



WORLD BANK GROUP

Protecting Food Systems, Preventing Future Pandemics

The Case for a Central Asia One Health Program



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Meat market in Astana, Kazakhstan.
Source: World Bank

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Preface

The world economy is still recovering from the COVID-19 crisis. Yet, as the pace of emerging infectious disease outbreaks continues to accelerate, the next pandemic may be closer than we think.

Human activity is the main driving force behind new, emerging, and re-emerging diseases. Most pathogens that are infectious to humans cross over from animals to people. The World Organisation for Animal Health estimates that about 75% of all human emerging infectious diseases have an animal origin. Their emergence is linked to our interference in animals' natural habitats, farming practices that harm water resources and biodiversity, and the intensive farming of a few domesticated animal breeds.

Climate change will only exacerbate these risks. Today, many countries rely on short-term solutions that involve the use of antimicrobials – medicines such as antibiotics, antivirals, and antifungals – to prevent and combat infectious diseases, preserve food, and promote animal growth. But this leads to one of the world's top global public health threats facing humanity—antimicrobial resistance, where bacteria, viruses, and parasites adapt and no longer respond to medicines.

This is why prevention, rather than cure, needs to be the global focus for emerging infectious diseases.

Prevention and preparedness based in strong and resilient health systems will be key. In Central Asia, countries are coming together to put this approach into practice.

Central Asia presents a unique opportunity

Central Asia is particularly vulnerable to emerging infectious disease outbreaks as it is located at an intersection of global value chains with countries that rely heavily on labor migration. Across the region, animal diseases, such as brucellosis, anthrax, and Lumpy Skin Disease – combined with relatively poor animal husbandry practices and genetics – have a detrimental impact on productivity, regional food supply, and agricultural competitiveness. However, it has, together with the broader region, a unique advantage to prevent and tackle future disease outbreaks due to the shared epidemiological past of the countries of the former Soviet Union, which once boasted an elaborate network of antiplaque centers, research institutes, and laboratories with trained personnel.

Some parts of this legacy remain and were further developed in Central Asian countries, notably with the support of the

World Bank, the Food and Agricultural Organization of the United Nation, the World Organisation for Animal Health, the United Nations Environment Programme, the World Health Organization, and the Centers for Disease Control and Prevention. As a result, the region already has a strong foundation for implementing One Health – a collaborative approach that brings animal, environmental, and public health sectors together to prevent, detect, respond to, and recover from infectious diseases. Central Asian countries also share animal species, farming systems, movement and trade patterns, and existing mechanisms for cooperation, which will help in developing a coherent regional response.

Regional collaboration is key

This report sets the tone for Central Asian countries to work together to proactively prevent emerging infectious disease outbreaks. The countries in the region share three high-level objectives: stronger and more resilient health systems for pandemic prevention, food system resilience, and trade and competitiveness.

Adopting a One Health approach in Central Asia could improve productivity

and the trade of animals and animal products, enhance the region's preparedness and response to disease outbreaks, and generate savings from sharing crucial information on animal and human health.

We may be on the precipice of another health pandemic, but the case for prevention is clear and the adoption of One Health is paramount. Central Asia is taking on the challenge and setting an example for other regions and countries to follow.



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Abbreviations

AAR	After Action Review
ADB	Asian Development Bank
AMC	Antimicrobials Consumption
AMR	Antimicrobial Resistance
AMU	Antimicrobials Use
BRI	Belt and Road Initiative
CAAHN	Central Asia Animal Health Network
CAAP	Central Asia Aids Control Project
CAC	Codex Alimentarius Commission
CAESAR	Central Asian and European Surveillance of AMR
CAREC	Central Asia Regional Economic Cooperation
CCHF	Crimean-Congo Haemorrhagic Fever
CDC	Centers for Disease Control (United States)
COVID-19	Coronavirus Disease identified in December 2019
CSOs	Civil Society Organizations
DALYs	Disability Adjusted Life Years
DTRA	Defense Threat Reduction Agency
EAEU	Eurasian Economic Union
EC	European Commission
ECOWAS	Economic Community of West African States
EID	Emerging Infectious Disease
EQA	External Quality Assistance
EU	European Union
EU-ECDC	European Centre for Disease Prevention and Control
FAO	Food and Agricultural Organization of the United Nations
FETP	Field Epidemiology Training Program of the US CDC
FMD	Foot and Mouth Disease
GDP	Gross Domestic Product
GIS	Geographic Information System

GLASS	Global AMR Surveillance System
GPAI	Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response
HPAI	Highly Pathogenic Avian Influenza
IBCM	Integrated Bite Case Management
IDPIP	Integrated Dairy Productivity Improvement Project (Kyrgyz Republic)
IFAD	International Fund for Agricultural Development
IHR	International Health Regulations
ILM	Integrated Land Management
JEE	Joint External Evaluation
JRA	Joint Risk Assessment
JROA	Joint Rapid Outbreak Assessments
JRRT	Joint Rapid Response Team
KAP	Knowledge Attitudes and Practice
KAZ	Kazakhstan
KYG	Kyrgyz Republic
LMICs	Low- and Middle-Income Countries
LSD	Lumpy Skin Disease
MDRTB	Multi-Drug Resistant Tuberculosis
MERS-CoV	Middle East Respiratory Syndrome—CoronaVirus
MRL	Maximum Residues Limit
NAPHS	National Action Plan for Health Security
NBW	National Bridging Workshop
OECD	Organisation for Economic Co-operation and Development
OFFLU	Joint OIE-FAO Scientific Network on Animal Influenza
OH	One Health
OHHLEP	One Health High Level Expert Panel
WOAH	World Organisation for Animal Health (founded as the OIE)
PLDCA	Network on Priority Livestock Diseases in Central Asia
PPR	Peste des Petits Ruminants
PVS	Performance of Veterinary Services
RASSF	Rapid Alert and Surveillance of Food and Feed

REDISSE	Regional Disease Surveillance System Enhancement program
SARS	Severe Acute Respiratory Syndrome
SDGs	United Nations Sustainable Development Goals
SPS	Sanitary and Phytosanitary
TAD	Transboundary Animal Disease(s)
TAJ	Tajikistan
TB	Tuberculosis
TUR	Turkmenistan
UNEP	United Nations Environment Programme
UNSC	United Nations System Influenza Coordination
UZB	Uzbekistan
VEE	Veterinary Education Establishment
VS	Voluntary Statutory Body
WHO	World Health Organization
WTO	World Trade Organisation

Pasture in Kyrgyz Republic
Source: Canva



Executive Summary

Central Asian countries face major regional challenges: preventing and preparing for future pandemics; improving food-system resilience; and addressing new opportunities and threats associated with increasing animal production and transborder movements of animals and animal products. These common challenges are high on governments' agendas and demand regional collaboration to develop prevention and control systems on a scale that single-country strategies are unable to achieve.

The signing of the Joint Communiqué 'Protecting food systems, preventing future pandemics in Central Asia' confirms the Central Asian countries recognition of One Health as a potential approach to addressing regional challenges through increased collaboration across sectors including agriculture, environment, health, and veterinary services. The signing of the Joint Communiqué on November 14, 2022, affirmed the commitment of the governments of Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan to continue to adopt a technically and economically justifiable One Health approach to prevent, prepare for and respond to regional vulnerabilities to pandemics, zoonoses, food hazards, antimicrobial resistance (AMR), climate change, biodiversity

erosion and degradation of land and water resources. The purpose of this document is to assess the basis for supporting regional and cross-sectoral cooperation towards a One Health approach in Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan. It reviewed:

- i. Gaps in knowledge and capacity hampering national and regional cross-sector cooperation activities for pandemic prevention and preparedness, prevention and control of zoonoses and AMR, and promotion of food safety, while ensuring ecosystem health;
- ii. Areas of potential national and regional cross-sector cooperation; and
- iii. The relevance of developing a Regional One Health program in Central Asia.

The assessment of the prospects for further implementation of a One Health approach in the region identified interest and advanced levels of readiness to further implement a One Health approach in the region. The assessment involved literature reviews, country case studies and dialogue with national stakeholders, including high-level meetings with Ministers and Deputy Ministers from the Agriculture, Health and Environment sectors, and representatives

from international partner organizations. Counterparts expressed great interest in engaging in a dialogue about implementing a One Health approach at national and regional levels. The assessment also verified that elements of the One Health approach are already in place, although implemented unevenly across countries and sectors, and in need of further support to reach full effectiveness.

COVID-19 emphasized the urgent need for pandemic preparedness and the prevention and control of infectious diseases and drug resistance.

The economic impact of the pandemic will continue, compounded by a relatively high prevalence of zoonoses in livestock, domestic animals, and the human population. Central Asian countries' food safety controls and compliance with the main food safety principles and mechanisms vary across the region. Antimicrobial drugs are widely used to treat people and in livestock and plant production, including for animal disease prevention and growth promotion and to prevent and cure crop diseases, while regulations vary across the region. This is likely to lead to drug resistance and to fuel future epidemics and pandemics affecting the region. In addition, land degradation and water scarcity are widespread and will be aggravated by climate change, with consequent effects on agricultural production and risk of spillovers to animal and human health.

Livestock-sector productivity is still low in the region and the region as a whole is a net importer of animal products and live animals. This is despite the net positive trade balances of Kazakhstan and the Kyrgyz Republic in the sector and the potential for production growth, given the natural resource endowment of the region.

Animal diseases, such as brucellosis, echinococcosis, foot and mouth disease (FMD), and lumpy skin disease (LSD) – combined with relatively poor animal husbandry practices and genetics – have a detrimental impact on productivity and, thus, on regional food supply and production costs. They also negatively affect human health and the efficiency of the use of natural resources in animal production, which aggravates land degradation and increases greenhouse gas emissions. Disease prevalence further limits the capacity of animals and livestock systems, in general, to cope with the effects of climate change.

Central Asia's future as a supplier of agri-products and livestock will depend on how food producers and processors in the region respond to the increased quality and safety demands of consumers, and on how well countries coordinate with each other to improve standards.

The development of regional networks, and the proximity of demanding markets, opens opportunities for the trade in live animals and animal products. However, the international trade of food products from Central Asian countries to countries

with efficient rapid alert systems is still limited. Trade costs are high due to complex topography, long distances, low economic density, and fragmented trade regimes. In addition, the prevalence of internationally reportable diseases (zoonoses and other transboundary diseases) and AMR, poses significant barriers to competitive trade in livestock and animal products. This adds to the already limited competitiveness of the sector because of poor biosecurity, the indiscriminate use of antibiotics, lack of coordination between border control services, non-compliance with sanitary and phytosanitary (SPS) standards, outdated knowledge and legislation, and poor laboratory capacity.

The AMR burden of disease in Central Asia is being driven by the misuse of antimicrobials, including for growth enhancement in the livestock sector, poor biosafety and animal health standards, and substandard food hygiene, all of which contribute to the spread of new infectious agents and AMR.

The 2019 Global Burden of Disease study estimates that in Central Europe, Eastern Europe and Central Asia, an expected annual average of 17.6 deaths per 100,000 (11.7–25.3) can be directly attributed to AMR, while an average of 67.7 deaths per 100,000 (45.4–96.6) can be indirectly linked to AMR per year. Data from the Central Asian and European Surveillance of AMR (CAESAR) network shows that resistance to priority AMR pathogens is widespread in the WHO's entire Europe Region, which

includes Central Asia, underlining the need for concerted action. In 2019, six pathogens were each responsible for more than 250,000 deaths associated with AMR: *E coli*, *S aureus*, *K pneumoniae*, *S pneumoniae*, *A. baumannii*, and *P aeruginosa*.

These challenges take place against a backdrop of renewed attention to persistent poverty and a renewed focus on inclusion, on resilience and on addressing food insecurities. Since 2020, the Central Asian regional economy has suffered from two major adverse shocks—the COVID-19 pandemic and the war in Ukraine. Long-term growth and investment prospects could be dampened by persisting geopolitical tensions and political instability in the wider region of Europe and Central Asia. The triggered imposition of wide sanctions on Russia, due to the invasion of Ukraine, is expected to have a sizeable impact on economic activity that could eventually impact migrant workers from Central Asia in Russia, whose remittances are a substantial source of income in the region. While the impacts of war on the livelihoods of migrant workers and thus remittances have so far been less severe than anticipated, they add to regional increases in food prices with reported food insecurity being currently largely linked to affordability concerns. Food security and the competitiveness of the agriculture and livestock sectors are likely to be further impacted by increasing prices for inputs.

Managing global health risks requires full cooperation nationally, regionally and globally between the animal, environmental and public health sectors. One Health is a collaborative approach that brings these sectors together to prevent, detect, respond to, and recover from infectious diseases, aiming at improving global health security and achieving gains in development. This approach addresses the root causes of the issues and is thus critical for achieving targets under the UN 2030 Agenda for Sustainable Development and the related Sustainable Development Goals (SDGs). One Health has been a useful approach in other regions that have adopted it and where it has proved to be cost-effective.

Cross-country and national inter-sectoral collaboration are already underway, for example, to harmonize legislation on food safety, on controlling wildlife migration or in relation to the livestock trade. Achieving further health and economic improvements would require, (i) studying the economic and health constraints to livestock productivity and trade in Central Asian countries, (ii) reducing internal trade barriers and synchronizing procedures for moving commodities and products across Central Asian countries' regional borders into China, the Middle East and the European Union (EU), (iii) facilitating the cross-border flow of goods and services to increase market size and make the region more attractive to foreign investors, and (iv) harmonizing

and coordinating policies, regulations and information relating to trade and to animal, environmental and public health, as well as co-investing in infrastructure, among other actions.

Regional collaboration forums exist and can serve as bases to develop mechanisms for addressing the challenges faced by regional food systems, health, and economic infrastructures.

Regional cooperation platforms include the Central Asia Presidential meetings, the Commonwealth of Independent States (CIS), the Eurasian Economic Union (EAEU), and the Central Asia Regional Economic Cooperation Program (CAREC). None of these platforms has yet developed sufficient One Health approaches to enable the region to significantly confront the challenges of pandemic preparedness and building resilience to the threats associated with increased regional movement and trade in animals and animal products, and to the impacts of climate change and other environmental challenges.

The economic case for investing in One Health is compelling. Refocusing on curative and reactive approaches to investment in One Health systems and the prevention of zoonotic diseases, food safety, AMR, and future pandemics, can offer significant economic returns. A World Bank cost-benefit analysis showed that investments by the international community of US\$1.9 to US\$3.4 billion per year (depending on whether disease prevalence is low or

high) in One Health systems will result in an annual expected rate of return between 44–71% and prevent half or all mild pandemics. The baseline annual expected loss in global national income from viral zoonotic disease outbreaks is US\$212 billion, suggesting that primary prevention could cost a fraction of the cost of response. Additional added value can be expected from a regional collaboration between animal, human and environmental sectors. For example, 50% of AMR costs are avoided by vigorous containment efforts across different sectors, and investment costs of US\$0.2 trillion would reap between US\$10 trillion and US\$27 trillion in expected cumulative global benefits by 2050. The infrastructure put in place in Central Asian countries to address Highly Pathogenic Avian Influenza offers a further example of significant opportunities for economies of scale when focusing on other species or health issues; support services for human and laboratory capacity can often be shared.

Lessons learned from the operationalization of One Health approaches in other regions show that investments in dialogue and institutional capacity at the regional level need to be complemented by building national resources. The exchange of knowledge, information, and lessons learned from action at the national and regional levels condition how Central Asian countries will be able to come together to address environmental, public health and veterinary issues that pose

a risk to national, regional, and global health security. Policy development and harmonization, epidemiological and environmental surveillance, and building institutional and professional capacity for adequate prevention and control of zoonoses, avoiding food hazards and reducing AMR are further areas that would benefit from improved cooperation. A key requirement for a One Health approach is capacity development at all levels and within all skill sets. There is a clear need for management expertise, but also for technical development and education, among health and veterinary professionals and specialists. Funding is needed for animal identification and traceability, effective information management systems and knowledge distribution throughout the region, as well as the establishment of modern laboratories and training.

A comprehensive response to implementing a One Health approach will only be possible through regional high-level commitment and coordinated action, in collaboration with international public and private partners. The successful implementation of a One Health approach will depend on the commitment of the Central Asian countries and coordinated support from international organizations, multilateral and bilateral donors, and other development partners. While Central Asian governments would ensure national ownership and technical and financial sustainability of a One Health regional initiative, international partner

organizations, including The World Bank, the Quadripartite (FAO, WOAHA, UNEP, and WHO), and other partners may be asked to consider providing coordinated support.

A Central Asia One Health Framework of Action will provide the direction and coordination mechanisms for regional cooperation to address needs for pandemic prevention and preparedness, prevention, and control of zoonoses and AMR, and food safety.

With the signing of the Joint Communiqué “Protecting food systems and preventing pandemics in Central Asia” on November 14, 2022, the five Central Asia countries affirmed their commitment to a regional response to shared current and emerging threats to public health, food security and competitiveness. The Central Asia One Health Framework for Action, which is under preparation, will be a practical tool for supporting cooperation and investment in the region. The framework will identify key work areas, potential coordination mechanisms and a monitoring framework. The development of the Central Asia One Health Framework for Action is expected to support regional dialogue between networks

of decision makers and technical staff (e.g., epidemiologists, veterinarians, and environmental specialists) from the three operational sectors.

Defining One Health governance structures for the implementation of national and regional activities is envisaged to drive the implementation of the Central Asia One Health Framework of Action forward.

The governance arrangements will be formalized in a regional platform for coordination of animal health, public health, and environmental health in Central Asia; defining national and regional mechanisms for collaboration, including (i) convening and coordination activities between sectors and countries and with global and regional international partner organizations active on One Health; (ii) development and harmonization of policies and legal frameworks; (iii) development of knowledge through joint research; and (iv) capacity building, including modern infrastructure and training. It will develop and operate a harmonized monitoring and evaluation mechanism, including targets, indicators and evaluation and reporting processes.

1. Introduction

Central Asia has made much progress in public health and animal health in the last 20 years but was as unprepared as other regions in the world to respond to the COVID-19 pandemic. The region also faces challenges from other emerging diseases, re-emerging diseases¹, and climate change. COVID-19, which is likely to have had an animal origin, has caused over 18,000 deaths and about two million cases in Central Asian countries. Zoonoses² are still very prevalent in the region, especially brucellosis and echinococcosis, which indicates active interfaces between humans, animals, and ecosystems. Livestock represent between 26% and 54% of agricultural GDP in most of the countries (Robinson 2020). According to the International Union for Conservation of Nature (IUCN) drylands in Central Asia are among the most rapidly degrading and climate-vulnerable areas in the world (2019). The region is increasingly exposed to intense weather events and natural disasters that further degrade the lands (Bosquet 2019). Climate change is expected to worsen the conditions of

the countries' natural resources with significant impacts on biodiversity, livestock production, and animal and public health through the spread of zoonoses. Climatic and environmental changes have accelerated the rate of emergency of controlling zoonotic diseases because rising temperatures increase the risk of transfer of vectors of human and non-human pathogens and reservoirs. Vectors and reservoirs can be dispersed through trade and migration. Deforestation results in movement of animals closer to human populated areas as well as an increased interaction with livestock, which also increases the risks of disease transmission through novel microbial pathogens (Mishra, Mishra and Aurora 2021).

Since 2020, the Central Asian regional economies, as the rest of the world, have faced two shocks—the COVID-19 pandemic and the war in Ukraine. Despite these shocks, Central Asia seems to experience only a relatively small slowdown of growth forecast to increase moderately from 3.7 percent in 2022 to 3.9 percent in

1 Emerging and reemerging diseases are infectious diseases that are newly recognized in humans, newly appearing in a different population or geographic area, affecting many more people and/or that have developed new attributes (e.g., resistance or virulence).

2 Zoonoses are communicable diseases that are transmitted from animals to humans. Most endemic and infectious diseases in humans have an animal origin, and can be transmitted directly or indirectly, through vectors, water, or food.

BOX 1.**A One Health (OH) approach**

One Health is an integrated, unifying approach that aims sustainably to balance and optimize the health of people, animals, and ecosystems. It recognizes that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines, and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, acting on climate change, and contributing to sustainable development (OHHLEP 2021).

