



ONE HEALTH CASES

September 2024

Advancing One Health Capacities in Mozambique: A Case Study of COHESA

Since 2013, Mozambique, has actively started the establishment of One Health (OH) initiatives, forming an OH Secretariat including ministries supported by research institutions, academia, and civil society. Based at the Instituto Nacional de Saúde (INS), the OH Secretariat currently coordinates efforts to prioritize zoonoses, draft an OH Strategic Plan and formalize the OH Platform.

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Abstract

One Health (OH) concept recognizes the interconnectedness of human, animal, environmental and plant health, and the need for collaboration across these sectors to address health challenges. Mozambique is a southern African country and faces a range of health challenges that can benefit from an OH approach. Publications on research and innovation related to OH in Mozambique have been increasing in recent years indicating the growing interest and support to work on OH. Mozambique has developed various policies and frameworks that indirectly support OH objectives. These include policies related to public health, animal health, agriculture, environmental conservation, and disaster management. While these policies may not explicitly mention OH, they often have overlapping goals, such as disease prevention, environmental protection, and food security. Mozambique has also implemented education and awareness campaigns to control and prevent zoonotic diseases such as rabies and COVID-19. These campaigns include posters and community meetings. In addition to the radio and television broadcasts, Mozambique introduced the OH module for a master's degree level. The government also partnered with NGOs and other organizations to provide training for farmers and livestock owners on disease prevention and control. To better understand the OH landscape in Mozambique, a baseline assessment was implemented to understand the stakeholders and opinions of OH as it relates to research and innovation, governance, education, and implementation. A series of key informant interviews, alongside a focus group discussion and desktop review, provided the basis for evaluating strengths, weaknesses, and opportunities in OH in Mozambique.

What is the Incremental Value that Makes this a One Health Case?

This case describes the extent of OH adoption and institutionalization in Mozambique. Mozambique has recognized the importance of OH and has been developing a national strategic plan to guide its implementation based on the Action Plan on Health Security from Portuguese Plano de Acção sobre Segurança Sanitaria (PASS). These plans typically involve multiple government entities, such as the Ministry of Health (MISAU), Ministry of Agriculture and Rural Development (MADER), Ministry of Land and Environment (MTA), and Ministry of Sea, Inland Waters and Fisheries (MIMAIP, 2021). This strategic plan aims to address the interconnectedness of human, animal, and environmental health through collaborative approaches.

After some years of engagement of various governmental entities, a stakeholder net-mapping exercise was organized in 2022 at the country-level to understand the key actors currently involved in the implementation

of OH in Mozambique. It was found out that the institutionalization of a national OH platform would broaden the OH agenda in Mozambique by incorporating other entities such as plant health and the environmental component, which so far, have limited engagement.

The formalization of the OH platform could contribute to creating mechanisms to disseminate OH-related activities in the different institutions and create synergies at the inter-institutional level. However, there are gaps in areas related to innovation, governance, education, and implementation (Fig. 1).



Fig. 1. Mozambique net mapping, Maputo, August 2022.

Learning Outcomes

1. Understand the importance of OH in Mozambique and how OH can be integrated into relevant existing academic programs.
2. Understand the need for formalized policies like a strategic plan OH platform as this will help the process of institutionalization of an OH platform and therefore facilitate implementation of an OH approach.
3. Increasing the collaboration between different institutions such as universities, government entities, and international organizations is needed to further develop and enhance OH education initiatives. These collaborations will promote the establishment of a multidisciplinary approach to dealing with zoonotic diseases at the national level, using OH approach by bringing together the human health, animal health, and environmental authorities.
4. Creation of the regulatory documents to empower the OH platforms and increase the advocacy to have more people engaged in OH activities. Having regulatory documents will make it possible to show at different levels that, the OH platform is a recognized entity. These regulatory documents will ensure that the OH platform addresses the complex and interconnected challenges of public health, animal health, and environmental health, leading to more sustainable and effective health outcomes.

Background and Context

One Health (OH) is a concept that fosters collaborative relationships between human health, animal health, and environmental health partners. Many diseases are emerging and re-emerging in Mozambique due to poor sanitation, the proximity of people to livestock, deforestation, porous borders, climate change, changes in human behavior, and unhygienic food preparation and consumption practices (FAO, 2021). Mozambique is particularly vulnerable to the effects of zoonotic diseases and approximately 81% of the country's labor force is involved in agriculture (CDC.gov, 2018).

