African Union



AFRICAN UNION DIGITAL ONE HEALTH INFORMATION POLICY AND ASSOCIATED ONE HEALTH INFORMATION ARCHITECTURE FRAMEWORK

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African Union Digital One Health Information Policy and Associated One Health Information Architecture Framework

Foreword



African countries bear a heavy burden of endemic diseases and a high incidence of emerging and re-emerging diseases with zoonotic potential. Early warning, early detection, and rapid response are essential components for management and control of these diseases. Given the interconnectedness between human health, animal health and ecosystem health, solutions for addressing the disease risks lie beyond sectoral and disciplinary boundaries and require a systematic and unified approach through multisectoral and multi-disciplinary cooperation among the human, animal, and ecosystem health actors, as well as the broader community at large. More and more, humans, animals, and the environment interact more closely due to several factors such as urbanisation, intensification of animal production, transportation, and climate change, resulting in pathogens´ spill over effects from animals to humans. Increased human population growth, estimated at 2.5 billion in Africa by 2050, will place immense pressure on production and ecosystems, triggering increased emerging disease incidences and ultimately increased antimicrobial resistance (AMR), another emerging concern that also requires a One Health (OH) Approach.

Currently in Africa, there is inadequate integration and harmonization of data and information from the three OH sectors resulting in inadequate data and information for decision making and for collaborative actions and planning, leading to poor collaboration, coordination and harmonization of OH interventions. There is therefore a need to promote OH data integration and harmonization and collaborative platforms across the Regional Economic Communities (RECs), African Union Member States, multiple disciplines and sectors.

The African Union Digital One Health Information Policy and Information Architecture Framework guides the RECs,African Union Member States for the establishment and operationalisation of digital OH systems for strengthened digitized OH governance and management, and improvement of prevention, detection, preparedness and response for the OH risks.

The African Union Digital One Health Information Policy and Associated Information Architecture Framework is aligned to global, continental and regional frameworks including the African Union Agenda 2063, the UN Sustainable Development Goals (SDGs), AU Digital Transformation Strategy, AU Data Policy Framework,Animal Health Strategy for Africa,Animal Welfare Strategy for Africa and Africa CDC Digital Transformation Strategy.

The African Union Digital One Health Information Policy and Associated Information Architecture Framework provides specific guidance and recommendations on the following:

- Digital One Health Information Architecture that is foundational to the designing of national, regional and continental digital OH platforms founded on data integration and exchange through decentralized, domain-driven architectures, data security, privacy, harmonization, scalability, and

interoperability amongst others. The architectures treat data as a product, with clearly defined ownership, users, and measurable value, enabling stakeholders to extract actionable insights.

- Capacity Building and Enhancements of Digital One Health in priority technical and infrastructural competencies and capacities for improved digital OH governance and management, including building capacities on Data science, Data governance, and Data analytics.
- Enabling Digital One Health coordination environment and sustainability mechanisms that will drive the establishment, operationalization, and adoption of coordination mechanisms and sustainability actions.

The enhanced digital OH governance and management in Africa can only be realized through enhanced collaboration and coordination among all key stakeholders in the continent. This will require commitment and engagement by actors at all levels and in particular member states as part of a more holistic effort to optimize the health of people, animals and ecosystems, as well as to enhance social and economic development in Africa through the OH approach.

I therefore call upon the RECs, member states and partners to consider the principles and recommendations provided for in this Policy Framework during the formulation of regional and national digital OH policies and strategies, and in the design and development of regional and national digital OH platforms for improved governance and management of digital OH in the continent.

Hon Moses Vilakati

Commissioner for Agriculture, Rural Development, Blue Economy and Sustainable Environment

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The Membership of the TWGs comprised experts drawn from several institutions and networks in the continent (the list of the experts is attached as annex 5).AU-IBAR takes this opportunity to thank them all for their commitments and efforts.

The African Union One Health Information Policy and Associated Information Architecture Framework provides guidance to Africa Union Member States on basic principles for structure, pan-African exchange, and use of OH information to inform the establishment of continental, regional and national Digital One Health Information platforms for improved OH governance and management.

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Table of Contents

Foreword ii

Acknowledgements vi

Abbreviations x

Background and Context 1

1. Introduction 12

2. The One Health Approach 14

2.1 Introduction to One Health 14

2.2 Stakeholder Engagement 18

3. Rationale 21

3.1 The Case for a Digital One Health Information Policy and One Health Information Architecture 21

3.2 Alignment to Continental and Global Strategies 22

4. Vision, Guiding Principles, Formulation of the Policy and Potential Use Cases for Digital One Health 27

4.1 The Vision 27

4.2 Guiding Principles 27

4.3 Formulation of the Policy Process 28

4.4 Potential Use Cases for Digital One Health 29

5. The African Union Digital One Health Information Policy and the Associated One Health Information Architecture Framework 31

5.1 AU Digital One Health Information Architecture 32

5.1.1 Key challenges the One Health Information Architecture aims to address 32

5.1.2 Aims of the Africa Union One Health Information Architecture 34

5.1.3 Principles of Digital Development 35

5.1.4 The African Union One Health Information Architecture 36

5.2 Capacity Building and Enhancement for Digital One Health 43

5.2.1 Basic understanding of Digital One Health 43

5.2.2 Data Governance 43

5.2.3 Data Science 43

5.2.4 Data Ecosystems Analysis 44

5.2.6 Process Optimization 44

5.2.7 Domain Specified Playbooks 45
5.3 Enabling Digital One Health Coordination Environment and Sustainability 45
5.3.1 African Digital One Health governance platform 46
5.3.2 Enabling Governance Tools 50

6 AU-Digital One Health Platform Prototype 51
6.1 Africa Union Digital One Health Platform Prototype 51
6.2 Use-case-based prototyping 53

7. Conclusion 57

Annexes 58
Annex 1: Priority themes, respective data indicators, sources, and actors 58
Annex 2: Description of Use Cases in line with One Health Priority Themes 65
Annex 3: Lessons from Data Mesh Pilots and Their Relevance to a Continental AU-Digital One Health Platform 69
Annex 4:Typical Use Case Example 72
Annex 5:The Technical Working Group 78
Annex 6: Glossary of terms 80

References 85

List of Figures

Figure 1: Definition of One Health (Visual) By the One Health High level Expert Panel (OHHLEP) highlighting intersectoral actions of collaboration, communication, coordination and capacity building. 14
Figure 2: Spillover effects from animals to humans.VEO Approach (19) 16
Figure 3:The AU One Health Information Policy derives and builds on key policies and strategies 23
Figure 4: Benefits of digitalization of healthcare. Africa CDC Digital Transformation Strategy 25
Figure 5:The Components of The African Union digital One Health information policy and the associated One Health Information Architecture Framework 32
Figure 6: Key challenges in the Digital One Health space in Africa 32
Figure 7: Principles of Digital Development 35
Figure 8 Domain-Oriented Design and Federated Governance and decentralised network 37
Figure 9: Foundational elements of the AU Digital One Health Information Architecture 39
Figure 10:The Golden Triangle (People, Process,Technology) 40
Figure 11: Categories of standards relevant for interoperability 41
Figure 12: Five key stages for exploring the data ecosystem 44
Figure 13:The African Union Digital One Health governance platform administrative structure and supporting strategies 46
Figure 14:AU Digital One Health Platform Prototype 51
Figure 15: Description of Use Case 55
Figure 16: Response to a suspected rabies case in the Animal and Human Health space 73
Figure 17: Kenya Animal Bio-surveillance System (KABSS) 75
Figure 18: ECOWAS Early Warning System 77

Abbreviations

ACDC	Africa Centres for Disease Control and Prevention
AFOHNet	Africa One Health Network
AFROHUN	Africa One Health University Network
AHSA	Animal Health Strategy for Africa
AMR	Anti-Microbial Resistance
AU	African Union
AU-IBAR	African Union Inter-African Bureau for Animal Resources
AU-OHDAA	Africa Union One Health Data Alliance for Africa
AU-IAPSC	African Union Inter-African Phytosanitary Council
AU-PATTEC	African Union Pan African Tsetse and Trypanosomiasis Eradication Campaign
CSO	Community Services Organisation
DHIS2	District Health Information System
DHS	Demographic Health Survey
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EID	Emerging Infectious Diseases
EMPERIS-i	Global Animal Disease Information System
EVD	Ebola Virus Disease
EWS	Early Warning Systems
FAO	Food and Agriculture Organization of the United Nations
GBAD	Global Burden of Animal Disease
GIZ	German International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit)
IA	Information Architecture
ICIPE	International Centre of Insect Physiology and Ecology
IGAD	Inter-Governmental Authority for Development
JEE	Joint External Evaluation
KABSS	Kenya Animal Bio Surveillance System
LOINC	Logical Observers, Identifiers, Names, and Codes
LTC	Livestock Technical Committee
MICS	Multiple Indicator Cluster Survey
MS	Member State
NGO	Non-Governmental Organization
OH	One Health
OH IA	One Health Information Architecture
OHHLEP	One Health High-Level Expert Panel
OpenHIE	The Open Health Information Exchange
OpenHIM	Open Health Information Mediator
PVS	Performance of Veterinary Services
RAHC	Regional Animal Health Centre
RAHN	Regional Animal Health Network
REC	Regional Economic Community

RISLNET	Regional Integrated Surveillance and Laboratory Network
SDG	Sustainable Development Goal
SNOMED-CT	Systematized Nomenclature of Medicine – Clinical Terms
SPAR	IHR States Parties Self-Assessment Annual Report
SORMAS	Surveillance Outbreak Response and Management System
TWG	Technical Working Group
UNEP	United Nations Environment Programme
VBD	Vector-Borne Disease(s)
VEO	Versatile Emerging infection disease Observatory
WAHIS	World Animal Health Information System
WHO	World Health Organization
WOAH	World Organisation for Animal Health

Background and Context

1. Introduction

Africa bears a heavy burden of emerging and re-emerging diseases, with 75% being of animal origin and many having epidemic and pandemic potential. For instance, over the two years from 2014 to 2016, a total of 28,616 cases of Ebola Virus Disease (EVD) and 11,310 deaths were reported in West Africa, specifically Guinea, Liberia and Sierra Leone, marking the largest Ebola outbreak ever recorded; and in the period 2005-2014 a total of 24 cases of Marburg fever, as well as 17 associated deaths, were reported across two countries in Africa. In addition, the high wildlife populations and consumption of uninspected bush meat in some African countries exposes human populations to numerous pathogens. Africa also experiences high incidences of endemic diseases with zoonotic potential including Rabies, Anthrax, and Rift Valley Fever, amongst others. Early detection, early warning, and rapid response are essential components for management and control of these diseases. These solutions lie beyond sectoral and disciplinary boundaries, and require a systematic approach to multisectoral and multi-disciplinary cooperation among the human, animal, and ecosystem health actors, as well as the broader community at large, within the One Health (OH) Approach.

Increased human population growth, estimated at 2.5 billion in Africa by 2050, will place immense pressure on production and ecosystems, triggering increased emerging disease incidences and ultimately increased antimicrobial resistance (AMR), another emerging concern that also requires a One Health Approach. AMR is a global health challenge that threatens to reverse the tremendous progress made by the world in controlling infectious diseases. Within the animal production sector in Africa, AMR has been detected in *Campylobacter* spp., *Salmonella* spp., *Escherichia coli*, and *Enterococcus* spp. The World Bank estimates that unless urgent action is taken, AMR will have far reaching impacts on public health, agricultural systems, and socio-economic development. First, the global increases in healthcare costs may reach more than US$1 trillion per year by 2050 worldwide. Second, by 2050, the decline in global livestock production could range from a low of 2.6% to a high of 7.5% per year impacting heavily on food security. Third, an additional 28.3 million people will fall into extreme poverty in 2050 in the high-impact AMR scenario, and the vast majority (26.2 million) would live in low-income countries.

The burden of vector-borne diseases (VBD) remains highest in the tropical and subtropical regions of the world, Africa inclusive. These are diseases caused by parasites, viruses, and bacteria, transmitted by vectors. Among other factors, climate change plays a critical role in propagating VBD by creating an optimal environment for their development and survival. The control, management, and prevention of VBD requires a good understanding of the ecological factors such as habitats and the interface with human, vector, and host species. Challenges faced in combating VBD include a lack of an integrated and coordinated effort by the key sectors i.e., human, animal, and ecosystem health sectors.

According to the World Health Organization (WHO), foodborne hazards are responsible for 137,000 deaths and 91 million acute illnesses in Africa every year. Africa already has the world´s highest per-capita rate of foodborne illnesses, and this continues to rise as a result of the increased

industrialization of food production, and the shift of meals away from staple grains to include meat, vegetables, and dairy products that are able to transmit such diseases. Reducing food borne illnesses is just as important as addressing the broader issue of hunger, as Africa remains the continent with the world´s highest rate of malnourishment, affecting one in every five people.

Ecosystem health plays three critical roles in animal-mediated diseases. First, it influences the accumulation and transmission of substances; second, it determines ecological and chemical processes; and third, it influences transmission of disease agents to animals and humans. Anthropogenic stressors such as land use change, biodiversity loss, climate change, and pollution all affect ecosystem health[1]. Loss of biodiversity, habitat fragmentation, and the loss of natural environments threaten the full range of life-supporting services provided by ecosystems at all levels of biodiversity, including species, genetic, and ecosystem diversity.

Neglected Tropical Diseases (NTDs) are infections that continue to inflict hardships and damage upon more than a billion individuals in almost 150 countries across the globe, adding to the challenges faced by already marginalized and disadvantaged people, families, and communities. NTDs pose challenges mainly in rural settings, and possess the ability to infect animals and persist in zoonotic reservoirs. A promising management approach for NTDs would involve local interventions requiring a One Health approach.

[1] *A health perspective on the role of the environment in One Health.*
Source: https://www.who.int/europe/publications/i/ item/WHO-EURO-2022-5290-45054-64214

2. The One Health Approach

2.1 Introduction to One Health

Definition of One Health

The complex relationships of human, animal, plant, and ecosystem health require a multisectoral and multidisciplinary approach, supported by active community involvement, more than ever before. The One Health (OH) approach offers an opportunity to comprehensively address human, animal, plant, and ecosystem health challenges in a holistic and integrated manner. The OH definition developed by the One Health High Level Expert Panel (OHHLEP) states[2]:

1. One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems.
2. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent.
3. 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.

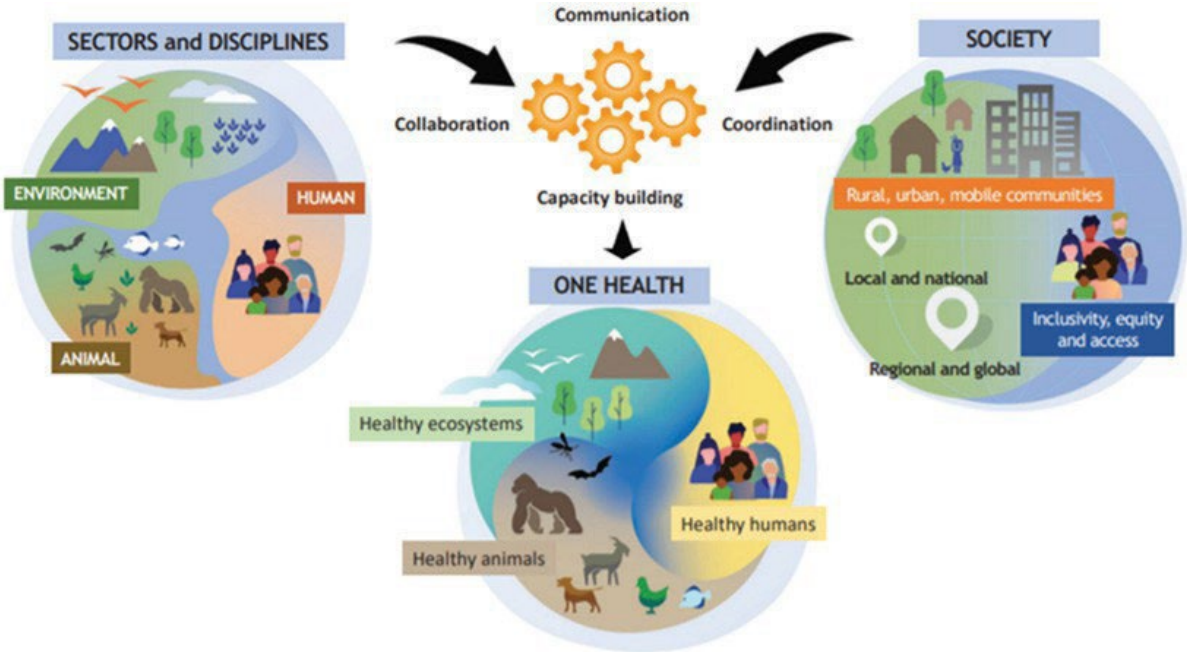


Figure 1: Definition of One Health (Visual) By the One Health High Level Expert Panel (OHHLEP) highlighting intersectoral actions of collaboration, communication, coordination and capacity building.

[2] *Tripartite and UNEP support OHHLEP's definition of "One Health".*
Source: https://www.who.int/news/item/01-12-2021- tripartite-and-unep-support-ohhlep-s-definition-of-one-health

OH can help to address the full spectrum of disease control, from prevention, detection, preparedness, response, and management, to improving and promoting health and sustainability. It promotes a paradigm shift from a sectoral view of health (human, animal, plant, and ecosystem health) to a more system-based approach that embraces innovative joint approaches and solutions. OH will enable better identification of health risks, and determination of the optimal preventive and responsive action through multisectoral integration of disease and contextual data such as socio-economic and climate data, and data from a variety of stakeholders, partners, and communities.

The current state of One Health in Africa

As OH has gained traction, it is evident that a considerable proportion of resources, research, and policy emphasis has been directed towards human health. This inclination is understandable, as human health is of paramount concern and holds significant political, economic, and societal implications. The successful containment of infectious diseases, advancements in healthcare, and improvements in living conditions have all been pivotal in prolonging human lives and enhancing overall well-being across the world in general, and Africa in particular. However, given its interconnectedness with animal, plant, and ecosystem health, human health cannot be sustainably attained in isolation, and there is a need to balance and optimize it alongside the health of these other sectors.