2023 and further to 4.3 percent in 2024 (World Bank 2022a). Long-term growth and investment prospects could be dampened by persisting geopolitical tensions and political instability in the wider region of Europe and Central Asia. The triggered imposition of wide sanctions on Russia, due to the invasion of Ukraine, is expected to have a sizeable impact on economic activity that could impact migrant workers from Central Asia in Russia, whose remittances are a substantial source of income in Tajikistan, the Kyrgyz Republic and, to a lesser extent Uzbekistan. While the impacts of war on the livelihoods of migrant workers and thus remittances have been less severe than anticipated, they add to regional increases in food prices with reported food insecurity being currently largely

linked to affordability concerns (UK Aid Direct and World Bank 2022). Food security and the competitiveness of the agriculture and livestock sectors are likely to be further impacted by increasing prices for inputs (World Bank 2022b).

Animal diseases do not respect borders and remain a public health concern because of the possible transmission of pathogens to humans.

They can spread quickly from one country to another, with impact on animal health, trade, food security, food safety and possibly creating public health emergencies. The World Organisation for Animal Health (WOAH) estimates that about 75 % of all human EIDs have an animal origin, and are thus zoonoses, and that out of the

five new human diseases that emerge each year, at least three are of animal origin (Jones, et al. 2008).³ The pace of emergence of infectious diseases of animal origin has accelerated over the past 70 years, driven by conversion of natural habitats into land for agriculture, urbanization, increased loss of biodiversity; and climate change. This has increased interactions between animals and humans, and hence offered more opportunities for infectious diseases to emerge. Trade, free movement of people, and environmental changes caused by agricultural and urban expansion lead to greater human-to-human and human-to-animal contact increasing the likelihood of diseases spreading.

As with other emerging and re-emerging diseases and pandemics of animal origin, the COVID-19 pandemic has brought into sharp relief the urgent need for increasing epidemic prevention and preparedness, improving health and food safety and socio-economic impacts. COVID-19, which is an EID with a likely animal origin, is now considered a reverse zoonosis, as animal species (dogs, cats, zoo animals, farmed mink, wild deer, etc.)

have become infected after contact with infected humans. Before COVID-19, which may have killed between 5 million and 19 million people worldwide, some of the largest outbreaks in the 21st century included the 2003 SARS pandemic, the 2009 Swine Flu H1N1 pandemic, the 2014 Ebola epidemic, and the 2015 Zika epidemic. Every year, 2.5 billion people in developing countries are infected by diseases with origins in animals (zoonotic) and 2.7 million die as a result (Gebreyes, et al. 2014). These diseases had staggering socio-economic costs, estimated to range from US\$7 billion for Zika, US\$10 billion for Ebola, and \$30 billion for the H5N1 Avian Influenza pandemic to over US\$10 trillion for COVID-19 (Morand 2020).

Central Asia is at a crossroads for humans and animals through regional trade and migration routes that facilitate the emergence and transmission of new pathogens, which raises the urgent need for improving pandemic prevention and preparedness. The livestock population is increasing in the region. Central Asian countries share regional vulnerabilities, especially intense cross-border movements

3 A zoonotic agent may be a bacterium, a virus, a fungus or other disease agent. Old zoonoses are epidemic and endemic human infections with a temporally distant non-human source (e.g., common cold and measles); established zoonoses are non-human infectious diseases occasionally transmitted to humans (e.g., rabies, monkeypox); recent zoonoses are new infections with a recent non-human source (e.g., HIV); new and emerging zoonoses are infectious diseases with a non-human reservoir host that have only recently spread, or been observed to spread, to humans (e.g., hantaviruses and Ebola); and parazoonoses are epidemic or endemic infectious diseases in humans that change in virulence after an input of genes from non-human pathogens (e.g., antibiotic resistance transferred from animal to human bacteria or genomic reassortment in influenza A virus or rotavirus).

of people and animals, and have to deal with the impact on human and animal health of international transport corridors, wild bird migratory flyways, climate change and land degradation. Transboundary corridors between Central Asian countries are land degradation hotspots, with regional impacts on deforestation and low land productivity, increased risk of animal-human diseases, poor livestock productivity, and increased poverty. As a result, these countries share common issues, such as pandemics and other transboundary diseases⁴, zoonoses and antimicrobial resistance (AMR), which pose barriers to trade of livestock and animal products and competitiveness. Zoonoses are still very prevalent in Central Asia and are expected to increase due to climate change. Very little is known about the role of wildlife in the spread of some of these diseases and more research is needed for outbreak investigation in the region. Kazakhstan and the Kyrgyz Republic have the capacity and the ambition to export live animals and animal products. However, animal productivity and animal health management capacity are low.

Central Asian countries are faced with poor animal, human, and environmental health, and public sector

management, with negative economic impacts from endemic and emerging zoonoses, unsafe food, and AMR.

SPS standards to protect humans, animals, and plants from diseases, pests, or contaminants are unevenly deployed, and are poorly coordinated. Pooling resources in a targeted manner would lead to economies of scale and would enable countries to address common problems across systems in a targeted manner without unnecessary duplication. The World Bank's Global Program for Avian Influenza (GPAI) supported countries in their efforts to deal with avian influenza in animals and to prepare for a possible human flu pandemic through a global funding program. Investments were made in the Kyrgyz Republic (2006–2011), Tajikistan (2006–2010), Turkmenistan (2007–2010) and Uzbekistan (2007–2009) to improve veterinary services made in the response to Highly Pathogenic Avian Influenza (HPAI) as well as interagency responses and coordination mechanisms to insure effective collaboration among the health, environment and agriculture sectors. The infrastructure put in place to address HPAI in poultry has offered significant opportunities for economies of scale when focusing on other livestock species. The GPAI has offered countries a method for intersectoral collaboration

⁴ While the terms transboundary animal diseases and zoonoses are often used interchangeably, they are not mutually inclusive. Transboundary animal diseases (TADs) are livestock and wildlife diseases that have the capacity to expand over large geographical areas and country borders, with significant economic impact. This is due to virus characteristics and environmental conditions, and occurs through animal movement across territories, by land or air. African swine fever, avian influenza and foot and mouth disease are classical examples of transboundary diseases. Avian influenza and, to some extent, brucellosis, are also transboundary diseases, but not all zoonoses are transboundary by nature.

to better coordinate a response in case of zoonotic disease outbreaks.

One Health is an approach that allows for addressing human, animal, and ecosystem health issues through intersectoral action, to prevent, detect, respond to, and recover from infectious diseases, with an endpoint of improving global health security and achieving gains in development.

Some Central Asian countries have adopted a One Health approach, with some of them offering field epidemiological training programs that explicitly include animal health professionals, and having mechanisms for sharing data among relevant ministries for human, animal, and wildlife surveillance.

The World Bank has been actively engaged in Central Asia for over two decades and is well-placed to act as a convener able to provide regional program-design expertise and implementation support for a One Health program.

The World Bank has worked for over a decade to promote and operationalize One Health approaches supported by country partners, technical institutions, international organizations, and donors. In 2018, the World Bank adopted a *One Health: Operational Framework for Strengthening Public Health Systems at the Human-Animal-Environment Interface* to offer guidance to apply a One Health approach to ensure sector- and country-specific action targeted to address the specific One Health issues and is integrated

appropriately into financed projects. It outlines activities and interventions to target disease threats and highlights mechanisms for institutional and technical implementation to build more collaborative veterinary and public health systems (Berthe, et al. 2018). This has been strengthened by continuous global operational experience addressing successive crises of the HPAI, the Ebola Virus Disease and most recently the COVID-19 pandemic. In 2020, the World Bank adopted a Regional Engagement Framework for Central Asia as a first step to increasing efforts to support a locally driven process of deeper economic cooperation within Central Asia and across Eurasia (Burunciuc 2020). Emergency operations in response to COVID-19 have proven useful in establishing regional networks to coordinate risk management in the event of transboundary disease outbreaks. In livestock and agriculture, Central Asian countries and the World Bank can build on initiatives such as the Integrated Dairy Productivity Improvement Project in the Kyrgyz Republic and the Livestock Sector Development Project in Uzbekistan. Both address weaknesses in public and private veterinary services to improve animal health, which can provide a better understanding of emerging infectious diseases and address the root causes of how these spread and support platforms for One Health implementation. The current World Bank portfolio in Central Asia of nine One Health-relevant projects amounts to US\$886 million, including

livestock and agriculture projects that include One Health approaches, and One Health-oriented projects that focus entirely on reducing the risk of emerging health threats (Burunciuc 2020).

The signing of the Joint Communiqué ‘Protecting food systems, preventing future pandemics in Central Asia’ confirms the Central Asian countries recognition of One Health as a potential approach to addressing regional challenges through increased collaboration across sectors including agriculture, environment, health, and veterinary services. The signing of the Joint Communiqué on November 14, 2022, confirmed the commitment of the Governments of Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan to continue to adopt a technically and economically justifiable One Health approach to prevent, prepare for and respond to regional vulnerabilities to pandemics, zoonoses, food hazards, AMR, climate change, biodiversity erosion and degradation of land and water resources. A Central Asia One Health Framework for Action will guide and support this process.

1.1. Objectives

In close cooperation with national and regional stakeholders, this work assesses One Health as a potential approach to addressing emerging food, health, and environmental issues in the Central Asia Region

through the increased collaboration across sectors, including agriculture, environment, health, and veterinary services. The assessment includes:

- i. Areas of potential regional cross-sector cooperation on prevention and control at the source of public health issues of zoonotic nature (e.g., endemic and emerging infectious diseases, AMR, foodborne diseases);
- ii. Gaps in knowledge and institutional capacity; and
- iii. The relevance of developing a Regional One Health program in Central Asia.

The findings of this report will support the preparation of the Central Asia One Health Framework for Action by providing recommendations for activities which can be further supported through public spending, private investments, and other financial resources. The governments of Central Asian countries, the Quadripartite Alliance for One Health (the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO), the World Organisation for Animal Health (WOAH), the United Nations Environment Programme (UNEP), international financial institutions and development banks have been working to mainstream One Health approaches in national policies and investments so that the region is better prepared to

prevent, predict, detect, and respond to global health threats and promote sustainable development. This effort takes place in the context of the global dialogue on One Health facilitated by the G7 and G20 leaders' group, the preparation of the International Treaty for Pandemic Prevention, Preparedness, and Response, as well as the launch of the Quadripartite Alliance for the One Health Joint Plan of Action to address health threats to humans, animals, plants, and the environment.

1.2. Approach and sources of information

This note incorporates information on livestock production and productivity, zoonoses and food-borne diseases, and AMR in Central Asian countries collated from country case studies and country consultations with stakeholders. Initial country case studies, carried out in 2022 and discussed at a regional workshop in July 2022 in

Tashkent, identified the need for further investments to strengthen national and regional cooperation to prevent and control outbreaks and epidemics of animal origin, identify and reduce the incidence of AMR, and to improve food safety. In-country consultations with stakeholders—Ministries of Agriculture/Veterinary Services, Environment/Natural Resources, Public Health, and Finance, as well as, academia, private sector representatives, civil society organizations (CSOs), and international organizations working on OH at the country and regional level—have informed the analyses through information on:

- The current situation of zoonoses, emerging infectious diseases, AMR, food safety, land degradation and biodiversity issues.
- Communication and collaboration mechanisms between stakeholders at national and regional level.
- The benefits and challenges associated with the development of a One Health approach to address health threats at the animal-human-environment interface in the regional context.

Flatbread sold on a market in Bishkek, Kyrgyz Republic.
Source: Canva



2. Main issues

Central Asian countries face similar vulnerabilities, drivers, and risks of outbreaks of zoonotic diseases, transboundary diseases, foodborne hazards and AMR that pose barriers to trade of livestock and animal products and to regional competitiveness. Human and animal mobility across borders and regional transport corridors and urbanization, together with changes in climate and the ecosystem, make these countries more vulnerable to circulating pathogens and more at risk of outbreaks of infectious diseases. Intensified livestock production and trade, and increased proximity of humans, livestock, and domestic animals to wildlife, coupled with limited inter-sectoral action between animal, environmental and health management systems are some of the regional drivers of zoonoses, food hazards and AMR. Factors such as economic and social inequalities and gender disparities further compound these risks.

About half of the population live in close contact with livestock and, as urbanization grows, there is an increased risk of disease outbreaks. Services, such as water and sanitation and energy, have not kept pace with the rates of population growth and

urbanization. As increased opportunities for agriculture and livestock exports will bring many benefits for regional countries, they also pose an increased risk of infectious diseases. Weather conditions and climate change in the region influence the region's agriculture and limit livestock productivity. Land degradation, which also increases the likelihood of zoonoses, is particularly prevalent in border areas. Transboundary corridors between Central Asian countries are land degradation hotspots, with regional impact on deforestation and low land and animal productivity, increased risk of animal-human diseases, and increased poverty.

These countries thus share similar risks of pandemics and transboundary animal diseases, zoonoses, food hazards and AMR. Zoonoses are still very prevalent in Central Asia and are expected to increase due to climate change. However, there is limited data on cases among animals and no information on the spread of these diseases from animals to humans. Assessing the magnitude of AMR in the region also remains a challenge due to a lack of adequate animal and public health surveillance systems.

2.1. Human population, mobility, and urbanization

Central Asia’s population of almost 76 million is young, with a median age of 27.6 years. The Central Asian population has continued to grow, but density is still low at about 19 inhabitants per km². According to World Bank staff estimates using 2021 official survey data, the percentage of people living under the international poverty line of lower- and middle-income countries living for

less than \$6.85 per day for 2021 is: 16.70 % in Kazakhstan; 66.35 % in the Kyrgyz Republic; 51.10% in Tajikistan; and 21.49% in Uzbekistan⁵. There is limited information about Turkmenistan. Table 1 summarizes key socio-economic indicators for Central Asia.

About half of the Central Asian population live in rural areas and are in close contact with livestock, from which they depend economically, and are therefore exposed to zoonoses—including emerging and reemerging diseases—and pandemics, as well as to food contamination and AMR. Politically and socially, the region is

TABLE 1.
Central Asia key socio-economic indicators

Country	Population 2021	GDP per capita (current US\$)	Human Capital Index (scale 0 to 1) 2020	Official development assistance as % of GNI	Poverty ratio (estimated % of 2021 population living on less than US\$3.65/day) ⁶	Unemployment, total (% of total labor force) (national estimate)
KAZ	19,000,988	10,373.8 (2021)	0.63	0.0 (2021)	0.4	4.9 (2020)
KYG	6,691,800	1,276.7 (2021)	0.60	6.0 (2021)	17.7	4.1 (2021)
TAJ	9,750,064	897.0 (2021)	0.50	5.2 (2021)	14.6	6.9 (2016)
TUR	6,341,855	7,344.6 (2019)	NA	0.1 (2019)	NA	4.0 (2010)
UZB	34,915,100	1,983.1 (2021)	0.60	1.6 (2021)	5.37	5.3 (2020)

Sources: The World Bank Open Data: <https://data.worldbank.org/> Accessed 25 May 2023

5 World Bank estimates based on 2021 official survey data.

6 World Bank estimates based on 2021 official survey data.

fragile. Although rapid economic growth over the last two decades has lifted millions of people out of poverty, uneven prosperity, restricted mobility, and degraded land resources have created yawning gaps between thriving and struggling areas. The region is also vulnerable environmentally and climatically, inducing a vicious cycle of land degradation, water scarcity, pollution, and sedimentation, and increased natural disasters. The resulting loss of arable land particularly affects the rural poor and their livelihoods.

As urbanization grows there is an increased risk of disease outbreaks.

The region has relatively low rates of urban density with more than 50% of Central Asia's population living in rural and often remote areas (Table 2). However, current trends of demographic growth, migration and industrialization in Central Asia will result in continued population growth in urban areas and cities, especially the small and medium-sized ones. Greater concentration of population, production and cultural life is expected in large cities (Center for Economic Research 2013). Services have not kept pace with the rates of population growth and urbanization. As water supply and sanitation systems and services are generally poor in Central Asia, especially for the most vulnerable, this can be a critical determinant of infectious disease susceptibility. The resulting increased interactions between livestock, wild and domestic animals, people, and the environment

is one of the main drivers for EIDs. At the same time, urban areas are experiencing very high levels of pollution with substantial health impacts, lower productivity, an impact on the wider economy and the decline of biodiversity (Center for Economic Research 2013).

2.2. Livestock production systems and livestock trade

The region is sparsely populated with large areas that are either too arid or at elevations too high to support human life.

For most of the Central Asian population, livestock is economically and socially important and the urban population remains connected to its rural origins for leisure, securing traditional foods and participating in social and religious events organized around animals in the countryside. Although Tajikistan has the highest proportion of the population (72.5%) living in rural areas and has the highest level of employment in agriculture (43%), livestock appears to have the lowest share of GDP (26%) compared to the other Central Asian countries. Access to veterinarians varies in the region with Kazakhstan having the highest number of veterinarians per 100,000 people with a score of 223.26 compared to 40.09 in Uzbekistan and 44.63 in Turkmenistan, numbers are not available in the Kyrgyz Republic and in Tajikistan (Table 2).

TABLE 2.**Agriculture and livestock production in the national economies of the five Central Asian countries**

Country	Rural population (% of total population) 2021	% employment in agriculture of total employment 2021	% GDP from agriculture, forestry and fisheries 2021	% livestock in total value of agricultural production 2016 (Robinson 2020)	Number of veterinarians per 100,000 people 2020 (Bell and Nuzzo 2021)
KAZ	42	15	5 (2021)	38	223.26
KYG	63	17	14.7 (2021)	48	N/A
TAJ	72	43	24 (2020)	26	N/A
TUR	47	22	10.8 (2019)	54	44.63
UZB	50	24	25 (2021)	37	40.09

Sources: The World Bank Open Data: <https://data.worldbank.org/> Accessed 25 May 2023; Robinson 2020; Bell and Nuzzo 2021

The Central Asian livestock population is increasing but agriculture's contribution to GDP varies. In 2020, Uzbekistan had the highest contribution (25,1%) and Kazakhstan had the lowest (5,4%), while the shares in Kyrgyzstan, Tajikistan and Turkmenistan were 13.5%, 23.8% and 10,8%, respectively. Over the last 10 years, the populations of cattle and sheep have significantly increased in all five countries of Central Asia (Table 3, Figure 1).

Nomadic pastoralism is practiced on the steppes, with transhumance from lowland pastures in the winter to highland meadows in the summer. Before Soviet collectivization, animals migrated to avoid areas of temporary

feed insufficiency, snow and/or cold, and to take advantage of natural forage surpluses in other areas. Later, under collectivization, livestock movement was restricted, cultivated forage substituted for the natural pastures previously captured through migratory movements, and winter settlements were imposed. National statistics do not fully account for animal movements in the region, especially transboundary movements such as traditional movements for grazing, where pastures are scarce.

