality to ensure access to quality antibiotics in Nepal.
7. Awareness in farmers and public for antibiotic residue in food and resistance can be added through simple modules in projects implemented by the department of Livestock Development, Department of Agriculture. The work done by the PACT and other livestock sector projects provide an opportunity to engage with the local community leaders, farmers and families to bring about awareness regarding antibiotic use in animals and for human illnesses.
8. On the animal side, the MoLD is responsible for training youth on taking up agriculture and animal husbandry as an industry within the country. The training and livelihood programme provided by DoLS can include training curriculum on WASH and IPC in farms, discourage antibiotic use for growth promotion and include incentives (cash/recognition) for good farming practices. Donor support from the World Bank and GIZ in the agriculture sector within Nepal especially for the Reconstruction programme after the earthquake in 2015, can be tapped into by the MoLD and MoA. The Village Health Coordination Committees formed to encourage farming practices can be the medium of change for awareness of AMR related farming activities.

Additional support for funding or capacity building will be needed:

1. To create awareness and commitment in the political leadership and EDPs to understand the crippling scale of AMR and seamlessly integrate it in existing programmes. Greater focus will be needed to add AMR responsive aspects to the competency based training for health practitioners (including doctors, HW and vets) and to establish substantial deterrent to curb irrational antibiotic use.
2. Pilot AMS projects though few have been conducted by NGOs which can be scaled up to demonstrate successful model antibiotic stewardship programmes within healthcare facilities (establishing Drug Treatment Committees etc) with representation of lab and clinical specialties.
3. Enhance capacity of the Department of Drug Administration as the National Regulatory Authority of Nepal. It can involve the EDCD, TB/HIV programme for surveillance of antibiotics appropriate use in community.
4. Integration of clinical and laboratory services in private sector, specialized, regional and district hospitals in AMR surveillance system. This will require standardized clinical and laboratory protocols for which additional funding will need to be earmarked. Though government budgetary support exists for all programmes, it should be supported by pooled funding and direct grants from external development partners (EDPs).
5. Significant EDPs and govt support (funds, HR and policy support) will be required with animal health and agriculture sector to scale up their response to AMR including building awareness, integrating AMR with other disease

control programme in animals like Rabies, developing AMR surveillance guidelines, and veterinary epidemiology services, importance of personal hygiene and WASH in farms and research and monitoring of appropriate antibiotic use.

6. Surveillance of food quality by the DFTQC will require support to integrate AMR specific and sensitive indicators in food. Strengthening the department as part of the one health surveillance will be critical.
7. Comprehensive surveillance of AMR in live animals (Farms by MoLD) and wet markets (DFTQC) is vital.
8. Additionally, Nepal with GAVI support (via WHO & UNICEF) has recently added several new vaccines such as Hib containing Pentavalent and PCV which impact the AMR drastically. The national immunization programme is a reliable source of service in both the government and the private sector. Research studies to quantify the impact of these vaccines on AMR are needed to encourage such multi-pronged interventions.
9. There is limited research on AMR in the country with few publications like the Situational Analysis by GARP-Nepal in 2015. Overall, in the human health sector, it is the NHRC is responsible for directing government funds towards documenting the burden of AMR, transmission dynamics, surveillance and impact of different government programmes on the burden. There are a few individual publications but lack of both academic as well as operational research on AMR in Nepal especially regarding the behavioural interventions that can help address the problem. Though there is a huge private sector in Nepal in delivery of health care services in rural as well as urban areas, there seems to be limited involvement of the sector in health care policies sensitive to AMR.

Development Partner Mapping

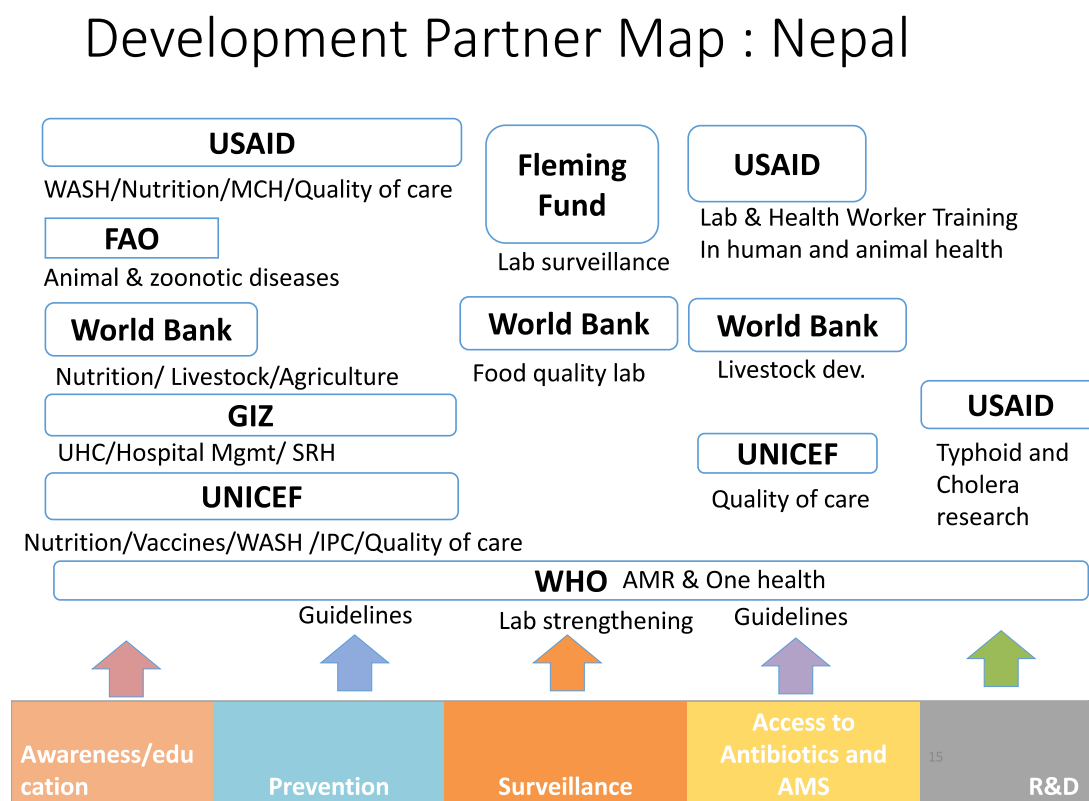
From the mapping exercise, it appears that there are a few key development partners already involved in the communicable disease (one health), quality of care and public health surveillance areas –either through existing programmes such as HMSP or MPDSR and with recent entry of the Fleming Fund lab assessment for surveillance for AMR is expected to improve.