Implementation of OH in Mozambique is growing with limited governmental funding. In Mozambique, the history of multisectoral collaboration on zoonotic diseases has been among the four ministries (Health, Agriculture, Fisheries, and Environment) and its collaborators, education, and researcher's institutions. Mozambique has been implementing the OH approach since 2013 (PASS for 2023–2027, (n.d.). Version approved in 2022). Before 2013, the government institutions that work directly or indirectly with the management of zoonoses frequently met during response activities to outbreaks caused by zoonotic diseases. In 2013, there was a decision to create a multisectoral, multidisciplinary group made up of entities that care for human, animal, and environmental health. This group was responsible for establishing the current OH Mozambique Secretariat. The Mozambican OH Secretariat is a group made up of human, animal, and environmental health professionals from different sectors and ministries. This group serves as a bridge between different ministries and working groups and has four working groups: Zoonotic Diseases; Antimicrobial Resistance; Food Security and Water Sanitation; and Hygiene and Biosafety and Biosecurity. This group was responsible for organizing and carrying out various activities:

- joint external evaluation of the World Health Organization (WHO) in 2016;
- development of the National Action Plan for Health Security in Mozambique;
- development of Mozambique's OH strategic plan in 2018;
- holding the workshop on prioritizing zoonotic diseases in Mozambique, 2018;
- development of the OH module for higher education, 2018;
- development of a training package for human, animal, and environmental health professionals using the OH approach, 2019;
- training of human, animal, and environmental health professionals in the southern and northern regions of the country in the OH approach, 2019;
- coordination of integrated response to cyclones IDAI and Keneth in 2019; and
- collaboration in responding to the COVID-19 pandemic.

While these numerous initiatives in OH in Mozambique have been beneficial, it was determined that a better understanding of the OH landscape in Mozambique would facilitate better institutionalization and operationalization of OH. Through the Capacitating One Health in Eastern and Southern Africa (COHESA) project, a team led by experts in OH at Eduardo Mondlane University (UEM) implemented a national baseline assessment to understand the status of OH across the themes of research and innovation, governance, education, and implementation.

Transdisciplinary Process

The One Health approach in Mozambique recognizes the interconnectedness of human, animal, and environmental health and aims to address these challenges collaboratively. The focus on zoonotic diseases, food insecurity, and environmental degradation reflects a holistic understanding of the interconnectedness between human, animal, and environmental health. The COHESA project has helped to integrate all disciplines into understanding the OH status in Mozambique, which has been important to understanding the key actors implementing OH in Mozambique. Knowledge of the stakeholders and how OH is being implemented in Mozambique helps the improvement of the collaboration between different stakeholders regarding the OH approach. Stakeholders are now aware of one another, where areas of overlap exist, and how they can use available strategies to collaborate effectively. The creation of the One Health Platform and the development of the One Health Strategic Plan (OHSP) indicate a commitment to a coordinated and collaborative approach in managing One Health challenges.

Research and innovation

Publications on research and innovation related to OH in Mozambique have been increasing in recent years specifically on topics related to: Rift Valley fever, rabies, bovine tuberculosis, foot-and-mouth disease, and emerging zoonoses in pastoralist areas (Fafetine *et al.*, 2016; Mapatse *et al.*, 2022). These suggest the focus on zoonotic diseases, and that less work is done on other areas of OH such as climate change, environmental and ecosystem health, and antimicrobial resistance.

Mozambique like other Southern African countries, faces a range of health challenges that can benefit from an OH approach and the local universities and research institutions should play a key role in generating evidence and promoting OH policies. For example, UEM, through its various faculties, including the Faculty of Medicine (FACMED), Faculty of Veterinary (FAVET), Biotechnology Center (CB), Instituto Nacional de Saúde, Centro de Investigação de Saude de Manhiça, conducts research and provides training in relevant OH disciplines.

Innovation related to OH in Mozambique includes the development of mobile health (*mHealth*) technologies (Available at: <https://www.malariaconsortium.org/news-centre/expanding-community-based-2018-mobile-health-mhealth-in-mozambique.htm>; <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/03/GSMA-mHealth-Market-Report-Mozambique.pdf>, accessed 1 January 2018). *mHealth* technologies can be used to improve health outcomes by providing access to health information and services through mobile devices.