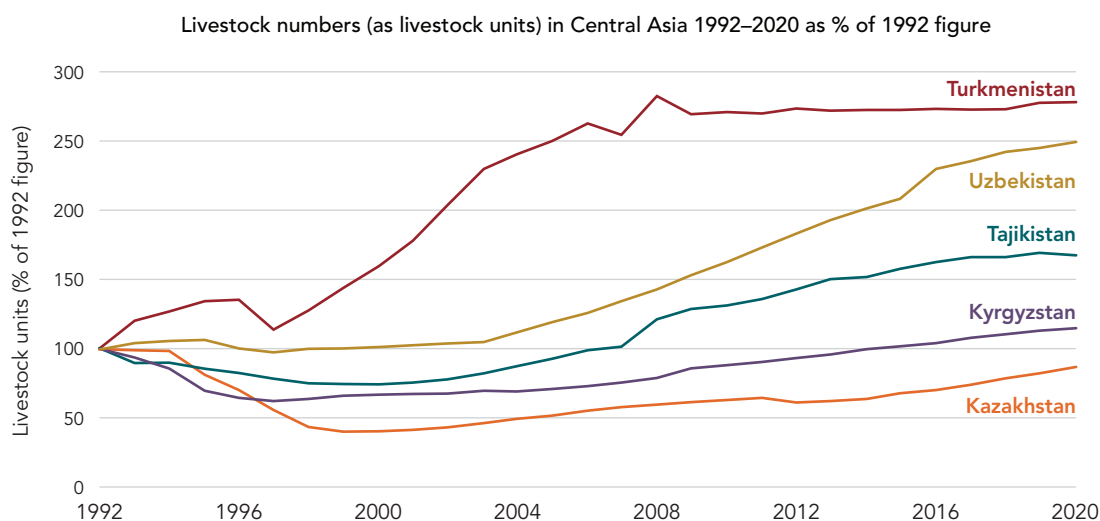
The Central Asian livestock sector used to supply meat, dairy products, and animal fiber to the rest of the Soviet Union. Economic collapse

TABLE 3.
Livestock numbers in Central Asia 2020 vs 2010

Item	Year	KAZ	KYG	TAJ	TUR	UZB
Cattle	2020	7 850 045	1 715 776	2 335 580	2 278 876	13 154 200
	2010	6 095 200	1 298 825	1 829 997	2 174 600	8 510 800
Sheep	2020	17 749 598	5 508 032	3 818 750	13 969 559	18 829 200
	2010	14 660 800	4 095 231	2 617 373	13 600 000	12 081 900
Goats	2020	2 307 969	770 704	1 950 635	2 327 988	3 629 600
	2010	2 708 900	942 484	1 582 811	2 800 000	2 350 700
Pigs	2020	816 736	29 465	87	7 726	52 430
	2010	1 326 300	59 791	418	13 900	96 500
Camels	2020	227 703	256	57	123 025	20 447
	2010	155 500	338	45	122 400	17 600
Horses	2020	3 139 831	539 644	81 646	26 044	253 625
	2010	1 438 700	378 448	75 796	24 600	180 600

Source: FAOSTAT. <https://www.fao.org/faostat/en/#home> Accessed 29 October 2022

FIGURE 1.
Central Asia livestock units by country



Source: FAOSTAT. <https://www.fao.org/faostat/en/#home> Accessed 29 October 2022

following the dissolution of the Soviet Union, combined with the breakdown of feed supply chains, long-distance grazing management, and veterinary systems led to plummeting productivity and, in some former Soviet Central Asian republics, loss of a large proportion of the national herd. With the disappearance of inter-republic trading links within the Soviet Union, marketing became a domestic and even local affair. Yet the livestock sector is an area with growth potential.

The livestock sector has a large potential for growth in the region.

Increasing urban incomes have stimulated domestic demand for meat-based products and Kazakhstan and the Kyrgyz Republic are already net exporters of cattle and sheep (Table 4). Based on their extensive land and water resources, Kazakhstan and the Kyrgyz Republic could become major exporters of meat and dairy products (Robinson 2020). Apart from livestock, Kazakhstan is already the world's ninth-largest wheat exporter, selling over nine million tons annually, and has the potential to become a significant global beef and mutton exporter. Uzbekistan also is a large crop producer and has steadily increased its agricultural exports. The Kyrgyz Republic and Tajikistan are boosting their dairy and beef sectors, which increasingly target export markets within and outside the region.

However, animal productivity is still low and Central Asian countries are

net importers of animal products and live animals, despite their production potential. Suboptimal production practices and relatively poor genetics and animal health management are the main constraints to productivity in the region. They are mostly explained by limited investment in research and training, extension services, and ill-directed public support. The prevalence of internationally reportable diseases and subsequent trade restrictions and high trade costs related to transport infrastructure and administrative protocols further limit Central Asian countries' trade in livestock and livestock products outside the region. Countries in the region face significant issues related to implementing harmonized national SPS measures consistent with international standards, guidelines and recommendations. Outdated legislation, poor laboratory capacity, and lack of coordination between border controls create vulnerability to transboundary pests and diseases which constrain the potential of Central Asian countries to expand their agricultural food trade (Figure 2).

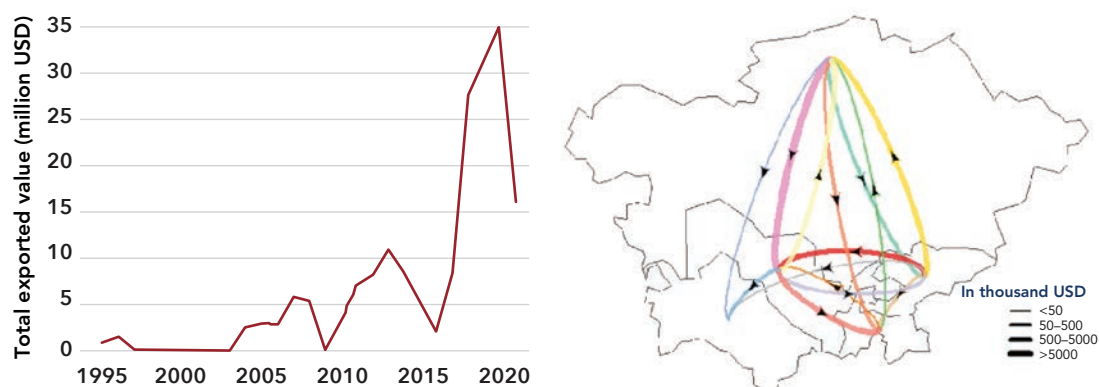
Agriculture in Central Asia is also vulnerable to climate change. Continued pressure on pastures, especially those surrounding villages, and a stagnant, low-productivity animal husbandry sector add to inefficiency. Fodder, particularly winter fodder, which is both scarce and of poor quality, animal diseases and poor operational management have been the main

TABLE 4.
National livestock exports/imports, Central Asia 2019

2019	KAZ		KYG		TAJ		TUR		UZB	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
Cattle										
Head	125 593	36 414	981	616	1	1 769	—	6 453	—	145 592
Thousand USD	81 100	74 005	994	476	—	2 298	—	9 691	—	122 407
Sheep										
Head	272 471	238	4 672	14	300	458	—	1 087	—	253 928
Thousand USD	24 247	241	576	2	64	53	—	216	—	21 327
Goats										
Head	3 947	841	—	1 204	88	59	—	709	—	4 401
Thousand USD	276	486	—	133	6	—	—	52	—	852
Camels										
Head	1 358	—	—	—	1	7	—	—	20	1 113
Thousand USD	1 901	—	—	—	n/a	n/a	—	—	n/a	n/a

Source: FAOSTAT: <https://www.fao.org/faostat/en/#home> Accessed 29 October 2022

FIGURE 2.
Intra-regional trade: Total export value (left) and trade flows of live animals (right)



Source: UN Comtrade database: <https://comtradeplus.un.org/> Accessed 6 July 2022

factors responsible for low productivity levels. Given the number of small-scale farms and the dominance of animal husbandry in the countryside, for example, combating animal diseases and improving range management and fodder production would be the quickest and most effective ways to improve the incomes and food security of many rural communities. Initiatives to support rural dwellers, like the Kyrgyz Integrated Dairy Productivity Improvement Project (IDPIP) exist to bolster the rural economy by, for example, providing micro-loans and promoting quality investment in the dairy sector by small-scale producers, as well as longer-term investment financing for herd improvement and dairy productivity.

The persistence of COVID-19 and the war in Ukraine, which is having a negative impact on global food security, have produced an increased sense of urgency in Central Asia to mitigate intersectoral, cross-country food security risks and prepare for pandemics. The impact of the COVID-19 pandemic on food security has generally not been significant. However, in some places, local food markets were closed, which made it difficult to access necessary inputs or financing. For example, the spring sale of livestock is a traditional way for livestock breeders to finance their spring fieldwork. Some external borders were completely closed and temporary restrictions on open-air markets led to a shift in food sales from markets to retail chains. This created advantages for large agricultural

producers able to supply retail chains and created significant difficulties for small producers used to selling their products directly to consumers. The war in Ukraine has created market volatility and high food prices, in particular in the Kyrgyz Republic, Tajikistan and Uzbekistan (FAO, IFAD, UNICEF, United Nations, WFP, WHO and WMO 2023).

Before the pandemic and the war, global international trade in animal products rose from €56 billion in 2000 to €152 billion in 2018, with acceleration since 2009, dominated by a few large private multinational companies or very large cooperatives (Chatellier 2021). The trade is increasingly oriented towards processed, transformed, and assembled products (finished products or ingredients for the agro-food industry). In 2018, the value of international trade in animal products was composed of 52% meat, 32% dairy products, 5% live animals and 11% other animal products (Chatellier 2021). World trade in animal products is geographically concentrated. Trade in live animals is frequent between neighboring countries, as it remains more complex over long distances.

Rising incomes and more demanding consumer preferences in target export markets are making product quality and safety a key determinant of export success. This is the case for OECD markets, and the markets in emerging Asian economies such as China, Vietnam, and Thailand. In these countries, the number of quality-conscious and increasingly wealthy

middle-class consumers is growing. In addition, the Central Asian countries are lagging behind jurisdictions, such as the EU countries, in creating an enabling business legislation for agriculture, infrastructure and information technology. The quality and capacity of the countries' phytosanitary and food safety certification systems, customs control, and inspection bodies typically do not meet the requirements of higher-end export market destinations. This puts the Central Asian exporters at a disadvantage vis-a-vis other major suppliers of those more lucrative, destinations (FAO, IFAD, UNICEF, United Nations, WFP, WHO and WMO 2023). Considering this, countries around the world are investing in infrastructure that assures better quality and safety of their agricultural products. For example, investments made by Uruguay to improve animal health to comply with EU requirements led it to significantly increase its share of China's beef imports in just eight years.

Central Asia's future as a supplier of agri-products and livestock will depend on how food producers and processors in the region respond to the increased quality and safety demands of consumers, and on how well countries coordinate with each other to improve standards, to boost economic growth and to raise citizens' standards of living. Increasing the capacity for processing animal products in compliance with international standards would also respond

to local consumers' needs for healthy livestock and safe food, reducing the dependence on imports.

Agriculture and livestock exports to markets such as China and the Middle East present many opportunities for Central Asian countries but also enhanced needs for SPS control.

The development of the Eurasian Economic Union, and the proximity of demanding markets open trade opportunities but also reinforce the need for SPS controls. Reducing internal trade barriers and facilitating the cross-border flow of goods and services would increase market size and make the region more attractive to foreign investors which would also help Central Asian countries improve product variety and enhance export-market penetration. The trade in live animals and animal products calls for the regional coordination of specific trade policies. Central Asian countries are well-placed to become a source of sheep and goat meat for Middle Eastern markets. Co-investing in this infrastructure would save time and money, as would synchronizing procedures for moving commodities and products across Central Asian countries' regional borders into China and the Middle East.

A One Health approach encourages coordination between public health, veterinary services, and environmental agencies as a prerequisite for ensuring access to new markets through harmonized and coordinated

BOX 2.**Key investment needs to improve animal productivity and trade, with a focus on animal health*****Convening***

- Regional cooperation and communication to improve animal productivity and trade, including addressing policy bottlenecks to trade.

Knowledge development and addressing gaps

- Routine monitoring of animal movements in the region, especially transboundary movements.
- Estimates of the impact of zoonoses on animal productivity.

Policy development and harmonization

- Cross-border and regional cooperation between veterinary services to address transboundary animal diseases such as foot and mouth disease, lumpy skin disease, highly pathogenic avian influenza, brucellosis and rabies.
- Border control coordination to address vulnerabilities to transboundary pests and diseases.
- Legislation development, including on disease notification and regulations (e.g., on prescription of antibiotics) and its implementation.

Capacity building

- Veterinary epidemiological surveillance, diagnosis, disease control, rapid response, and inspection, especially of endemic/emerging zoonoses and transboundary diseases.
- Veterinary laboratory capacity and technology; biosecurity, nutrition and husbandry practices; and use of antibiotics.
- Inspection and quarantine capacity.
- Access to inputs and supplies, e.g., quality vaccines and veterinary drugs.
- Resources and methods available to extension services.
- Capacity for processing animal products in compliance with international standards.
- Implementation of SPS measures to improve trade opportunities.
- Animal identification and traceability of movements.

regulations to prevent and control zoonoses, reduce food safety risks and facilitate the safe movement of animals. The readiness of the region to increase exports and access new markets is currently challenged by the unsatisfactory level of compliance of national regulations with international standards. While the ambition of increasing the export of live animals and animal products is common for the region, the trade situation differs between the countries. Kazakhstan and the Kyrgyz Republic have both the capacity and the ambition to export live animals and animal products, whereas Tajikistan, Turkmenistan, and Uzbekistan need to import animals and animal products but face the challenge of unsafe import of live animals and animal products. Both challenges require a harmonization and coordination of regulations to prevent and control zoonoses, reduce food safety risk and, especially, facilitate the safe movements of animals through increased coordination between public health, veterinary services and environmental agencies in the region.

2.3. Climate change, wildlife and ecosystem transformations

Among other issues, environmental degradation has brought global attention to Central Asia. The destruction of the Aral Sea is one of the worst

environmental disasters the world has seen. Desertification has devastated many areas, and the booming mining, oil and gas industry has created additional environmental problems. Many of these challenges occur due to a lack of regulatory policies for curbing deforestation and regulations for environmental management in mining areas. Due to the lack of regulation and enforcement in the Kyrgyz Republic, important freshwater resources have been contaminated by foreign mining companies. The increasing livestock population in the region has also led to intensive grazing, which has exacerbated deforestation, degradation of pastureland, alluviums and soil drift into river and lake ecosystems, creating an additional burden on the already vulnerable environment. This puts animals and humans at increased risk as it lowers the quality of drinking water. Efforts to contain desertification are under way in some regions. For example, the World Bank's Resiland CA+ program financed by IDA, PROGREEN, Korea Green Growth Trust Fund and The Korea-World Bank Partnership Facility seeks to help affected rural communities in restoring landscapes, protecting lives and livelihoods, and increasing resilience to desertification, landscape degradation and climate change. The program includes projects in all five Central Asian countries working under a regional umbrella, seeking to build resilience through regional knowledge sharing and institutional capacity building (KGGTF 2021).

Land degradation is particularly prevalent in rangelands and border areas⁷, causing acute regional damages such as low land productivity, poor livestock productivity, accelerating deforestation, increased poverty, and increased risk of animal-human diseases (Quillerou, et al. 2016). Transboundary corridors between Central Asian countries are land degradation hotspots. With the breakdown of the Soviet Union, transboundary pastoralism slowed down, leading to overgrazing of pasture resources around the borders. These hotspots are also home to rural communities and livestock. Thus, regional collaboration is critical in enhancing land restoration and animal-human health. Environmental degradation contributes to air pollution and enhances the use of chemical inputs to reduce nutrient loss, coupled with higher irrigation and precipitation, leading to the leaching of chemicals into groundwater sources and surfaces with serious animal and human health impacts.

Climate change will induce a further increase in average temperature and temperature extremes. Changes in precipitation patterns are also anticipated which is predicted to impact agriculture and livestock production – and increasing food security risks. The evidence of the impact of climate change on animal health and production in the region remains limited. However, international research has outlined how the frequency

of extreme climate events, such as those occurring in the region, impacts animal health and productivity. For example, warmer weather causes heat stress and increases the spread of vector-borne diseases transmitted by ticks and mosquitos to areas of livestock and human population. Most of Central Asia falls within arid and semiarid zones and is covered by grassland, rangeland, desert, and woodland, with a dramatic physical landscape, ranging from grassy steppes and high mountains, to deserts and large rivers, to lakes and seas. Therefore, the degradation of biodiversity, natural habitats, and ecosystems due to climate stressors will increase the vulnerability of poor rural areas, which largely lack the financial and political capacity to overcome these challenges.

Climate-change induced transformations are already being observed in the region. The predator-prey balance in nature is being modified, with a higher risk of contact between humans and/or domestic animals with wild animals (wolves, foxes, and non-domesticated ruminants), which increases the risk of diseases such as rabies and brucellosis. Other prevalent infectious diseases, particularly vector-borne, such as Crimean-Congo Haemorrhagic Fever (CCHF), continue to spread among livestock in some countries in the region. Meanwhile, drought and flooding push predators closer to inhabited areas, while drought

⁷ This could be explained, *inter-alia*, by the slowdown of transboundary pastoralism after the breakdown of the Soviet Union, which has restricted the mobility of livestock between pastures to this day. This restriction of seasonal pastures results in overuse of pasture resources along the borders.

BOX 3.

Key investment needs to improve the preservation of wildlife and ecosystems

Convening and coordination

- Cooperation and communication to integrate climate change adaptation and mitigation in wildlife and preservation efforts.

Knowledge development and addressing gaps

- Wildlife status and ecosystem monitoring data.
- Role of wildlife in the presence and spread of zoonoses and related surveillance needs.

Policy development and harmonization

- Integrated land management (ILM) in development plans to achieve large-scale outcomes in complex and highly vulnerable landscapes.
- Harmonized policies and strategies for landscape restoration and improvement of land management sustainability, animal safety standards, and trade.
- Regional and transboundary approaches for landscapes shared by more than one country.
- Pooling of national technical and financial resources towards shared landscape management; attraction of external investors.
- Implement a systematic program of surveillance and analysis of drinking-water between water agencies and health sectors so as to ensure water quality according to a national drinking water quality standard.

Capacity building

- Knowledge-sharing platforms on successful strategies to improve the technology of keeping farm animals and pasture management and pasture monitoring system.
- Educational and scientific support of crop production and animal husbandry, setting up training on land, animal and human health monitoring and evaluation systems.
- Restoration of degraded landscapes such as forests and rangelands; water management at farm and landscape level.
- Strengthen disease monitoring and surveillance systems to detect and control desertification, land degradation and drought related diseases with the integration of approaches among key sectors.
- Monitoring of ecosystems and ecosystem services, including wildlife populations and movement and carbon sequestration, biodiversity, and other ecosystem services related to climate resilience.
- Organic farming and resource-saving technologies for tillage and sowing, such as Zero (no-till) and minimum (mini-till) tillage, and bed-sowing and precision-farming.

reduces the availability of grassland, both for livestock and for wild ruminants, as pest patterns change, and disease outbreaks increase (Guglielmi 2022).

The melting of permafrost and glaciers reduces water storage and availability during hot months which can cause disease spores to come to the surface and spread into new areas. Anthrax

is an example of a global zoonotic and epizootic disease, with a high case-fatality ratio in infected animals, whose transmission is mediated by environmental contamination through highly resistant spores that can persist in the soil for several decades. The temporal variability of grazing and active layer thawing may influence the dynamics of anthrax disease and, specifically, favor sustained pathogen transmission. Particularly warm years are shown to be associated with an increased risk of anthrax outbreaks and may also foster infections in the following years (Stella, et al. 2020). Extending pasture to new places without memory of their sanitary status will increase the risk of telluric (soil-based) diseases such as anthrax. Scarcity of water and pastures can lead to local disputes and small-scale (cross border) conflicts over the use of scarce resources. Regionally, land degradation, soil erosion, water extraction and sedimentation disrupt river connectivity for migratory fish (especially the iconic sturgeon) and pose water supply and water quality problems. Such land degradation can destroy infrastructure and disrupt connectivity, trade and value chains in the region.

Responding to challenges posed by land degradation and improving water management will contribute to restoring productive landscapes and ecosystem services, with positive impacts on climate change mitigation, human health and livestock productivity.

Poor grazing practices combined with climate change have led to land degradation and desertification issues, and to reduced animal productivity, thus increasing food systems reliance on cultivated fodder and irrigation water. Poor grazing practices also resulted in increased livestock-wildlife contacts. The restoration of rangelands and other forms of natural vegetation would improve the availability of quality feed for cattle and small ruminants, which would in turn reduce the carbon footprint per kilogram of animal protein produced and contribute to carbon sequestration. Restored landscapes would also allow to reduce biodiversity losses and livestock-wildlife contacts, thus reducing the risk of zoonoses, water- and food-borne diseases, as well as respiratory diseases caused by atmospheric dust from wind erosion and other air pollutants. Addressing these challenges requires increased cooperation among key sectors to strengthen the management of pasturelands, water and feed quality, and disease monitoring and surveillance systems to guide interventions for addressing environmental challenges (Sena and Ebi 2021).

2.4. Public health

Central Asian countries have made progress in public health. Key health indicators have improved in all of them, though at different paces.