As per the NHSS, the Government and EDPs have pooled funds to maintain efforts aimed at strengthening Nepal's World Bank-supported Health Sector Wide Approach (SWAp). This has been done to better align funding and technical support with the strategic priorities of the government. As part of these pooled funds, the government provides leadership in programme design, implementation and monitoring towards progress in health outcomes and health system strengthening under NHSP-2. Only a few donors such as GIZ and USAID provide direct funding for certain government programmes in Nepal. Most of the EDPs have pooled funds which are provided in strategic pre-selected priority areas directly to the government (treasury) or through UN organizations like WHO, UNICEF or FAO.

An effective mechanism to help strengthen partnerships in health sector has been established through the JAR. The JAR, coordinated by WHO, which includes

external development partners as well as ministry staff, is a great opportunity to monitor progress and do course correction. Moreover, the Management Division is responsible for collecting, analysing and sharing updates in the health indicators agreed in the HSSP-2 which include AMR related activities.

Fig 3: Development partner mapping of Nepal



The key development partners appear to be:

- GIZ – working in area of Universal Health Coverage (UHC), Sexual and Reproductive Health (SRH) and reconstruction programme following natural disasters
- World Bank – specifically governance, health systems and agriculture and livestock development
- USAID- in maternal and child health programme, WASH and Quality of health care services
- DFID- as they have a very large technical capacity in laboratories as well as they provide community level and maternal health programmatic support in the field.

Integration of AMR into donor programmes

The following key factors must be considered for integrating AMR into existing and new programmes:

- Evidence should be provided to development partners of the threat that AMR is posing to clinical care and SDG achievements. This should include how AMR is a health threat and a health security threat.
- Generating awareness at the highest political and citizen level through presentations in the fora provided by the JAR and One health platform will help to leverage vital resources. In addition, the External Development Partners Forums should be engaged directly to discuss AMR and how existing projects of the DP's are overlapping.
- Efforts to monitor antibiotic use will require extensive support to the government from donors and UN agencies including WHO, UNICEF and FAO. These should be aimed at strengthening health systems and capacity of national regulatory authorities to make available quality surveillance and medicine quality (SSFFC) data in the country.
- Establishment of AMR-specific indicators in the quality of care paradigm that is a focus of the Nepal government and donors will be helpful in integrating AMR. UNICEF is leading work in this area and inclusion of such indicators such as establishment of DTC, availability and quality of drugs, HR and information systems sensitive to AMR will help to track NAP progress.
- Impact of WASH, IPC and hygiene projects on AMR in the country overall and especially in health care facilities should be analyzed from already available data in the government health facilities (from the checklist of quality of care indicators). Baseline AMR-sensitive indicators can be developed for Nepal and progress monitored over time. Such projects for non-health interventions impacting health systems and AMR may be attractive to donors such as GIZ which are supporting reconstruction of new health facilities and ensure they provide high quality services.
- The data from the design and rollout of the Basic Health Services package in the new Health Insurance scheme in Nepal (supported by GIZ) may have a wealth of information to understand the health systems, disease profile and clinical care services in the country including AMR relevant indicators especially for making an economic case for AMR. This needs to be tapped for health modelling, baseline assessments linking AMR with SDG progress.
- Significant donor and govt support (funds, HR and policy support) will be required with agriculture and veterinary sector to scale up their response to AMR including building awareness, surveillance guidelines, monitoring and enforcement of appropriate antibiotic use and personal hygiene and WASH in farms.
- Funds will be required to strengthen health research on AMR in Nepal- both from the govt. and EDPS. Involvement of private sector, academics and programme managers, policy makers and economists remains vital to devise AMR responsive policies.
- Surveillance of food quality by the DFTQC will require support and strengths to integrate AMR specific and sensitive indicators within the one health surveillance systems platform.

AMR STAKEHOLDERS

a. Health sector stakeholders

Ministry of Health and Population

The Ministry of the Health and Population plays a dual role of regulating the health sector and delivering health services. The regulatory function has been carried out mainly by divisions within the MoHP and through central level professional and institutional councils, such as Nepal Medical Council. Besides these, the DDA also functions as a regulatory body for production and supply of medicines and other health products. The other two departments of the MoHP, namely Department of Health Services and Department of Ayurveda, manage delivery of the health services at the central level while district level (public) health offices and wide network of public health facilities including autonomous and semi-autonomous hospitals deliver health services to the people. Further, national level centres work closely with district health offices to deliver a wide-range of health services directly to the people.

Department of Health Services

Department of Health Services is one of three departments under MoHP, responsible for delivery of health services through the district health system, from the District Hospital to the lowest health unit, Health Post. The department is responsible for the district health system: managing human resources; procuring and supplying equipment, commodities and drugs; managing information systems; conducting inductive and continuous training activities; and planning construction activities. The department plays an important role in coordinating support provided through technical agencies, non-governmental, non-profit and for-profit organisations and partners. In addition, the department also provides technical inputs to the ministry on acts, policies and other long-term strategies relevant for Nepal.

There are AMR related activities being conducted within various divisions of the DHS, particularly the Family health, Child health, and EDCD. Other important centers that conduct AMR activities include the National Tuberculosis Center, National Centre for AIDS and STD Control, NHEICC, National Health training Centre, and National Public Health Laboratories.