Unfortunately, Africa's animal health systems are generally weak, and most of the African veterinary services assessed through the WOAH PVS pathway have medium to low capacity in the core critical competencies. This is as a result of insufficient investments, and inadequate cross-border coordination. Weak veterinary capacities prevent veterinary services from contributing effectively to the resolution of OH challenges. This state of affairs is exacerbated by insufficient institutional development, inadequate human resources, and a lack of capacity building in various sectors pose challenges to implementing OH initiatives. In many sub-Saharan African countries, there is a disparity where public health capacities are more developed compared to animal health and environmental health capacities. These discrepancies have hindered the coordination and harmonization of interventions across sectors. Non-harmonized and decentralised multisectoral platforms cause a duplication of roles and efforts and discourage the participation of government ministries. These challenges have broad implications, ranging from the health of individual animals, the well-being of humans and ecosystem health. This poses considerable threats to public health and results in massive losses in animal production, inability to meet set market standards for animals and animal products, and adverse ecosystems impacts.

Disruptions to ecosystems, such as deforestation, encroachment on wildlife habitats, climate change, and habitat loss, can lead to changes in animal behaviour, migration patterns, and population dynamics. Such alterations can, in turn, influence the prevalence and interspecies transmission of infectious diseases, potentially affecting human, animal, and ecosystem health. Often, the interaction between the health of humans, animals, plants, and ecosystems are not stressed in sectoral approaches and interventions.

The Desired State of One Health in Africa

OH should address a broad set of priority thematic areas identified in Africa, including transboundary animal diseases and zoonosis, wildlife and aquatic diseases, vector-borne diseases, antimicrobial resistance, foodborne diseases, feed safety, and ecosystem health.

Close coordination between human and animal health experts and ecosystem health specialists is crucial for preventing, detecting, and controlling zoonotic diseases at their source. Early identification of potential outbreaks in animal populations can prevent spillover events and human infections (Fig. 2), mitigating the public health, animal health, and socio-economic impacts.

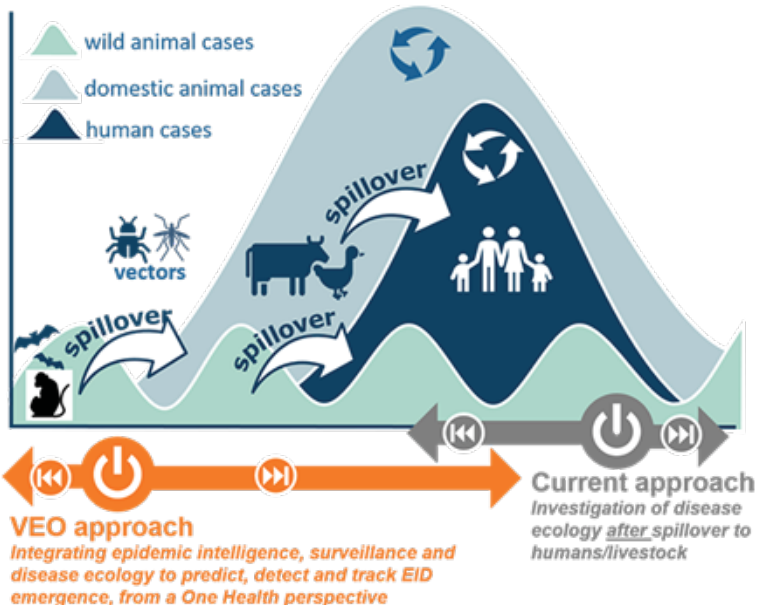


Figure 2: Spillover effects from animals to humans.VEO Approach

OH approaches are also necessary for coordinating efforts to monitor and control foodborne illnesses, identify and address potential hazards along the food production chain, and ensure proper animal health and hygiene practices in livestock and poultry farming to minimize the risk of foodborne pathogens entering the human food chain.

Information systems pertinent to ecosystem health such as national forestry, water, agriculture, biodiversity, and climate change (among others) need to be integrated with data from the other OH sectors to effectively understand health risks and to identify the best preventive and responsive actions.

The digitalization of OH is particularly important, especially in Africa, for the following non- exhaustive list of reasons:

- **Disease problems are complex,** move quickly, and require wide-spread coordinated action. Digitalization allows the rapid and efficient collection of data for the analysis of complex problems

(which would be impossible with non-digital systems) and allows data to be efficiently collated from a broad geographic area covering multiple countries.

- **OH involves multiple sectors generating a large scale of data, namely "big data",** covering associated issues. To address these problems, datasets have to be analysed, and actions taken across those sectors, requiring integrated analysis and reporting. Digital data systems make data integration and advanced analytics feasible and therefore facilitate the breaking of sector silos. This enables better identification of health risks while also supporting the development of powerful predictive models that are able to determine the best preventive and responsive actions.

The level of technological capacity in Africa, particularly in the OH sectors, is lagging compared to other regions globally; the challenges are enormous and the current capacity is insufficient to meet them. If effective digital systems for OH are to be developed, then it is important that these be coordinated as early as possible, while individual countries are still developing their own national and local digital health infrastructure. These early efforts will support the standardization of data thus enhancing analytics, reporting, and decision making. Failing to act promptly will make the effort to integrate multiple incompatible systems extremely challenging, limiting the provision of assistance to countries in need.

Multisectoral data integration avails comprehensive data to effectively identify health risks and enables evidence-based decision-making and informed policy formulation. Integration of data also forms a framework for informed and coordinated approaches to health challenges, maximizing the impact of health interventions. By leveraging the power of advanced data analytics and machine learning, the digitalization of OH can provide valuable insights, early warning systems, and evidence-based recommendations to promote better animal, human, and ecosystem health. Data integration allows for the aggregation of information from various sources: sectoral health data, socio-economic data, and wildlife monitoring systems, among others.

OH data can cover sources like ProMED-mail, satellite image, geostatistics applications, information on the habitat and migration of birds, animals, and marine species, agricultural data, climate change data, climate risk management information, temperature and rainfall records, data on floods and cyclones, land use information, forecast cover data, recycling data, air quality data, and waste management information.

By integrating and analysing this data collectively, it becomes possible to identify disease risk factors, trends, and patterns. Prediction models can then be used to forecast potential disease outbreaks, enabling proactive measures to prevent or control the spread of infections. Early detection and intervention can significantly reduce the impact of diseases on animal populations, safeguarding animal health, food security, and socio-economic wellbeing. By taking a proactive and evidence-based approach, we can safeguard animal health, enhance food security, and promote the well-being of both human populations and the planet.

In the African context, the OH approach should span all levels, from community to continental, with well-established feedback loops to ensure that all key actors across these levels receive timely quality information to facilitate decision support in the OH space. Additionally, interlinkages and standards with the global level need to be considered.

At the national level, ministries supporting the aforementioned key health sectors (human, animal, and environment) need to foster greater coordination and collaboration, while also engaging key stakeholders from the public sector, private sector, civil society (non-governmental organizations-NGOs, community service organizations-CSOs, etc.), academic and research institutions across all levels, i.e., sub-district, district, zonal, and national levels.

At the regional level, the Regional Economic Communities (RECs) need to adopt the OH approach, and promote collaboration and information exchange among human, animal, and ecosystem health organizations, as well as initiatives in the region, to address OH-related issues.

At the continental level, there is a need for close collaboration, coordination, and information exchange between key organizations addressing human, animal, and environmental health at that level. This effort will require leadership from the African Union's Inter-African Bureau for Animal Resources (AU IBAR), working closely with the Africa Centres for Disease Control and Prevention (Africa CDC), to link in and engage all key stakeholders active in the OH space.

At the global level, consistent monitoring is necessary for key OH information gathered and disseminated by international organizations like the World Health Organization (WHO), Food and Agriculture Organization (FAO), World Organisation for Animal Health (WOAH), and the United Nations Environment Programme (UNEP). This will require the regular monitoring of global databases, including WHO health databases, the Global Animal Disease Information System (EMPERIS-i) maintained by FAO, and World Animal Health Information System (WAHIS) maintained by the WOAH, among others.

Functional feedback loops, with the help of customized analytics dashboards, will be a key requirement to ensure that relevant information for prevention, prediction, detection, and response mechanisms is generated for decision support and made accessible across all levels, i.e., continental, regional, national, and sub-national levels in a timely manner.

To realize this, the approach will leverage digital solutions, working towards digital OH for Africa.

2.2 Stakeholder Engagement

Strategic partnerships and Stakeholder Engagement

OH is applied at global, continental, regional, national and community levels. This requires strategic partnerships among institutions and extensive stakeholder engagement supported by effective collaboration, coordination, communication and shared governance.

The strategic partners at global, continental, regional, and national levels include:

Global Partners

- World Health Organization (WHO)
- World Organisation for Animal Health (WOAH)
- Food and Agriculture Organization of the United Nations (FAO)
- United Nations Environment Programme (UNEP).
- World Bank (WB)

Continental Partners

- **Africa CDC** — Collaboration on cross-cutting aspects relating to systems interoperability, data standards and sharing protocols. Ensuring alignment on zoonotic diseases data.
- **African Development Bank (AfDB)** – Coordination around livestock development programmes and potential funding to mainstream digital OH in projects.
- **Food and Agriculture Organization of the United Nations (FAO) and World Organization for Animal Health (WOAH)** – Technical collaboration on animal health data standards, analytics methodologies, and capacity building. Ensuring alignment with global animal health data standards and guidelines.
- **Africa Forum for Research and Education in Health (AFREHealth), Africa Health Federation** – Engagement of their community of practice on digital health to incorporate innovations into the One Health Information Architecture (OH-IA) and other pertinent AU institutions.
- **Science Granting Councils** –- Partnership on resilient funding models for health data systems strengthening and mobilizing African researchers to help evaluate digital OH implementation.

Regional Partners

- **WHO Regional Office for Africa** — Coordination to connect and align national animal and human health data systems within the OH-IA framework.
- **Africa Academy for Environmental Health** — Collaboration to integrate relevant environmental data into the OH-IA to support vector control and mitigate climate-sensitive diseases.
- **Development banks** — Partnership to fund modernization of veterinary service data systems through projects and co- donor inputs into the OH-IA.
- **Regional Economic Communities**

Member State Partners

- **Ministries of Agriculture/Veterinary Departments, Ministries of Health and Ministries of Environment -** Close collaboration to align the OH-IA with national priorities and strategies. Integration with existing human health, animal health, veterinary systems, and environment.

- **Statistic Agencies and Academia -** Engagement to enable animal health data usage for research and official statistics. Academia provides capacity building support.
- **Local Technology Community -** Leveraging their innovations and systems integration capabilities to support OH-IA implementation and extensions.

3. Rationale

3.1 The Case for a Digital One Health Information Policy and One Health Information Architecture

Presently, data that can support One Health (OH) actions and decisions has largely remained underutilized, under-analysed, and under disseminated in sector silos (human, animal and ecosystem health), thereby compromising evidence-based decision making towards OH objectives. The lack of harmonization and integration of data and data systems across the OH sectors has further resulted in loss of information, lack of information, and ultimately failure to comprehensively understand and address the complex health challenges at the human, animal, and ecosystem interface, leading to poor OH governance and management.

Further, inadequate integration of data from the three OH sectors has made it more difficult to leverage cutting-edge tools, such as data science-based algorithms and machine learning, to support the predictive analysis and identification of patterns or trends necessary for informing adequate prevention and response interventions. In the context of OH, predictive analysis holds significant potential to improve human, animal, and ecosystem health outcomes.

Interdisciplinary complexity, regulatory and ethical concerns, resource constraints, and fragmented reporting have resulted in the inability to collaboratively understand and address common health challenges by ministries responsible for health, agriculture, environment and labour, among others. Intergovernmental organizations responsible for the development of animal health, public health, and ecosystem health are not systematically and comprehensively engaged on the basis of integrated OH data. Currently in Africa, there is inadequate integration and harmonization of data and information from both national and regional laboratory, surveillance, and epidemiological networks, resulting in inadequate data for collaborative actions and planning, and poor coordination and harmonization of OH interventions. Therefore, there is a need to promote data integration and harmonization, capacity development, and collaborative platforms across multiple disciplines, sectors, African Union member states, and regions through harmonized continental, regional, and national OH data systems.

There have been some efforts to integrate national animal health surveillance and laboratory data, spearheaded by various Regional Animal Health Networks (RAHNs) such as the Economic Community of West African States (ECOWAS), Regional Animal Health Network (ECOWAS-RAHN), Eastern Africa-RAHN, Southern Africa Development Community (SADC), and Livestock Technical Committee (LTC). However, there has been little effort to integrate this data with public health and environmental data. Within the public health arena there have been efforts by the Africa Centres for Disease Control and Prevention (Africa CDC) to integrate surveillance and laboratory data through the Regional Integrated Surveillance and Laboratory Network (RISLNET), albeit with particular focus on human health. In this regard, Africa CDC has elaborated Health Information and Exchange Guidelines to guide sharing of data across the continent[3].

[3] *African Union Health Information Exchange Guidelines and Standards. Africa CDC. Source: https://africacdc. org/download/african-union-health-information-exchange-guidelines-and-standards*

The lack of integrated and real-time digital OH data and information systems, both at the national and continental levels, has led to significant delays and inadequate responses. These systems are crucial for improving real-time capturing, reporting, and monitoring of key OH health indicators. As a result, disease outbreaks are not managed collaboratively or swiftly, and the household, economic, and other contextual needs of affected communities are left unaddressed.

Weak technical and institutional capacities have continued to plague the animal, public, and ecosystem health sectors with evidence of a fragile and strained workforce. In Africa, the technical competencies of the OH workforce are in high demand and the qualified personnel cover large numbers of cases, often overburdening their capacities. Therefore, to ensure that the OH approach is operationalized, there is a need to build technical expertise as well as increase the workforce numbers in all sectors. For OH data systems to be efficient, technical competencies on data collection, analytics, informatics, and risk communication must be built. Training of personnel should be considered a key priority, precisely optimizing the digital skillset of personnel.

The digitalization, integration, and harmonization of OH data systems are therefore key for holistic and collaborative management of OH issues.

To address the identified gaps, it is pertinent to formulate a Digital One Health Information Policy and One Health Information Architecture (OH-IA) Framework that guides African Union Member States and Regional Economic Communities (RECs) on multi-sectoral integration, digitalization and harmonization of data from the three OH sectors and other sources (including climate change and socio-economic data), data standards, analytics, informatics, sharing, and risk communication. This will facilitate improved preventive and responsive actions to address the OH challenges and hence improve digital OH management and governance.

3.2 Alignment to Continental and Global Strategies

The African Union One Health Information Policy and OH-IA framework derives, builds and contributes to key goals, agenda, strategies, and policies at global and continental levels (Figure 3).

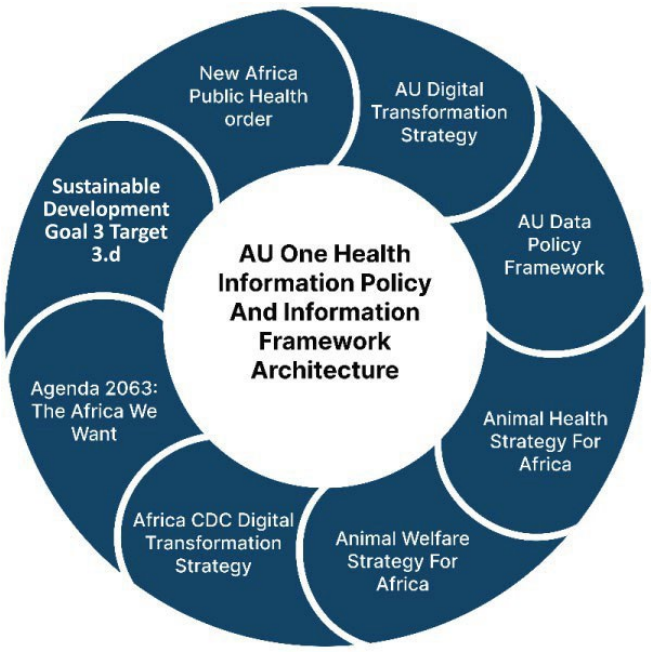


Figure 3: The AU One Health Information Policy derives and builds on key policies and strategies

The data governance principles and recommendations stipulated in the AU Data Policy framework apply to the Africa Union digital OH Information Policy and OH-IA framework, including but not limited to:

- The overarching principles of trust, accessibility, security, quality, integrity, representativity, and non-discrimination;
- The need to promote interoperability, data sharing, and responsiveness to data demand through the setting of open standards in data creation that conform to the general principles of anonymity, privacy, and security, as well as any sector-specific data considerations needed to render non-personal data, and certain categories of personal data, accessible;
- The need to govern the integrated national data system according to the principles of access, availability, openness (where anonymity can be preserved), interoperability, safety, security, quality, and integrity;
- The need to promote and facilitate data flows within and among AU member states by developing a Cross Border Data Flow Mechanism that considers the different levels of digital readiness, data maturity, as well as legal and regulatory environments of countries; and
- The need to facilitate data circulation across sectors and across borders by developing a Common Data Categorization and Sharing Framework that considers the broader types of data and associated levels of privacy and security.

The African Union digital OH Information Policy and OH-IA Framework builds on The Digital Transformation Strategy for Africa (2020-2030) of "harnessing digital technologies and innovation to transform African societies"[4].

[4] *The Digital Transformation Strategy for Africa (2020-2030). African Union.*
Source: https://au.int/en/documents/20200518/ digital-transformation-strategy-africa-2020-2030

It contributes to the stimulation and acceleration of digital transformation for national, regional, and continental development and informs effective cooperation among institutions engaged in OH and building of vibrant approaches to the digitalization of OH data. It reiterates the digital transformation´s focus on "integration and interoperability of digital health solutions, including the importance of standards and a focus on scale, and increased awareness of the need for harmonized approaches". It acknowledges the limited human resource capacity and digital skills, and the need to upskill the workforce in the journey towards digital OH. The policy also informs the development of OH-IA to inform the structure, exchange, information sharing, harmonization and interoperability of systems.

The Africa Union digital OH Information Policy and OH-IA Framework contributes to the UN Sustainable Development Goal 3 (SDG 3), i.e., ensuring healthy lives and promoting wellbeing for all at all ages. It contributes to Target 3.d – strengthening the capacity of all countries in Africa for early warning, risk reduction and management of sub-national, national, regional, and continental risk; and to SDG 2 – end all forms of malnutrition, double agricultural productivity, maintain the genetic diversity of seeds[5].

The OH-IA Framework contributes to the Quadripartite One Health Joint Plan of Action (2022-2026) and more specifically to action track 2.3 which aims to strengthen national, regional, and global OH surveillance, early warning, and response systems[6].