In the three decades since the dissolution of the Soviet Union, the health indicators have significantly improved in Kazakhstan, the Kyrgyz Republic and Tajikistan, while slower progress has been made in Turkmenistan⁸ and Uzbekistan. Tajikistan, which had the highest under-5 and maternal mortality rates, has shown most progress in these indicators, partly due to external assistance. The Kyrgyz Republic has the highest maternal mortality ratio, while Turkmenistan has the highest under-5 mortality rate (Table 5). Central Asian countries allocated between 3.79% and 8.18% of GDP to health in 2020 (Table 5). This compares to the 5.32% that middle-income countries allocated to health on average in the same year, while high-income countries allocated 12.5%. External aid provides a relatively small contribution to national budgets, but it continues to be a major influence on health sector reform in the region.

The double burden of disease is present in all these countries,

with increasing dominance of non-communicable diseases over the last three decades, but with a persistent communicable disease burden as well

(Table 5). The burden of disease due to communicable, neonatal, maternal and nutritional causes, measured in Disability-adjusted life years (DALYs)⁹ losses per 100,000 population, is three to six times higher than in the EU. Chronic infectious diseases such as hepatitis B and C, HIV/AIDS and multi-drug resistant tuberculosis (MDRTB) continue to represent an important part of the burden of disease and of health care utilization and expenditures in the region. Meanwhile, emerging diseases, such as COVID-19 and other zoonoses continue to make inroads in the region.

Equity, cost-effectiveness, and quality of health services continue to be issues in Central Asia, despite these countries' maintaining more health professionals than other middle-income countries.

In the health sector, improving information and evidence, tackling the burden of chronic diseases and further developing public health, primary health care and the quality of care, are the main policy priorities.

8 The Ministry of Health and Medical Industry of Turkmenistan has informed the World Bank that since the country adopted the international definition of live births and stillbirths in 2007 and adopted strategies aiming at improving the survival of children and mothers, including integrated management of childhood diseases, the level of morbidity and mortality from infectious diseases has significantly decreased and, with some fluctuations, there has been a steady downward trend in infant and child mortality indicators.

9 One DALY represents the loss of the equivalent of one year of full health. DALYs for a disease or health condition are the sum of the years of life lost to due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population.

TABLE 5.
Central Asia key health indicators

Country	Life expectancy at birth 2019 (WHOa)	Burden-of-disease ¹⁰ non-communicable diseases (NCDs) 2019 (Roser, Ritchie and Spooner 2021)	Burden-of-disease communicable neonatal, maternal and nutritional diseases 2019 (Roser, Ritchie and Spooner 2021)	Under-five mortality rate (per 1,000 live births) 2021 (UN IGME 2021)	Maternal mortality ratio (per 100,000 live births) 2020	Health expenditure as a % of GDP 2020	Medical doctors per 10,000 population (WHO _b)
KAZ	73.95	24916.93	3133.80	10.27	13	3.79	40.28 (2020)
KYG	74.18	22541.78	4160.66	17.4	50	5.26	21.68 (2019)
TAJ	69.50	27901.25	6552.81	31.42	17	8.18	17.08 (2014)
TUR	69.75	26726.68	5399.55	41.43	5	5.68	21.47 (2014)
UZB	73.01	31275.16	5633.95	14.07	30	6.75	23.73 (2014)

Sources: The World Bank Open Data: <https://data.worldbank.org/>; Accessed 25 May 2023; WHOa The Global Health Observatory: <https://www.who.int/data/gho/data/indicators/indicator-details/GHO/life-expectancy-at-birth-years>; Accessed 25 May 2023; WHO_b The Global Health Observatory: [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/medical-doctors-\(per-10-000-population\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/medical-doctors-(per-10-000-population)); Accessed 25 May 2023; Roser, Ritchie and Spooner 2021, UN IGME 2021

10 Burden of disease is a measure of population health that aims to quantify the gap between the ideal of living to old age in good health, and the current situation where healthy life is shortened by illness, injury, disability and premature death.

BOX 4.**Key investment needs to improve pandemic preparedness, prevention and response*****Convening and coordination***

- Coordination and cooperation between the animal health, human health and environmental health services, to avoid duplications and gaps in diagnosis and responses.

Knowledge development and addressing gaps

- National One Health priorities for which a coordinated approach will improve animal, environmental and public health: priority zoonoses and transboundary diseases, food safety, and prudent use of antibiotics and AMR.

Policy development and harmonization

- Coordinated communication with policymakers and the public about risks, outbreaks, responses, and the respective reviews to strengthen community outreach.
- Coordinated and integrated management of risks in animal health, environmental health and public health, involving national authorities.
- One Health legislation on pandemic preparedness, prevention, and response, zoonoses, food safety and AMR.

Capacity building

- Coordinated epidemiological surveillance and prevention and control of zoonoses, including the development of early warning and response systems.
- Intersectoral database communication and integration.
- Public health laboratory capacity: HR and equipment.
- Disease prevention and control activities based on integrated risk assessment and response plans.
- Simulation exercises to improve coordination and intersectoral cooperation.
- Coordinated investigation of epidemic outbreaks and after-action reviews.
- Capacity building for joint response and field investigation of priority zoonoses.
- Expand the reach of the primary healthcare networks and quality of primary healthcare.

The COVID-19 pandemic has so far caused over 18,000 reported deaths and about 2 million cases in Central Asia (Worldometer 2022), but the share of population fully vaccinated remains below 50%¹¹. By December 2022,

Kazakhstan had reported almost 1.4 million COVID-19 cases¹² and 13,693 deaths (713/million); the Kyrgyz Republic reported over 200,000 cases and almost 3,000 deaths (445/million); Tajikistan reported over 17,000 cases and 125 deaths (13/million); and Uzbekistan had over 240,000 cases and 1,637 deaths (48/million) (Worldometer 2022). The share of population partly vaccinated according to the country protocol varies from about 25% in the Kyrgyz Republic, 56% in Kazakhstan, and 61% in Uzbekistan (Our World in Data 2022), to 99% with at least one dose in Tajikistan¹³. The global average was 69% of people at least partly vaccinated by December 2022 (Our World in Data 2022). Overall, there have been lower COVID-19 numbers in Central Asia compared to Europe and the United States. These relatively low numbers may be due to the pandemic's not having spread as efficiently in the region as it did in other parts of the world, but it may also be due to poor health surveillance and testing, and to transparency in reporting, since obtaining accurate data remains an issue across the region. The number of cases is closely linked to diagnosis capacity (tests per million population),

rather than the real extent of the dissemination of the virus. The number of cases is closely linked to diagnosis capacity (tests per million population), rather than the real extent of the dissemination of the virus.

The probability of zoonoses and reverse zoonoses manifesting and spreading is growing, posing risks for environmental conservation, public health, and national economies.

Central Asian countries would increase their ability to detect, prevent, and respond to this challenge by adopting an OH approach to zoonoses at the human-animal-environment interface. Multidisciplinary teams and collaboration across sectors are fundamental to building capacity and creating solutions for challenges at the human-animal-ecosystem interface.

2.5. Priority zoonoses in Central Asia

Many transboundary diseases are endemic in Central Asia, and the prevalence of zoonoses in human and domestic animals is higher in this region than in other parts of the world. Zoonoses such as anthrax, brucellosis, echinococcosis, HPAI and rabies are still very prevalent among animals in Central Asia and, in the cases of brucellosis and echinococcosis,

¹¹ Share of people vaccinated against COVID-19 according to a complete initial protocol.

¹² COVID-19 confirmed cases include hospitalized patients and people on ambulatory care with mild symptoms or asymptomatic.

¹³ Dose 1 of the target group (18+) COVID-19 vaccination as reported by the Ministry of Health and Social Protection

among humans as well. Other animal diseases that have also been reported among humans in the region are zoonotic tuberculosis, CCHF, and foodborne zoonoses such as salmonellosis, leptospirosis, leishmaniasis, and orthohantavirus infections (WOAH 2022). Some of the major transboundary animal diseases that are circulating in the region, although not zoonoses, are foot-and-mouth disease (FMD), peste des petits ruminants (PPR), or lumpy skin disease (LSD), requiring capacity to develop contingency plans in case of outbreaks. The circulation of animal diseases may jeopardize trade and movement of live ruminants between countries, and represent a food security issue through their impact on animal production and trade.

There is limited data on zoonosis cases among animals and even more limited data on the spread of these diseases from animals to humans.

In 2019–2022, 137 animal outbreaks of anthrax, brucellosis, echinococcus, HPAI and rabies in Central Asia were reported to WOAHA in Kazakhstan (24), Kyrgyz Republic (25), Tajikistan (83), Turkmenistan (3) and Uzbekistan (2) (WOAH 2022). However, the number of zoonosis outbreaks notified yearly varies significantly due to inconsistencies in the collection of case information and the poor quality of surveillance of zoonotic diseases (WOAH 2022).

Anthrax, caused by a bacterium persisting in soil (telluric), is present

in parts of Central Asia and is a major veterinary and public health concern.

In 2021, Kazakhstan reported 27 human cases¹⁴, and the Kyrgyz Republic reported 22 (National Statistical Committee of the Kyrgyz Republic 2022). Infections annually cause sporadic outbreaks in domestic livestock and wild animals, which could be a sign of a loss of awareness of infected pastures or the emergence of cases in new areas. The pathogen can be spread by scavengers or vultures feeding on animal corpses. Drought can increase outbreaks, because low grass cover leads to soil consumption by ruminants and due to the extension of pastures into new areas not previously known to carry the disease. Heavy rains and floods can bring spores to the surface and affect areas that had not reported any cases for some time. Anthrax presence in animals and humans can be controlled by improving the surveillance system (including investigation of all human cases), increasing the biosecurity in the field, and vaccination, which would be a more effective strategy for countries. Mapping the risk of disease is necessary for targeted surveillance and routine vaccination. In Kazakhstan, modelling of anthrax burial-site data for the period 1933–2014 indicated elevated risks along the northern and southeastern borders, which follows the distribution of historic disease cases and accounts for potentially suitable environmental

14 Data provided by the Ministry of Healthcare of the Republic of Kazakhstan to the World Bank

conditions (Abdrakhmanov, et al. 2020). In the Kyrgyz Republic, ongoing anthrax outbreaks have also been reported in humans associated with handling infected livestock and contaminated animal by-products such as meat or hides. Mapping based on data of anthrax in livestock reported from 1932 to 2006, identified four areas most at risk of outbreaks in animals and humans: the plateaux near Talas and Bishkek, the western Fergana Valley region, and the low-lying areas along the shore of Lake Issyk-Kul (Blackburn, et al. 2017). Cattle were the most affected in the period, with the greatest number of cases in late summer months. In areas where domestic animals have had anthrax in the past, routine vaccination and high-quality inspection of food animals prior to slaughter helps preventing outbreaks (CDC 2020).

Brucellosis causes considerable economic losses due to reduced reproduction in livestock. The number of reported cases of brucellosis in humans has decreased in Kazakhstan and the Kyrgyz Republic. In 2021, Kazakhstan reported 412 cases¹⁵ and the Kyrgyz Republic 796 (National Statistical Committee of the Kyrgyz Republic 2022). However, the quality of epidemiological data is uneven across the region, and accurate epidemiological data allowing for the design of cost-effective risk-

based prevention and control policies and programs is lacking, which is a serious problem, since brucellosis is an endemic zoonosis. A 2015 study in Kazakhstan indicated that about US\$24 million was spent on testing animals, and about US\$21 million compensated for animals that were slaughtered due to brucellosis (Charupkhan et al. 2019). People can contract brucellosis when they are in contact with infected animals or animal products, and consumption of unpasteurized/raw dairy products. Farmers and their families may also be contaminated during breeding events (abortions, calving, lambing, etc.) if animals are not handled following proper biosecurity measures. With increased recourse to summer pastures and increased competition for pastures between wild and domestic animals from climate change effects, the circulation of brucellosis in wild ruminants will contribute to its circulation in domestic ruminants. Vaccination before transhumance to mountain pastures or grasslands is indispensable and, in most cases, mass vaccination is the best option.

Echinococcosis, a parasitic disease caused by infection with tiny tapeworms of the genus *echinococcus*, causes a substantial health and economic burden due to costs related to treating cases and losses to the livestock industry. The two most important forms, which are of medical and public

15 Data provided by the Ministry of Healthcare of the Republic of Kazakhstan to the World Bank

health relevance in humans, are cystic echinococcosis and alveolar echinococcosis. Both cystic echinococcosis and alveolar echinococcosis in humans are often expensive and complicated to treat, sometimes requiring extensive surgery and/or prolonged drug therapy. Prevalence rates range from under 1 per 100,000 to more than 200 per 100,000 in rural populations in close contact with domestic dogs. The annual prevalence of the disease has decreased in the Kyrgyz Republic, but it still reported 888 cases in 2021 (National Statistical Committee of the Kyrgyz Republic 2022); while Kazakhstan had almost 600 human cases in 2021¹⁶. In most countries, a limited number of animal outbreaks may be due to limited symptoms in animals and lack of surveillance and reporting in slaughterhouses. Dogs are mainly responsible for cases in humans. The handling and preparation of fur from foxes, mostly involving women, is also a high-risk practice. Considering the long incubation period before the first symptoms, epidemiological surveillance in animals should be strengthened in slaughterhouses and for wild animals with the assistance of hunters trained to identify the effects.

Rabies is still prevalent in Central Asia among domestic and wild animals as well as in humans. Rabies is a viral disease affecting the central nervous system that can be prevented by

vaccination of dogs and puppies, staying away from wildlife, and seeking medical care after potential exposure before symptoms start. People are usually infected following a bite or scratch from an animal with rabies, which is, in most cases, a dog. Once clinical symptoms appear, rabies is usually fatal (CDC 2022a). Rabies continues to be present in all Central Asian countries, but cases are rarely reported, and registered numbers differ greatly from the estimated burden. Current diagnostic tools are not suitable for detecting rabies infection before the onset of clinical disease. Unless the rabies-specific signs of hydrophobia or aerophobia are present, diagnostic tools fail in detecting rabies infection before the onset of clinical disease. To support countries in improving their national rabies elimination plans, it is important to engage with local communities to strengthen disease surveillance, data reporting and monitoring of rabies.

Highly Pathogenic Avian Influenza (HPAI) continues to be a risk for Central Asia, as the first cases of the current H5N8 strain have been identified in the region. In 2020, FAO alerted the countries of Central Asia of the risk of re-introduction of HPAI, as the genetic characteristics of the latest H5N8 HPAI virus were identified in Kazakhstan (FAO 2022). These outbreaks were probably linked to high density and frequent movement of

16 Data provided by the Ministry of Healthcare of the Republic of Kazakhstan to the World Bank

BOX 5.**Key investment needs to improve the prevention and control of zoonoses and non-zoonotic animal diseases*****Convening and coordination***

- Cross-sector and regional coordination of risk assessments as the basis for decision-making.
- Cross-sector coordination of risk-based decision-making between local, national and regional authorities.

Knowledge development and addressing gaps

- Risk factors and underlying drivers associated with emerging zoonoses and reverse zoonoses and non-zoonotic animal diseases to identify pathogens and transmission routes.
- Risk-based identification of priority zoonoses and interventions based on evidence.

Policy development and harmonization

- Coordination and mobilization of technical resources (e.g., epidemiological surveillance, diagnosis capacity, vaccine production) and human resources from animal health services, environmental agencies, and public health services.
- Allocation of adequate and sustainable resources for vaccination programs.
- Establishment of compensation systems in case of need to cull animals.
- Risk communication to prevent contamination by zoonotic pathogens.

Capacity building

- Zoning and compartmentalization to control transboundary diseases, and to ensure free zones or compartments.
- Veterinary and public health laboratory capacity, including staff training to identify priority zoonotic pathogens.
- Coordination of epidemiological surveillance
 - between the animal, environmental and public health systems, and integrating surveillance of wild animals.
 - focusing on relevant pathogens and risk factors which provide early warnings and allow for planning appropriate responses.

BOX 5.**Key investment needs to improve the prevention and control of zoonoses and non-zoonotic animal diseases (continued)**

- to facilitate evidence-based decisions based on risk assessment and monitoring and evaluation of prevention and control programs.
- Training of farm biosecurity for farmers.
- Epidemiology training of program managers and field veterinarians to correctly implement disease prevention and control programs, especially during outbreaks.
- Implementation of biosecurity measures to control priority zoonoses.
- Outbreak investigation in regions (*oblasts*).
- Simulation exercises to test the capacity of the different authorities to develop a coordinated and efficient response.

flocks from intensive poultry production, the disease is now considered a priority zoonosis in Kazakhstan, and a roadmap to prevent and control avian influenza (AI) is under implementation. Central Asia is situated at an important migratory crossroads for waterfowl and other species of birds that bridge regions where avian flu is prevalent. Direct transmission of the virus from wild birds to humans is rare or non-existent, but transmission from domestic species to humans does occur and hundreds of cases have been reported globally. Therefore, controlling the disease in birds is critical to decrease risk to humans. During the 2005–2006 outbreak emergency response, environmental

agencies in the region were responsible for monitoring the concentration of wild birds and mapping their migration to identify the location of AI and risks of transmission, and intersectoral training on sample collection and laboratory diagnosis took place. However, inter-sectoral collaboration has been limited since the closure of the 2011 Regional One Health project financed by the Bank-managed Avian Flu TF and the Kyrgyz Republic Avian Influenza Control and Human Pandemic Preparedness and Response (GPAI) project. The 2011 Regional One Health grant of US\$ 3 million to prevent and control zoonoses and improve food safety, developed and applied a

detailed gap analysis tool, as well as economic analyses of the impact of zoonoses; and developed action plans for veterinary and public health services in Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan.

2.6. Food safety

In all Central Asian countries, the strengthened implementation of a One Health approach could support better control of foodborne zoonoses and reduce food safety risks along the food chain. The data on food-borne illnesses and international notification of food safety events coming from these countries is limited and does not allow for an accurate description of the food safety situation. Their international trade of food products with countries with efficient rapid alert systems is limited: from January 2020 to March 2023, 36 notifications have been recorded on RASSF¹⁷ by EU countries on their products (mainly ochratoxins and chemical contaminants on fruits and vegetables). Central Asian countries have made no recent notifications to INFOSAN and only Kazakhstan has been audited by the EU Food and Veterinary Organization for fish products. The burden of food-borne diseases in the region is not much higher than it is in Western Europe (Figure 3):

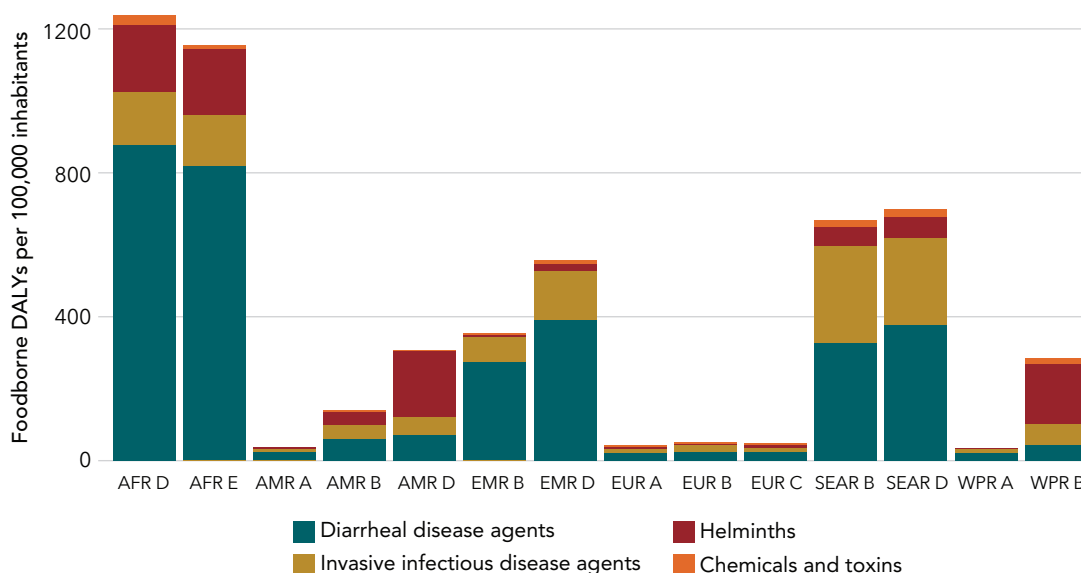
49–52 per 100 000 people in the region versus 41 in Europe (Havelaar, et al. 2015). The difference is mainly due to zoonoses (Havelaar, et al. 2015). Local populations are exposed to significant food-safety risks, due to limited capacity in food and water safety management and control. Progress on reducing food safety risks has mainly been driven by private food companies' voluntary implementation of food-safety standards. However, only larger food companies and global exporting companies have developed food-safety management systems according to the Eurasian Economic Union (EAEU) international standards and technical regulations.