DHS Family Health Division

Family Health Division (FHD) is responsible for implementing reproductive, maternal health and population related activities. FHD focuses on coverage, quality and improvement in the services to support achieving universal health coverage. FHD also supports the districts for the implementation of demand side financing schemes mainly on safe motherhood, new born Care, family planning and RH morbidity management areas. Regular improvement in standards and quality of maternal and new born health services is also the concern of FD.

Safe Motherhood and Newborn Health Programme

The Safe Motherhood and Newborn Health (SMNH) Programme of the FHD functions to reduce maternal and neonatal mortality by addressing complications of pregnancy and childbirth for all women, including the poor and excluded.

Some of the key activities included within the SMNH programme, outside of the child health delivery activities, include maternal death reporting and a child health training programme for nurses. In the case of maternal deaths, these are investigated by nurses and health care workers to identify the cause of death. This is also conducted within private sector hospitals and the reports are completed in the same format. Within the health training programme, staff nurses and trainers train midwives and volunteers on safe delivery practices based on a developed curriculum. The FHD relies on many female community health volunteers within their 75 districts to administer the activities.

Maternal and Perinatal Death Surveillance Response Programme

Nepal has shown significant progress in reducing maternal and perinatal mortality over the past two decades. Despite progress, maternal mortality in Nepal continues to be one of the main causes of death among women of reproductive age and a major public health problem. In 2015, it was estimated that about 1500 women died in Nepal during pregnancy, delivery and the puerperium period (WHO 2015).

Started in 1990, a maternal death review process in Paropakar Maternity and Women's Hospital in Kathmandu, the only maternity hospital in the country, gathered momentum for implementation of perinatal death review only in 2003. By 2006, maternal and perinatal death reviews were being conducted in six hospitals increasing to 44 referral hospitals by 2014. The Government of Nepal (GoN) initiated a maternal and perinatal death surveillance and response system in 2014. The system builds on experiences from MPDR implementation and the maternal mortality and morbidity study. While facility-based reviews of maternal and perinatal deaths continue in 44 referral hospitals, the GoN, with support from the WHO and other partners has been implementing MPDSR in five districts, namely Banke, Dhading, Kailali, Kaski and Solukhumbu since 2016. In these districts, MPDSR is implemented at two levels: health facility and community. At the facility level, both maternal and perinatal deaths are reviewed and appropriate actions are taken. In the community, verbal autopsies are conducted for maternal deaths only.

Hospital Management Strengthening Programme (HMSP)

With a view to strengthen the effectiveness of the Hospital Development Committees (HDC) responsible for managing clinical health facilities and ensure accountability of to HDC members, a pilot programme was developed in conjunction with Nepal Health Training Centre (NHTC). Learning from the pilot showed that a number of different Divisions in both MoHP and the Department of Health Services impact the effectiveness of hospitals. A checklist for Minimum Service Standards for District Hospitals has been thus developed to bring together all the previous standards,

guidelines, tools and other documents that are related to the quality of hospital services. The HMSP programme checklist intends to focus more on 'service standards' that expects to demand the resources including human, infrastructure, and supplies required to establish a hospital fulfilling the 'Minimum Service Standards'. It can be a start for analysing the current state of AMR-related indicators at facility level as it already includes some.

DHS Epidemiology and Disease Control Division

The Epidemiology and Disease Control Division (EDCD)'s responsibility is to reduce the burden of communicable diseases through primary health care services. At this stage, it is responsible for several diseases including epidemic/outbreak preparedness and control programme, malaria pre-elimination programme, kala Azar elimination programme, lymphatic filaria elimination programme, dengue control programme, disaster management programme, control of zoonotic disease specially snake bites and dog bites, avian influenza control programme and surveillance and communicable disease research programme.

EDCD can play a vital role within Nepal's future AMR activities and has the possibility to bring together animal, human and environmental laboratory surveillance. Ongoing TB, malaria and neglected tropical disease (NTD) programmes can seamlessly integrate AMR components. At this time, AMR is not a priority of EDCCD, but will likely change when funding is provided with government and donor support as part of the global health security agenda.

National Public Health Laboratory

The National Public Health Laboratory (NPHL) is the national referral lab which also regulates the laboratory services in the country. Along with routine and special diagnostic facilities, the NPHL conducts surveillance and plays a role during outbreaks of various emerging and re-emerging. It also operates as a quality assurance body, responsible for the registration and licensing of private sector laboratories as well as the support of lab services through health posts to public hospitals. NPHL manages wide range of programmes, including routine diagnostic test, special diagnostic test, National Influenza Center, HIV referral laboratory with ARV monitoring facilities, antimicrobial resistance (AMR), JE / Measles / Rubella surveillance, Molecular diagnostic laboratory and National External Quality Assessment Scheme (NEQAS).

NPHL primarily focuses on human health surveillance and pathogens. NPHL does not interact with other animal and veterinary labs on a consistent basis, rather only when there is a special case or a joint event – like the AMR awareness week. During outbreaks, the central veterinary laboratory (CVL) may send samples to NPHL for pathogen identification. Most of these samples are taken from meat or milk products to be tested for one to two pathogens. There is no consistent data exchange between CVL and NPHL but data sharing due to personal coordination exists. Quality of existing lab data is also an area of concern. There are no uniform tests,

standardization of labs or tests and even between NPHL and veterinary labs, there are inconsistencies in test reports. Currently, the NPHL is not internally accredited and does not have standard guidelines for lab quality assurance. NPHL recognizes these gaps and expects to improve data reporting and surveillance through new funding with a goal to report to WHO GLASS by 2020. The NPHL currently serves as the coordinating organization of the technical working group for the multisectoral AMR committee while the Curative Services Division works as the focal point for the AMR NAP.