The Framework also contributes to the New Public Health Order for Africa adopted by the African Union in 2021, providing a new framework for prevention, detection, and response to public health emergencies in Africa, thus enhancing the continent´s efficiency in preparedness and response to disease threats.

The Digital OH Information Policy contributes to the African Union Agenda 2063: The Africa We Want[7]; in particular to key goals of Aspiration One – A Prosperous Africa Based on Inclusive Growth and Sustainable Development; a high standard of living, quality of life, sound health and well-being for all citizens; healthy and well-nourished citizens; and develop human and social capital through education and skills revolution.

The Digital OH Information Policy contributes to the vision for the Africa Health Strategy 2016-2030[8] which aspires for an integrated, inclusive, and prosperous Africa, free from its heavy burden of disease, disability, and premature death.

[5] *Targets of Sustainable Development Goal 3. WHO. Source: https://www.who.int/europe/about-us/our-work/sustainable- development-goals/targets-of-sustainable-development-goal-3*

[6] *One Health Joint Plan of Action, 2022–2026. FAO; UNEP; WHO; (WOAH). Source: http://www.fao.org/documents/card/en/c/cc2289en*

[7] *Agenda 2063 | African Union. Source: https://au.int/agenda2063*

[8] *Africa Health Strategy 2016 – 2030. Young African Policy Research Hub (YAPORH). Source: https://youngafricanpolicyresearch.org/africa-health-strategy-2016-2030*

The Digital OH Information Policy aligns with the Africa CDC Digital Health Transformation Strategy, which aims to "support public health initiatives of Member States and strengthen the capacity of their public health institutions to detect, prevent, control, and respond quickly and effectively to disease threats"[9]. The

Digital OH Policy Framework contributes to six of the eight benefits that digitalisation brings to health care, resulting in strengthened health systems as outlined in the Africa CDC Digital Transformation Strategy, i.e., capability, accountability, scalability, efficiency, capacity, and quality (see Figure 4).



Figure 4: Benefits of digitalization of healthcare. Africa CDC Digital Transformation Strategy

The Digital OH Information Policy Framework contributes to the Animal Health Strategy for Africa, 2019-2035[10], which provides a common vision and goals for the African continent regarding the improvement of animal health delivery systems (Animal Health Strategy for Africa (AHSA) 2019 – 2035) through the following strategic objectives (SO):

- SO 1: Strengthen animal health policy and institutional frameworks.
- SO 2: Reduce disease risks and impacts on animals, humans, and environment.
- SO 3: Strengthen animal health interventions to address current and emerging issues of public health concern at the human-animal-environment interfaces.
- SO 4: Improve capacities, access to inputs, markets, and trade in animal resources.
- SO 5: Strengthen science, innovation, research, and knowledge management.
- SO 6: Enhance partnerships, investment, and resourcing of the animal health sector.

[9] *Digital Transformation Strategy. Africa CDC. Source: https://africacdc.org/download/digital-transformation-strategy*

[10] *Animal Health Strategy for Africa (AHSA) 2019-2035.* https://www.au-ibar.org/resources/animal-health-strategy-africa-ahsa-2019-2035-framework-delivering-sustainable-animal

The AHSA promotes the OH approach through:

- Supporting advocacy and awareness creation among stakeholders and policy makers and the public on the OH approach to promote risk management actions.
- Promoting the establishment, strengthening, and institutionalization of the OH

approach to foster sustainable collaboration and coordination at all levels.

- Promoting joint research initiatives on disease dynamics at the animal-human-environment interface.
- Promoting the integration, periodic review, and strengthening of OH modules into the curriculum of both Veterinary Education establishments and continuous professional development programmes.

The OH Digital Information Policy Framework contributes to the Animal Welfare Strategy for Africa, which aims to transform the animal resources sector through adoption of good animal welfare practices that impact human wellbeing, sustainable livelihoods, poverty reduction, and economic growth.

4. Vision, Guiding Principles, Formulation of the Policy and Potential Use Cases for Digital One Health

4.1 The Vision

The African Union Digital One Health (OH) Information Policy and One Health Information Architecture (OH-IA) Framework envisions an Africa where data and information at the animal, human, and ecosystem health interface are integrated through decentralized, domain-oriented systems. This vision prioritizes a scalable and interoperable architecture that enables each domain to independently manage its data as a product, fostering trust, accountability, and innovation. By adopting a Data Mesh approach, the framework aims to empower domains with self-service analytical tools, facilitate actionable insights through real-time feedback loops, and drive the implementation of evidence-based OH actions across all levels – from community to continental scale.

4.2 Guiding Principles

This Information Policy and Information Architecture framework is based on the following guiding principles:

- **Multisectoral Collaboration:** This policy document underlines the importance of need-based collaboration across human; animal, ecosystem health; and other relevant sectors.
- **Data Standards and Interoperability:** Robust data standards and interoperability systems to facilitate the smooth exchange and integration of data across different applications, systems, and sectors.
- **Data Security and Privacy:** Robust data-sensitive policies and practices that enhance data privacy, confidentiality and security of OH data.

  Domain Data Ownership: Empower each domain—human, animal, and ecosystem health—with ownership and accountability for their data, promoting independent management and high-quality data stewardship.
  - **Data as a Product:** Treat data as a product, with clearly defined ownership, users, and measurable value, enabling stakeholders to extract actionable insights.
  - **Decentralized Interoperability:** Facilitate data integration and exchange through decentralized, domain-driven architectures while maintaining global standards for interoperability.
  - **Data Scalability:** Establish systems to efficiently manage and process OH data at varying scales.
  - **Self-Service Data Analytics:** Provide tools that enable stakeholders to independently analyse and utilize data without reliance on central teams, fostering greater innovation at the domain level. Additionally, this will establish analytical frameworks to guide robust data analysis, visualization, quality assurance, and interpretation that can inform better insights, identify emerging trends, and support monitoring and evaluation.
  - **Data Sharing** and Exchange: Foster data sharing, dissemination, and exchange while ensuring

data privacy, confidentiality, security, and standardization.

- **Capacity Building and Enhancement:** Invest in technical and infrastructural capacity building and drive innovation in OH research, data management, and governance.
- **Equity and Inclusion:** Foster digital OH data systems that are inclusive, gender-sensitive and community-focused.
- **Sustainability and Resilience:** Establish and strengthen coordination mechanisms at the national, regional, and continental levels to promote sustainability and response to key needs of OH stakeholders. Furthermore, ensure functionality of the system, i.e., resilience and backup.
- **Evidence-based Policy and Practice:** Drive availability of high-quality digital OH data and information for evidence-based policy formulation, decision making, targeted investment, improved preventive and responsive actions for OH challenges and establish best practices and lessons learned.
- **Research and Innovation:** Promote generation and dissemination of new knowledge and technologies for digital OH.

4.3 Formulation of the Policy Process

An assessment of the need for digitalization of OH information was undertaken in September-October 2021 through virtual engagement of various stakeholders in animal, environmental, and human health sectors; an appraisal on organizational digitalization activities and services was also undertaken. Additionally, discussions were held on how to improve digitalized OH governance and management across the continent. Key topics included the formulation, and subsequent endorsement, of an interlinked OH Information Policy and OH-IA. It was agreed that these initiatives are important foundational tools for informing both the structure and Pan-African exchange and utilization of OH information. Furthermore, discussions explored potential collaborations and use cases of a Pan-African OH data platform.

Following the appraisal, a digital health consultancy firm was engaged to guide the development of the OH Information Policy and the interlinked OH-IA. The draft OH Information Policy, Information Architecture, and maintenance model were then reviewed by members of the OH Technical Working Group, which consists of four subgroups: the African Union OH Information Architecture Technical Working Group; the African Union OH Information Policy Technical Working Group; the African Union OH Data Analytics Technical Working Group; and the African Union OH Digital and Information Systems Technical Working Group. Other experts also participated in the review and validation meeting.

The draft Information Policy and Information Architecture were further enriched by the findings of a study on the assessment and mapping of stakeholder and data systems within the OH ecosystem in Africa. The assessment and mapping of the digital OH landscape covered several key areas at the

continental level, including regulatory frameworks, information exchange systems, standards and infrastructure, as well as identifying priorities and gaps.

4.4 Potential Use Cases for Digital One Health

The African Union Digital One Health Information Policy and OH-IA Framework will promote the following potential use cases for digital OH.

Disease Detection, Prevention, and Response: Leverage on integrated laboratory, surveillance, and vaccination data and other relevant data to enable rapid and informed preventive and responsive actions. This requires monitoring of endemic diseases, early detection of emerging diseases, disease spill over detection (human, animal and environment), evaluation of disease control, and effective implementation of eradication programmes among others.

Predictive Analytics: Leveraging data integration to identify trends and make predictions related to OH concerns such as zoonotic diseases with pandemic potential, environmental degradation, and climate change impacts. These general use cases can be made more concrete, with data sets selected depending on the OH issue being addressed.

Evidence-Based Policy Making: Utilizing integrated OH data for the development and formulation of evidence-based policies, regulations, and strategies related to OH.

Socio-economic Insights: Integration and analysis of socio-economic and trade data to guide targeted interventions, policies, and initiatives in the OH sphere, considering factors such as wildlife populations, animal trade movement, consumption patterns, and occupational settings.

Gender and age disaggregated data: Generating data disaggregated by gender and age to inform gender- and age-sensitive measures to be taken within the context of OH.

Community Awareness: Utilizing integrated data to generate and disseminate best practices and lessons learned and drive community awareness initiatives as well as improve the delivery of OH interventions at the community level.

One Health Platforms and Networks: Improving the coordination of national and regional OH platforms and networks through data integration and harmonization, enhancing knowledge sharing, and enabling collaboration for shared OH challenges.

Competencies and Capacity Building: Using data insights to identify gaps and needs in building digital OH technical competencies, including data analytics/science, data management, data informatics, and risk communication.

Regulatory Compliance: Facilitating compliance with data sharing policies, ICT regulations, and data privacy policies using standardized and harmonized OH data, to create a conducive environment for sharing high quality OH data with all key stakeholders across all levels for decision support.

Continental One Health Data Advisory Group: Strengthen and/or establish a forum for data scientists to advance knowledge outputs generated from OH data analytic communities or consortiums.

5. The African Union Digital One Health Information Policy and the Associated One Health Information Architecture Framework

The African Union Digital One Health Information Policy provides a framework for African Union Member States to improve digital One Health (OH) governance and management. It guides the establishment of operational digital OH systems that enable key actors to address priority OH challenges such as:

- Transboundary animal diseases and zoonoses including wildlife and aquatic diseases; priority diseases include brucellosis, rabies, anthrax, avian influenza, zoonotic tuberculosis, among others.
- Zoonotic Vector-borne Diseases (VBD) including Rift Valley Fever (RVF).
- Antimicrobial Resistance (AMR).
- Food and Feed Safety with a focus on aflatoxins, residues and food-borne diseases.
- Ecosystem Health with a focus on sanitation, pollution, land use, biodiversity, natural disasters, invasive species, climate change, and ecosystem resilience.
- Capacity enhancement on digital OH.

The Policy Framework comprises the following three key components:

- **Digital One Health Information Architecture** (OH-IA) that is foundational to the designing of national, regional, and continental digital OH platforms founded on data integration and exchange through decentralized, domain-driven architectures, data security, privacy, harmonization, scalability, and interoperability, among others. The architecture treat data as a product, with clearly defined ownership, users, and measurable value, enabling stakeholders to extract actionable insights.

- **Capacity Building and Enhancements of Digital One Health** features priority technical and infrastructural competencies and capacities for improved digital OH governance and management, including building capacities on data science, data governance, and data analytics.

- **Enabling Digital One Health** coordination environment and sustainability mechanisms that will drive the establishment, operationalization, and adoption of coordination mechanisms and sustainability actions, including the Digital One Health Secretariat, the One Health Governance Platform, and the One Health Technical Working Groups.

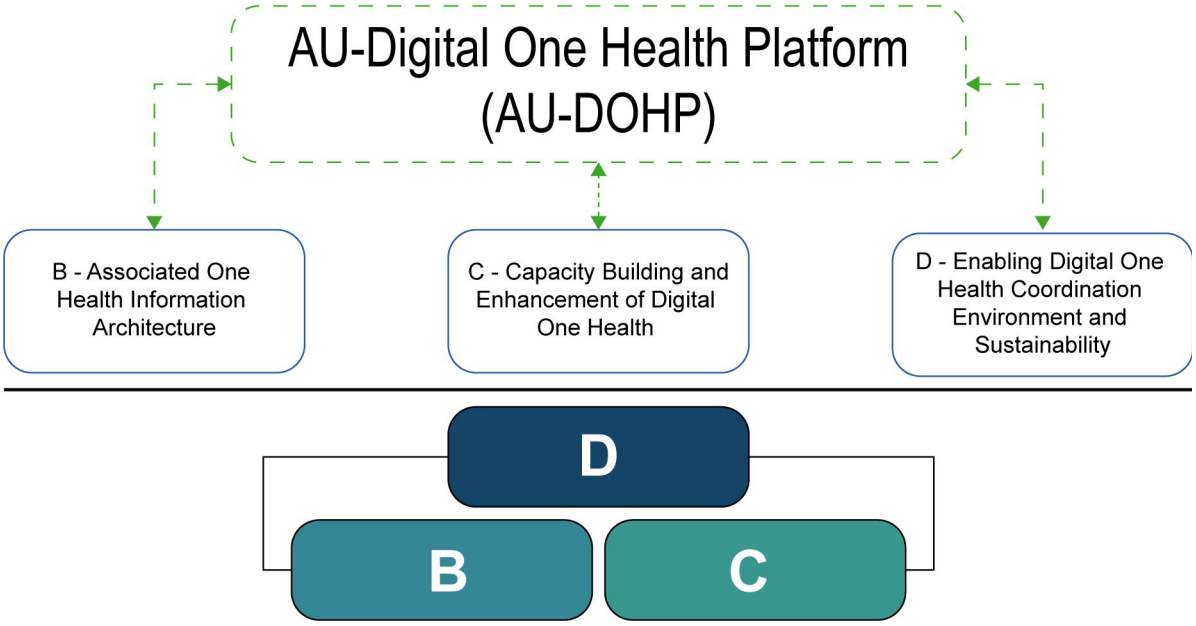


Figure 5: The components of the African Union Digital One Health Information Policy and the associated One Health Information Architecture Framework

5.1 AU Digital One Health Information Architecture

5.1.1 Key challenges the One Health Information Architecture aims to address

Generally, digitalization comes with many challenges that are manifested both within and across sectors. These challenges are exacerbated in the digitalization of the multi-sector, in this case, OH. The OHIA addresses key challenges that include siloes and fragmentation, evidence gaps, inefficient planning, slow detection and response to OH events, and digital skills gaps (Figure 6).

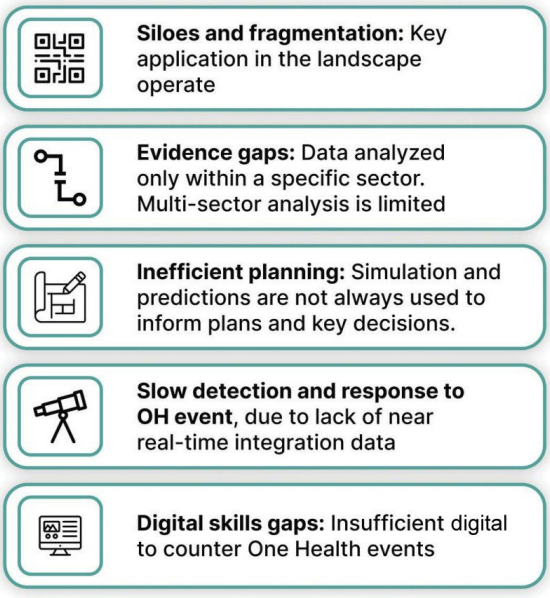


Figure 6: Key challenges in the Digital One Health space in Africa

Siloes and fragmentation

Currently, key actors in the OH domain operate their databases in isolation.

Federated architectures and interoperability will enable actors across all levels from sub-national to continental to share and access data through a centralized platform while preserving security and privacy. Federated data systems permit authorized users to access data through a network of federated organizations, all while refraining from transferring the pertinent datasets out of any of these individual organizations. This allows actors to share data responsibly and purposefully.

The policy proposes an integrated OH platform at the sub-national, national, regional, and continental levels. Human, animal, ecosystem health, and other related databases will seamlessly exchange key information for decision support to advance the OH agenda in Africa.

Evidence gaps

Currently, data is mainly analysed by and within specific sectors (public health, animal health and ecosystem health) in isolation. To better understand risks at the OH interface for appropriate actions, multi-sectoral integrated data from human, animal and ecosystem health and data from other sources is required. Sector-specific data analysis cannot provide the required insights for comprehensive OH actions due to evidence gaps.

The OHIA will pull in data from disparate sources and consolidate it on central OH platforms, accessible to actors at all levels across the continent. This will support OH surveillance, which includes the integrated monitoring of both known and unknown pathogens, as well as the surveillance of disease drivers and the prevention and mitigation of spill-over effects.

Inefficient planning

Currently, simulations and predictive analytics of OH data are limited as data is not centralized, and there is limited integration and triangulation to support such analytics.

Integration of data from the multi-sector enables modelling, simulation, and predictive analytics that informs planning and coordination, and acts as an Early One Health Warning System for the continent.

Slow detection and response to One Health events

Key platforms in the landscape are not integrated and surveillance is mostly executed based on aggregate data instead of anonymised, disaggregated, and integrated data. Aggregate reports for notifiable diseases are usually compiled on a weekly basis in the human health sector and monthly in the animal health sector. This results in delays in the detection of, and response to, OH events. In case of outbreaks, immediate notifications are shared with key actors as per international standards. Effective OH data analysis requires disaggregated data on individual disease events (not summary counts). It is important that the OH system can handle this type of data, but if national human, animal, and environmental health systems are not able to report disaggregated data

(because it is never collected) then it will not serve its purpose. The policy should aim to transform surveillance information management within the three sectors, to ensure that the data being digitally captured refers to individual disease events (where, what, when) rather than summary counts (how many, what period).

The OHIA is designed to support data integration beyond aggregate reports. The architecture will integrate data at the continental level and render these accessible through user-friendly dashboards in near real-time, enhancing prevention, detection, prediction, and response.