Meeting the countries' ambitions of exporting animal food products to external markets can be supported through compliance with international standards, animal identification systems, farm-to-fork surveillance plans and strengthening the capacity for the enforcement of food safety regulations. The International Health Regulations (IHR) 2005 agreement states that all countries are required to build the capability to detect and report potential public health emergencies worldwide and the ability to detect, assess, report, and respond to public health events. According to Joint External Evaluation (JEE) and Performance of Veterinary Services (PVS) assessments, the food-safety

17 RASSF: Rapid Alert and Surveillance of Food and Feed <https://webgate.ec.europa.eu/rasff-window/screen/search>

FIGURE 3.

The global burden of foodborne disease (DALYS per 100,000 population) by hazard groups and by subregion for 2010



Source: WHO Global Estimates and Regional Comparisons of the Burden of Foodborne Disease in 2010 (Havelaar, et al., 2015).
 Note: The Central Asian countries belong to subregion EUR B (Albania; Armenia; Azerbaijan; Bosnia and Herzegovina; Bulgaria; Georgia; Kyrgyzstan; Montenegro; Poland; Romania; Serbia; Slovakia; Tajikistan; North Macedonia; Turkey; Turkmenistan; Uzbekistan) and EUR C (Belarus; Estonia; Hungary; Kazakhstan; Latvia; Lithuania; Republic of Moldova; Russian Federation; Ukraine).¹⁸

procedures in both the animal and public health services do not currently comply with the international standards. Addressing the region’s food-safety gaps is important for ensuring access to safe and nutritious domestically produced or imported food. Controlling the safety of imported food products is currently restricted by limited border infrastructure and a lack of resources to detect and respond to food-safety

issues. Food-safety inspections of domestically produced products are shared by (i) veterinary services, that inspect primary products (pre- and post-mortem, raw milk), (ii) the Ministry of Health, that inspects food processing units, and (iii) local authorities, that are responsible for inspecting slaughterhouses and distribution chains in local communities. In systems with shared responsibilities, multisectoral

¹⁸ The subregions are defined on the basis of child and adult mortality. Stratum A: very low child and adult mortality, Stratum B: low child mortality and very low adult mortality, Stratum C: low child mortality and high adult mortality, Stratum D: high child and adult mortality, and Stratum E: high child mortality and very high adult mortality. The use of the term ‘subregion’ here and throughout the text does not identify an official grouping of WHO Member States, and the “subregions” are not related to the six official regions. AFR = African Region; AMR = Region of the Americas; EMR = Eastern Mediterranean Region; EUR = European Region; SEAR = South-East Asia Region; WPR = Western Pacific Region (Havelaar, et al. 2015).

BOX 6.**Key investment needs to improve food safety*****Convening and coordination***

- Develop and adopt national food-safety strategies from farm-to-fork based on international best practice and guidelines using the One Health approach.

Knowledge development and addressing gaps

- Develop a joint database accessible for all food control agencies for registration of food inspection results (ante- and post-mortem inspections and food inspections).
- Develop a database registration of food-business operators to categorize food business according to risk and plan risk-based inspection activities.

Policy development and harmonization

- Strengthen institutional frameworks and multisectoral coordination for effective food control.
- Strengthen compliance and risk-based food inspection and enforcement capacity.
- Cooperation to
 - Strengthen evidence-based policy and legal frameworks complying with international guidelines.
 - Adopt quality and safety standards for food-business operators.
 - Strengthen food safety laboratories and implement consistent testing and analysis, based on international best practices.
- Adopt a risk-based preventive approach to food safety, including consumer campaigns on how to prepare food safely.
- Establish certification systems based on food-safety standards, such as the Codex Alimentarius Commission (CAC) and other international risk-assessment approaches.

Capacity building

- Enhance capacity to detect, assess, investigate and respond to food safety events.
- Joint investigation and response to foodborne and zoonotic disease outbreaks.
- Strengthen the network of reference laboratories (national and/or regional) with specialization in specific food-safety hazards.

BOX 6.**Key investment needs to improve food safety (continued)**

- Improve national laboratory capacity to test residues and contaminants and carry out priority food pathogens surveillance.
- Strengthen risk-based food inspection systems.
- Strengthen food-business operators' capacity to implement food safety management systems, including full traceability with capacity of recalling and withdrawal of unsafe and non-compliant products.
- Build risk management capacity, including training-of-trainers programs for (i) farmers and agri-food producers to follow international food-safety requirements, (ii) epidemiological surveillance and laboratory information systems, and (iii) lab technicians, food-safety regulators and inspectors, and relevant personal in food-business operators.

coordination of surveillance and monitoring systems, inspection and enforcement plans, and food safety emergency response is of utmost importance. While all countries have intersectoral committees in place for coordinating food-safety efforts, the countries are facing different challenges in ensuring efficiency. The Kyrgyz Republic and Kazakhstan have animal identification systems in place but, in the former, there is a lack of IT specialists and resources to develop the traceability systems further. In Uzbekistan, a Food Safety Council has been established, and a draft law prepared as part of the preparation for WTO accession. In Tajikistan food-safety regulations are being updated to comply with the CODEX Alimentarius, and a Food

Safety Strategic Plan has been prepared but not yet approved. Kazakhstan and Turkmenistan are current beneficiaries to the Codex Trust Fund and recipients of technical and financial support to strengthen their participation in Codex Alimentarius. Kyrgyzstan completed its Codex Trust Fund supported project in 2020. Uzbekistan will soon start implementation of a Codex Trust Fund supported project and Tajikistan is eligible for applying. Overall, food-safety efforts in the region are being prioritized, however, management of food-safety crises is limited by a lack of animal identification and traceability in the supply chain. While work on addressing these issues is ongoing, the lack of surveillance plans and limited collection and analysis

of food-safety data from inspections reduces most of the countries' ability to assess food-safety risks and implement efficient and cost-effective policies based on risk assessment.

2.7. Antimicrobial resistance (AMR)

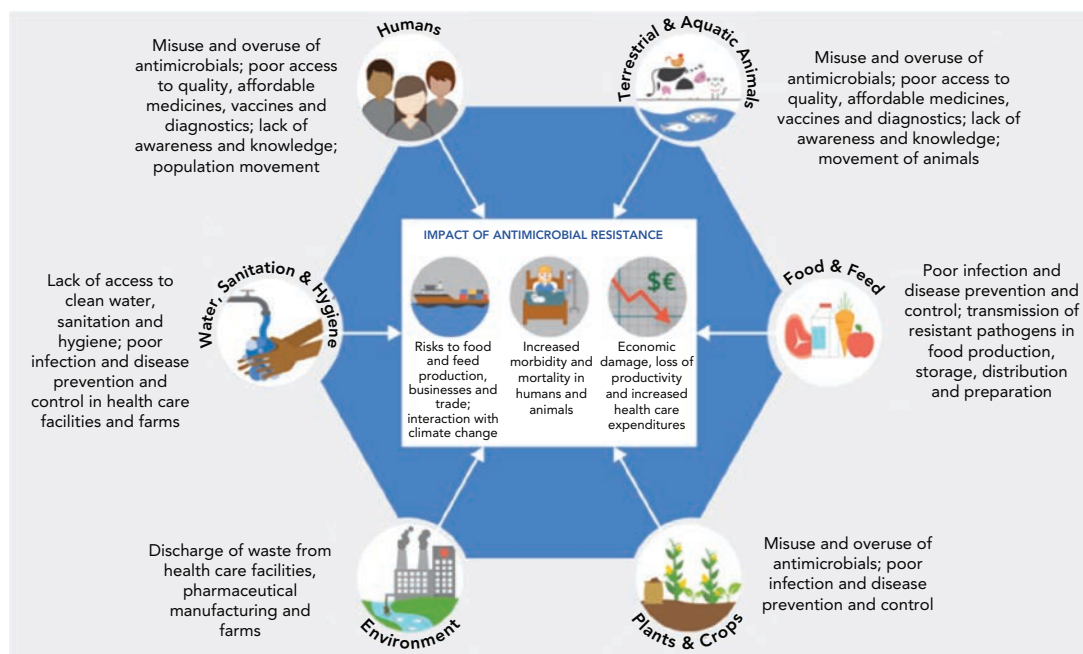
Progress on controlling AMR, which in 2019 caused 1.2 million deaths worldwide, is a significant development challenge, with a substantial economic impact on developing countries, and posing a substantial threat to global health security. AMR's disproportionate impact on poverty reduction, food security, health, and well-being, and inequality reduction in low- and middle-income countries (LMICs) makes it a priority for development strategies. Unaddressed, AMR is expected to cause 10 million deaths per year by 2050 (Wellcome Trust 2016, 2020). In 2017, the World Bank estimated that the impact of AMR could account for as much as 3.8% of annual GDP by 2050, with much of the burden of this impact falling on LMICs (Jonas, et al. 2017).

While AMR may be devastating for human health, the driving forces of resistance go well beyond the health sector and are shaped by actions in multiple sectors with consequences that threaten human, animal, and environmental health, collectively. The key driver of AMR remains the overuse and misuse of antimicrobials.

Over the last decade, research has demonstrated a range of drivers contributing to AMR emergence and spread, ranging from environmental dissemination of antimicrobial residues, resistant pathogens, and resistant genes to inappropriate use of antimicrobials in health-care settings and animal production, and low public awareness about prudent use (Figure 4) (WHO 2019). AMR requires enforcement of legislation, public education, and infection prevention and control measures. Detecting and responding to AMR relies on strengthened and coordinated surveillance and laboratory capacity and coordinated responses across sectors of human and animal health, environment, and trade.

The AMR burden of disease in Central Asia is being driven by increasing livestock production, poor biosecurity and animal health standards, misuse of antimicrobials and growth hormones, and substandard food hygiene, all of which contribute to the spread of new infectious agents and AMR. The 2019 Global Burden of Disease (GBD) study estimates that in Central Europe, Eastern Europe and Central Asia, an expected average of 17.6 deaths per 100,000 (11.7–25.3) can be directly attributed to AMR, while an average of 67.7 deaths per 100,000 (45.4–96.6) can be associated with AMR per year (Murray, et al. 2022). Data from the Central Asian and European Surveillance of AMR (CAESAR) network shows that

FIGURE 4.
Main drivers of AMR



Source: WHO 2019. *No Time to Wait: Securing the future from drug-resistant infections.*

resistance to priority AMR pathogens is widespread in the WHO's Europe Region that includes all five Central Asian countries, underlining the need for concerted action. In 2019, six pathogens were each responsible for more than 250,000 deaths associated with AMR: *E coli*, *S aureus*, *K pneumoniae*, *S pneumoniae*, *Acinetobacter baumannii*, and *P aeruginosa*, by order of number of deaths (WHO 2020).

Assessing the magnitude of AMR in the region remains a challenge due to

a lack of adequate animal and public health surveillance systems. Although Kazakhstan, the Kyrgyz Republic and Tajikistan have satisfactory AMR surveillance in humans and participate in the regional External Quality Assistance (EQA) scheme (WHO 2020), the region generally lacks accurate information on the AMR situation. All the countries have been taking steps to address AMR and are making some progress on antimicrobial consumption (AMC)¹⁹ (Table 6). All of them have developed AMR action plans. The countries have

¹⁹ Antimicrobial consumption (AMC) is defined as the quantity of antimicrobials used in a specific setting (total, community, hospital) during a specific period of time (e.g. days, months, and year).

TABLE 6.
Central Asia anti-microbial resistance progress indicators

	KAZ	KYG	TAJ	TUR	UZB
Focal point appointed	No	Yes	Yes	Yes	Yes
Action Plan developed	Yes	Yes	Yes	Yes	Yes
Data submitted to CAESAR, regional surveillance network	No	No	No	No	No
Regional external quality assistance (EQA) scheme participation	Yes	Yes	Yes	Yes	Yes
Enrolled in GLASS	No	No	No	No	No

Sources: WHO 2020, Central Asian and European Surveillance of AMR—CAESAR

appointed AMR focal points; and they have established some multisector cooperation to tackle the issue.

While there is a strong commitment to addressing AMR in the region, the high-level endorsement and implementation of action plans have been stalled due to the prioritization of issues related to COVID-19 and lack of resources and capacity to detect AMR in humans, animals, and in the environment. In Uzbekistan, an AMR legislative framework is being updated, and a draft presidential resolution is under review by the Cabinet of Ministers, while in Tajikistan a new National Action Plan for AMR is under preparation to follow up on the action plan from 2018–2022 (Table 6).

Legislation for use of antibiotics is in place to varying degrees across the region, but all countries suffer from gaps in enforcement. In Uzbekistan, the national legislation requires a prescription for antibiotic use in both animals and humans, including all veterinary medicines and feed additives. In Kazakhstan, the national legislation requires prescriptions for antibiotic use for animals and imposes a withdrawal period of 21 days for antibiotics before an animal is slaughtered and animal-based products are produced; and the sale of antibiotics to people in the retail network is not carried out without a prescription. The use of antibiotics in medicine is also regulated through nationally approved clinical protocols. The Kyrgyz Republic and Tajikistan have legislation banning

the sale of antimicrobials for humans without prescription (Bell and Nuzzo 2021). In addition, the Kyrgyz Republic also prohibits the improper addition of antibiotics to animal feed and imposes fines on the free sale of antibiotics. In Turkmenistan, there is currently no legislation in place requiring prescriptions for antibiotic use in animals (Bell and Nuzzo 2021). For all Central Asian countries, there are gaps in enforcement of the legislation due to the lack of training of doctors, nurses, veterinarians, and para-veterinarians, as well as animal and human health pharmacists on the prudent use of antibiotics (ICARS 2021). Surveillance and monitoring of both sales and the use of antimicrobials is unevenly carried out in the region (Bell and Nuzzo 2021).

Addressing the gaps in enforcement will require capacity building in laboratory systems to implement surveillance and monitoring systems of antimicrobial use (AMU)²⁰ in both humans and animals efficiently. For all countries, there is currently no systematic reporting of AMR data, although surveillance, detection, and reporting of priority AMR pathogens is a priority. Tajikistan, Turkmenistan, and Uzbekistan have included the development of new surveillance tools, training of

professionals, and establishing integrated systems for public health, animals, and food surveillance systems in their national strategy for AMR. In Uzbekistan, the national laboratory system tests for nine AMR pathogens, including four WHO priority pathogens: *Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella spp.*, and *Streptococcus pneumoniae* (WHO 2020) with one accredited AMR laboratory. In Turkmenistan, a few designated laboratories are capable of detecting and reporting on seven priority AMR pathogens *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Salmonella spp.*, *Neisseria gonorrhoeae*, *Mycobacterium tuberculosis* (Bell and Nuzzo 2021). In Tajikistan, the National Reference Laboratory and four hospital-based laboratories have initiated AMR susceptibility testing, but a laboratory quality assurance system should be established; AMC and AMR surveillance should be expanded across the animal health, food safety and environment sectors, and data should be published and used to inform public policy (Bell and Nuzzo 2021). Both Kazakhstan (WHO 2020) and the Kyrgyz Republic (Bell and Nuzzo 2021) are in the process of appointing an entity to coordinate the AMR surveillance network to develop a national multisectoral plan for AMR surveillance.

20 Antimicrobial use (AMU) means the volume of antimicrobials delivered. Depending on the data source, this may not reflect the actual amount administered.

BOX 7.**Key investment needs to control antimicrobial resistance*****Convening and coordination***

- Action plan on AMR setting goals for the reduction of antibiotic use and the prevention of resistance among humans and animals and for cross-border cooperation.

Knowledge development and addressing gaps

- Biosafety and the quality of veterinary drugs, including to tackle the risk of fraudulent drugs, and their use under supervision by veterinarians.
- Public awareness and behavior change campaigns
 - for farmers, veterinarians and other health professionals on AMR risks in livestock and the environment (rivers, wastewater).; and alternatives to antimicrobials in animal feed.
 - for policymakers and the public on AMR risks, prevention, and control.

Policy development and harmonization

- Animal husbandry and animal health practice guidelines, including biosecurity measures and vaccination strategies at farm level, according to international guidelines and standards.
- Regulation on prudent use of antibiotics and bans on their use for growth.
- Legislation/guidelines on prudent use of antimicrobial drugs in animal production and healthcare, in compliance with AMR international standards.
- Regulation/guidelines on over-the-counter sales of antimicrobials.
- Prescription guidelines and stewardship for healthcare workers.
- Antibiotic residue surveillance and control plans, including according to Limit Maximum residues limit (MRL)²¹ on food.

21 Maximum residues limit (MRL) is the maximum concentration of residue legally tolerated in a food product obtained from an animal that has received a veterinary medicine.

BOX 7.

**Key investment needs to control antimicrobial resistance
(continued)**

Capacity building

- Surveillance of:
 - AMR and AMU among animals and humans.
 - AMR genes in main pathogens (E. coli, salmonella).
 - AMU and AMR bacteria in water and sanitation systems.
- Public health and veterinary laboratory capacity, including training of lab workers to identify priority zoonoses, carry out quality control of antimicrobial drugs, and test their use in animals and humans.
- Safe disposal of unused antimicrobials.
- Detection and deterrence of substandard and falsified antimicrobials.
- Infection prevention and control in health care settings.
- Waste management practices in pharmaceutical manufacturing and agricultural production/processing.
- Treatment and disposal of sewage and wastewater.
- Field inspection systems to monitor and control the use and sales of antibiotics in animals and humans.



Goats on a mountain bridge, Tajikistan.
Photo credit: Canva

A woman selling artisanal dairy products at a free market in the outskirts of Almaty, Kazakhstan.
Photo: Ospan Ali



3. One Health in Central Asia

Central Asian countries have been working on One Health-related issues, such as strategy development, epidemiological surveillance, and laboratory capacity, with international partner organizations; and on specific prevention and control plans, such as those against brucellosis and echinococcosis, and AMR. Significant progress has been observed when there have been clear objectives at national level and good involvement of the different local authorities and other stakeholders in program implementation. However, there are many gaps in One Health implementation, the most significant of which is limited intersectoral cooperation between the animal, environmental and public health sectors, at the national and regional level, in relevant aspects such as regional epidemiological surveillance.

Animal diseases know no boundaries or borders, and, therefore, their prevention and control require cooperation and coordination between animal health, environmental health and human health services. Implementing a One Health approach in the region currently faces challenges of poor-quality health specialist training and the lack of integrated animal and public health surveillance systems. The

services responsible for prevention and control of epidemic outbreaks, and transmission of diseases between species, used to work in highly specialized silos with rules and functions well-defined by law, but without incentives for cooperation and coordination of preparedness and responses. While veterinary services notify public health services of zoonoses, many other prevention and control actions are still taken by each sector without consultation or common planning and reviews. A One Health approach would bring veterinary, public health and environmental health services together to assess risks, prepare for epidemics, plan and implement timely responses to outbreaks, and carry out joint reviews of those responses, among other joint activities.

Country consultations with senior representatives from the Ministries of Agriculture, Environment, and Health of the five Central Asian countries, demonstrated a high level of engagement, and willingness to initiate regional collaboration on a One Health approach with the World Bank and other international partners. These country consultations have confirmed two pressing high-level issues shared at the regional level: pandemic preparedness and

new trade-related opportunities and threats associated with regional transport infrastructure. One Health is considered an appropriate approach to address these high-level issues through the control of zoonoses, food safety, and AMR. All Central Asian countries have developed interagency programs and have been implementing joint activities. Ad hoc cross-country collaboration is already taking place, for example, in the control of wildlife migration or on issues related to the livestock trade. More support for cross-sectoral cooperation to address urgent health security risks across animals, human and environmental health would be welcome. The need for a regional approach has been highlighted by most counterparts and none expressed doubts about the feasibility of regional collaboration. The nature and the magnitude of the two common challenges require regional collaboration to develop prevention and control systems on a scale that single-country strategies will not be able to achieve. Platforms for regional collaboration, such as the Central Asia Presidential meetings, Commonwealth of Independent States (CIS), the Eurasian Economic Union (EAEU), the Central Asia Animal Health Network (CAAHN) and Central Asia Regional Economic Cooperation (CAREC) do exist and can be vectors for One Health strategic initiatives.