Department of Drug Administration

In accordance with the objectives of the National Health Policy 1992, the DDA works to improve and manage activities related to drug production, import, export, storage, supply, sales, distribution, quality assessment, regulatory control, rational use and information flow by establishing coordination among governmental, non-governmental and private organizations as directed in the National Drug Policy implemented in 1995. Under the Drug Act 1978, several rules, regulations and codes have been implemented as supporting tools for the active enforcement of Drug Act 1978 namely-Regulation on Constitution of Drug Consultative Council and Drug Advisory Committee 2037, Drug Registration Regulation 2038, Interrogation and Inspection Regulation 2040, Codes on Drug Manufacturing 2041, Drug Standard Regulation 2043. Drug Donation guidelines have been implemented for the quality assurance of donated drugs. The DDA was a key stakeholder in the development of the Situational Analysis with GARP as well as the drafting of the current NAP AMR. It has undertaken activities to encourage antibiotic stewardship programmes with select hospitals and developed AMR awareness training manual for community pharmacy and for different level of health care providers in collaboration with GARP Nepal as well as materials for spreading awareness among consumers and public on antibiotics use.

Curative Service Division

CSD is responsible for the overall management of public hospitals above the district level. With the frequent natural disasters and rapid expansion of private health sector, in Nepal, this division has a key role in ensuring quality of health services in clinical facilities. However, it suffers from limited human resources and resources to match deliverables considering the rising public expectations.

b. Agriculture sector stakeholders

Ministry of Agricultural Development

Agriculture is the major sector of the Nepalese economy. It provides employment opportunities to 66 percent of the total population and contributes about 33 percent in the GDP. Therefore, the development of agriculture sector is key for the

development of national economy. The ministry bears overall responsibility for the growth and development of agriculture sector.

Department of Food Technology and Quality Control

Department of Food Technology and Quality Control (DFTQC) is one of the three departments under the Ministry of Agriculture Development (MoAD) The main aim is to ensure and enhance the quality and safety of food and feed products in the country. Further, the department has a paramount role in augmenting appropriate food processing and post-harvest techniques to promote agribusinesses. Similarly, the department has been implementing various food and nutrition activities for the reduction of various forms and types of malnutrition in the country. DFTQC, as CODEX Contact point for Nepal for more than three decades, has also been given the role of National Sanitary and Phyto-Sanitary (SPS) Enquiry Point in 2004.

Ministry of Agriculture, Land Management and Cooperative (Livestock Development)

Department of Livestock Services was first established in 1939 as a veterinary dispensary, which was converted into Veterinary Hospital in 1940. Until 1964, 33 vet. Hospitals, 21 dispensaries and 18 check-posts were established. Five farms were also established during this period. In 1966, Department of Livestock Development and Animal Health was established and various livestock development programmes like animal health, nutrition, breeding management etc. were implemented. It was amalgamated with Department of Agriculture (DOA) in 1972 and separated from DOA in 1979 and named as its first name, Department of Livestock Development and Animal Health. During this period, 75 district livestock development offices, service centers in field levels, regional labs and some new farms were established. Divisions and sections were also established in the central level to support livestock development programmes. It was again re-amalgamated with the DOA with the name of the Department of Agricultural Development (DoAD) in 1992 with the purpose of providing all the agricultural services through an umbrella. Due to some management complexities and problems in the programme implementation, it was then separated from DOAD and named as Department of Livestock Services (DLS) in 1995.

Directorate of Animal Health

Directorate of Animal Health is the focal point of National Veterinary Services and represents Nepal Government, Ministry of Agriculture Development, Department of Livestock Services as a National Veterinary Authority. It is committed to preventive, curative and laboratory services to the needy people to protect their animals from various diseases. It also carries out activities for public health and quality control. Being a member of the World Trade Organization (WTO), Nepal has to comply with the SPS agreement. In this context, the Directorate of Animal Health is playing

important role in formulation of legislation, enforcement and application of internationally acceptable standards for quality control of animals.

It is working with the World Bank on a livestock project (2017) that aims to tackle the multidimensional nature of the issues constraining the development of the livestock sector in Nepal including active involvement of the private sector. The project aims to:

1. create an enabling regulatory and institutional environment;
2. enhance livestock productivity through improving livestock services delivery in terms of quality and quantity; and
3. strengthen key strategic livestock value chains and improving access to business development services.

Some of the key activities planned under this component include the formulation and/or updating of the Animal Welfare Act, Animal Health Policy, Livestock Master Plan (LMP), Strategy for One Health Approach, and installation of a central-level management information system (MIS). The project will enhance the capacity of the MoLD to provide guidance and strategic direction to support the sector and strengthen the capacity of respective municipalities for efficient and demand-based extension services. Staff capacity will be built at all levels to promote effective and efficient service delivery. The project will also develop local resources by identifying and training para-veterinarians and community service providers who will continue to provide services at the local level even after the project's lifespan

Central Veterinary Laboratory

Central Veterinary Laboratory (CVL) focuses programme with the objective of securing healthy national flocks of animals and birds throughout the nation by mitigating the occurrence of diseases of livestock and poultry. CVL also works on epidemic investigation as well as surveillance and investigation on various diseases in its approved annual programme. CVL works with a series of laboratory test procedures through its various laboratory sections; Pathology, Parasitology, Microbiology, Serology, Laboratory management and teaching lab and Molecular Biology with a considerable progress in the later. At present the molecular-based diagnosis of avian influenza is in routine use.

CVL has standard Operating Procedures, test protocols and quality guideline manual. CVL is gradually practicing the biosafety/ biosecurity measures so that good laboratory practice is followed in our all the diagnostic laboratories. CVL has already been adopting test verification system through international reference laboratories which will help in the accreditation of CVL for international certification as well. To provide diagnostic facilities throughout the country, CVL works through its five Regional Veterinary Laboratories (RVLs) located one in each of the development regions of the nation. To provide the diagnostic services smoothly throughout the nation, 15 basic laboratories have been established in 15 District Livestock Service Offices (DLSOs) and 60 primary laboratories one in each DLSOs of other districts. The basic laboratories are capable to perform parasitological examinations, microbial

culture and antibiotic sensitivity testing. CVL works as a reference veterinary laboratory in Nepal.