Digital skills gaps

Currently, not all stakeholders engaged in the OH domain have sufficient digital skills to counter OH events. Digital skills gaps are especially predominant among women and other marginalised and underserved populations. Key stakeholders need to leverage digital OH solutions to predict, prevent, detect, and respond to OH events across all levels from the continental to the sub-national level. This policy recommends digital upskilling in the areas of OH governance, data analytics, data science, ecosystem analysis, and process optimization.

5.1.2 . Aims of the African Union One Health Information Architecture (OH-IA)

The OHIA framework provides a domain-oriented structure for pan-African exchange and utilization of OH information. It establishes a cohesive yet decentralized approach for collecting, managing, analysing, and exchanging OH data across Africa. By treating data as a product and adopting interoperable standards, the OHIA ensures that each sector—human health, animal health, and ecosystem health—maintains ownership and accountability of its data, while still contributing to an integrated continental data ecosystem.

A harmonized OH platform, underpinned by Data Mesh principles, enables the collation, integration, and analysis of multisectoral data on a single framework—while respecting the autonomy of different domains. This empowers evidence-based decision-making, predictive modelling, and data- driven governance at sub-national, national, regional, and continental levels. In practice, the architecture spans data acquisition, storage, integration, analytics, and exchange, ensuring that customized insights flow rapidly to all relevant stakeholders.

Although multi-tiered, the OHIA fosters interoperability and collaborative governance by providing common metadata standards and APIs. At the same time, it offers flexibility to align with each Member State's specific needs and resources. By balancing coordination with local adaptation, the framework catalyses a convergence of evidence, insights, and actions across the OH domains while preserving domain-level sovereignty and accountability.

Finally, the OH-IA is tailored to the unique contexts of Africa's diverse OH landscape. It leverages advances in digital infrastructure and existing data systems, acknowledging limited resources and varying capabilities. Through a phased, collaborative rollout, the architecture seeks to incrementally build

capacity for managing and using OH data across Africa, thereby strengthening digital readiness and

ensuring a sustainable, scalable OH ecosystem.

5.1.3 Principles of Digital Development

The principles for digital development, endorsed by global health development partners, informs and guides the design and implementation of the OHIA. The nine principles (Figure 7) support practitioners to successfully apply digital technologies to development programmes[11].



Figure 7: Principles of Digital Development

The nine digital development principles outline key fundamentals that the AU Digital OH Information Policy and associated OH-IA Framework takes into consideration:

- **Design with the User:** Successful digital development initiatives are rooted in an understanding of user characteristics, needs, and challenges. This starts with getting to know the people you are designing solutions for, through conversation, observation, and co-creation. Several consultative workshops and one-to-one meetings are informing the design of the OHIA.
- **Understand the Existing Ecosystem:** Well-designed initiatives and digital tools consider the structures and needs that exist in each country, region, and community.
- **Design for Scale:** Achieving scale requires adoption beyond an initiative's pilot population. The solution we are proposing should be designed to scale to the multisector level and across the continent.
- **Build for Sustainability:** To maximize long-term impact, the design, development, and rollout of the OHIA will be embedded in, and informed by, sustainable human and financial resources.

[11] *Principles for Digital Development. Source: https://digitalprinciples.org*

- **Be Data Driven:** When an initiative is data-driven, quality information is available to the right people when they need it, and they are using that data to drive action. The OHIA will emphasize a feedback loop, ensuring that data flows back to key actors across all levels, i.e., sub-national, national, regional, and continental levels.

- **Use Open Standards, Open Data, Open Source, and Open Innovation:** An open approach to the OHIA, equally designed to preserve privacy and confidentiality concerns, will help increase multisectoral collaboration and development in the continent and avoid duplicating work that has already been done.
- **Reuse and Improve**: Instead of starting from scratch, the OHIA will look for ways to adapt and enhance global public goods already used in the continent and beyond. The OH-IA will leverage existing resources and apply best-practice approaches in the implementation of the OHIA.
- **Address Privacy and Security:** The OHIA will take careful consideration of which data are collected and how data are acquired, used, stored, and shared. We are cognizant of the need to use anonymised and de-identified, individual, and integrated data for practical surveillance. The system will be designed to enable this while preserving security and confidentiality. Identifiable data will be kept at the source.
- **Be Collaborative:** Being collaborative means sharing information, insights, strategies, and resources across the board. A participatory development approach will be applied in the design and implementation of the OHIA.

5.1.4 The African Union One Health Information Architecture

The African Union OH-IA (Figure 8) adopts a decentralized, domain- oriented approach to ensure adaptability across AU member states while respecting their sovereignty and operational independence. By leveraging Data Mesh principles, this architecture transforms OH data management into a scalable, federated model that empowers each member state and sector to manage their data as sovereign domains, while promoting interoperability at the regional and continental levels.

Some key characteristics of this decentralised architecture are outlined below:

- "Generic" and not "prescriptive". It can be easily customized to fit information flow at any level of the OH domain, and can be adapted to the local context.
- Proposes a decentralized network of national, regional, and continental OH data nodes, where each node operates autonomously but adheres to a shared metadata framework. The metadata layer ensures that every data exchange is fully traceable, detailing the origin, transformations, and usage of each dataset across domains.
- Allows for needs-based exchange of OH information for decision support across all levels.
- Domain-oriented design: Each sector—human, animal, and ecosystem health—along with each member state, operates as an autonomous domain, owning and managing its data products.
- These domains are equipped with APIs and metadata-driven artefacts to enable secure and efficient data exchange.
- Federated governance: A federated governance model oversees interoperability, setting standards for APIs, data exchange, and compliance, while allowing domains to maintain local control over their data systems.



Figure 8 Domain-oriented design and federated governance and Decentralised Network

- **Data as a Product:** Data from each domain is treated as a product, with clear ownership, defined consumers, and high-quality standards. This ensures data is actionable and accessible for evidence-based decision-making at all levels.
- **Scalable Interoperability:** The architecture supports a dynamic network of interoperable nodes, facilitating real-time data exchange across sub-national, national, regional, and continental levels without centralising data ownership.
- **Respect for Sovereignty:** The architecture recognises the unique contexts and legal frameworks of AU member states, ensuring that data management aligns with national priorities and regulations.
- **Feedback Loops:** Continuous feedback mechanisms ensure that actionable insights generated at the continental level flow back to local actors, enabling real-time decision support and adaptation.
- **Customisation for Local Contexts:** While adhering to overarching standards, domains retain flexibility to customise their systems to meet local needs and constraints.

As highlighted in Figure 9, the AU Digital OH-IA rests on three interrelated pillars that together ensure local ownership of data, while maintaining robust interoperability across the continent.

I. The first pillar emphasizes federated data governance, with centrally defined standards for data integration, access, and security. In practice, this means each domain—be it human health, animal health, or ecosystem health—adheres to agreed-upon protocols, such as shared APIs or metadata frameworks, even as they tailor workflows to their specific realities. The outcome is a balanced approach: local systems remain autonomous, yet any data that needs to be exchanged

or aggregated follows consistent rules, guaranteeing trust and transparency. More importantly, raw data remains stored locally and owned by the Member States. By collecting and preserving data on national servers or within domain-managed infrastructure, data sovereignty is reinforced: countries retain full legal control over their assets. This, in turn, builds trust and encourages active participation in the broader architecture. Data is only shared when necessary, and always under mutually agreed-upon protocols that respect national legislation and local cultural contexts.

II. The second pillar extends this concept by providing federated data governance with common OH-specific standards (for instance, HL7, FHIR, or ICAR) that can be reused by multiple use cases. This reduces duplication of effort, since each new project or dataset does not have to "reinvent the wheel," and ensures alignment across vastly different domains. As a result, analytics, dashboards, and predictive models can draw on a single library of shared schemas, coding systems, and quality checks—substantially improving data comparability and usability.

III. The third pillar features a domain-agnostic, self-service layer of tools and technology infrastructure, hosted and governed at the African Union level. This common infrastructure covers secure data storage, cataloguing, high-performance computing, and advanced analytics— reducing the technical burden on individual member states. Domains connect to these powerful shared resources on an as-needed basis, accelerating innovation while avoiding the pitfalls of costly, one-off implementation.

Collectively, these three elements create a truly federated, scalable, and sovereign architecture: national and sectoral actors keep ownership of their data, yet they can still harness continent-wide insights and capabilities for more effective OH governance.

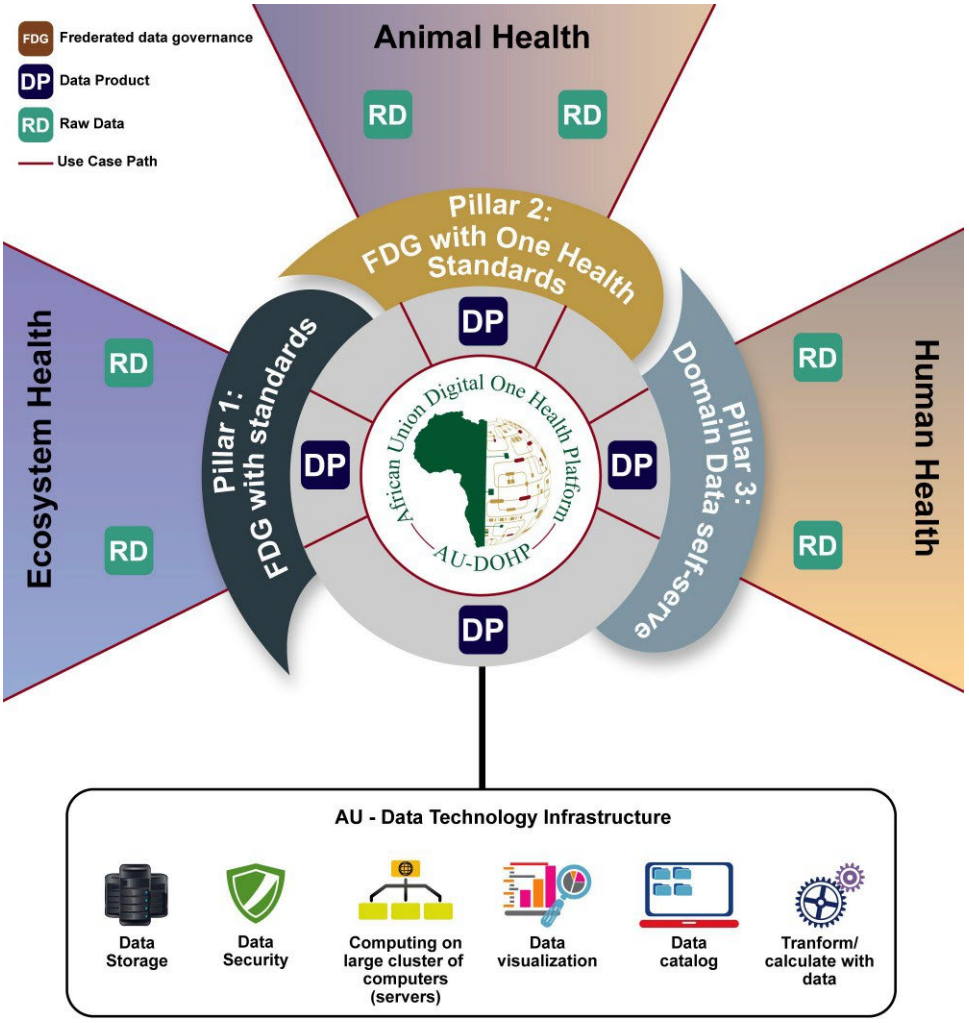


Figure 9: Foundational elements of the AU Digital One Health Information Architecture

Key Building Blocks for AU-*One Health Information Architecture* (OH-IA)

The six key building blocks for AU-OHIA consist of the following:

1. **Data Governance**

Data governance refers to mechanisms put in place to ensure that data is secure, private, accurate, available, and usable. It takes a holistic approach looking at the "Golden Triangle", or People, Processes, Technology (PPT) triangle depicted in Figure 10, addressing the actions that people must take, the processes they must follow, and the technology they must use to improve on general performance across the data life cycle, i.e., collection, consolidation, analysis, and dissemination. This data governance adopts a decentralised and federated approach. This ensures that each domain (e.g., human health, animal health, ecosystem health) and each AU member state has full sovereignty over its data while adhering to agreed-upon continental standards for interoperability, privacy, and security.

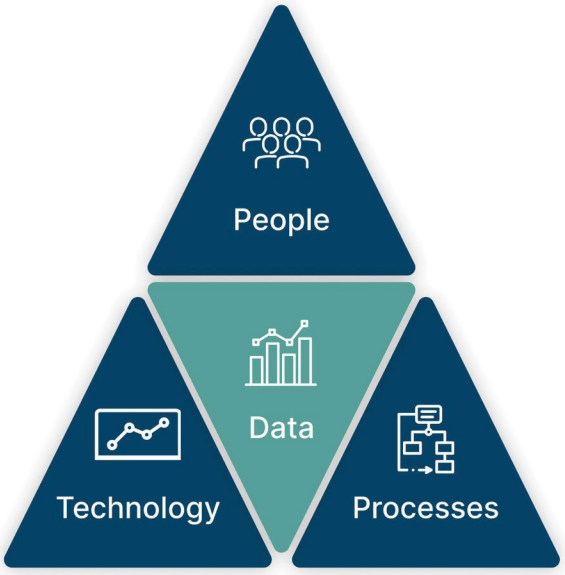


Figure 10: The Golden Triangle (People, Processes, Technology)

The successful implementation of the OHIA will require that people, technology, and processes are aligned and work in harmony across the continent. It will require that internal standards are set to streamline the collection, storage, processing, and disposal (dissemination) of data in the Digital One Health landscape across the continent; it will also regulate compliance with appropriate international data standards.

2. **Standards and Interoperability**

Interoperability refers to "the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged".

Successful information exchange (interoperability) requires data standards that can be grouped into five categories presented in Figure 11, namely: semantics, syntax, transport, security, and services.

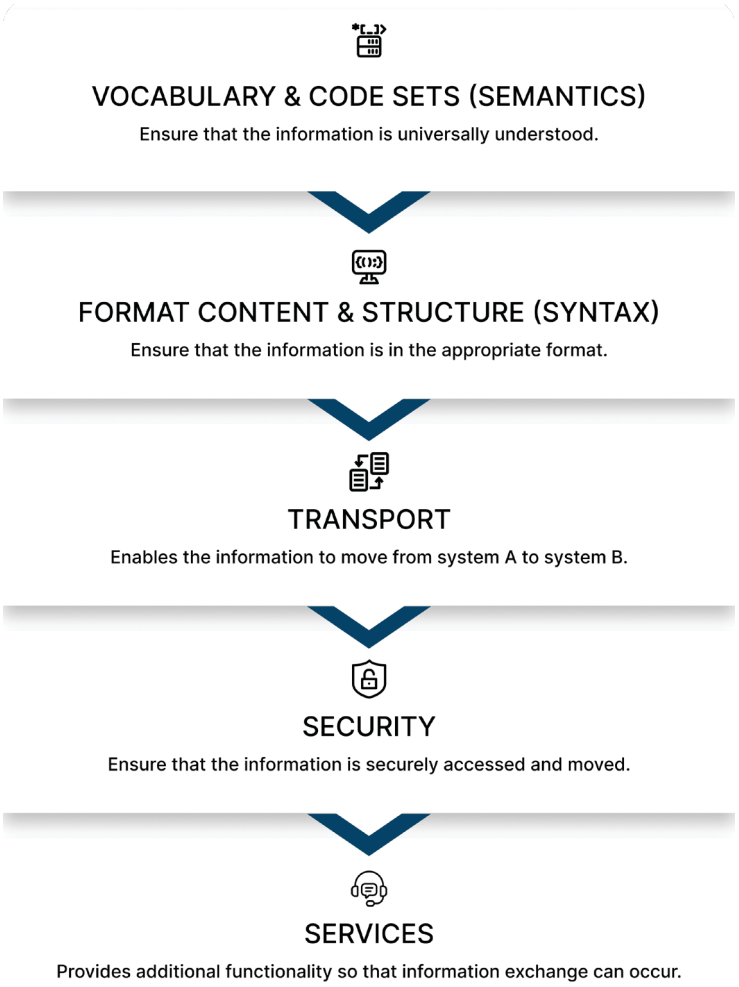


Figure 11: Categories of standards relevant for interoperability

The following are examples of standards and disease codes for consideration:

- The Fast Health Interoperable Resource (FHIR) is a global industry standard for passing healthcare data between systems. FHIR defines how healthcare information can be exchanged between different computer systems regardless of how it is stored in those systems.
- Logical Observers, Identifiers, Names, and Codes (LOINC) is the mostly widely used terminology standard for health measurements, observations, and documents.
- Systematized Nomenclature of Medicine – Clinical Terms (SNOMED – CT) is a standardized, international, multilingual core set of clinical healthcare terminology that can be used in electronic health records.
- International Classification of Diseases (ICD-11) is designed to promote international comparability in the collection, processing, classification, and presentation of mortality statistics.
- Terrestrial and Aquatic Animal Health Codes provide standards for improvement of animal health and welfare, and veterinary public health worldwide[12]. These standard-setting documents largely deal with standards for surveillance and diagnosis to support disease control and international trade.

[12] *WOAH Codes and Manuals. WOAH - World Organisation for Animal Health. Source: https://www.woah.org/en/what-we-do/standards/codes-and-manuals*

- The Open Health Information Exchange (OpenHIE) is an initiative providing a reference architecture, and workflow specifications for sharing health information between point of care systems. Open Health Information Mediator (OpenHIM) is a related middleware component designed to ease interoperability between disparate information systems, providing for secure communications and data governance, as well as support for routing, orchestrating, and translating requests as they flow between systems.
- Any environment health standard-setting documents that may apply.

Note: The standards, mediator platform, and codifications listed here are not exhaustive and some may apply to only specific sectors, e.g., to public health only.

The framework should incorporate a clear set of interoperability standards. A comprehensive interoperability blueprint should include technical specifications, protocols, and common data models to facilitate data exchanges. The blueprint will be supplemented with a compatibility matrix that aligns various data standards with corresponding data types across the OH spectrum. A certification process for systems and platforms that ensure compliance with the standards in place will be introduced.

3. **Data Security and Privacy**

Data security is the practice of protecting digital information from unauthorized access, corruption, or theft throughout its entire life cycle. This requires federated identity management and access control mechanisms to authenticate users and control data access. Data privacy refers to the right of a citizen to control how their personal information is shared.

The OHIA will be designed to maximize information integration and exchange while preserving data security and data privacy. Only anonymised de-identified individual records will be transmitted for analytics. This will support privacy by design, with the governance framework integrating privacy principles at every stage of the data lifecycle, ensuring compliance with international and local privacy regulations, while maintaining trust in the system.