Country consultations with stakeholders—Ministries of Agriculture/

Veterinary Services, Environment/Natural Resources, Public Health, the Quadripartite and other partners—will continue to be carried out in the context of this activity to establish communication and collaboration mechanisms between them; identify priority issues in the prevention and control of zoonotic and non-zoonotic animal diseases, AMR and food safety; discuss the benefits and challenges associated with the development of a One Health approach to address those issues; and provide governments with an overview of financing options for ongoing, planned and future activities.

National strategies, plans and policies mention One Health approaches and prioritize key One Health activities under different areas, such as improvement of the prevention and management of main communicable diseases, modernization of sanitary-epidemiological services, public health laboratories, and veterinary services (Table 7).

The Quadripartite One Health Joint Plan of Action (JPA) provides guidance for countries to implement the One Health approach to address food safety, zoonotic diseases, AMR and pandemic preparedness. Most countries have drafted national strategic plans to address the impact of climate change, and have also developed strategies against transboundary zoonoses, according to their available resources.

TABLE 7.
Central Asia One Health-relevant strategies and policies

Kazakhstan	<ul style="list-style-type: none"> ■ Roadmap for implementation of the International Health Regulations (IHR) and Global Health Protection (GHP) Program 2019–2023 ■ Interdepartmental Internal Evaluation of the Republic of Kazakhstan for IHR and GHSA, based on the JEE tool in 2016 ■ PVS 2011—and follow-up in 2018 ■ National Bridging Workshop—Roadmap for implementation of IHR and the OIE PVS Pathway 2018 ■ WOHAI PVS Gap Analysis mission 2021
Kyrgyz Republic	<ul style="list-style-type: none"> ■ Program on Public Health Protection and Health Care System Development 2019–2030 Healthy Person—Prosperous Country ■ PVS Evaluation Follow-up mission in 2016 ■ JEE in 2016 ■ National Bridging Workshop—Roadmap for implementation of IHR and OIE PVS Pathway 2018
Tajikistan	<ul style="list-style-type: none"> ■ National Health Strategy 2021–2030 ■ Health Codex 2017 ■ JEE 2019 ■ PVS GAP analysis Mission 2017
Turkmenistan	<ul style="list-style-type: none"> ■ National Health Strategy 2021–2025 ■ National Program 2021–2025 for strengthening the capacity of the population to fight infectious diseases ■ Plan for Preparedness for Counteraction and Response to Acute Infectious Diseases ■ National Strategy for containment of AMR 2017–2025 ■ JEE 2016 ■ PVS mission in 2017
Uzbekistan	<ul style="list-style-type: none"> ■ Public Health Strategy 2010–2020 ■ Healthcare system development concept 2019–2025 ■ PVS mission in 2017 ■ OIE PVS Gap Analysis mission 2018

BOX 8.**Key investment needs for a strategic and regulatory framework*****Convening and coordination***

- Effective intersectoral cooperation frameworks between the animal, environmental and public health sectors, at national and regional levels, including the private sector, to agree on strategy, policy, and regulation for coordinated management of risks.

Knowledge development and addressing gaps

- Identification of national and regional platforms for increased cooperation, coordination and harmonization of One Health strategies, policies, regulations, and activities.

Policy development and harmonization

- Establishment and resourcing of a multisector coordination mechanism, and technical working groups on pandemic prevention, preparedness and response, prevention and control of zoonoses, food safety, and AMR, at national and regional level.
- Harmonized policies and regulations on those areas, at national and regional level.
- Development and implementation of One Health Action Plans.
- Harmonized and coordinated legislation that complies with international standards, to (i) provide incentives, and define mechanisms, for increased intersectoral cooperation between animal health services, environmental health services and public health services to avoid duplications and gaps on diagnosis and responses; (ii) control diseases to facilitate safe movement of animals and products; and (iii) identify epidemiologic units and regulate the movements of animals.
- Coordinated communication with policymakers and the public about risks, outbreaks, responses and the respective reviews.
- Compensation systems for farmers in response to animal culling as part of specific disease prevention and control programs.

Capacity building

- Development and implementation of One Health Action Plans, in line with The Quadripartite One Health Joint Plan of Action.
- National and regional management capacity for increased cooperation at both levels.

3.1. Institutional capacity

Successful implementation of a One Health approach in the region is threatened by limited capacity to implement intersectoral collaboration on epidemiological surveillance, prevention and control of zoonoses and AMR, and food safety. The Public Health and Veterinary, Phytosanitary Services supervise and control the safety and health of people, animals, and plants. While these services have the capacity to perform epidemiological surveillance in both humans and animals, there is limited coordination between them, which compromises efforts to implement infection prevention and control interventions as well as to ensure compliance with sanitary and phytosanitary (SPS) standards. The veterinary sector has sufficient staff, but service quality is poor because of a lack of critical

competence due to declining training quality in the absence of continuing education.

PVS assessments²² and One Health workshops, carried out by FAO, WHO and WOAHA, have identified the need to define priority diseases and improve surveillance programs, laboratory capacity, and vaccination programs as prerequisites for successful implementation of a OH approach. The assessment of the need to strengthen coordination between public health and veterinary services through Joint External Evaluations (JEE)²³ and National Bridging Workshops (NBW)²⁴ on IHR²⁵ has been delayed in the region due to the COVID-19 pandemic. The capacity building workshops on One Health in both Kazakhstan and the Kyrgyz Republic identified anthrax and HPAI as priority diseases, and were advised to limit the number of priority diseases to avoid dilution of resources. The PVS

- 22 The Performance of Veterinary Services (PVS) pathway exercises are performed to strengthen the capacities of the veterinary services in countries by doing a situation assessment, a gap analysis, and developing an action plan with a budget estimate; WOAHA provides support to the development of legislation and of the veterinary laboratory network.
- 23 The JEE is a voluntary, collaborative, multisectoral process comprehensively to assess country capacity to prevent, detect and rapidly respond to public health risks in the framework of the IHR, and inform the development of the national action plans. It validates and adapts a country's self-evaluation, helping to identify the most critical gaps in IHR core capacity implementation, and prioritize actions to improve preparedness and response capacities.
- 24 NBW workshops are designed to bring together veterinary and public health country specialists to harmonize frameworks and prepare plans to increase collaboration and develop a joint roadmap for improved management of infectious diseases, particularly zoonoses. Joint use of the IHR Monitoring and Evaluation Framework (IHR MEF), developed by WHO and the OIE Performance of Veterinary Services (PVS) pathway, result in better alignment of animal and public health strategies, and facilitate capacity building.
- 25 IHR is an international legal instrument under which countries commit to reporting public health emergencies of international concern and to strengthening national preparedness and response systems. Countries are required to provide self-evaluations of core capacities for emergency preparedness and response annually. The State Party Self-Assessment Annual Reporting (SPAR) tool collects data using 24 indicators across 13 capacities: (i) legislation and financing; (ii) IHR coordination and National IHR Focal Point functions; (iii) zoonotic events and the human–animal interface; (iv) food safety; (v) laboratory; (vi) surveillance; (vii) human resources; (viii) National Health Emergency Framework; (ix) health service provision; (x) risk communication; (xi) points of entry; (xii) chemical events; and (xiii) radiation emergencies.

assessments carried out in Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan informed the need for improving veterinary institutional capacity related to surveillance, laboratories and vaccination programs as part of One Health programs.

Modern public health and veterinary sciences—epidemiology, risk analysis, veterinary governance—required for the implementation of the OH approach should be further developed in Central Asia (WOAH 2012).

This should entail a significant training effort of local staff, to upgrade their knowledge and capacity to take the right decisions in case of outbreaks. Improvements in veterinary education require curricula to comply with WOAHS standards and guidelines, professional and social expectations to be met and innovative teaching methods and educational best practices to be adopted. It is also necessary to improve the dialogue between Veterinary Statutory Bodies (VSBs) and enhance regional cooperation and harmonization between Veterinary Education Establishments (VEEs) (WOAH 2018). Improvement of continuing education will enable the veterinary workforce to remain skilled and updated with new developments (WOAH 2016). In the Kyrgyz Republic, the need for specialist training in epidemiology, laboratory diagnosis, chemical and nuclear/radiation safety, and primary health care was

highlighted. In Tajikistan, multisectoral collaboration and communication between public health, animal health, food safety and other relevant sectors need to be further strengthened. This can be achieved through the implementation of joint action plans for the prevention and control of priority zoonoses as well as supporting data sharing or implementing an integrated animal and public health surveillance system. In Turkmenistan, the One Health strategy needs to ensure a better coordination of standard operating procedures (SOPs) and that coordination mechanisms are in place.

Environmental public administrations in the region have been included in national One Health initiatives only to a limited degree, despite having the capacity to predict transmission of zoonoses and prevent their emergence and spread, as long as budgets for surveillance and monitoring of wildlife and pasture protection are available. These services are responsible for waste management and control; supervision of the rational use of natural resources; study of the soils and resource bases; use and protection of water, including sanitation; and protection, reproduction, and use of wildlife in protected areas, including hunting, forest management, and control of pasture lands. Stronger integration of the environmental services in One Health activities can support

BOX 9.**Key investment needs to support institutional capacity building*****Convening and coordination***

- Interdisciplinary network of strategic animal, environmental and public health managers to
 - improve surveillance and monitoring, with a strong focus on outbreak prevention and control.
 - increase transparency, openness and willingness to share information and resources.
 - supervise the surveillance system and monitor a One Health Dashboard.

Knowledge development and addressing gaps

- Development of a dashboard to monitor and evaluate progress on One Health implementation at country and regional level.
- Mapping activities of the stakeholders to avoid duplication of efforts.

Policy development and harmonization

- Development of a Central Asia One Health Framework for Action for pandemic prevention and preparedness, prevention and control of zoonoses and AMR, and food safety.
- Regulation of the chain of command and coordination mechanism needed for sharing information, and decision making on planning, implementation, and M&E.
- Harmonize One Health case definitions, tools, methods, and operational procedures to address animal and human health threats.

Capacity building

- Quality training and simulation exercises in
 - epidemiology, laboratory diagnosis, chemical and nuclear/radiation safety, and primary health care related to infectious diseases, especially zoonoses, AMR, and food hazards.
- Training of veterinarians and veterinary paraprofessionals with a curriculum aligned with WOA recommendations. The number of graduated veterinarians should be based on the country's real needs.
- Data management and operational M&E, with formal procedures for the development of the information system and harmonized development and implementation of disease-prevention and control plans.

institutional capacity for disease prevention and control across human, animal, and environmental sectors at both national and regional levels through surveillance of wildlife movements. Through their engagement with hunters and forests workers, who can locate and remove carcasses safely, they can collect samples to determine the cause of death. In general, these authorities have been underfunded, which has left a knowledge gap, in terms of monitoring and surveillance of wildlife, on how best to maintain and protect pastureland, forests, and biodiversity to limit the interaction between wildlife and livestock and ensure the productivity of livestock through healthy feeding.

3.2. Epidemiological surveillance

Although Central Asian countries have made some progress in animal and public health epidemiological surveillance and reporting, data quality is insufficient to ensure good information and decision-making around prevention and control of zoonoses, AMR and food safety.

Controlling contagious diseases starts by building the capacity to detect them. However, the animal health and human health sectors do not use harmonized case definitions, tools, methods, and operational procedures

to address health threats. While there is an increased focus on the prediction and prevention of diseases in public health, the animal health sector lacks proper surveillance and reporting of animal diseases and laboratory diagnosis. National regulations do not define epidemiological units in compliance with the WOAHA definition. Kazakhstan has recently updated its regulations, but the definition does not cover all situations (e.g., “village with common pasture”, “farmers”, “settlements”), which may lead to misunderstandings. In the absence of the definition of epidemiological units, the epidemiological indicators are not entirely useful. It is often better to use prevalence or incidence in epidemiological units, and not prevalence and incidence in individual animals. The lack or low quality of epidemiological data does not allow for risk assessment and design of appropriate and efficient prevention and disease-control programs. Active, surveillance is essential to guide effective disease prevention and control programs, and to demonstrate when countries become free of diseases; and it will result from, and further promote, collaboration between the relevant public sectors, between the public and private sector, and between large companies and smallholder farmers.

Effective animal and human health surveillance systems require a mechanism for data sharing and

BOX 10.**Key investment needs to improve epidemiological surveillance*****Convening and coordination***

- Coordinated and integrated network of animal health, environment and public health managers to collect and share epidemiological data across all relevant sectors, stakeholders, and countries.
- Interdisciplinary network of strategic stakeholders to improve surveillance and monitoring, with a strong focus on outbreak prevention and control.
- Notification of nationally- and internationally notifiable diseases.
- Notification of suspected cases to ensure effective field surveillance, including of wild animals.

Knowledge development and addressing gaps

- Mapping the risk and spread of priority zoonotic and non-zoonotic diseases among humans and animals (wildlife, livestock, domestic animals).
- Incorporation of climatic/meteorological data into epidemiologic surveillance.

Policy development and harmonization

- Cross-country information-sharing on priority diseases across veterinary, environmental and public health services.
- Development of animal (domestic, livestock and wildlife), environmental and public health epidemiological surveillance networks.
- Network of National Reference Laboratories for animal health, environmental health and public health to ensure the surveillance of circulating strains.
- Coordination of public health and veterinary laboratory activities to ensure better coverage and more flexibility in case of emergency management.

(continues)

BOX 10.**Key investment needs to improve epidemiological surveillance (continued)*****Capacity building***

- Capacity for detection, reporting and immediate notification of public health events, including through improved coordination among animal, environmental and public health services.
- Early warning and response systems, with intersectoral communication of early warning signals and surveillance results.
- Integrated electronic system to gather animal, environmental and public health data, allowing for routine sharing of data on priority zoonoses and monitoring epidemiological indicators and programs.
- Coordination of capacities of health and veterinary laboratories, including data-sharing mechanisms.
- Field surveillance capacity and reporting to national databases.
- Laboratory quality control management to ensure the quality of the tests performed.

transparency to ensure reliable, high-quality, and timely data for decision making. The animal health surveillance systems in the region still rely on a few data sources, and delayed and chronic under-reporting, while the costs of data collection and transmission are high. The integration of data from multiple sources can enhance early detection and response to animal diseases and zoonoses and facilitate the early control of outbreaks. The strengths and limits, for example, of the development of animal identification and traceability of animal movement

systems in Kazakhstan and the Kyrgyz Republic can be assessed, with the objective of sharing the experience with the other countries of the region. Mobilization and support of national research institutes would enable the development of research on country challenges to adapt international practices to the Central Asian context. This also facilitates the transfer of know-how from international expertise to national and regional research institutes. The collection of accurate and transparent epidemiological data, to assess the situation and define the

best risk-based prevention and control strategy is essential, and an area that needs improvement across the region.

3.3. Prevention and control of zoonoses, anti-microbial resistance and food hazards

A coordinated approach to management of zoonoses and food safety risks across ministries to prevent and control zoonoses is not yet fully established in the countries of the region. It would need to include joint early and effective detection, prevention and control of endemic, emerging and re-emerging diseases, and of antimicrobial use (AMU) and resistance (AMR); and food safety risks. There are lists of priority zoonoses by country, but the criteria for prioritization are not clear. One Health Action Plans have been developed, with WHO assistance, and are at different stages of implementation in each country. IHR core capacities are being developed. However, the animal health and human health sectors do not use harmonized case definitions, tools, methods and operational procedures to address animal and human health threats. The inspection capacity of animals, ante- and post-mortem, to detect and

report suspected zoonoses and food hazards, is limited. Epidemiologists, public health, environmental health and veterinary specialists, as well as laboratory technicians, have few opportunities for common training streams. The curriculums of the veterinary faculties and the schools for veterinary paraprofessionals do not comply with international standards defined by WOA. Modern and evidence-based knowledge in epidemiology, a risk-based food safety system, animal welfare, cost-benefit analysis and impact studies are not well-developed and understood, especially to the extent that they would be required to develop the One Health approach. Clinical skills to provide high-value animal care services for farmers are not sufficiently developed by veterinary faculties. Quality and safety standards for food producers and processors in the region need to be updated and harmonized. Joint operational risk communication does not exist. When infected animals are culled, farmers' compensation is not guaranteed.

Most countries have given priority to the control of zoonoses in humans and livestock but, among other aspects, have underestimated the role of wild animals in the transmission of new viruses. Countries are involved in the global strategy to control FMD and PPR. The Kyrgyz Republic and Uzbekistan have been implementing a control program of echinococcosis, and all Central Asian

BOX 11.**Key investment needs for One Health prevention and control programs*****Convening and coordination***

- Network of animal health, environmental health and public health services and professionals to agree on risk-based prevention and control actions and programs based on surveillance data and other evidence.
- One Health workshops would contribute to further strengthening intersectoral cooperation, as well as to raising awareness among the rural population about animal infectious diseases, vaccination and the need for their notification.

Knowledge development and addressing gaps

- Assess and address: (i) wildlife reservoirs of foxes and wolves; (ii) The dynamics of the stray dog population, to limit rapid renewal and growth of an uncontrolled population, at the time of vaccination.
- M&E of national disease prevention and control action plans, based on international best practice, to increase effectiveness and efficiency.

Policy development and harmonization

- Development of a One Health managerial culture to manage zoonoses, including by early and effective detection, prevention and control of endemic, emerging and re-emerging infectious diseases; to mitigate AMU and AMR; and to improve food safety.
- Intersectoral One Health Action Plans for risk assessment, prevention, preparedness, and response to pandemics, zoonoses, AMR and food safety events.
- Contingency plans for response to outbreaks of priority zoonoses and other biological threats, and to prevent food contamination and food-borne diseases.
- Routine and outbreak intersectoral operational risk communication.
- Long-term, adequate resources to facilitate successful implementation of the One Health programs.
- Food quality and safety standards for food producers and processors.

BOX 11.**Key investment needs for One Health prevention and control programs (continued)*****Capacity building***

- Routine and outbreak intersectoral operational risk communication to develop awareness among decision-makers and the population, targeting the most exposed people, such as animal handlers and hunters.
- Raise awareness among rural population, and further intersectoral cooperation on the prevention and control of animal infectious diseases, vaccination, and the need for their notification.
- One Health field activities involving community stakeholders: farmers, veterinarians, environmental specialists, and public health specialists.
- Joint Rapid Outbreak Assessments (JROA), simulation exercises and After-Action Reviews (AARs) to improve coordination and networking across sectors, strengthen the recovery phase and build resilience.
- Simulation exercises by Joint Rapid Response teams (JRRT) at local level to ensure effective capacity to manage emergency situations.
- Joint prevention and control programs for zoonoses, especially in highly vulnerable regions (*oblasts*), (i) for rabies, better coordination between human and animal health services for the management of biting dogs and bitten humans, following integrated bite-case management (IBCM); (ii) for brucellosis, vaccination campaigns of young females in cattle and small ruminants, and for rabies, of the dog population; (iii) simultaneous deworming to prevent echinococcosis and vaccination against rabies.
- Zoning and compartmentalization to control some diseases and to ensure free zones.
- Risk-based food inspection capacity, including developing inspection capacity, ante- and post-mortem, to detect and report suspected zoonoses and food safety issues.
- HR capacity for joint response and field investigation of priority zoonoses and foodborne diseases, and establish joint continuous education for epidemiologists, public health and vet specialists, and lab technicians.

countries have expressed interest in developing joint control strategies for echinococcosis, in line with the One Health approach, to strengthen their efforts to carry out dog deworming and to control offal from slaughtered animals better. The One Health approach should be developed through specific prevention and control programs, demonstrating the added value of a coordinated approach, and illustrating internationally recognized concepts and practices, to improve public health and animal health indicators, while increasing understanding and capacities of international One Health practices.