Veterinary Epidemiology Centre

Epidemiological surveillance of animal diseases is an essential and integral part of National Veterinary Services. In Nepal disease reporting was encouraged during Rinderpest vaccination campaign in the 1960s. The concept of national animal disease database is developed in early eighties and epidemiological unit was created Central Animal Health Centre, Central Veterinary Laboratory and Infectious Disease and Parasite Control Project in the past. The disease reporting system was irregular, incomplete and not standardized. In 1996 when Nepal joined Office International des Epizooties (World Organization of Animal Health) and bound to follow OIE pathway in order to get international recognition of rinderpest disease and infection free country. Central Epidemiology Unit (CEU) was established under the Central Veterinary Laboratory and Animal Disease Control Section in 1996. A computerized national database and standardized disease reporting system has been developed which has gone through a series of metamorphosis. Nepal was declared as rinderpest disease and infection free country in 2002, which demonstrates the strength of effective national epidemiological system in Nepal. Veterinary Epidemiology Center was established as an independent organization in 2004 under the new organizational structure of the Department of Livestock Services. Government of Nepal has well recognized the importance of epidemiology in the context of OIE/WTO membership. Currently frequency of monthly reporting is about 90%. E-mail has been used for epidemiological reporting by some districts and regional veterinary laboratories.

c. Development partners and key funders

Current systems for providing donor support in Nepal are a mix of pooled and direct funding from donors. In 2014, the Ministry of Finance (MoF) agreed on a pooled fund from all donors to support activities in pre-selected areas of focus as per donor priorities. This was also done to tackle leakage or loss of funds within the system and programmes. The JAR serves as a mechanism to understand the progress and assess the results achieved for the input of funds received by the various sector. However, at present there is a lot of uncertainty in the donors as well as the government about the devolution of power to the municipality level (federalization) and the existing of various departments and ministries within the govt. at national and provincial level. Moreover, the donors are also unclear on the MoUs and collaborations that will have to be in place at national, local and provincial level with different systems to support priority areas.

For now, it seems the pooled support provided to the UN agencies such as WHO, FAO and UNICEF is likely to continue and support can be extended to select municipalities and specific areas of donor interest. Inclusion of AMR-specific

indicators in this support will help to strengthen one health surveillance and tackle AMR

World Bank

The World Bank's current portfolio is comprised of 22 active projects with a net commitment of \$2.32 billion. In terms of the number of projects, the energy sector makes up the largest share (5 projects) followed by agriculture and education (4 projects in each sector). In terms of volume, the education sector accounts for the largest at \$530.8 million, followed by agriculture (\$464.9 million), and energy (\$341.9 million). The World Bank is also financing projects in climate resilience, education, financial management, health, irrigation and water management, social protection, and urban development.

The current country partnership strategy is for the period 2014-18 and a new Country Partnership Framework (CPF) will be prepared in the second half of FY2018. The Programme Development Objective is to improve efficiency in public resource management systems of the health sector in Nepal. The Programme for Results (PforR) operation will support the Programme through a series of Disbursement Linked Indicators (DLIs), which form the basis for disbursement. There are 11 DLIs that focus on critical aspects of health sector management including priority areas in procurement and financial management and reporting and information management for better evidence-based planning.

Within the human health sector, the World Bank contributes to the pooled funds with other donors and its funding can be utilized for programme support, human resources, travel, and administrative costs.

There are five major projects supported by the World Bank that have or potentially have AMR components: Nepal Livestock Sector Innovation Project (establish several animal health policies and livestock plans with the One Health approach), Nepal Health Sector Management Reform Program, Project for Agricultural Commercialization and Trade (PACT), Nepal Rural Water Supply and Sanitation Improvement Project and the Food and Nutrition Security Enhancement Project (in pipeline). Other AMR-related activities include, support for vaccination campaigns, developing and promoting good animal health practices, establishing vaccination programmes, and community health and farmer education,

The World Bank has provided financial and technical assistance for Nepal's nutrition and food security interventions for the following projects. The Nepal Agriculture and Food Security Project (AFSP) 2013–18 (World Bank, 2013), Sunaula Hazar Din–Community Action for Nutrition Project (SHD) (World Bank, 2012), and the Rural Water Supply and Sanitation Improvement Project (2014–19) (World Bank, 2014). The AFSP, implemented by MOAD, supports nutrition-sensitive agricultural activities to promote the production and consumption of nutritious foods in marginal regions. MOFALD implemented the SHD Project, which is a demand-driven community-led project implemented at the ward level by community teams. The Rural Water Supply Project aims to improve access to quality drinking water and sanitation, which is a major component of nutrition-sensitive interventions. The World Bank also provides technical support through the South Asia Food and

Nutrition Security Initiative (SAFANSI), a programme financed by the Department for International Development (DFID) and the European Commission.

UK Department for International Development: (not met)

The Department for International Development (DFID) leads the UK's global efforts to end extreme poverty, deliver the SDGs and tackle a wide range of global development challenges. Top 3 planned spending programmes in Nepal (as at June 2017) include: Building Resilience and Adaptation to Climate Extreme and Disasters, Nepal Health Sector Programme-III and the Post-Earthquake Reconstruction Programme - Building Back Better.

DFID support is delivered through directly funded projects, multilaterals, financial aid and technical assistance. It has increased its work through direct funding, however, financial aid remains an important instrument to strengthen Nepali government systems and promote sustainability. DFID Nepal has extensive experience of ensuring the robust protection of funds delivered through financial aid. Through its work with the Gurkha Welfare Service, DFID is making a significant contribution to water and sanitation provision, helping at least 600,000 people to get access to clean water and sanitation. Multi-country programmes managed by DFID headquarters complement country programmes to achieve results in the areas of climate change adaptation, trafficking and migration, trade and investment, and girl's education.