4. **Data Scalability**

Scalability is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands.

The OHIA will be designed to scale; be robust enough to support multi-sectoral data across the continent, and versatile enough to support growth in data volume over time and increasing concurrent access.

5. **Feedback and Loop Analytics**

Feedback loops will ensure that all levels transmitting data for reporting are able to access and analyse data for decision support with the help of robust dashboards.

The OHIA will enable the flow of data from the global and continental levels back to the regional,

national and sub-national levels for near real-time use in evidence-based decision support.

6. **Federated Standards**

A federated governance body (AU-IBAR) sets overarching guidelines for API development, metadata standards, and security protocols. These guidelines ensure seamless data exchange across domains while respecting local autonomy.

5.2 Capacity Building and Enhancement for Digital One Health

Digital OH capabilities are necessary for the realisation of integrated, ethical, impactful and sustainable Digital OH systems. The essential competency profiles and associated skills related to data governance, data science, data management, and risk communication that together enable harnessing the power of OH data are detailed below:

5.2.1 Basic understanding of Digital One Health

The workforce engaged in the different sectors usually has sector-specific knowledge. There is a need to build the capacity of all key stakeholders, especially women, on the basic OH approach, and particularly strengthen their competencies and capacities on digital OH, its fundamentals, importance and principles, as well as the components and frameworks.

In addition, targeted competency and capacity building of African Union member states are needed for operating and maintaining digital OH information platforms at continental, regional and national levels, particularly in the following areas:

5.2.2 Data Governance

In order to strengthen digital OH data systems, the continent requires building capacities on data governance. Core competencies include efficient data governance practices, data privacy and security policies, ethical and legal regulations, and standards and procedures to align people, processes and technology.

5.2.3 Data Science

Before end users can access data for decision support, the data must be analysed, interpreted, visualised, and configured in user-friendly dashboards that are accessible across all levels. Beyond basic data analysis, capacities need to be built on predictive models, building algorithms, and conducting research to uncover patterns and trends.

To support data-driven decisions, a strong workforce on data science is required. The core competencies on utilization of big data, data science tools, data analysis, statistics, machine learning, domain expertise, programming, and data visualisation.

This will require the development of a continuous learning environment with modular training programmes, encouraging hands-on experience with real-world datasets.

5.2.4 Data Ecosystems Analysis

Designing a continental digital OH platform that is robust, versatile, and resilient will require expertise in data ecosystem analysis, conceptualization, design, implementation, and monitoring to make necessary adjustments in response to changes in the ecosystem.

The data ecosystem as illustrated in Figure 12 should be built, including capacities to provide better understanding on programming languages, packages, algorithms, cloud-computing services, and general infrastructure that an organization uses to collect, store, analyse, and use data for evidence-based decision support.

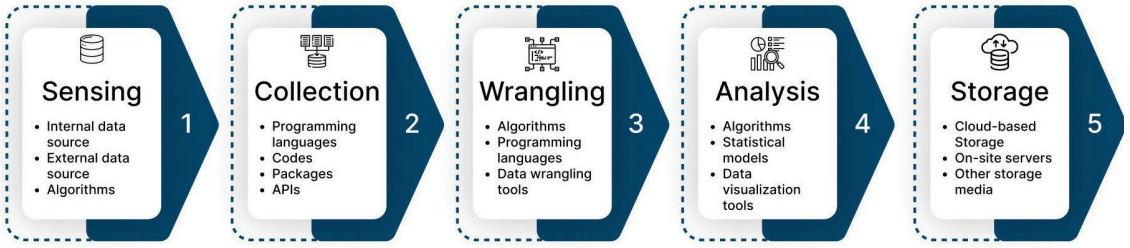


Figure 12: Five key stages for exploring the data ecosystem

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5.2.5 Process Optimization

The design and implementation of the OHIA requires building capacities of data managers and business analysts on process optimization to enable data integration, centralised storage, and easy access and use.

5.2.6 Domain Specified Playbooks

To facilitate the adoption of the decentralised OHIA, domain-specific playbooks need to be developed for human, animal, and ecosystem health. These playbooks serve as operational guides, providing actionable steps for implementing Data Mesh principles in alignment with the unique needs and priorities of AU member states.

Each playbook includes:

- **Domain Governance Structures:** Guidelines for establishing domain-specific governance teams, defining roles, responsibilities, and accountability mechanisms to ensure smooth operations.
- **Data Product Development Frameworks:** Step-by-step instructions on how to develop, maintain, and manage data products within each domain, emphasising interoperability and usability.
- **API and Metadata Standards**: Practical guidance on implementing API protocols and metadata standards tailored to each domain's data-sharing requirements.
- **Integration Scenarios:** Use-case scenarios demonstrating how domains can integrate their data with other domains or regional and continental platforms while respecting sovereignty.
- **Capacity Building Templates**: Training materials and resources to upskill local teams on decentralised data management, analytics, and governance.
- **Monitoring and Evaluation Protocols**: Customised indicators for each domain to

assess the performance, quality, and impact of their data products.

- **Customisation Options**: Recommendations for adapting the playbooks to national legal, cultural, and operational contexts, ensuring flexibility while maintaining continental coherence.

5.2.7 Community Engagement and Risk Communication

Risk Communication and Community Engagement (RCCE) in Digital OH is meant to improve the capacity of stakeholders on effective OH risk communication and strategies to engage communities. Capacities will be built on effectively communicating risks related to zoonotic diseases and other OH threats by leveraging on digital tools and platforms. Emphasis is on integrating cultural, social, and technological considerations into risk communication efforts and fostering trust and collaboration with communities. Effective communication skills will be developed and integrated with digital technologies to improve efficiency.

5.3 Enabling Digital One Health Coordination Environment and Sustainability

Effective governance is imperative for enabling decentralised coordination across diverse domains and member states, optimising investments, upholding ethics, and ensuring that the desired digitalized OH outcomes are achieved in a sustainable manner. This entails multi-tiered governance mechanisms spanning technical, legal, policy, and partnership dimensions. This policy framework provides for the establishment of a digital OH platform. The governance framework leverages the principles of Data Mesh to balance autonomy and collaboration, ensuring that sovereignty and domain-specific needs are respected while maintaining continental alignment.

Key components of the decentralised governance framework include:

- Federated Governance Model: Establish a federated governance structure that provides overarching standards for interoperability, security, and metadata management while empowering domains and member states to govern their data independently.
- Domain-Specific Steering Committees: Create steering committees at the domain level (e.g., human health, animal health, and ecosystem health) to oversee local governance and ensure alignment with continental priorities.
- Sovereignty-focused Governance: Design governance protocols that respect the legal, cultural, and operational sovereignty of AU member states, allowing each to implement standards in ways that align with their national frameworks.
- Continental Coordination Body: Establish a continental OH coordination unit to manage cross-domain interactions, resolve conflicts, and ensure that governance principles are uniformly applied across all nodes.
- Transparent Decision-making: Incorporate mechanisms for transparent and inclusive decision-making processes that include representatives from all domains, member states, and relevant stakeholders.
- Dynamic Feedback Loops: Embed feedback loops to continuously refine governance policies based on emerging needs, technological advancements, and lessons from implementation.
- Ethical and Inclusive Governance: Prioritise ethical considerations and inclusivity, ensuring that all governance activities promote equitable participation and benefit all stakeholders, including

marginalized and underserved groups.

5.3.1 African Digital One Health Governance Platform

The objective of the Digital One Health (DOH) Governance Platform is to enhance cooperation, collaboration, coordination, partnerships, and harmonisation for improved digitised OH governance and management at continental, regional, and national levels.

The key governance structure comprises:

- The African Digital One Health Secretariat
- The African Digital One Health Steering Committee
- The African Union One Health Technical Working Groups (TWGs)

The above arms of the DOH Governance Platform will be guided by the African Union DOH communication and advocacy strategy and the DOH sustainability framework.

The DOH Governance Platform consists of the Steering Committee, the Secretariat and four technical working groups as depicted in the organogram in Figure 13 :

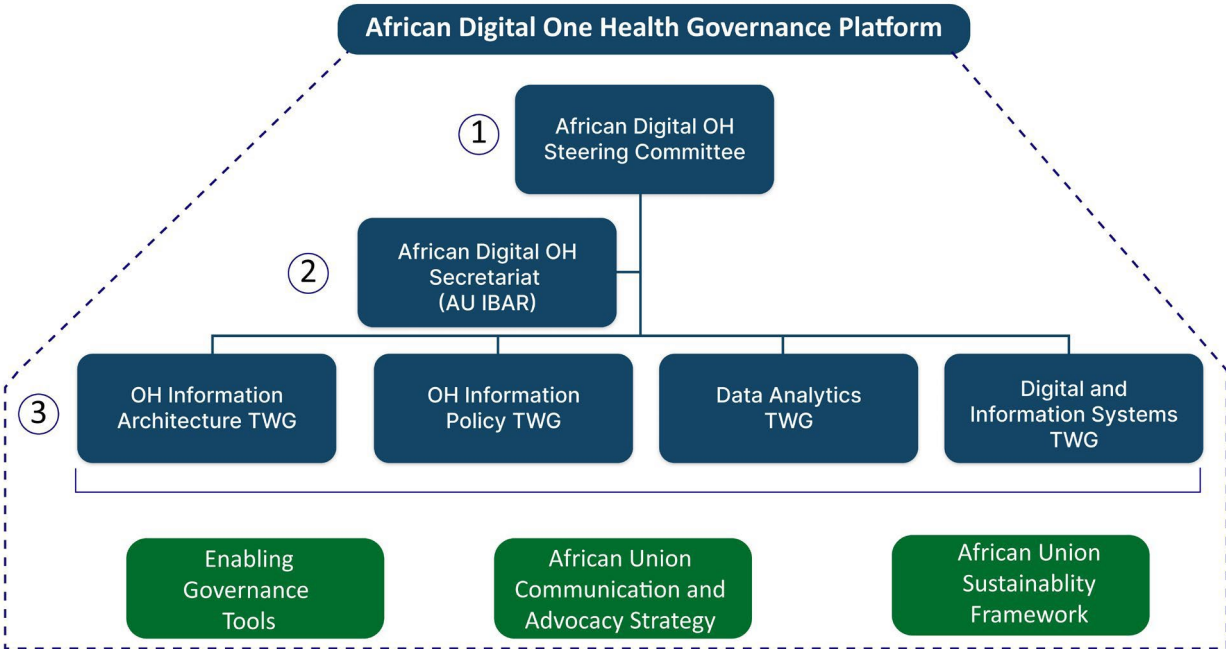


Figure 13: The African Union Digital One Health Governance Platform administrative structure and supporting strategies

5.3.1.1 African Digital One Health Steering Committee

The African Digital One Health (DOH) Steering Committee is a high-level body that will drive the continental vision of DOH governance and management. This includes providing strategic guidance, resource mobilisation, maintaining ethics and data security, and liaising with external stakeholders. The Secretariat will promote collaboration and coherence of DOH governance and management at continental, regional, and national levels, and drive the vision of DOH.

Key principles

- The African DOH Steering Committee will be replicated at regional and national levels.
- The African DOH Steering Committee aligns with the existing AU OH Coordination Mechanism on zoonotic diseases and AMR.

Membership and strategic partnerships

Membership

The African DOH Steering Committee consists of the following members by designation:

- African Union Commission (AUC)
- Respective AU Organs (AU IBAR, Africa CDC)
- Regional Economic Communities (RECs)
- Quadripartite (FAO, WHO, UNEP, and WOAH)
- AU-PANVAC
- AU-NEPAD
- AfroNet
- National OH Unit
- DOH Champions (animal health, ecosystem health, human health)
- Civil Society Representation
- Private Sector Representation
- Ex-Officio (Head of the Secretariat)
- Representative from the OH Information Architecture TWG
- Representative from the OH Information Policy TWG
- Representative from the OH Data Analytics TWG
- Representative from the OH Digital and Information Systems TWG

Roles and responsibilities

1. Strategic oversight and guidance
2. Lobbying and advocacy for policy, regulation, and resources
3. Endorse Digital OH agenda
4. Promote collaboration and ensure improved Digital OH governance and management at continental, regional, and national levels
5. Drive the vision of OH, including DOH
6. Support research initiatives and actions
7. Promote awareness and advocacy on Digital OH
8. Support formulation, adoption, and domestication of Digital OH policies, regulations, strategies
9. Strengthening capacity building in Digital OH at regional, national, and continental levels
10. Build and maintain multisectoral relationships amongst member states and ensure partners' monitoring

5.3.2.1 African Union Digital One Health Secretariat

The Policy framework provides for the establishment of a continental Digital OH Secretariat hosted at AU- IBAR to drive the continental vision of DOH governance and management.

The DOH Secretariat will support the operationalization of the Digital OH Information Policy and Information Architecture Framework.

Roles and Responsibilities

5.3.2.1.1 Policy advocacy: Advocate for OH IA-IP.

5.3.2.1.2 Global Collaboration: Connect with international organizations and partners to discuss current pending DOH challenges in the continent and best practices.

5.3.2.1.3 Monitoring and Evaluation: To ensure sustainability, monitoring and evaluation mechanisms have been put in place.

5.3.2.1.4 Standardisation: Encourage the development and implementation of continental and global standardised data formats, vocabularies, and protocols to ensure consistency in data collection, storage, and sharing.

5.3.2.1.5 Capacity Building: Invest in training and development of digital skill sets for relevant professionals and experts.

5.3.2.1.6 Community Engagement: Connect with local communities; explore their needs and engagement in feedback channels.

5.3.2.1.7 Leave No One Behind (LNOB): empower women and the marginalised.

Membership

5.3.2.1.8 Custodianship and steering by AU IBAR

5.3.2.1.9 Representative from Africa CDC

5.3.2.1.10 Representative from the OH Information Architecture TWG

5.3.2.1.11 Representative from the OH Information Policy TWG

5.3.2.1.12 Representative from the OH Data Analytics TWG

5.3.2.1.13 Representative from the OH Digital and Information Systems TWG

5.3.2.2 African Union One Health Technical Working Groups

To ensure effective implementation of the African Union Digital One Health Information Policy and the Associated Information Architecture Framework, technical working groups (TWGs) that bring together experts from the various OH sectors and disciplines will be put in place.

The TWGs will provide a platform to share best practices, exchange ideas, and work collaboratively towards achieving DOH.

Membership

- Rotating MS Chair (elected)
- Member States
- RECs

- Domain experts (depends on TWG)

Roles and responsibilities

1. To guide the development of OH-IA
    a) Provide technical advice and guidance on identification and harmonization of data elements, data standards, harmonization across the multi-disciplines
    b) Provide technical advice on integration of data from the relevant sectors
    c) Guide in the design and operationalization of the OH-IA
2. To guide the implementation of the Digital OH Information Policy
    a) Establish baseline information and gaps across the Digital OH multi-stakeholders
    b) Identify policy intervention areas and formulate adoption strategies at national, regional and continental levels
    c) Propose principle for exchange and use of information including stakeholder management
3. To lend subject matter support in the development of knowledge and information products including standard operating procedures, training manuals, OH strategies and frameworks, and identification and roles of OH stakeholders, amongst others
4. To provide technical support to the data analytics aimed at informing evidence-based OH policy and regulations formulation and the AU-OHDAA feedback tool
5. Provide technical support for the operationalization of the DOH data platforms and information systems at national, regional and continental levels

African Union One Health Technical Working Groups composition

While the above roles and responsibilities generally apply to all TWGs, the four TWGs to be established will specifically focus on the following areas:

- **One Health Information Architecture Technical Working Group:** This group will be responsible for developing and continuously improving upon the OH-IA to respond to evolving needs in the continent. This will include data standards, protocols, and guidelines for data collection, sharing and integration across OH sectors. This group will provide advice on key data, data sources, and indicators, and contribute to the design of data collection tools. This will require a focus on critical OH aspects including but not limited to surveillance, diagnostics, preventions, environmental threats and degradation, risk assessment and management, amongst others.

- **One Health Information Policy Technical Working Group:** This group will be responsible for identifying gaps and challenges facing good governance in the OH domains, establishing the intervention focus areas and developing harmonised continental policy frameworks for improving collection, integration, sharing, and use of OH data across the African continent, as well as contributing to the drafting of policy documents.

- **One Health Data Analytics Technical Working Group:** This group will provide technical support for analysis that provides user-friendly information highlighting trends, intervention areas/use cases in the OH interface, and socio-economic impacts, amongst others. This will be used to improve evidence-based OH governance and management including policies and regulations formulations, as well as community-targeting information to influence behavioural change. The group will contribute to the design of OH dashboards, advise the Steering Committee on data dissemination strategies, advise on future trends in data analytics, and provide the statistical support for all required analyses.

- **One Health Digital and Information Systems Technical Working Group:** This group will provide technical support aimed at ensuring integration and operationalization of the OH digital platforms at national, regional, and continental levels that ensure security, data privacy and interoperability. The group will advise on system conceptualization, design, development, and deployment, and liaise with the OH-IA TWG and Data Analytics TWG to coordinate continuous platform improvement (including data computation).

5.3.2 Enabling Governance Tools

- ***African Union Communication and Advocacy Strategy***

A communication and advocacy strategy is necessary to ensure a coordinated approach to the implementation of the policy guidelines within this policy framework. If well implemented, it sets the tone and ensures that all key stakeholders have a common understanding of the undertaking. It will enable stakeholders and partners to contribute to the strategy and it will ensure a unified approach to achieving deliverables.

The framework encourages the formulation of communication and advocacy strategies at all levels under the guidance of the OH governance.

- ***Sustainability Framework***

To ensure sustainability of the DOH platforms developed, based on the DOH-IA, a sustainability strategy will provide frameworks to guide upscaling and domestication of the AU-OHIP and associated AU-OHIA at national and regional levels. The framework will also guide monitoring, evaluation and learning mechanisms with robust feedback structures for improving the efficiency of DOH data systems.