3.4. Regional cooperation

Regional infrastructure developments open significant economic opportunities for Central Asian countries but bring an increased risk for the transmission and spread of transboundary diseases along regional transport corridors, as has been observed in other parts of the world. Regional cooperation on One Health will contribute to unlocking the countries' potential even more, enhancing efficiency and lowering costs. Regional and international organizations have been helping Central Asian countries to improve public health and veterinary services and take initial steps in

implementing a One Health approach. Partners include: the Central Asia Regional Economic Cooperation (CAREC) Program, the Eurasian Economic Union (EAEU), the Central Asian and European Surveillance of AMR (CAESAR), the World Health Organization (WHO), the Food and Agriculture Organization (FAO), the World Organization for Animal Health (WOAH), and the United Nations Environment Programme (UNEP), the Asian Development Bank (ADB), the World Bank, EU countries and the European Commission (EC). The Quadripartite (FAO, WOA, WHO, and UNEP) have been carrying out sector evaluations and developing capacity building activities on zoonoses, AMR, food safety and biosecurity, biodiversity loss and climate change. EU countries such as Austria, France, and Germany; the European Commission; the US Center for Disease Control (CDC), US Defense Department and others have also carried out studies and provided technical and financial assistance to the development of One Health activities in Central Asia.

Regional cooperation in Central Asia has significant potential; the region is well placed to prevent and tackle future zoonoses and other disease outbreaks. As viruses flow freely across borders, knowledge, information, and action at the national and regional level are important first steps to identify how Central Asian countries can come

together to address environmental, public health and veterinary issues posing a risk to national, regional, and global health security.

The World Bank and other international partner organizations have been supporting the development of One Health Initiatives in Central Asia in the last decade. A World Bank-funded Regional One Health Project was implemented in Central Asia in 2011, in the context of the Central Asia Regional Public Health Platform, initiated under the Central Asia AIDS Control Project (CAAP), both financed by World Bank grants and implemented by the Eurasian Economic Community (World Bank 2012a). The 2011 World Bank US\$3 million One Health grant to prevent and control zoonoses and improve food safety, developed and applied a detailed gap analysis tool, as well as economic analyses of the impact of zoonoses; and developed action plans for veterinary and public health services in Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan. The World Bank is currently (end-2022) assisting the Kazakh government with the development of its Health Strategy, and the Bank has financed and assisted the implementation of

a COVID-19 project. In the Kyrgyz Republic, World Bank-financed projects are under implementation: Integrated Dairy Productivity Improvement, Emergency COVID-19, and Integrated Forest Ecosystem Management. Others under preparation: Climate-Smart Investment for Food Security; Resilient Landscape Restoration, and Air Quality Improvement. In Tajikistan, the World Bank is currently preparing a new health project: *Milati Solim*—Healthy Nation—including a US\$4.75 million component to strengthen Health Emergency Preparedness and Response, and is assisting in the preparation of the National Agriculture Strategy, and the implementation of four OH-related projects: Strengthening Resilience of the Agriculture Sector; Resilient CA+; Emergency COVID-19; and Rural Water Supply and Sanitation. In Uzbekistan, the One Health-related World Bank-financed project—First Livestock Sector Development—has been completed; the Emergency COVID-19 Response is being implemented; and the Second Livestock Sector Development is under preparation.

Since its inception in 2001, CAREC²⁶ has mobilized US\$40 billion of funding to establish multimodal transportation

26 CAREC is a partnership of 11 countries and development partners working together to promote development through cooperation, leading to accelerated economic growth and poverty reduction. A vision of Good Neighbors, Good Partners, and Good Prospects guides members: Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, People's Republic of China, Tajikistan, Turkmenistan and Uzbekistan.

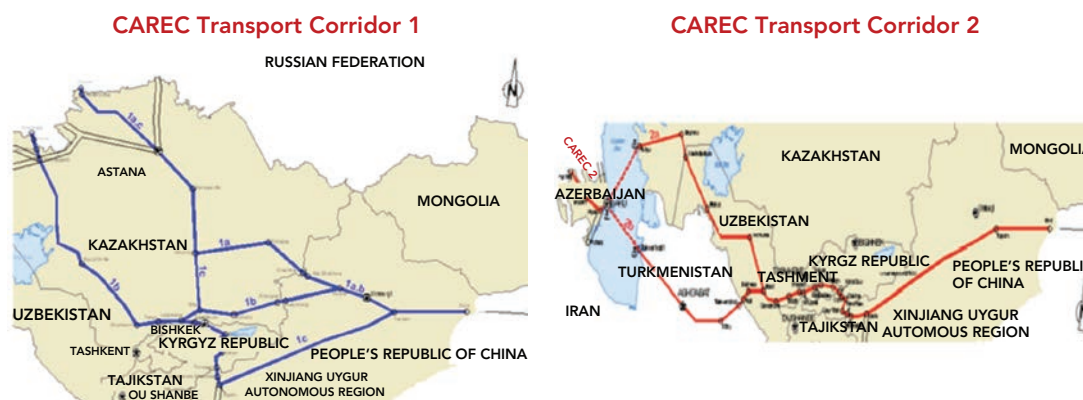
networks (Figure 5), increased energy trade and security, facilitated free movement of people and freight, and laid the groundwork for the development of an economic corridor.

About 75% of these investments were in transport, 22% in energy and 3% in trade. About US\$15 billion have been financed by ADB, US\$16 billion by other development partners, and US\$9 billion by CAREC governments. CAREC 2030 provides the new long-term strategic framework for the program. It is anchored on a broader mission to connect people, policies, and projects for shared and sustainable development, serving as the premier economic and social cooperation platform for the region.

In November 2021 CAREC adopted a Health Strategy 2030, which addresses public health threats in member

countries through a regional approach, while safeguarding the needs of the most vulnerable segments of the population. The Strategy has five pillars: leadership, coordination, human resource capacity building; improved surveillance and laboratory infrastructure; emergency demands and access to supplies; border health and services for migrants, border communities and vulnerable groups; and cross-cutting issues: gender, digital health/innovation. It aims at addressing pandemic risks and controlling communicable diseases, including through the development of early warning and response systems and regional surveillance centers; and facilitate common approaches and cross-learning in prevention and treatment protocols for non-communicable diseases. A Regional Investment Framework for implementation of the CAREC Health Strategy is being developed in 2022.

FIGURE 5.
Central Asia Regional Economic Cooperation transport corridors



Source: CAREC 2017

ADB has been assisting CAREC to develop and implement the 2030 Strategy, which includes a Health Strategy. ADB supports the development of the Almaty-Bishkek economic corridor as part of the China Silk Road initiative. The Belt and Road Initiative (BRI) was announced by China's President Xi Jinping in 2013. Countries along the BRI are expected to improve infrastructure connectivity to form a network that will bring together Asia, Europe and Africa. Key transportation passageways are being improved to facilitate international transport for the countries through railways and highways, and on seaports and airports, energy-oil and gas pipelines, power supply grids and communications-optical networks. Four of the six CAREC corridors pass through Kazakhstan, reinforcing its critical role in regional transport. The most vital are the CAREC Corridor 1, an important cargo-transit route from China, through the Kyrgyz Republic and Kazakhstan, to the Russian Federation and Europe; and the CAREC Corridor 2, an east-west conduit linking Uzbekistan with China and the Russian Federation, the Caucasus and beyond (CAREC 2017).

In addition, ADB has provided support to regional countries. In Kazakhstan, the ADB has helped to ensure COVID-19 pandemic recovery, and to minimize the country's dependence on commodity exports, reduce inequalities, and address vulnerabilities

associated with climate change; it provided a US\$200 million to finance women's businesses, and the Entrepreneurship Development Fund ("Damu") financing mechanism to support adoption of green investments by micro, small and medium enterprises (MSMEs). In the Kyrgyz Republic, ADB focuses on supporting inclusive growth and economic diversification, improving access to public and social services. It provided US\$25 million for COVID-19 vaccines, and plans to assist school education reform, regional health security, and assistance with the development of the Issyk-Kul Lake environmental management and tourism development. In Tajikistan, ADB assists diversifying the economic base and improving the investment climate to create jobs with higher incomes. It has approved a US\$30 million grant to modernize the Yovon irrigation and drainage system in the lower Vakhsh river basin, and it plans to provide US\$345.54 million from 2022 to 2024, to fund food security and water-resource management, develop urban infrastructure and the energy sector. ADB has been assisting Turkmenistan to reposition itself as a regional trade and transit hub and to diversify its overseas markets. ADB plans to support SME exporters, the development of renewable energy and a gas pipeline and is supporting improved nursing quality and capacity. In Uzbekistan, ADB is assisting reforms to transition to a more inclusive and market-driven economy by developing the private sector and

reducing the state's footprint. It plans to invest in the gas transmission network's modernization and efficiency, urban development, infrastructure for rural productivity, wind power, and water resources management in the Aral Sea Basin.

The Eurasian Economic Union (EAEU) is an international organization for regional economic integration.

It has an international legal personality and is established by the Treaty on the Eurasian Economic Union. The EAEU provides for free movement of goods, services, capital, and labor, and pursues coordinated, harmonized and single policy in the sectors determined by the Treaty and Union international agreements. The Union was created to upgrade, raise the competitiveness of and increase cooperation between the national economies involved, and to promote stable development to raise the living standards of its member states: Armenia, Belarus, Kazakhstan, Kyrgyz Republic, the Russian Federation, and Moldova (as an observer). To allow for free trade between country members, common standards and regulations on food safety and animal health have been developed in compliance with international specifications (CAREC 2019). However, despite amendments to veterinary legislation, Central Asian countries lag behind and are not providing appropriate levels of protection from animal diseases and zoonoses. The same applies to food safety, where national legislation needs

to be updated by taking a risk-based approach to food safety based on the Hazard Analysis Critical Control Point (HACCP) principles adopted according to country-specific circumstances (ADB 2019)

The Central Asian and European Surveillance of AMR (CAESAR) is a network of national surveillance systems.

It includes European countries that are not part of EARS-Net, the European AMR Surveillance Network, which is coordinated by the EU ECDC—European Centre for Disease Prevention and Control. CAESAR is a joint initiative of WHO-Europe, ESCMID—the European Society of Clinical Microbiology and Infectious Diseases, and RIVM—the Dutch National Institute for Public Health and the Environment. CAESAR is part of the GLASS—the Global AMR Surveillance System. Participating countries are (October 2022) Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyz Republic, Kosovo, Montenegro, Moldova, Russian Federation, Serbia, Switzerland, Tajikistan, North Macedonia, Turkey, Turkmenistan, Ukraine and Uzbekistan.

In Central Asia, the US CDC has been working on global health security activities, including supporting implementation of a One Health approach and strengthening emergency preparedness. The CDC supports cross-sectoral collaboration, development of guidelines, and

training of key government staff on epidemiological surveillance, disease outbreak response, laboratory systems and workforce development (CDC 2022b). CDC's Field Epidemiology Training Programs (FETP) in Kazakhstan, the Kyrgyz Republic, Uzbekistan, and Tajikistan have trained 176 health professionals since 2003. FETP trains field epidemiologists who work to improve global health security by strengthening their country's capacity to prevent, detect and respond to disease threats before they become larger epidemics. FETP residents have conducted outbreak investigation and surveillance evaluations of zoonoses such as anthrax, CCHF, leptospirosis and tularemia.

In Kazakhstan, CDC has conducted five-week workshops on surveillance evaluation, Geographic Information Systems (GIS) and scientific communication for epidemiologists and veterinarians. It has helped enhance CCHF surveillance and control (CDC 2022b). With CDC support, Kazakhstani public health and veterinary officials conducted a serosurvey (of people, sheep and cows) and a knowledge, attitudes and practice (KAP) study on CCHF in the Zhambyl region (CDC 2022b); as well as a study on the distribution of tick-borne pathogens among hospitalized patients and ticks in the Pavlodar region. In Uzbekistan, CDC, the Defense Threat Reduction Agency (DTRA) and FAO have worked with the government on new approaches to

tracking diseases, improving testing and standardizing clinical practice guidelines. A One Health 5-year strategic plan was completed, and the national One Health Program used a CDC tool to prioritize zoonoses (CDC 2022b): anthrax, brucellosis, CCHF, echinococcosis, plague, rabies, zoonotic influenza, and tuberculosis. CDC assisted the establishment of the National Centre for AMR, which is responsible for diagnosing and identifying drug-resistant bacteria, conducting surveillance and antimicrobial susceptibility testing.

FAO, WOAHA, and WHO have focused on global and regional health-security issues such as AMR, rabies and zoonotic influenza, zoonotic tuberculosis, and Middle East Respiratory Syndrome—Coronavirus (MERS CoV).

These organizations have been providing tools and capacity building to strengthen cooperation between public health and animal health systems and synergize the capacity development of health services. The WHO Global Action Plan on AMR, which was developed in close collaboration with FAO and WOAHA and was endorsed by member countries of all three organizations, committed countries to implement action plans at national level. The Global framework for the elimination of dog-mediated human rabies aims to reduce the number of human deaths to zero by 2030. The WOAHA-FAO Network of Expertise on Animal Influenza (OFFLU), addressing zoonotic influenza, has improved

global surveillance and information sharing with WHO experts to adapt flu vaccines to the current animal strains in circulation. FAO, WOAAH and WHO are participating in the implementation of the Multi-Partner Trust Fund (MPTF) project to combat AMR in Tajikistan. The project aims to use multisectoral approaches to implement the National Action Plan (NAP) on AMR in the country.

International organizations are taking steps to strengthen the multi-lateral health architecture. In 2017, FAO, WOAAH and WHO established the One Health Tripartite with the objective of addressing priority areas requiring a multi-sectoral collaborative leadership through joint planning, monitoring, and reporting. This partnership was recently enlarged by partnering with UNEP and is now referred to as the *Quadripartite*, to include the environment sector and ensure optimal animal, environmental and public health levels. Tools have been developed to assist countries in enhancing One Health collaboration, coordination, and communication, including by strengthening early warning and surveillance and monitoring systems, implementing risk-based approaches to address emerging, re-emerging and neglected infectious diseases and pandemics, and addressing food-safety issues. The partners encourage and support collaboration through regional, national and local networks. Since 2021, the One Health

High Level Expert Panel (OHHLEP), a multidisciplinary group of 26 internationally recognized experts, collects, distributes, and publicizes reliable scientific information on the links between human, animal, and environmental health to assist public officials in making appropriate decisions to avoid future crises and to inform citizens (OHHLEP 2021).

The Regional One Health Coordination Mechanism for Europe consolidates cooperation between the FAO, the WOAAH, the WHO and the UNEP Regional Offices for Europe and Central Asia to address the wide range of activities related to this approach, within the human-animal-environment interface. This was established in April 2021, and when the Regional UNEP Office joined the mechanism in August 2022, the regional directors of the four organizations signed a new Joint Statement of Intent establishing the Regional Quadripartite Mechanism for Europe. A Regional Operational Plan of Action on One Health is under preparation for consideration by the WHO Regional Committee for Europe in 2024. WHO and FAO have approved Global Food Safety Strategies, and WHO EURO has recently established a Technical Advisory Group on One Health.

To promote the One Health approach with national partners, FAO and WOAAH have been supporting the development of the Central Asian Animal Health Network (CAAHN), which acts as an umbrella organization

to coordinate initiatives and projects by countries and international agencies related to animal health in the region.

Other FAO initiatives in the region are the Network on Priority Livestock Diseases in Central Asia (PLDCA) and the project on reducing the advance of AMR in food and agriculture in the region. Globally, FAO works with partners to promote global health, eliminate hunger, promote food safety and healthy diets, prevent and

control zoonoses and AMR, protect the livelihoods of farmers from the impacts of plant and animal diseases, and increase the sustainability of agricultural practices. To anticipate, prevent, detect and respond to plant, animal and food-borne disease outbreaks and AMR, FAO encourages the sharing of epidemiological data and laboratory information across sectors and borders, which can result in more effective coordinated planning and response.

BOX 12.

Key investment needs for regional cooperation

Convening and coordination

- Areas of potential regional cross-sector cooperation are livestock productivity and trade, the prevention and control of zoonoses, emerging diseases and pandemics, AMR and biodiversity losses.
- Exchange of information about a regional harmonization of national SPS requirements consistent with international standards, guidelines and recommendations as stated in the WTO agreement on the application of SPS measures.
- Regional coordination of food oversight programs on quality and safety to reduce costs.

Knowledge development and addressing gaps

- Technical, environmental, sanitary and regulatory constraints to livestock productivity and trade in Central Asian countries.

Policy development and harmonization

- Investment, leadership, and engagement on a coordinated approach to One Health in Central Asia.

(continues)

BOX 12.

Key investment needs for regional cooperation (continued)

- Coordination of management of animal health, environmental and public health risks, involving all national and local competent authorities, would increase regional well-being and add value to the regional economies.
- World-class plant- and animal-product safety standards to grow agricultural and meat exports.

Capacity building

- Capacity to rapidly share information during food safety emergency situations using the FAO/WHO International Food Safety Authorities Network (INFOSAN).
- IHR core capacities, including a regional epidemiological surveillance network.

Stockfish in the Issyk-Kul market,
Kyrgyz Republic.
Photo credit: Canva



4. One Health: lessons learned from implementation

In the past decade, the World Bank has worked globally at both national and regional levels to promote and operationalize One Health approaches supported by governments, technical institutions, and international partner organizations.

The One Health approach is used to design and implement programs, policies and legislation impacting sustainable agriculture, food safety and security, AMR, nutrition, animal and plant health, fisheries, and livelihoods. In the context of the global avian influenza crisis, FAO, WOAHA (OIE at the time) and WHO, in collaboration with UNICEF, UNSIC, and the World Bank, have also developed a joint strategic framework (FAO, et al. 2008) to address risks associated with emerging and re-emerging diseases and pandemics. The joint report set out six specific objectives for countries to consider in their approach to infectious disease control at the human-animal-environment interfaces, which can be applied to One Health issues such as zoonoses, AMR, and food safety and security. Table 8 summarizes the specific objectives for infectious disease prevention and control whose success depends on countries' ability to strengthen collaboration among existing institutions and its effectiveness

to allow each partner to make regulatory adjustments based on shared data.

To support countries reaching infectious disease prevention and control objectives, the World Bank has developed a considerable knowledge base on how to address One Health dimensions at both national and regional levels.

The World Bank *One Health: Operational Framework for Strengthening Public Health Systems at the Human-Animal-Environment Interface* offers guidance to apply a One Health approach to ensure sector- and country-specific action is targeted to address the specific One Health issues and is integrated appropriately into financed projects. It outlines activities and interventions to target disease threats and highlights mechanisms for institutional and technical implementation to build more collaborative veterinary and public health systems (Berthe, et al. 2018). Lessons learned from country-based operations, such as the Global Program for Avian Influenza and Human Pandemic Preparedness and Response (GPAI), and ongoing regional operations, such as the Regional Disease Surveillance System Enhancement Program (REDISSE), and Africa Center for Disease Control and Prevention (Africa CDC), have been considered.

TABLE 8.
Infectious disease prevention and control objectives

Component	Approach
Risk Assessment	Identify and take sensible and proportionate measures to control the risks.
Surveillance	Develop international, regional, and national capacity in surveillance using international standards, tools, and monitoring processes.
Prevent, detect, and respond	Ensure adequate international, regional, and national capacity in public and animal health including communication strategies.
Rapid response system	Ensure functioning national emergency response capacity as well as global rapid response capacity.
Collaboration	Promote interagency and cross-sector collaboration and partnerships.
Control	Control existing and reemerging infectious diseases.
Training and capacity building	Infectious disease prevention and control of health care staff and biosecurity measures of farmers and veterinarians.
Research	Conduct strategic research.

Source: World Bank

BOX 13.

The Regional Disease Surveillance System Engagement (REDISSE) in Nigeria

The REDISSE project aims at strengthening countries in the Economic Community of West African States (ECOWAS) sub-region following the 2014 West African Ebola crisis. It is designed as a multi-sectoral One Health project incorporating an interdependent series of projects to be implemented across the human and animal health sectors in four phases across West Africa.

Project structure. In Nigeria, the project is being implemented under regular government structures by the Federal Ministry of Health, represented by the Nigeria Centre for Disease Control (NCDC), and the Federal Ministry of Agriculture and Rural Development, represented by the Department of Veterinary Services. The NCDC hosts the project coordination unit (PCU), which is staffed by civil servants.

BOX 13.**The Regional Disease Surveillance System Engagement (REDISSE) in Nigeria (continued)**

Regional component. The project's regional component is anchored by the West African Health Organization (WAHO), which provides oversight and technical guidance through the coordination of the Regional Technical Committee and technical support to countries. WAHO provides technical support for regional laboratories, funding for regional training of residents on the advanced field epidemiology program, establishment of centers for epidemiological surveillance in some countries and capacity building for regional rapid response teams.