USAID

USAID partners with Nepal on three U.S. presidential development initiatives: Feed the Future, Global Climate Change and Global Health. Across all sectors, USAID focuses on strengthening gender and social equality, reducing disaster risk, and working with the Government of Nepal to improve its institutional capacity, inclusiveness and accountability. In its health projects, programme staff view AMR through lens of quality of care. It can easily integrate AMR within its maternal and child survival programme, implemented via Save the Children. With the MCH programme, USAID conducted an assessment survey among 0-2 year olds getting treatment within private sector (Save the Children report December 2017). The survey found that 48% of young people were treated in the private sector where its projects are focused. The private sector is varied in terms of standard clinical practices, protocol adherence, training, and there is no current forum for private health clinics to communicate with government or public institutions.

USAID has been financing food and nutrition and among other projects, USAID finances the Suaahara Project, with a focus mainly on nutrition, Sustainable Action for Resilience and Food Security (SABAL) Project with a focus on livelihood, health, and nutrition, and Feed the Future or the KISAN Project with a focus on food security, markets, and the private sector.

In the past, USAID has been a key development partner within Nepal but it anticipates a significant reduction in funds for ongoing health, WASH, nutrition and family planning projects. To integrate AMR activities within these limited funding

resource, the agency can undertake only a seamless no or low-cost integration within USAID's focus on quality of care.

With its support it is recommended to integrate AMR efforts in funded projects to set up demonstration projects for antibiotic stewardship in private sector, identify and standardize AMR specific indicators in the ambit of Quality of care (including the private health facilities) and integrate AMR specific modules within WASH, nutrition, reproductive health and family planning projects.

German Society for International Cooperation (GIZ)

GIZ has been active in Nepal since 1975 and implements projects mainly on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), but also other German ministries, namely the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), as well as various co-financing partners.

The German Federal Ministry for Economic Cooperation and Development (BMZ) has been supporting the development of the Nepalese health sector since 1994. The project is closely aligned with the Nepal Health Sector Strategy (2015–2020). It advises the national authorities responsible for steering the sector on designing reforms and supports implementation in selected districts and municipalities in the Far Western, Mid-Western and Central development regions. There are five key activities within GIZ's health project:

1. Design and implementation of a pay-for-service social health insurance system including strengthening hospital management
2. Raising the quality of health care services in sexual and reproductive health by mentoring Trained Birth Attendants (TBAs)
3. Strengthening governance in health (including urban health) by helping government transition into the federal system
4. Upgrading and networking existing health information systems to prepare for a future national health information platform
5. Improving the delivery of medical and psycho-social services for drug users (up to June 2016)

In general, German Embassy engagement is provided in the form of financial and technical support which is implemented by GIZ. There are two sectors in which GIZ can currently integrate AMR activities within two ongoing initiatives in the private sector, a medical waste management system and a health management information system (HMIS). Within the medical waste management system, GIZ works to reduce infectious waste by collecting waste from various hospitals then consolidating and selling it in bulk to buyers. Hospital waste has been neglected in the past from waste buyers due to the low amounts collected from individual hospitals. Within the HMIS, GIZ plans to collect patient level data and create an open data tool to be accessed by any public or private hospital. This data tool is currently used at two NGO-supported hospitals. Other health activities include midwifery training within communities and localities.

WHO

The WHO country office has 6 strategic areas for work in Nepal- Achieving communicable diseases control targets (includes vaccination); controlling and reversing the growing burden of non-communicable diseases; health over the life-cycle focusing on interventions for under privileged and vulnerable populations (Promote evidence-based interventions to improve quality of neonatal, child, adolescent, maternal and reproductive health and improving access and utilization of maternal, neonatal, child, adolescent health and reproductive health services); improving health systems (including improved availability, access, quality and safety of essential medicines, medical devices, blood for transfusion and traditional medicine, strengthen quality, sharing, analysis and utilization of health data, strengthen the institutional base for progress and performance review, information use and accountability and support management of the health policy dialogue process); Reducing the health consequences of Disasters and Addressing environmental determinants of health. Nepal has Sector Wide Approach (SWAp) in Health and partners support is based on Joint Financial Arrangement (JFA). A new JFA has been developed to support the implementation of new Nepal Health Sector Strategy (NHSS) for the period of 2015/16 – 2020/21. WHO coordinates the annual Joint Annual Review with DFID and key External Development Partners meet twice a month to coordinate and discuss current issues/determinants of health. The main donor and partner agencies of WHO are: the World Bank, DFID, GAVI, GFATM, KOICA, USAID, GIZ, KFW (German Development Bank), USAID, UNAIDS, UNICEF, UNFPA and WHO.

UNICEF

UNICEF has a history of more than four decades of work in Nepal and has contributed towards many development goals ranging from efforts to boost child survival, infrastructure for drinking water and sanitation, women's empowerment and self-sustainability; and social & child protection, and governance and emergency preparedness; and the direct participation of children and adolescents in the planning processes of government and civil society. UNICEF provides a wide range of financial and technical support for the GON to develop policy and to implement nutrition activities. UNICEF's activities cover health, water and sanitation, nutrition, child friendly local governance, social policy, child protection, education and adolescent development. It aligns its activities with the Health Sector Wide Approach (SWAp) Programme to support maternal, neonatal, and child health, the micronutrient programme, community management of acute malnutrition, and school sanitation (UNICEF, 2013). UNICEF has remained one of major partners for the GON to support scaling up of implementation of Multi Sector Nutrition Plan (MSNP) in Nepal.