6 AU-Digital One Health Platform Prototype

6.1 African Union Digital One Health Platform Prototype

The African Union digital One Health Information Policy and the associated Information Architecture Framework (AU-OHIP/OH-IA) guides the systematic and efficient digitalisation of One Health (OH) across the continent, informed by standards and interoperability that will enable data integration, analytics and information exchange and sharing. The AU-OHIP/OH-IA advocates for a platform-agnostic approach to systems design, whereby individual member states retain flexibility to adopt or adapt components that best suit their local context—provided they meet minimum norms for cross-border data sharing and governance. The African Union digital One Health Platform (AU-DOHP) blueprint (Figure 14), depicts a network of interconnected nodes, each of which is sub-partitioned according to domain (human, animal, and ecosystem health). Rather than storing data in one centralised repository, each member state node runs an instance of the blueprint, with local ownership of raw data and local control over analytics. Within each node, toolkits for data virtualization, integration, and visualization can be deployed so that national data teams can combine multiple sources—ranging from human clinical data to animal health surveillance or meteorological observations—to create cohesive, domain-specific data products. Common services for security, metadata management, or monitoring are hosted at the African Union level, offering a shared backbone that ensures consistent standards

and reduces duplication of effort.

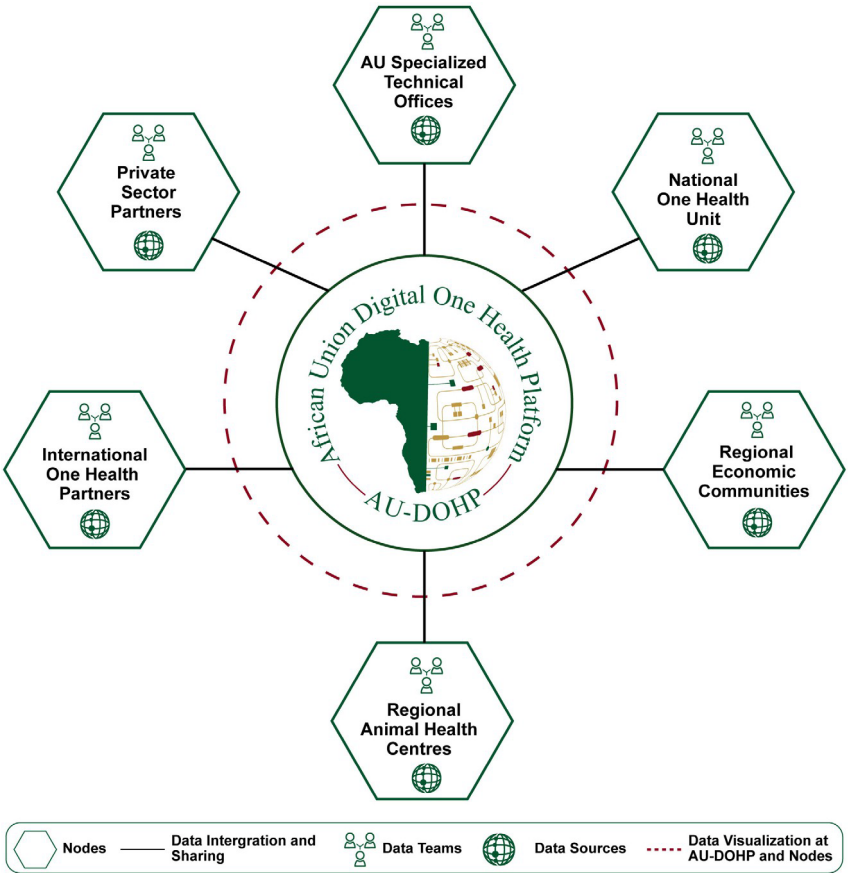


Figure 14: AU Digital One Health Platform Prototype

By federating governance, the AU-DOHP approach strikes a balance between national sovereignty over data and the need for continental coherence in combating transboundary threats like emerging zoonoses or climate-driven disease spread. In this model, metadata-driven artefacts allow raw datasets to flow between nodes for authorized use cases, without forcing states to relinquish direct control of their records. Data integration hubs can coordinate the exchange of de-identified or aggregated indicators, which then power user-friendly dashboards for evidence-based decision-making at sub-national, national, regional, and continental levels.

A major emphasis of the prototype is incremental implementation, respecting the continent's vast diversity in digital maturity. Early stages may focus on linking or enhancing existing systems in a handful of pilot countries, with insights from these efforts guiding further refinements. Stakeholder engagement is similarly essential: robust involvement of public health agencies, veterinary services, environmental experts, and local communities ensures solutions are fit-for-purpose and effectively address real-world OH challenges. Over time, local nodes can expand their capacity, while the broader African Union layer evolves with new services—such as advanced analytics or machine learning frameworks—enabling member states to self-serve according to their readiness and strategic priorities.

In line with the AU-DOHP Prototype, each of the three core OH domains—human health, animal health, and ecosystem health—collects and transforms raw data into data products aligned with Africa's five priority thematic areas: (1) transboundary animal diseases and zoonoses (including wildlife and aquatic diseases); (2) vector-borne diseases; (3) antimicrobial resistance/use; (4) foodborne diseases and feed safety; and (5) ecosystem health.

In a Data Mesh spirit, each domain owns its data products, but also reuses products from other domains to generate new derivative insights. For example, an environmental data product (e.g., climate metrics) can be ingested and cross-referenced by an animal health data team looking at disease hotspots, thereby creating a composite product that informs national rabies control or Rift Valley Fever surveillance. These domain-owned data products then flow into OH platforms—national, regional, and continental—for further analysis, while still respecting Member State sovereignty and data privacy regulations.

Once consolidated on user-friendly dashboards, OH data products provide timely, relevant information to decision-makers at all levels—sub-national health workers, national ministries, regional economic communities, and continental bodies. The result is a powerful ecosystem where health events can be detected early, responded to swiftly, and analysed holistically, fostering stronger OH governance across Africa.

Key Facets for Effective Implementation:

1. Collaborative, Stepwise Approach

– Each domain and member state begins with a baseline assessment of existing data systems, identifying user needs and pain points.

– A phased rollout prioritizes early wins, enhancing buy-in and ensuring the architecture remains flexible enough to accommodate local variations.

2. Stakeholder Engagement and Governance
   – Multi-sector forums, workshops, and advisory councils guide the co-creation of data standards, shared services, and governance rules.
   – A federated governance model, with the OH domains such as Africa CDC and AU- IBAR coordinating their domain, ensures alignment while supporting local autonomy.
3. Reusable Building Blocks
   – Shared resources—data catalogues, interoperability layers, security frameworks—are introduced as "self-service" capabilities.
   – Each member state can adopt and adapt these common services to suit local workflows, thereby optimizing investments and reducing silos.
4. Incremental Systems Integration
   – Emphasis is placed on linking or augmenting existing data systems to avoid duplication and leverage past investments.
   – New platform components are introduced only after demonstrating value and compatibility with local contexts.
5. Iterative Piloting and Scale-Up
   – Select member states or regions pilot critical use cases—such as AMR surveillance or environment–animal health linkages—to validate data flows, governance, and stakeholder engagement.
   – Learnings from these pilots inform the continental scale-up, accelerating mature, proven solutions while continuing to iterate based on evolving needs.
6. Public-Private Partnerships and Sustainability
   – Partnerships with the private sector offer additional avenues for funding and technical capacity, ensuring the system remains future-proof.
   – Open data access is encouraged, subject to appropriate governance controls, to stimulate broader innovation.
7. Continuous Monitoring and Adaptation
   – Regular tracking of key performance indicators—for data accessibility, timeliness, usage, etc.—supports proactive course corrections.
   – Ongoing feedback loops among domains strengthen the "data as a product" mindset, ensuring that products remain relevant, accurate, and readily consumable.

Through this co-creative, Data Mesh–aligned process, the AU-DOHP can continuously expand data capacity, break down silos, and enhance evidence-based decision-making. Member states and their respective OH domains retain full sovereignty over data collection and governance, yet benefit from a continent-wide infrastructure that encourages interoperability, collective learning, and responsive OH action.

6.2 Use-case-based prototyping

The domain-oriented architecture not only encourages data ownership by specialised OH disciplines, namely human health, animal health, and ecosystem health, but also lays the groundwork for use-case-driven prototyping. As outlined in Annex 1, the priority themes (e.g., transboundary animal diseases

and zoonoses (including wildlife and aquatic diseases), vector-borne diseases, foodborne diseases and feed safety, antimicrobial resistance/use, and ecosystem health) form the initial backbone for defining concrete user needs and relevant indicators. These in turn inform the creation of data products that can be shared and reused across domains.

By employing a Data Mesh perspective, each domain is free to manage its own data pipelines and combine them into domain-centric data products. These are tested through focused prototypes that demonstrate how data can be collected, integrated, and delivered back to decision-makers in near real- time. Starting with smaller, targeted pilots (e.g., tracking rabies in three pilot countries or assessing climate–vector disease relationships in a specific region) allows stakeholders to refine data flows, confirm alignment with local governance policies, and validate the federated approach without creating undue complexity or overhead.

Description of the Use Case Approach

Foundation of "user needs"

The foundation of any data-driven initiative starts with understanding the "User Needs" such as:, which diseases are urgent to monitor? What risk factors drive outbreaks? How do local stakeholders (e.g., health workers, veterinarians, environmental scientists) need to see the data?, among others These requirements determine which indicators must be tracked, which data sources are needed, and how data must be integrated.

Then data priority themes (as outlined in Annex 1) can be aligned with the user needs and areas of focus. The themes are consequently narrowed down to specific data priorities (use cases) which informs the list of indicators required. These indicators will guide the mapping of data sources and assessment of data availability. Figure 15 outlines the steps required for the use case prototype of the digital OH platform.

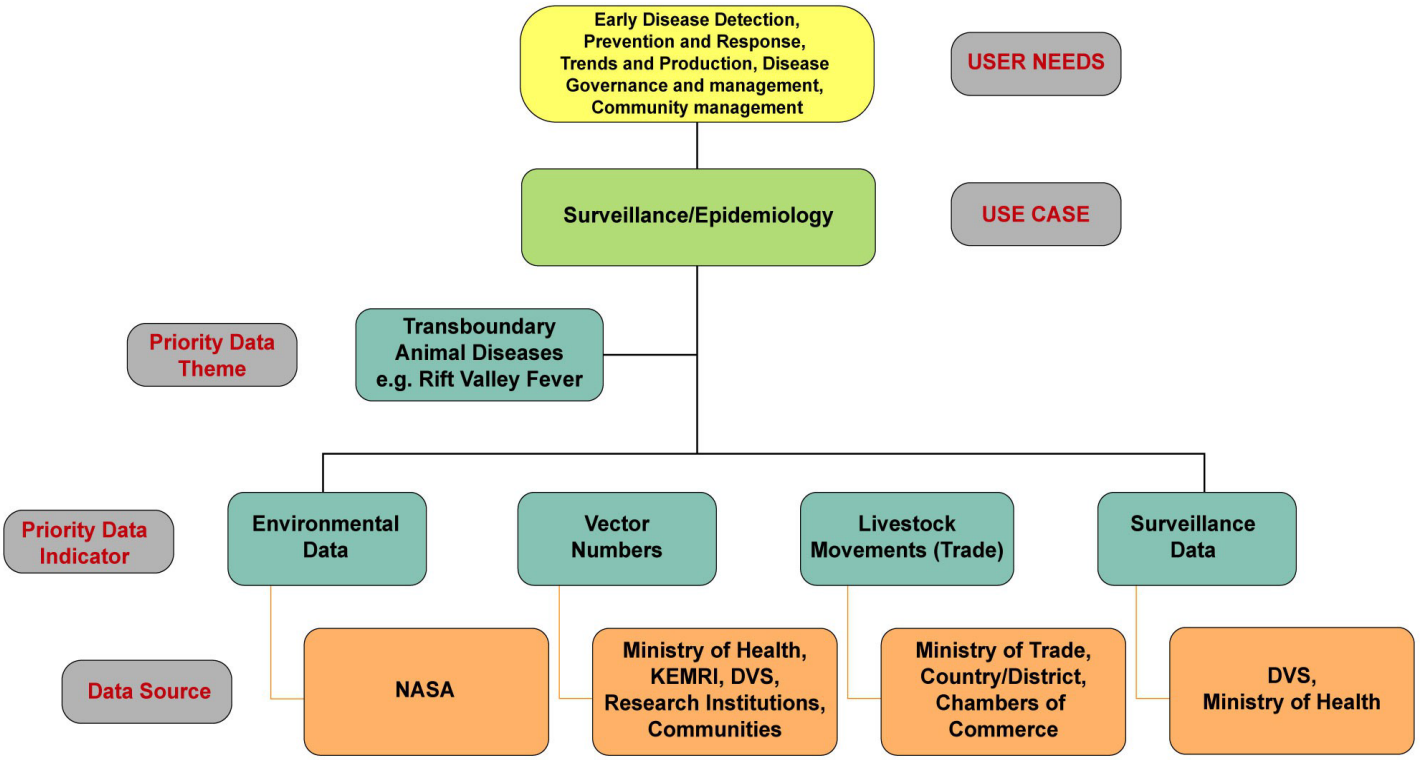


Figure 15: Description of Use Case

Translating User Needs into Prototypes

After identifying the most pressing requirements, developers and stakeholders jointly create prototypes to test end-to-end data flows—from collection and ingestion to analytics, dashboards, and alerting. These prototypes also validate the governance mechanisms: who owns which data product, what the usage permissions are, and how data from multiple domains might be cross-referenced or aggregated. It is recommended to start with a single disease or issue (e.g., rabies) to ensure that complexities remain manageable, while uncovering valuable insights into data integration, local capacity, and feedback loop design (Annex 4).

Piloting and scale up:

The scale-up approach will build on the decentralised, domain-oriented principles established in the pilot prototype. This approach respects the sovereignty of AU member states while ensuring seamless collaboration across domains and regions.

Key elements of the scaling strategy include:

- Gradual Decentralised Rollout: Begin with pilot nodes for key domains and member states, gradually expanding to additional sectors and countries based on readiness and demand. Each domain node will operate independently while adhering to continental interoperability standards.
- Horizontal Scaling within Domains: Allow individual domains to scale their infrastructure

horizontally, accommodating increased data volumes and user demands without dependence on central systems.

- Support for Local Sovereignty: Maintain flexibility for member states to implement and scale domain nodes in line with their unique legal, cultural, and operational contexts, supported by technical and governance frameworks.
- Federated Governance for Scaling: Establish a governance structure to coordinate scaling efforts, ensuring that new domain nodes meet standards for API integration, data quality, and privacy while fostering innovation.
- Progressive Interoperability: As new nodes are added, focus on incremental interoperability testing to ensure that all domains can exchange data seamlessly without compromising security or privacy.
- Sustainability through Local Capacity Building: Invest in training and capacity-building programmes to empower local teams to manage and expand their domain nodes independently.
- Iterative Learning and Adaptation: Continuously refine the architecture and scaling processes based on feedback from pilot implementations and emerging requirements.

7. Conclusion

This policy provides African Union member states and Regional Economic Communities (RECs) and partners with a blue print that will enhance digital One Health governance and management for coordinated prevention, preparedness and response interventions. AU member states and RECs are encouraged to domestic this endorsed policy framework.

ANNEXES

Annex 1: Priority themes, data, indicators, sources, and actors

The priority themes, data, indicators, sources, and actors, were put together through a stakeholder consultation workshop with representation of key actors.

Priority theme: Transboundary animal diseases and zoonosis including wildlife and aquatic diseases

Priority data	Key Indicators	Key data sources	Key actors
Surveillance/Epidemiology	Incidence Rate Prevalence Rate Case Fatality Rate Population at risk Epicentres/Hotspots Number of outbreaks	• District Health Information System (DHIS2) • Animal health Surveillance Systems (paper and electronic) • Environmental Health Surveillance Systems (paper and electronic). • Weekly epidemiological reports • Surveillance Outbreak Response and Management System (SORMAS) • QLAS report	• Ministries (Health,Agriculture, Environment) • RECs and other regional bodies and networks • Academia/Research Institutions • Communities • Private Sector actors • Laboratories • Statistical service/Bureau of statistics • African Union Commission • WAOH, FAO,WHO, and UNEP (Quadripartite) • Other Global Partners.