National level. The PCUs of the participating countries would be responsible for collecting and compiling all national level data with the assistance of external partners through external evaluations, including the US Centers for Disease Control (US CDC), and World Health Organization (WHO) for the human health sector, and OIE for the animal health sector.

Project Components, Sectors and Units. The REDISSE project provides access to flexible and easily deployable resources through five components.

- Surveillance and health information
- Capacity building of laboratories
- Emergency preparedness and response
- Human resources management for effective disease surveillance and epidemics preparedness
- Institutional capacity building, project management, coordination and advocacy

Project governance. Governance for the project is provided by the National Steering Committee (NSC) which is chaired by the Minister of Health with the Federal Minister of Agriculture and Rural Development (FMARD) as co-Chair. oversight is provided by the National Technical Committee (NTC) which is led by the Director General of the NCDC, and cochaired by the Chief Veterinary Officer of Nigeria (Director, Department of Veterinary and Pest Control Services, FMARD).

Source: REDISSE Project Nigeria, Annual Report 2020

The World Bank is now supporting around 45 projects incorporating a One Health approach at a value of US\$1.5 billion in commitments. This includes REDISSE in West & Central Africa, an interdependent Series of Projects (ISOP, US\$657 million) supporting surveillance in human and animal populations and epidemic preparedness.

Aligning priorities across different sectors and across borders can be challenging, adding to One Health project complexity, but it is crucial for investing in preparedness and risk reduction, as demonstrated by the REDISSE project (Box 13).

The main obstacles for countries to embrace One Health at national level include the lack of coordination between public entities, the absence of communication and coordination across the public and private spheres, the reorientation of investments from prevention to response, and a tendency to focus on one sector, which may divert attention from other One Health components.

One Health strategies have proven to be highly cost-effective for reducing pandemic impacts, AMR risks and zoonotic and endemic diseases, while enhancing food safety and providing benefits of economies of scale. Refocusing from curative and reactive approaches to investment in One Health systems and the prevention of zoonotic diseases, food safety, AMR, and future pandemics, can offer

significant economic returns. A World Bank cost-benefit analysis showed that investments by the international community of US\$1.9 to US\$3.4 billion per year (depending on whether disease prevalence is low or high) in One Health systems will result in an annual expected rate of return between 44–71% and prevent half or all mild pandemics (World Bank 2012b). The baseline annual expected loss in global national income from viral zoonotic disease outbreaks is \$212 billion (Berstein, et al. 2022) suggesting that primary prevention could cost a fraction of the cost of response. Additional added value can be expected from regional collaboration between animal, human and environmental sectors. For example, 50% of AMR costs are avoided by vigorous containment efforts across different sectors, and investment costs of US\$0.2 trillion would reap between US\$10 trillion and US\$27 trillion in expected cumulative global benefits by 2050 (Jonas, et al. 2017). In addition, the total productivity loss associated with foodborne disease in low- and middle-income countries is estimated to cost US\$ 95.2 billion per year, and the annual cost of treating foodborne illnesses is estimated at US\$ 15 billion (Jaffee, et al. 2019).

The infrastructure put in place in Central Asian countries to address Highly Pathogenic Avian Influenza offers an example of significant opportunities for economies of scale when focusing on other species or health issues; support services for

human and laboratory capacity can often be shared. Pooling resources in a targeted manner will lead to economies of scale and enable countries to address common problems across systems rationally, avoiding duplication. For example, investments in improving veterinary services in the response to HPAI were focused mostly on poultry, however, the resulting infrastructure offers significant opportunities to address additional species and AMR, as support services for human and laboratory capacity can often be shared. Harmonization can bring coherence to communication approaches and unify communication messages. Importantly it can also support faster and better coordination in crisis (World Bank 2019). Vietnam Avian and Human Influenza Control and Preparedness Project (VAHIP, under the Framework of the Global Program for Avian Influenza) clearly demonstrated the high rates of return on investment in enhancing government effectiveness in veterinary and public health services, by controlling avian influenza at the source in poultry, thereby reducing the risk of pandemic influenza. The preparedness under VAHIP would have saved Vietnam's economy US\$1 billion if a pandemic had started (World Bank 2015) and continues to strengthen existing systems, multi-sectoral collaboration and the country's preparedness for future pandemics.

Substantial evidence exists of the economic value of investing in the control of endemic zoonotic diseases at the source, the animal reservoir. Control of

zoonoses will not only attenuate human health costs but reduce livestock sector losses in the region. Classic examples from brucellosis and rabies demonstrate that zoonosis control can save money in resource-limited countries and is likely to reduce their occurrence worldwide. Multiple cost-effect analyses have shown that the control of canine-mediated rabies through vaccinating of dogs is a highly cost-effective One Health intervention by WHO definitions (Baltussen, et al. 2003) compared to human post-exposure prophylaxis alone (Borse, et al. 2018). The per-unit cost of post-exposure prophylaxis in humans is about 500 times higher than the vaccination of dogs. Livestock vaccination for brucellosis (Roth, et al. 2003) (Coelho and Pinto 2011) control of cystic echinococcosis through drug administration and improved management practices also offer positive cost-benefit ratios for society (Robertson, Torgerson and van der Giessen 2018). Brucellosis control in Central Asia—and in Mongolia, as part of the 10-year annual livestock mass vaccination campaign—has proven to be one of the most cost-effective interventions at US\$ 25 per DALY averted, which is comparable to the cost-effectiveness of vaccinating women and children, or treating tuberculosis (Zinsstag, et al. 2007).

Control of zoonotic food-borne infections at the animal source also presents a strong case for investment in One Health, because of the substantial co-benefits, such as for food safety. Prevention of salmonellosis,

campylobacteriosis, toxoplasmosis, cysticercosis and *Escherichia coli* within livestock underscore the case for public and private investment by illustrating a cost-effective means of reducing the risk of exposure and subsequent incidence of human cases, in addition to industry losses. For instance, a cost-benefit analysis of the food safety regulation of poultry production (in New Zealand) showed a remarkable cost-benefit ratio with good returns from the combined efforts of industry and the regulator equal to US\$32.7 million annually (Duncan 2014).

4.1. Strengthen national and regional capacity

At the national level, the success of One Health projects requires an understanding of the country context and actions to prevent and manage emerging infectious diseases, including zoonoses, as well as the institutional and human resource capacity to work across sectors. Several tools can be useful in informing the country diagnoses, including the IHR security framework, which has already been used in Central Asian countries. Where there is appetite for a multisectoral approach, bringing the results of the JEE and the PVS together in a National Bridging Workshop (NBW), as has already been done in Central Asian countries, can help prioritize

investments and planning for collaborative implementation at an early stage.

One country's experience in positively addressing a key One Health issue can serve as a good example for neighboring countries. Disease control and public health functions are handled largely through national institutions. Evidence from past public health emergencies shows the importance of supporting the client country's own systems for prevention, emergency preparedness, response, and recovery systems. However, while country projects are at the core, coordinated responses across countries and sectors would strengthen performance.

Investments in institutional capacity at the regional level must be complemented by resourcing the national level. REDISSE has highlighted the importance of developing a robust regional management implementation agency through recruitment and capacity building (Box 13). This needs to be supported by national staff to strengthen communication between regional countries and build institutional capacity. The capacity of this implementation agency is key for project success. An experienced agency can overcome emerging difficulties and speed up implementation. The institutional capacity of the implementation agency is equally important to ensure well-prepared sub-projects and effective project oversight.

Adoption of the One Health approach would have the advantage of

including: (i) pooling of expertise and financial resources to address the issues across the three health systems of animal-human-environmental health; (ii) synergies between different institutional perspectives and experiences; and (iii) a strong focus on constructive partnerships.

The experiences of the HPAI campaign underline the importance of a productive institutional partnership between the traditional public, animal, and wildlife health sectors, and between social and public financing sectors, including government departments, industry, the private sector, research institutions, and CSOs. At the regional level, potential partners would include organizations that promote collaboration among governments. Internationally, they would include both international organizations, such as the Quadripartite, and a wide network of actors. The institutional partnership should be focused on prevention, contingency planning, and action against emerging and reemerging infectious diseases and not be limited to addressing one or few infectious diseases or other health threats such as AMR (Berthe, et al. 2018).

4.2. Regional cooperation

Both REDISSE and Africa CDC show the value of working with a regional institution. Central Asian countries shared economic interest in improving productivity and the trade of animals

and animal products can benefit from sharing information and coordinating policies at the regional level. A regional mechanism can support complementary and joint actions among implementation agencies for greater efficacy and efficiency. Such a regional service could also save money, which is particularly important when regional activities are funded by grants or loans. Stakeholder and donor alignment needs to be a priority early in project preparation, especially for a novel reform, while ensuring that sufficient time is given to tailor design to the local context is another key to project success. Striking a balance between donor involvement and government ownership is also necessary. Alignment of donors funding a national program helps improve efficiency and focus on a country's own priorities. The World Bank has been bringing stakeholders to a shared understanding of development priorities, and harmonizing donors around the objectives, design, and implementation of a reform such as One Health. Some OH activities that benefit from regional cooperation are: (i) networking decision makers to respond to multi-jurisdictional outbreaks; (ii) connecting epidemiologists to share information and efficiently integrate new knowledge; (iii) creating common high-level infrastructures; and (iv) sharing of laboratory capacity.

Lessons learned from FAO, WHO, WOA, and UNEP suggest that implementing a standing coordination

mechanism to help ensure continuity of joint operations and encourage One Health implementation could be secured by either creating a forum or partnership between governments or through joint agreements and coordination mechanisms.

A forum or partnership between governments would be advised to focus on the implementation of a Strategic Framework from a political perspective and providing advice and guidance to the specialized international agencies. Another approach would be to strengthen formal collaboration between the specialized agencies,

themselves, and engagement with other stakeholders through joint agreements and coordination mechanisms, e.g., Global Early Warning System (GLEWS), the global network on animal influenza (OFFLU), and Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs)²⁷ to encourage collaboration with more stakeholders and strengthen a country focus (FAO, et al. 2008). Indeed, the OH Quadripartite is planning to initiate a stock-taking exercise of existing cross-sectoral global and regional initiatives around OH to identify and advise on synergies and overlaps, and to support coordination.

27 GF-TADs is a facilitating mechanism that will endeavor to empower regional alliances in the fight against transboundary animal diseases (TADs), to provide for capacity building and to assist in establishing programs for the specific control of certain TADs based on regional priorities.

5. Conclusion and recommendations for a Regional One Health program in Central Asia

5.1. Regional issues require a regional response

Central Asian countries face similar animal, ecosystem and human health challenges: the need to prepare for future pandemics; and to seize new opportunities and address threats associated with food insecurity and land and water resource degradation. The nature and the magnitude of these common challenges are high on governments' agendas and call for regional collaboration to develop prevention and control systems on a scale that single-country strategies are not able to achieve.

In addition to the COVID-19 pandemic, Central Asian countries confront regional and global issues such as zoonoses, food safety and AMR. Many zoonoses are endemic in the region, including anthrax, brucellosis, echinococcosis, HPAI, TB and rabies. Meanwhile, these countries continue to deal with food safety issues and face the suspected increased threat of AMR. Country strategies and policies on prevention and control of such issues are not harmonized at national

and regional level; data availability and data sharing are very limited, and so are human capacities and cross-sectoral collaboration.

The continuing development of regional transport infrastructure brings major opportunities for exports of livestock and animal products, but also brings increased risk of the transmission and spread of transboundary diseases and unsafe food. The prospects of these countries as suppliers of agri-products and livestock will depend on how their food producers and processors respond to the quality and safety demands of consumers, and on how well they coordinate on quality standards and expanding agricultural food trade to boost economic growth and raise standards of living.

Managing health risks from pandemics and climate change requires full cooperation and collaboration between the animal, environmental and public health sectors at national and regional level; investments in environmental and agricultural sectors can contribute to preventing diseases at source. The One Health approach enables swift detection and

rapid response to infectious disease outbreaks. Regional infectious disease surveillance networks can strengthen multi-sector coordination in participating countries by improving resource allocation, organize information flows and facilitate the implementation of IHR. This approach could be as useful in Central Asia as it has been in other regions. It has proved to be highly cost-effective in strengthening animal and public health management systems, contributing to improving global health, supporting sustainable economic growth, and furthering poverty alleviation.

5.2. Now is the right time

Three factors suggest a conducive environment for Central Asia to adopt a One Health approach. First, the COVID-19 pandemic and the war in Ukraine have produced an increased sense of urgency in Central Asia to mitigate intersectoral and cross-country food security risks and prepare for pandemics. Second, there is a high level of awareness in the region around the risks and opportunities from increased production and trade of animal products. Third, readiness to adopt One Health approaches is well advanced because Central Asian countries have experience of working with the World Bank and other international partner organizations on OH. Indeed, initial elements of OH are already in place, and the region can benefit from implementation

experience gained in other parts of the world, including those supported by the World Bank.

Central Asian governments and sector services have taken initial steps to implement a OH approach and have expressed interest in further developing this. Cross-country and national intersectoral collaboration is already underway, for example, to harmonize legislation on food safety, on controlling wildlife migration or related to the livestock trade. On 11 September 2022, ministers of health of Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan endorsed the Roadmap for Health and Well-being in Central Asia 2022–2025 fostering cooperative responses to crises, including the COVID-19 pandemic, the climate crisis and political instability. At the national level, public health and veterinary services have identified neglected zoonoses as top priorities, while the Central Asia Animal Health Network (CAAHN), a coordinating mechanism focused on zoonoses, has been established. Numerous activities strengthen the sectors that work together under One Health. International tools—such as JEE, PVS pathway, National Action Plans for Health Security (NAPHS) and National Bridging Workshops (NBW)—have been used. National governments, the World Bank, and international partner organizations such as ECDC and CDC, WHO, FAO, WOA, and UNEP have been supporting initial OH efforts. In October 2022,

a new One Health Joint Plan of Action was launched by the Quadripartite (WHO, OIE, WOAHA, and UNEP) with the objective to create a framework to integrate systems and capacity to improve the health of humans, animals, plants, and the environment, while contributing to sustainable development.

Regional collaboration forums exist and can serve as a starting point to develop effective mechanisms to address the identified regional food system and health challenges.

Platforms for regional collaboration do exist – the Central Asia Presidential meetings, the Commonwealth of Independent States (CIS), the Eurasian Economic Union (EAEU), and the Central Asia Regional Economic Cooperation (CAREC). Currently, none of these platforms have emphasized One Health as a strategic approach to confront the dual challenge of pandemic preparedness and building resilience to the threats associated with increased regional movement and trade.

5.3. A Regional One Health program in Central Asia

A regional response to the threats exposed by pandemics and trans-border diseases can be coordinated with national intersectoral efforts.

Following the signing of the regional communiqué “Protecting food systems and preventing pandemics

in Central Asia”, a Central Asia One Health Framework for Action is being prepared. An increased regional dialogue between networks of decision makers and networks of technical staff (e.g., epidemiologists, environmental specialists, and veterinarians) from the three operational sectors is supporting the development of the Framework for Action, which will guide investments, policy work and collaboration for One Health in Central Asia.

The Central Asia One Health Framework for Action will address shared priority areas, establish a mechanism for coordination, monitoring and evaluation as well as activities for implementation. Broad regional objectives as well as concrete intervention areas will be identified and a dashboard designed to facilitate progress monitoring by all countries will support progress in closing specific knowledge gaps as well as supporting increased regional cooperation to be able to track wildlife movements, zoonoses outbreaks and other transboundary diseases. The Framework will encourage data and information sharing between relevant stakeholders for a more active integration of new knowledge in decision making. Further, the Central Asia One Health Framework for Action will include the identification of leadership opportunities for intersectoral action at regional and national levels. High-level leadership for transcending sectors is essential for successful implementation of a One Health approach but it can be

difficult to achieve as high-level initiatives risk becoming orphaned without an effective home. Existing collaboration mechanisms in Central Asia will be further reviewed, regional and national champions identified in collaboration with relevant authorities, and options will be considered.

Country engagement in operationalization of One Health approaches should focus on core issues with a strong economic rationale for investment. Lessons learned from the operationalization of One Health approaches in other regions show that investments in dialogue and institutional capacity at the regional level need to be complemented by building resources at the national level. Knowledge, information, and action at the national and regional levels will condition how Central Asian countries will be able to come together to address environmental, public health and veterinary issues posing a risk to national, regional, and global health security. Policy development and harmonization, epidemiological surveillance, and building institutional capacity for adequate prevention and control of zoonoses, food hazards and AMR are further areas that would benefit from improved cooperation. Another key requirement for a One Health approach is capacity development at all levels and within all skill sets. There is a clear need for management expertise, but also for technical development and training among health and veterinary professionals and specialists. Funding

is needed for technical training, the establishment of modern laboratories, animal identification and traceability, effective information management systems and knowledge distribution throughout the region.

The findings of this report support the preparation of the Central Asia One Health Framework for Action by providing recommendations for activities within four broad areas of work, which can be further supported by public investments and through future lending operations. Based on the findings of this report it is recommended to focus activities on the following four broad areas of work:

- (i) **Convening and coordination.** A current challenge for One Health implementation in Central Asia is the limited and fragmented links nationally and regionally between the agriculture, environment and health sectors, and the private livestock and animal products sector. The limited collaboration between the relevant sectors increases the likelihood of regional epidemics of transboundary diseases, diminishes human and animal productivity and returns on public and private investments, duplicates efforts and promotes inefficient use of scarce resources. The purpose of this work area is

to support the development of a One Health platform in Central Asia and establish a process for the adoption of the Central Asia One Health Framework for Action. This will build on ongoing initiatives at the local and regional level, including those supported by the World Bank and international partners. It will also build on the experience of inter-sectoral collaboration that took place between 2006 and 2011, when the World Bank carried out an One Health assessment in the region.

- (ii) **Knowledge development** is essential and needs to cover a wide variety of topics that affect animal health, their identification and, therefore, their traceability, including records of wild animal movements, that can eventually be linked to zoonosis. In addition, shared knowledge of transboundary disease outbreaks, while contributing to traceability systems, can also identify shortcomings in surveillance systems that could compromise implementation of international guidelines on food safety. This is particularly important for economic analysis of issues such as the opportunities and risks of

livestock production, health implications of imports of live animals and animal products, and losses due to animal diseases. Major benefits include shared knowledge that can contribute to methods to ensure healthy pasture management. Institutional and social assessments can identify institutional engagement and social awareness, to allow for the design of communication, participation, and operational activities. An environmental assessment of the impact of climate changes on livestock productivity, biodiversity, wildlife, AMR, and endemic and emerging infectious diseases can equip authorities with the tools to cope with such threats.

- (iii) **Policy and regulatory development and harmonization** is needed to provide a medium-term strategy for OH development at the national level, with a clear division of roles and responsibilities, and technical and financial support for intersectoral cooperation and coordination between the relevant sectors. Such a strategy would include the development of epidemiological surveillance systems at all levels, with data

management and sharing to prevent and control zoonoses and other animal diseases. Coordination of public health and veterinary laboratories will ensure better coverage and more flexibility in case of emergency management. Policy changes will be needed to remove bottlenecks and obstacles to trade and productivity as well as to improve animal productivity, protect pasturelands and provide incentives for essential workers—especially in the veterinary sector—to work in rural areas.

- (iv) **Capacity development for implementing One Health critical processes for zoonotic disease prevention and control, AMR control, and food safety will be needed.** Skills in biodiversity management and wildlife monitoring, as well as epidemiological surveillance systems of animal and human health, are necessary. Interoperable databases to manage epidemiological information need to be created to analyze and share data on zoonoses, AMR, and food safety. National Reference Laboratories should be developed across the

region. There is an abiding need for standardization and monitoring of animal vaccination and veterinary drugs to prevent and control zoonoses and transboundary diseases, while attacking the threat of AMR. SPS standards in animals and plants should be brought up to international standards and meet consumers' expectations, while raising public awareness of zoonoses, the proper use of antibiotics, and the importance of food-safety standards. For professionals and other actors in the food chain there is a need for continuing professional development and training sensitive to the local and regional context, as well as for capacity building in the relevant areas of management. Cultural and behavioral challenges related to the operationalization and implementation of the One Health approach in Central Asia also needs to be better understood and addressed. Soft skills need to be developed together with a conducive environment that fosters multisectoral collaboration and coordination.

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