The current five-year programme (2013-2017) focuses on addressing the three main sets of inequity factors (policy, system and societal) so that all children, adolescents and women have access to basic and other services necessary to fulfil their rights to survival, development, protection and participation. UNICEF has current initiatives within the MCH programme where it seeks to increase compliance of antibiotic

prescriptions to control new born sepsis and infections. UNICEF's works are focused on the poorest regions of Nepal, working with disadvantaged communities and advocating for national policies that enable the poorest to engage and be protected. Their programmes that related to AMR include: WASH, Immunization delivery, nutrition, MCH related skill building, HIV prevention and treatment.

Stronger attention will be given to neonatal care, given that most (61 per cent) under-five deaths occur in the first month of life — many within 24 hours of birth — as well as to achieving the elimination of new HIV infection among children and to keeping alive the mothers of children infected by HIV.

UNICEF works with vulnerable communities (with a particular focus on school communities) to strengthen, utilize and participate in the management of safe and sustainable drinking water and sanitation facilities. The intensive Communication for Development initiatives can integrate AMR related messages in activities promoting maternal, newborn, infant, child and adolescent health, and HIV prevention and care, and impact behaviours related to safe water use, hygiene (including hand washing with soap and menstrual hygiene for adolescent girls), and sanitation which tackle AMR.

Fleming Fund

The aim of the Fleming Fund is to improve laboratory capacity and diagnosis as well as data and surveillance of antimicrobial resistance (AMR) in low and middle income countries (LMICs) through a One Health approach. This approach spans work across the human, veterinary, environment and development sectors. With the right data in place not only is there a better chance that AMR becomes a part of national health policy planning with targeted investments where needed, but specific actions can be taken to lessen the impact of AMR on population health.

Food and Agriculture Organization

Nepal is a member of FAO since 1951 and the Nepal office provides advice on policy matters and technical support in relevant sub sectors. It also mobilizes extra-budgetary sources in times of disaster and emergency to provide urgent humanitarian support. Over the past years, almost 300 projects have been implemented by the organization, embracing a broad range of programmes related to crop, vegetables, forestry, livestock, fishery, food safety, nutrition, planning, policy, rural development and environment conservation.

Through its Emergency Centre, FAO has been assisting the Government of Nepal in strengthening its capacities to control and contain transboundary animal diseases such as Highly Pathogenic Avian Influenza (HPAI). It has established a Regional Support Unit in Kathmandu which contributes towards strengthening and empowering the South Asian Agency for Regional Cooperation (SAARC) member states to deliver improved and quality veterinary and public health services to prevent, control and eradicate highly pathogenic and emerging disease. Its support includes capacity building, institutional improvement, food security-related issues,

agriculture and rural development in operationalizing the Agriculture Perspective Plan (APP), from 1995- 2015. It also is collaborating with other development partners in supporting the Government of Nepal in formulating an Agriculture Development Strategy and a National Food and Nutrition Security Plan, both of which have a vision for 20 years.

Though FAO has 4 strategic priority areas (food and nutrition safety and security, institutional and policy support, market orientation and competitiveness and natural resource conservation and utilization) in Nepal, there is no focus towards addressing the AMR burden jointly with other UN or government agencies in the country.

d. Civil society organizations

INGOs involved in food and nutrition in Nepal include Care Nepal, HKI, Micronutrient Initiative (MI), Oxfam, Plan Nepal, Heifer International, Save the Children, and Action Contre la Faim (ACF) (Action Against Hunger). HKI's activities include essential nutrition actions, homestead food production, local multisector governance, and improved nutrition interpersonal communication. The INGOs work with local NGOs and community-based organizations to achieve social mobilization of targeted population. Often, they are also able to reach pockets of marginalized communities. Of the many NGOs working in Nepal, the Center for Environmental and Agricultural Policy Research, Extension and Development (CEPRED), the Support Activities for Poor Producers in Nepal (SAPPROS), and the Forum for Rural Welfare and Agriculture Reform for Development (FORWARD) are NGOs involved in nutrition and food security. They work with farmers' groups to increase income and food consumption by the commercial cultivation of vegetables and other high value crops. The three NGOs cover a wide geographical area of Nepal. Several civil society organizations are also active in food and nutritional security. They include the Civil Society Alliance for Nutrition, Nepal (CSANN), the National Network on Right to Food Nepal (RtFN), comprising more than 50 national and international NGOs, the NGO Federation, the Federation of Community Forest Users Nepal, the Irrigation Water User Federation, Drinking Water and Sanitation Federation, human rights networks, women rights networks, peasants' federations, and youth organizations. The National Alliance for Food Security in Nepal (NAFOS) and Food-First Information and Action Network (FIAN) Nepal are involved in food rights.

Nepal Public Health Foundation

Nepal Public Health Foundation (NPHF) was established in April 2010 with a mission to have concerted public health action, research, and policy dialogue for health development, particularly of the socio-economically marginalized population. Since its establishment, NPHF has taken initiatives to raise voices and advocate the relevant public health issues at national and regional level in a short span of time. NPHF has been involved in policy related dialogues and have taken lead roles in advocating public health and service access issues in Nepal, especially concentrated to urban poor and rural marginalized people with special focus on health and nutrition. NPHF board is represented by professionals from multiple disciplines.

These include academicians, public health experts, clinicians and health rights activists. NPHF has established good linkages with academic institutions, civil society and different non- government organizations. NPHF has been the secretariat for GARP-Nepal and led several efforts to address AMR in Nepal.

Group for Technical Assistance

Group for Technical Assistance (GTA) is a non-political, non-government and non-profit national organization established in Nepal, registered at the District Administration Office in Kathmandu since 1998. GTA provides technical assistance to development actors for better efficiency and effectiveness in the way development activities are carried out in Nepal.

The activities of GTA centre on immunizations, vaccines, burn victims and family planning. Through a partnership with the Ford for Health Systems and Merck Pharmaceuticals, GTA worked in two major hospitals to train hospital professionals and develop an antibiotic stewardship programme. This in fact may be the first of its kind in Nepal and the Standard Treatment Guidelines for use of antibiotics for burn victims are a step towards antibiotic stewardship. In addition, GTA regularly partners with other NGOs, Ministries and UN agencies such as WHO and representatives from these agencies are members of the Advisory Board for its flagship antibiotic stewardship programme for burns.