Social and Economic Burden of the Disease	Global Acute Malnutrition Rate Cost of livelihood lost DALYS Animal disease burden/ economic lost	Demographic Health Survey (DHS) Multiple Indicator Cluster Survey (MICS) Emergency Response Assessment report Census Data Household Surveys Global burden of animal disease (GBAD) Data base	WHO Ministry of Health UNICEF WORLD BANK WFP Emergency Response Agencies Statistical service/Bureau of statistics Africa CDC WAHO Ministry of Agriculture
Priority data	Key Indicators	Key data sources	Key actors
Port Health	Number of animals screened, isolated, symptomatic Data on travellers (number of travellers, sick travellers, symptomatic travellers, human migration pattern, number of travellers in isolation, quarantine)	Port health authorities reports. International Health focal points reports. Cross-border forum/meeting reports Report on quarantine and live animal export	Ministry of Health Statistical service/Bureau of Statistics Africa CDC AU-IBAR WAHO Ministry of Agriculture /Livestock and Fisheries Immigration authorities IOM
Animal movement patterns	Origin Destination Species Number of animals moved	National movement certificate systems	Ministry of Agriculture

Transboundary movement and trade	Number of animals slaughtered. Number of animal movement permit Number of animal movement without permit Number of animal movement with permit	• Border authority report • Bureau of Statistics report • Codex Alimentarius • Animal trade reports	Ministry of Agriculture Custom/border Authorities Line Ministry dealing trade AU-IBAR
Vaccination Data	Total number of individuals fully vaccinated Total Number of animals vaccinated. Vaccination coverage Total number of vaccines Vaccine wastage	• DHIS2 • Animal health Surveillance Systems (paper and electronic) • Environmental health Surveillance Systems (paper and electronic). • Weekly epidemiological reports • SORMAS	• Ministry of Health • Ministry of Agriculture • Academia • Research Institutions • Communities • Laboratories • Ministry of environment • Statistical service/Bureau of Statistics • Africa CDC • WAHO
Priority data	Key Indicators	Key data sources	Key actors
Treatment data (including antimicrobial usage – discussed below)	Number of animals Treated Product Reason		

Priority theme:Vector-borne diseases

Priority data	Key Indicators	Key data sources	Key actors
Vector ecology	• Number and type of vectors • Vector distribution • Percentage of land encroached/ deforested, settled) • Change in temperature and precipitation	• Vector survey reports • Reports on forest development • Land use reports • Report of natural resources Meteorology reports	• Research institutions • Academia • Ministry of Health • Africa Union Pan African Tsetse and Trypanosomiasis Eradication Campaign (AU-PATTEC) • International Centre of Insect Physiology and Ecology (ICIPE) • National Forest development Institutions • Land use and administration Institutions • Ministry of Agriculture • Meteorology agencies (national, regional, and global) • Africa CDC • African Union Inter-African Phytosanitary Council (AU-IAPSC)
Surveillance of VBD's	• Incidence rate • Prevalence • Mortality rate • Population at risk • Epicentres/Hotspots • Number of outbreaks • Case fatality rate	• DHIS • Animal health Surveillance Systems (paper and electronic) • Environmental health Surveillance Systems (paper and electronic). • Weekly epidemiological reports • SORMAS	• Ministry of Health • Ministry of Agriculture • Academia • Research Institutions • Communities • Laboratories • Ministry of Environment /wildlife authority • Statistical service/Bureau of Statistics • Africa CDC • WAOH • AU-IBAR • African Union Inter-African Phytosanitary Council (AU-IAPSC) • FAO (emergency centre for animal diseases)

Priority theme: Antimicrobial resistance/use

Priority data	Key Indicators	Key data sources	Key actors
Antimicrobial use (in humans, livestock, wildlife, plants) – Prescription and dosage Name of the antibiotic, frequency of use, duration of use Generic name Antimicrobial resistance Types of samples of collected Tests and antibiograms Prevalence of resistant pathogens in collected samples Drug resistance in isolates AMR related mortality and morbidity	• Data on treatment including numbers (animals, humans, use in plants) • Number and types of pathogens resistant to antibiotics, and to what antibiotics • Numbers of sick/ dead	• Note the different stewardship arrangements in the countries • Use: Line ministries and departments; Medical facilities (humans, vet clinics/ hospitals); Pharmaceutical companies and NGOs- Brooke, VSFS etc.; Private practitioners – vets, human health; Pharmaceutical donors; Community animal health workers; community health workers; department of agronomy/ environment (plants); farmers; fragmented/ unregulated sources; universities; research centres • **Resistance** • Laboratories (on resistance) – human, vet • Universities • Research centres • GLASS • Human and vet practitioners • Africa CDC,WHO	Environmentalists, agronomists, veterinarians, pharmacists, entomologists, relevant government departments,

Priority theme: Foodborne diseases and feed Safety

Priority data	Key Indicators	Key data sources	Key actors
Foodborne diseases (priority) – causative agent Residues in food (aflatoxins, antibiotics, chemicals) Allergens Feed types and composition	Frequency of occurrence (diseases, allergy cases) Residue/ Levels of contaminations (and numbers meeting recommended standards ISO? Does it exist in the countries, for food safety handling?	Line ministries and departments (health, veterinary, plants- Kenya has KEPHIS); Food and feed processors; slaughterhouses; laboratories; research centres; universities and other teaching institutions; human and veterinary hospitals; development partners (WHO, WOAH, FAO, UNEP allergens); retailers/ food stores, producers??	Government ministries; processors (food, feed), development partners (FAO, WHO), CDC, National Standard bodies, RECs, producers

Priority Theme: Ecosystem Health

Crisis	Indicators
Climate Change	Increase in Global Average Temperature: rise in global temperatures over time. Greenhouse Gas Concentrations: levels of carbon dioxide, methane, and nitrous oxide. Frequency of Extreme Weather Events: hurricanes, droughts, heatwaves, and heavy rainfall (floods).
Biodiversity Loss	Species Extinction Rates: disrupt natural checks on disease vectors, food diversity and nutritional quality Number of Biodiversity Hotspots: Identifying areas with high levels of species endemism and threat. Deforestation Rates: Loss of pollinators
Pollution	Air Quality indices: particulate matter and ground-level ozone. Water Quality indices: physical, chemical, biological parameters and hydrocarbons. Waste Generation Rates: general waste (domestic, commercial), Hazardous Waste (health care waste, industrial)

Priority theme: Capacity enhancement

Priority data	Key Indicators	Key data sources	Key actors
One-Health workforce mapping	1. Number of surveillance officers 2. Number of registered veterinarians 3. Number of registered clinicians 4. Number of environmental health inspectors 5. Number of epidemiologists 6. Number of laboratory technicians 7. Number of One Health training modules available 8. Number of tertiary institutions offering One Health related courses 9. Existence of a One Health platforms	WHO, FAO, Research training, Institutions, WOAH, Regulatory Bodies report	WHO, FAO, Research Institutions, WOAH, Regulatory bodies, training institutions
Field and Laboratory capacity for priority diseases	1. Number of accredited laboratory test One Health related 2. Existence of an electronic surveillance system in animal health 3. Existing of a formal electronic surveillance system in human health 4. Existence of a formal electronic surveillance system in environmental health	Accreditation certificates/reports, Accreditation Agencies/Bodies (SADCAS/ SANAS etc.)	Accreditation Agencies/Bodies

Annex 2: Priority Diseases in line with Priority Themes

After the second consultation workshop with representatives from member states, some priority diseases were selected upon which specific use cases can be developed. The key indicators and data sources for the diseases identified were identified..

Priority diseases, indicators and data sources for priority theme: Zoonosis including wildlife and aquatic diseases

Priority Use Case	Priority indicators	Data sources
1. Haemorrhagic Fever (Rift Valley Fever)		
Viral haemorrhagic fevers (VHFs) are a group of diseases that are caused by several distinct families of viruses. The term "viral haemorrhagic fever" refers to a condition that affects many organ systems of the body, damages the overall cardiovascular system, and reduces the body's ability to function on its own. Symptoms of this type of condition can vary but often include bleeding, or haemorrhaging. Some VHFs cause relatively mild illness, while others can cause severe, life threatening disease. Most VHFs have no known cure or vaccine.	• Geo-temporal predictors of diseases (what time and where, is risk of disease transmission and occurrence heightened?) • Data on case counts disaggregated geospatially. • Data on vectors (relevant for the particular disease) • Environmental factors, e.g. climate data • Transborder movement data • Past haemorrhagic fever data e.g. high burden areas, burden disease, socio-economic impact, geo-locations • Social economic data e.g. cultural practices, • Satellite data for vegetation, land use change, deforestation • Meteorological data for rainfall, availability of food for vectors, breeding environment, etc. • Number of trained Multisectoral RRTs	• e-IDSR data e.g. DHIS2, SORMAS • ICPAC data • Ministry of Social Affairs • Ministries of planning • Universities • Research Institutes • ESA and NASA • FAO • WOAH • WTO • World Bank • Customs • Africa CDC • RECs • Relevant Government Ministries (Health, Agriculture and Environment) • Metrological institutions • PVS • JEE • SPAR

2. Zoonotic Avian Influenza (and other flu subtypes)		
Zoonotic influenza refers to disease caused by animal influenza viruses that cross the animal–human divide to infect people. People can be infected with influenza viruses that are usually circulating in animals, such as avian influenza virus subtypes A(H5N1) and A(H9N2) and swine influenza virus subtypes A(H1N1) and (H3N2). Other species including horses and dogs also have their own varieties of influenza viruses. Even though these viruses may be named as the same subtype as viruses found in humans, all of these animal viruses are distinct from human influenza viruses and do not easily transmit between humans.	• Immigration patterns of wild birds by group of species • Prevalence data of the different influenzas in different species • Prevalence of the diff virus in livestock by species • Spikes in trends of certain diseases (time series or geotemporal data) • Animal trade data eg. Transboundary trade (quantity of livestock per species, frequency • Percentage of vaccinated livestock population data • Identifying driving factors for mutation of influenza viruses e.g. What are the geographic zones with high prevalence, high movement and number of different species • Identify risk areas for potential spillover of avian influenza from birds to pigs or vice versa e.g. high prevalence of avian influenza vs. number of pigs • Economic data, GDPs, GBADs • Past influenza data e.g. high burden areas, burden disease, socio-economic impact , geolocations • Number of population disaggregated by housed and free range • Proximity of poultry production to lakes and wet lands • Availability of preventive test kits/ treatment kits • Number of trained Multisectoral RRTs • Immunization data	• FAO • WOAH • Universities • Research Institutes • WTO • World Bank • Customs • Africa CDC • RECs • WWF (World Wildlife Fund) • National Parks • Relevant Government Ministries (Health, Agriculture and Environment) • Metrological institutions • PVS • JEE • SPAR • Central Medical Stores
3. Zoonotic Tuberculosis		

Cattle are the most important animal reservoir of TB in relation to zoonotic exposure of humans, but the disease can affect many other species and become established in wildlife reservoirs.	Number of cases in human, wildlife, and livestock (geo referenced) • Prevalence and incidence in human, wildlife, and livestock (per species) • Level of contact between human and animals (livelihood zones) • Community Knowledge, Attitude, and Practices. (consumption of raw products, husbandry practices) • Areas of interface between wildlife and livestock • Migratory routes for human and animals • Population (human and animals) mobility • Bacterium typing and whole genome sequences (WGS) • Genotypes and phenotypes of resistant bacteria • AMU	
4. Brucellosis		
Brucellosis is an infectious disease caused by Brucella bacteria, primarily transmitted from animals to humans. It is often contracted through the consumption of unpasteurized dairy products or direct contact with infected animals. In animals it causes abortions. Prevention includes avoiding unpasteurized dairy products and ensuring proper handling of animal	• Number of abortions and wildlife, livestock and humans • Number of cases in human, wildlife, and livestock (geo referenced) • Prevalence and incidence in human, wildlife and livestock (per species) • Level of contact between human and animals (livelihood zones) • Community Knowledge, Attitude, and Practices. (consumption of raw products, husbandry practices) • Areas of interface between wildlife and livestock • Migratory routes for human and animals (influenced by the climatic factors, breed management, watering points, etc.) • Population (human and animals) mobility • Bacterium typing and whole genome sequences (WGS)	• Routine surveillance data (wildlife, livestock and human) o WHO database o WAHIS database o Reports from MS focal points to AU-IBAR • Scientific literature • Movement patterns _Economics department • Laboratory surveillance data (genomic and AMR data) • Genomic databases • Surveys • Georeferenced vaccination data and other interventions

5. Anthrax		
Anthrax is an infectious disease caused by the bacterium *Bacillus anthracis*. It primarily affects livestock and wild animals, but humans can become infected through contact with infected animals or contaminated animal products. Prevention includes vaccination for at-risk individuals and proper handling of animal products.	• Spatial location (to predict) • Proper disposal of carcasses • Animal cases • Human cases • Population and animal movement • Vaccines sources • Infection Prevention and Control • Climate indicators (drought, floods, heat…) • Mortality and morbidity in susceptible wildlife • Animal consumption	• Veterinary services and Ministries of Health • Environmental services and systems • Animal information systems · • Human information systems (IDSR) • Population connectivity across borders (PopCAB) • Vaccine manufacturers, Panvac & Vet services • Vet services, MOH, law enforcement agencies • Environmental systems • Wildlife services • Veterinary services and local government
6. Rabies		
Rabies is a viral disease that leads to severe neurological symptoms and is often fatal if not treated promptly. It is primarily transmitted through the bite of an infected animal, commonly domestic dogs and wild carnivorous animals. Prevention in animals is through vaccinations.	• Animal bites • Animal cases • Human cases • Vaccination coverage • Stray dog population, distribution and hotspots • Infection prevention and control • Availability of pre- and post-exposure vaccines • Rabies control strategies data (vaccination, neutering and castration,…) • Carcass and waste disposal • Policies and strategies in place • Tap into the 2030 global strategy	• Veterinary services • Veterinary services • Human information systems (IDSR) • Veterinary services • Veterinary services and local government • Vet services, MOH, law enforcement agencies • Ministries of Health • One Health structures in countries • Environment and Veterinary departments • One Health structures in countries • OH Quadripartite systems

Annex 3: Lessons from Data Mesh Pilots and their Relevance to a Continental AU-Digital One Health Platform

The African Union's ambition to create a continental One Health (OH) Digital Platform demands a transformative approach to data governance and architecture. As health challenges become increasingly complex, spanning zoonotic diseases, antimicrobial resistance (AMR), and the impacts of climate change, traditional, centralised systems struggle to meet the dynamic needs of a diverse continent. This annex draws from global and regional experiences with Data Mesh implementations to argue why a decentralised, domain-oriented architecture is uniquely suited to the African Union's goals. It highlights key lessons, provides actionable methodologies, and frames decentralisation as a pathway to respect member state sovereignty, foster collaboration, and drive innovation.

Why Data Mesh for a Continental Platform?

The challenges of establishing a continental platform for OH in Africa are vast: the diversity of member states, varied levels of digital readiness, distinct legal frameworks, and the sheer complexity of managing health data across domains. A decentralised architecture based on Data Mesh principles offers solutions to these challenges by:

1. Respecting Sovereignty:A centralised system often requires countries to relinquish control over their data, creating resistance and limiting engagement. Data Mesh allows member states to retain ownership and control, enabling them to manage their data within local legal and cultural contexts while still participating in a continental framework.
2. Scalability:Africa's health data ecosystem is expanding rapidly, with increasing demands for real-time analytics and cross-sectoral data integration. A decentralised architecture grows horizontally, enabling domain nodes to scale independently, avoiding bottlenecks and ensuring resilience.
3. Interoperability without Centralisation: Data Mesh fosters seamless data exchange through standardised APIs and metadata, ensuring interoperability without centralising storage. This empowers member states and domains to share data securely while maintaining local control.
4. Flexibility for Innovation: A decentralised approach accommodates the unique needs of each country and domain, fostering innovation at the local level. Member states can pilot bespoke solutions within their domains while contributing to a broader framework.
5. Empowering Local Capacity: By embedding responsibilities for data governance and management within domains, Data Mesh strengthens local expertise, reducing dependency on external or centralised resources.

Lessons from Data Mesh Pilots and Their Relevance

1. Building Domain Data Ownership: In successful Data Mesh pilots, domain teams were empowered to treat data as a product. This ownership model ensured accountability, improved data quality, and fostered trust among stakeholders. For the African Union (AU), domain ownership translates to national and sectoral nodes—such as human health, animal health, and environmental health—being fully responsible for their data products. This approach aligns with

the AU's principle of subsidiarity, enabling countries to lead while contributing to continental priorities.

2. Starting Small to Scale Effectively Pilots emphasised the importance of starting with manageable use cases, such as zoonotic disease surveillance, before expanding. For Africa, this means piloting in a subset of countries or sectors to validate the framework before a broader rollout. For example, a pilot integrating human and animal health data for AMR surveillance could demonstrate the feasibility of decentralised nodes.

3. Investing in Metadata Infrastructure Metadata was central to interoperability, traceability, and data quality in all successful pilots. For the AU platform, a robust metadata layer ensures that each member state and domain can log data provenance, version history, and usage permissions, enabling secure and efficient cross-border data flows.

4. Aligning Decentralisation with Continental Standards Pilots highlighted the need for federated governance to balance local autonomy with global alignment. For Africa, federated governance ensures that member states can adapt standards to their local contexts while contributing to continental interoperability and security requirements.

How a Decentralised Approach Addresses Africa's Needs

The African Union's diverse member states vary in their legal frameworks, cultural contexts, and technological capabilities. A decentralised platform respects these differences by allowing flexibility in implementation. For example:

1. Customisation for Sovereignty: A decentralised architecture enables countries like Kenya to prioritise AMR surveillance while others, such as Nigeria, focus on zoonotic disease outbreaks. Each country's node can align with national priorities while adhering to overarching continental standards.
2. Equity and Inclusion: A decentralised model reduces barriers to participation for smaller or less-resourced countries. These countries can build lighter nodes tailored to their needs without needing to invest in large, centralised systems.
3. Real-time Decision Support: During crises like Ebola outbreaks, decentralised nodes can share critical data in real-time with minimal bureaucracy, accelerating response times while maintaining data ownership.
4. Sustainability: Decentralised systems distribute maintenance and operational responsibilities, reducing the dependency on a central authority and enabling cost-sharing across nodes.

Implementing the Decentralised Vision

To realise this vision, the African Union must:

1. Establish Domain Nodes: Each member state and sector must develop autonomous nodes capable of managing data as a product. These nodes will form the backbone of the continental platform.
2. Adopt Federated Governance: Create a governance body that ensures alignment while allowing flexibility for local adaptation.

3. Invest in Capacity Building: Train local teams in managing decentralised systems, ensuring sustainability and independence
4. Embed Feedback Mechanisms: Design systems that enable continuous learning, where local insights inform continental strategies.
5. Pilot Use Cases for Validation: Focus on high-impact areas, such as AMR or zoonotic diseases, to validate the approach and refine methodologies.

Annex 4: Example of a Typical Use Case

Use Case – Rabies

We first consider Rabies as a Use Case to contextualise information flow and information system touch points from the sub-national to the continental level.

In up to 99% of cases, domestic dogs are responsible for rabies virus transmission to humans. Rabies occurs in more than 150 countries and territories. It is present in all continents except Antarctica, with over 95% of human deaths occurring in the Asia and Africa regions.

In Figure 16, we present key actions necessary along the cascades of detection, response, prevention, and prediction, in case of suspected rabies resulting from a dog bite. While some of the actions cited are part of current practice, others, such as prediction, are aspirational –simulating an ideal case scenario.

These actions were formulated based on key processes shared by the Nigeria Centre for Disease Control and Prevention (Nigeria National Public Health Institute).

To illustrate, consider rabies—a preventable, often fatal viral disease—through the lens of a domain-oriented One Health (OH) system:

- Human Health (Africa CDC): Local clinics and hospitals record dog-bite injuries, run diagnostic tests for rabies, and enter the results into Electronic Medical Records (EMR).
- Animal Health (AU-IBAR): Veterinary officers or community-based animal health workers capture suspected rabies cases in livestock or wildlife, logging them into a bio-surveillance system (e.g., KABS in Kenya).
- Ecosystem health (Institution responsible for ecosystem health): Climate variables (temperature, rainfall), land use changes, or wildlife migration patterns are monitored—forming a data product that might predict where rabies hotspots are likely to emerge.

Once the raw data is anonymised and mapped to a shared standard (HL7, FHIR, or ICAR), it becomes a domain-specific data product that feeds into the National One Health Database. User-friendly dashboards alert decision makers of unusual spikes or confirm outbreaks in near real-time. Feedback loops then trigger the response phase: e.g., quarantining animals, administering PEP (post-exposure prophylaxis) to affected humans, and mobilizing awareness campaigns. By retaining domain-level control over data pipelines, each organization remains nimble and accountable, while federated interoperability ensures that cross-domain signals and multi-country patterns are not missed.

	Animal Health	Human Health
Detection	• A One Health Rapid Response team (composed of human, animal, and environmental experts) is sent out following an alert of a suspected rabies case • Following history taking the dog is quarantined or euthanized • For the quarantined dog, observe the development of rabies symptoms for 14 days. If no symptoms ensue, the dog is up to date on rabies vaccination • For euthanized dogs, decapitate the dog and send the head to the national Rabies reference lab for confirmatory test (ensure the sample is well transported according to the standard protocols)	• Take appropriate samples and send to the rabies reference laboratory for confirmatory diagnosis • Quarantine the suspected case • Ensure palliative care • Administer PEP in non-advanced cases
Response	• Quarantine the dog and observe for 14 days • Send appropriate samples to Lab following euthanasia or death • Capture geo-coordinates of the scene/case • Transmit key data to the National Animal Health Database • Transmit de-identified key data on the dog and animal/human exposures to the National One Health Database • Submit data upwards to regional and continental databases	• Wash wound with copious soap and water wearing appropriate PPEs • Administer /encourage the 4 complete doses of PEP to each human exposed (as recommended by WHO) • Capture geo-coordinates of the scene/cases • Transmit key data about the case(s) to the National Electronic Medical Records System • Transmit de-identified data on the case(s) and respective bite to the National One Health Database • Submit data upwards to regional and continental databases
Prevention	• Send alerts to key actors in the affected community engaged in animal health • Conduct community sensitization on the public health threat of rabies • Mobilize the community for mass vaccination of their dogs annually • Display geo-coded and triangulated data on dashboards accessible across all levels, for strategic planning and intervention • Record and upload number of dogs vaccinated • Castrate stray dogs and cats routinely in veterinary teaching hospitals to control the population	• Raise awareness of rabies in the community to destigmatize rabies and encourage early reporting • Send alerts to key actors in the affected community engaged in human health • Sensitize the community about the risk of rabies and the need to vaccinate dogs in the neighborhood • Display geo-coded and triangulated data on dashboards accessible across all levels, for strategic planning and intervention
Prediction	• Use data science techniques to predict possible rabies outbreak and initiate prevention strategies	• Use data science techniques to predict possible rabies outbreak and initiate prevention strategies

Figure 16: Response to a suspected rabies case in the Animal and Human Health space

In this prototype, we are imagining a real-world scenario staged in surveillance systems of Kenya and the ECOWAS region, to gain insights into the information flow and systems required for successful detection, response, prevention, and prediction of OH events from the sub-national to the continental level based on rabies as an OH event.

Use case – Kenya: Prototype the case of canine rabies in Kenya

Assume a child in a specific community in Kenya is bitten by a dog. The following should ideally happen in the context of OH information exchange along the case management cascade of detection, response, prevention, and prediction:

Detection and Response:

- If normal, the dog would be quarantined, observed, and tested for rabies. If infected, administer PEP and capture key data, including geo-coordinates of the scene, in the Kenya Animal Bio-

surveillance System (KABS)

- If severe, the dog would be decapitated, and samples tested for rabies. If infected, capture key data in the KABS.
- The child would be captured in the Electronic Medical Records System (EMR) and tested for rabies. If infected, administer PEP and update records in the EMR.
- De-identified anonymised information would flow into the National One Health database, both from the National EMR central repository and from the KABS system.
- The information pushed to the National One Health Database would display on dashboards accessible by all, to alert of rabies at the scene.
- Using the national analytics system, the National One Health Database would send alerts to key stakeholders at national or sub-national level, alerting on rabies. The alerts would also contain key messages on how to engage the community to act against rabies.
- The National One Health database would transmit key data to the regional and continental databases for integration at high levels.

Prevention:

- Upon receiving the alerts, key stakeholders on the ground would mobilize the community and invite dog owners to vaccinate their dogs against rabies.
- Key stakeholders would sensitize the community on how to guard against rabies, and what signs to look out for in case a dog has rabies, and how to act in such situations.

Prediction:

- At the national level, the National One Health database would process information over time to predict potential rabies outbreaks and possible preventive mechanisms by the community.

The current state of OH application architecture and data flow of the Kenya Animal Bio Surveillance System (KABSS) (Figure 17) .

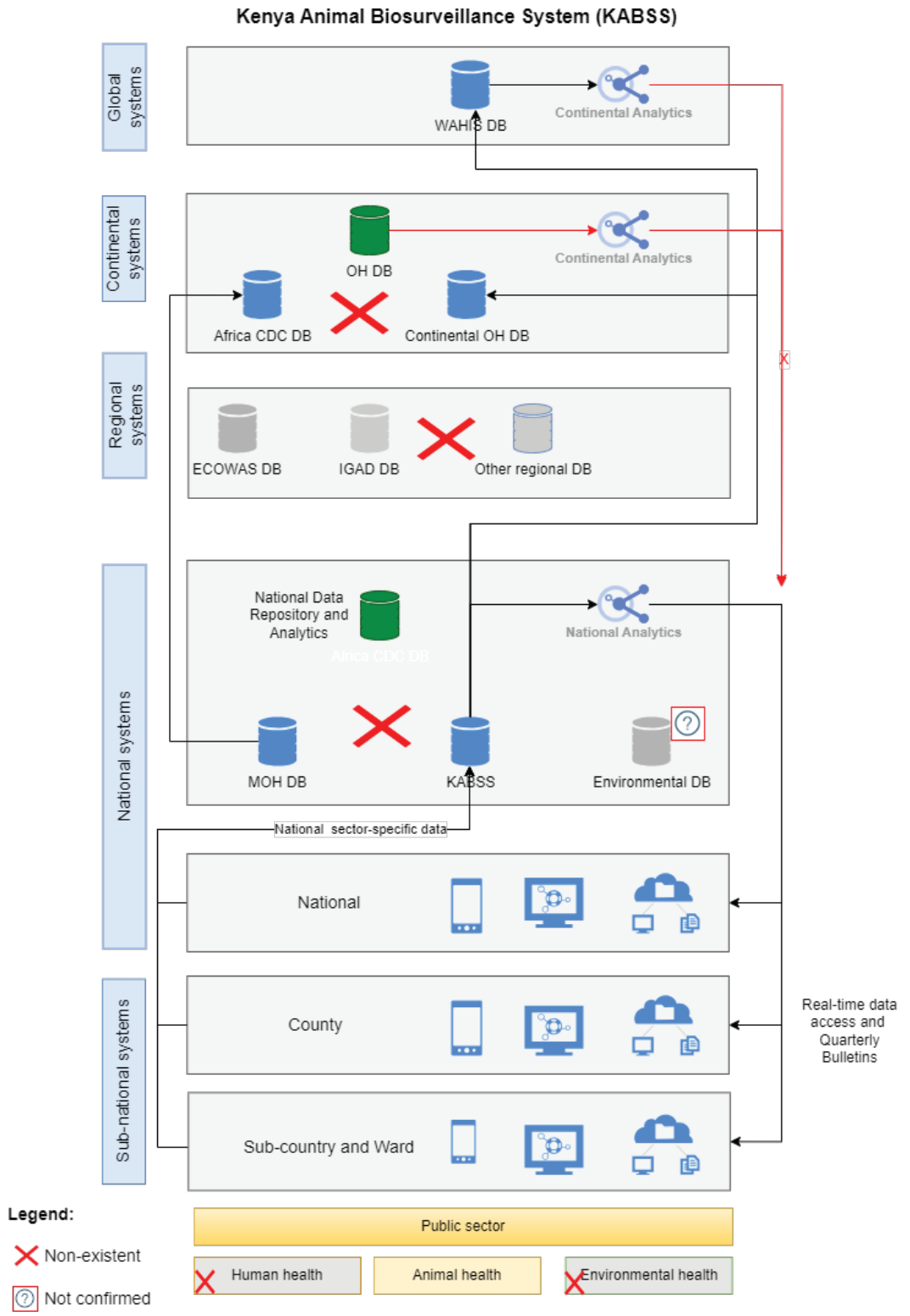


Figure 17: Kenya Animal Bio-surveillance System (KABSS)

Opportunities exist to improve the KABBS by fostering the integration of OH systems and improving the feedback loop. Thus all national systems will be aligned to the continental Digital OH Platform.

Key recommendations include the need to install a National One Health database; the need to reinforce collaboration across the OH domains; and the need to strengthen feedback loops from the global and continental levels down to the national and sub-national levels, where necessary.

Use case: The ECOWAS One Health Platform, and the continental and global setup

The current state of OH application architecture and data flow in the ECOWAS region can be seen in Figure 18 below. At the regional level and continental levels, key strategic information is made to influence policy and strategic information for action against OH events happening in member states.

In the case of rabies, the following should happen in an ideal OH context:

- De-identified anonymised information on rabies cases identified in dogs are transmitted to the regional and to the continental Animal Health and OH databases.
- De-identified anonymised information on children with rabies are transmitted to the regional and continental Human Health and Animal Health databases.
- Dashboards on the OH databases at regional and continental level display triangulated OH information on human and animal health. The information displayed is geo-coded permitting the tracing back to the scene of the event.
- Policy makers at regional and continental level analyse trends and patterns, and take key decisions to strengthen detection, response, prevention, and prediction across the continent.
- Key statistics on rabies flows from the continental OH database to the global databases.
- Stakeholders at continental, regional, and national level use key information pulled in from the global level to inform decisions to counter rabies at continental, regional, national, and sub-national levels.

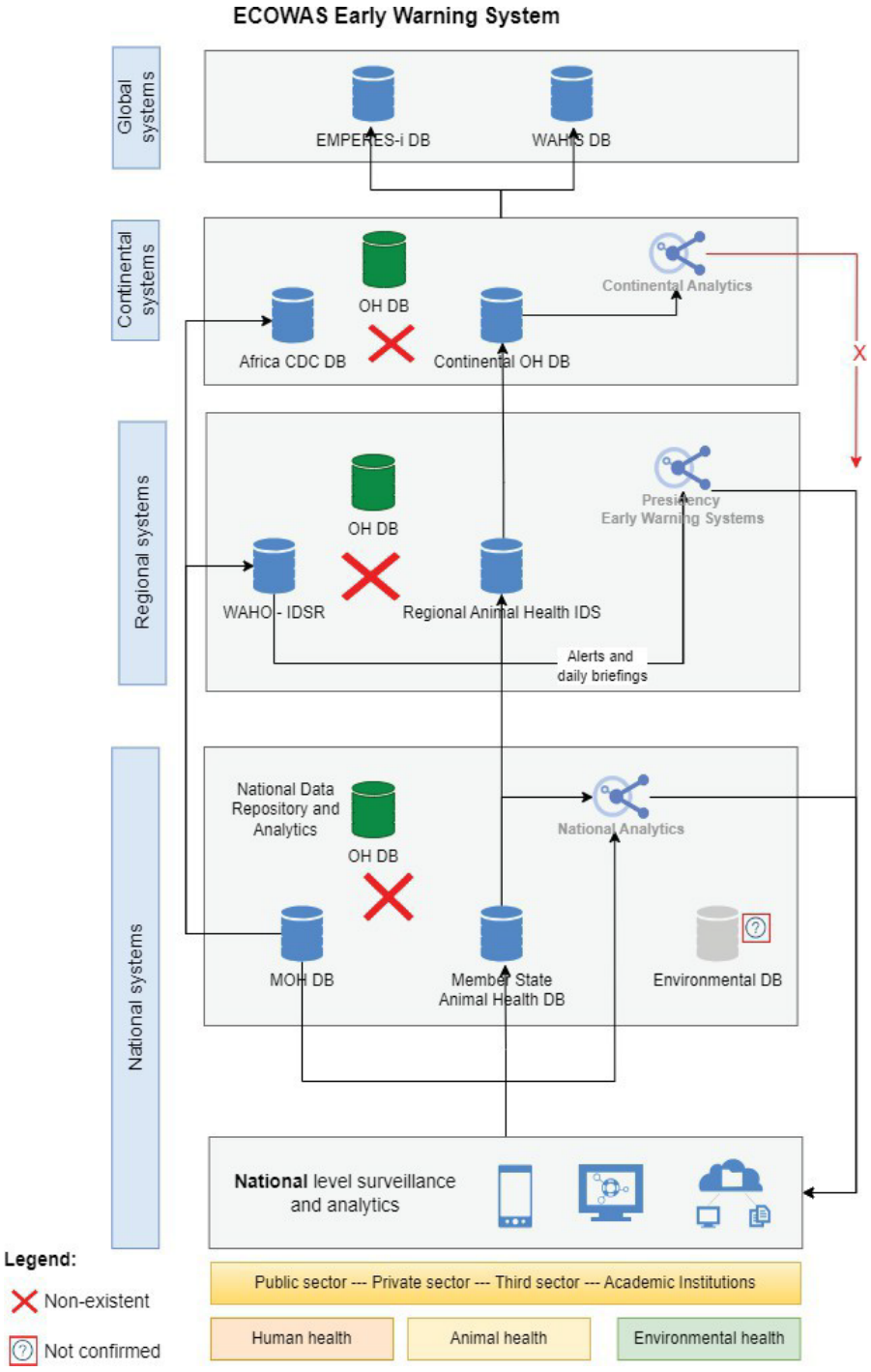


Figure 18: ECOWAS Early Warning System

Opportunities for improvement in the ECOWAS region include the integration of the OH databases present in the region.

Annex 5: The Technical Working Group

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Mr. Rodwell Chandipo	Zambia Environmental Management Agency
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Annex 6: Glossary of terms

The following terms and definitions are working definitions used in the context of the African Union One Health Information Policy and the One Health Information and may be used differently anywhere but a deliberate effort has been made on alignment with international best practice.

Term	Definition
Anonymised Data	Data from which personally identifiable information has been removed to prevent individuals from being identified.
Antimicrobial Resistance (AMR)	AMR occurs when bacteria, viruses, fungi and parasites no longer respond to antimicrobial agents.As a result of drug resistance, antibiotics and other antimicrobial agents become ineffective and infections become difficult or impossible to treat, increasing the risk of disease spread, severe illness and death.
Application Programming Interface (API)	A set of rules and protocols that allows different software applications to communicate with each other.
Big Data	Large, complex datasets that exceed the processing capabilities of traditional database systems.Typically characterized by the "5 Vs": volume (size), velocity (speed of generation), variety (different formats), veracity (reliability), and value (usefulness for decision-making).
Continental	As used in this Policy Framework refers to Africa.
Data	A set of values of qualitative or quantitative variables about one or more persons, objects or activities.
Data as a Product	An approach where data is managed as a valuable, standalone product with defined ownership, quality standards, and clear value proposition rather than as a by-product of business processes. It includes proper documentation, accessibility features, and ongoing maintenance to ensure usability for consumers.

Term	Definition
Data Ecosystem	The collection of infrastructure, software, tools, processes, stakeholders, and governance structures that work together to collect, store, manage, and utilize data within an organization or across multiple organizations. In the One Health context, this encompasses the entire environment of data capture, analysis, and sharing across human, animal, and environmental health sectors.
Data Governance	Data governance refers to mechanisms put in place to ensure that data is secure, private, accurate, available, and usable.
Data Mesh	A set of principles that enable the collation, integration, and analysis of multisectoral data on a single framework—while respecting the autonomy of different domains.
Data Sovereignty	The concept that data is subject to the laws and governance structures of the nation where it is collected, protecting national control over data.
Data Scalability	The capability of data systems to handle growing amounts of data and accommodate increased demand. Scalable systems can maintain or improve performance when workloads increase by adding resources or optimizing existing ones, ensuring the system remains functional regardless of data volume growth.
Decentralized Interoperability	A system that enables separate data systems to exchange information while each maintains independence and control over its own data.
Digitisation	The process of converting something to digital form.
Digitalization	The process of transformation of digital data. More than just making existing data digital, digitalization embraces the ability of digital technology to collect data, establish trends and make better business decisions. Trend analyses of disease reports would be an example.

Term	Definition
Domain Data Ownership	The principle where each sector (e.g., human health, animal health) has full control and responsibility over their data while allowing controlled sharing.
Domain-specific Playbooks	The playbooks serve as operational guides, providing actionable steps for implementing Data Mesh principles in alignment with the unique needs and priorities of AU member states.
Ecosystem	A dynamic complex of plant, animal and microorganism communities and their non-living environment, interacting as a functional unit in a particular physical environment.
Ecosystem Health	The extent to which an ecosystem (or group of ecosystems) can function, maintain ecological and evolutionary processes, adapt to change and cope with the impacts of human activity.
Early warning	A disease early warning system is a mechanism designed to detect and monitor potential outbreaks of diseases at their earliest stages.
Federated Architecture	A system design approach that distributes data, processing, and governance across multiple autonomous components while maintaining unified access and coordination. It allows independent systems to operate locally while participating in a larger interconnected network through standardized interfaces.
Federated Governance	A federated governance model oversees interoperability, setting standards for APIs, data exchange, and compliance, while allowing domains to maintain local control over their data systems.
Harmonisation	Is ensuring uniformity in the systems through the use of minimum standards to facilitate interoperability.

Term	Definition
Interoperability	This is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged.
Metadata	Data that provides information about other data, such as origin, structure, and meaning.
Open data	Open means anyone can freely access, use, modify, and share for any purpose (subject, at most, to requirements that preserve provenance and openness).
One Health	An integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent.
Open standards	These are standards made available to the general public and are developed (or approved) and maintained via a collaborative and consensus-driven process. Open standards facilitate interoperability and data exchange among different products or services and are intended for widespread adoption.
Predictive Analytics	The use of statistical algorithms and machine learning techniques to identify patterns in data that can forecast likely future outcomes.
Progressive Interoperability	An incremental approach to implementing data exchange capabilities, where systems gradually increase their ability to share information over time.
Scalable Interoperability	The ability of connected systems to maintain effective data exchange as the number of systems, users, or data volume increases.
Self-Service Analytics	Tools and capabilities that enable users to access and work with data to create analyses and reports without requiring specialized technical knowledge.

Term	Definition
Surveillance	Continuous collection analysis and interpretation of animal health data to inform disease control programmes for actions.
Transboundary animal diseases (TADS)	Animal disease that are highly contagious or transmissible and have the potential for very rapid spread, irrespective of national borders, causing serious socioeconomic and possibly public health consequences.
User Needs	The requirements or expectations that users have for a system or service to perform specific functions or deliver certain benefits.
Use Case	A specific situation or scenario that describes how a system would be used to accomplish a particular goal or task.
Zoonoses (zoonotic diseases)	Infectious diseases that can be spread between animals and humans, by food, water, fomites or vectors.

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