APUA

Nepal has organized a core group of Nepali medical and scientific professionals committed to APUA's mission and to cooperating and sustaining related projects. The group consists of representatives of key interest groups such as DDA, Tribhuvan University.

In the summer of 1997, APUA piloted a surveillance project which has identified major technical barriers and developed a model for surveillance of antibiotic resistance in remote areas.

The pilot identified important considerations that need to be part of a viable surveillance structure in Nepal and other developing countries. A surveillance software package that is being developed will facilitate the surveillance there.

APUA has established arrangements for a lease of space for an office and laboratory in Kathmandu, and has arranged for a part time coordinator to lay the groundwork for a culturally sensitive programme which will identify and involve in-country resources for antibiotic resistance surveillance. The chapter has a proposal for an antibiotic resistance surveillance and intervention programme and is planning a workshop for emergency room doctors in the hospitals.

The Nepal government spends 42% of the national health budget on drugs, and international donors spend nearly three times as much. Drug distribution and use in Nepal is largely unregulated and the pharmaceutical industry is a major and growing

market. 80% of the drugs are purchased outside of the government-supplied health system, mostly through private retail shops and pharmacies. Nine thousand druggist shops in 75 districts supply 80% of the drugs. Even when antibiotics are prescribed, they are not used correctly. 72% of all drug prescriptions are in non-compliance with standard norms, and 38% of patients misunderstood dosage and administration requirements. Ciprofloxacin is becoming the treatment of choice for physicians, drug sellers and the public.

Although valid research on antibiotic resistance in Nepal is limited, there have been several studies noting multidrug resistant tuberculosis, methicillin-resistant *Staphylococcus aureus*, and resistance of *V. cholera* to tetracycline and *H. pylori* to amoxicillin and tetracycline. The most up-to-date surveillance analysis of antibiotic resistance in Nepal was conducted by APUA with a pilot completed in the summer of 1997. These results were compiled and presented at the American Society for Microbiology meeting. Information on antibiotic supply and distribution and resistance patterns is minimal.

APPENDIX A : THE METHODOLOGY

The methodology followed was a stepwise approach to teasing out integration points and funders:

Stage 1. Review the NAP and AMR Policy to identify integration points and AMR activities and whether plans are (partially) funded or not.

Few, if any, NAPs from LMICs have explicitly recognized the interrelatedness of priority activities with other programmes and projects. Therefore, the first task involved determining opportunities where countries *can* integrate AMR activities with other programmes and projects.

Who: This stage was undertaken by the CDDEP consultants using existing documents on AMR, national policy plans, priority programme strategies and development partner country support plans

Aim: The aim of this stage is to find out which stakeholders/Ministries/development partners are involved in AMR; what AMR activities can be integrated into existing priority programmes and plans; and which of these activities are funded.

Stage 2. Identify existing or potential funders.

Aim: The aim of this stage was to list (and if necessary prioritize) funders to interview. “Existing or potential funders” could include:

Who: This stage was undertaken by the CDDEP consultants in conjunction with the key AMR coordinators within human health, animal health and environmental sectors who were involved in the development of the NAP.

Stage 3. Discussions with (potential) funders and key integration programmes and agencies.

The consultants visited Nepal from the 3rd – 8th December 2017 and conducted interviews and discussions with the potential funders and key stakeholders in AMR.

Aim: The aims of the meetings are:

- To discuss the broad range of AMR activities to create awareness of the need for AMR support
- To identify what AMR specific or AMS sensitive activities are already funded and how long this is likely to last
- To establish what scope there is to adjust current activities so that they are more relevant to AMR.
- To establish how likely or not the body is to fund additional AMR activities.

Stage 4. Describing next steps and reporting back to country key stakeholders

Aim: To provide the teams working on antimicrobial resistance (AMR) in the country with feedback on how to scale up delivery of AMR activities through integration into existing programmes and projects and how to access the necessary funds to do so from existing and potential funders.

APPENDIX B: KEY STAKEHOLDERS INTERVIEWED IN NEPAL

ORGANIZATION	REPRESENTATIVE
WHO	Dr. Jos Vandelaer (WR) Dr. Rajan Raymajhi Dr Samuel Reuben
GIZ	Saurav Bhattarai
GERMAN EMBASSY	Florens Benedikt Vogt
NPHL	Dr Raj Kumar Mahto Dr Jyoti Arya
EDCD	Dr Bibek Lal
WORLD BANK	Dr. Manav Bhattarai
MIN. LIVESTOCK DEVELOPMENT	Dr. Barun Kumar Sharma
DIRECT. FISHERIES DEVELOPMENT	Names TBC
DFTQC	Krishna Prasad Rai
CURATIVE SERVICES DIVISION	Dr Bhola Ram Shreshta
DDA	Narayan Prasad Dhakal
NHEICC	Ms Jyoti
UNICEF	Dr. Midori Sato Dr. Ashish K.C.
FAO	Dr Ratala Dhan Dr Arjun Thapa Dr Kharak Singh
ACADEMIA	HOD Microbiology, Tribhuvan University
GTA	Deepak Bajracharya
NPHF	Dr Sameer Mani Dixit Dr Buddha Basnyat Ms. Santosi Giri
USAID	Dr Sheelu Adhikari
Fleming Fund	Dr Prakash Ghimre
UNFPA	Dr. Neeta Shrestha

References

1. WHO Nepal fact sheet
2. WHO Country Cooperation Strategy, Nepal
3. UNICEF strategy
4. World Bank Reports
5. Website of MoHP, DHS, DDA
6. Nepal NAP AMR
7. MoLD Nepal website
8. MPDSR programme Nepal
9. HMSP Checklist Nepal
10. Website Fleming Fund
11. Website of USAID Nepal