Governance

The main findings within the OH baseline assessment in Mozambique related to governance revealed that there are important activities and information that are being produced in the OH field by different institutions. However, the integration and collaborative network among different stakeholders remains weak. So, the formalization of the OH platform can possibly contribute to create mechanisms to disseminate OH-related activities in the different institutions and create synergies at the inter-institutional level.

Mozambique has developed various policies and frameworks that indirectly support OH objectives. These include policies related to public health, animal health, agriculture, environmental conservation, and disaster management (PASS for 2023–2027, (n.d.). Version approved in 2022). While these policies may not explicitly mention OH, they often have overlapping goals, such as disease prevention, environmental protection, and food security. The implementation of good policies and advocacy will be helpful for the implementation of the OH approach in all other areas.

Mozambique engages in collaborations with international organizations, such as the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), the World Organization for Animal Health (WOAH) and the United States Agency for International Development (USAID) by financing workshops for activity plans and implementations. These partnerships aim to strengthen OH governance capacities, share knowledge and resources, and align efforts in fighting against zoonotic diseases and promoting sustainable development. For example, the FAO is financing the development of the AMR project using the OH approach.

The National OH Platform in Mozambique is operational although it is not yet institutionalized. It is currently hosted at the National Institute of Health under the Ministry of Health and brings together experts from a range of disciplines, including public health, veterinary medicine, and environmental science, to address complex health issues. The OH platform is part of Interministerial decree already approved and has been involved in several initiatives to address public health and environmental issues.

For example, the platform has been involved in efforts to control the spread of zoonotic diseases, such as rabies and Ebola, which can be transmitted from animals to humans. The platform has also been involved in efforts to improve water and sanitation infrastructure, which can have a significant impact on public health.

Development of the One Health strategic plan in Mozambique (2024–2029)

The OH Strategic Plan in Mozambique was started in 2017 to guide the implementation of the OH approach in the country. The leading ministries responsible for agriculture, the environment, human health, and animal health, and other governmental institutions, worked closely together to produce this strategic plan, together with national and international non-governmental organizations. There is a multidisciplinary working group OH TWG that includes people from different institutions and is responsible for responding or quickly disseminating important information. However, due to various factors including IDA1 and Kenneth cyclones and their consequences in Mozambique and the COVID-19 pandemic requiring drastic investment from the core ministries, the process of drafting the strategic plan was discontinued until the beginning of 2023.

In March 2023, the multisectoral OH technical working group was reunited to restart work on alignment and harmonization of the OH strategy thanks to the support of COHESA. The OH Strategic Plan was reviewed following the OH Joint Plan of Action (2022–2026) of the Quadripartite (FAO *et al.*, 2022), One Health Joint Plan of Action (2022–2026)). A final version of the OH Strategic Plan for Mozambique has been finalized in October 2023 and should be validated by the relevant ministries in the first quarter of 2024.

The OH Strategic Plan aims to strengthen the collaboration and coordination between the different sectors by creating healthy ecosystems enabling people, animals, and plants to live healthy and decent lives with a controlled disease burden and managed health threats. It also ensures effective and efficient coordination and collaboration in the integrated, multidisciplinary and multisectoral implementation of prevention, detection, and response actions to One Health events in Mozambique.

The plan has currently six OH thematic pillars, that could evolve, which include:

1. Research and training
2. Coordination and communication
3. Resources, policy, and governance
4. Preparedness and response
5. Surveillance, laboratory capacity

Until the OH Strategic Plan has been approved and formally implemented, the OH Platform will continue to operate under the direction and guidance of the National Institutes of Health of Mozambique (INS). The plan is to create an OH National Committee in the future, which will have four technical subcommittees to oversee the implementation of specific initiatives in the following fields: (i) zoonotic diseases; (ii) food safety; (iii) antimicrobial resistance; and (iv) emerging threats and has the following objectives:

1. Strengthening the surveillance and response system for zoonotic diseases.
2. Improving the diagnosis and treatment of zoonotic diseases.
3. Enhancing the prevention and control of zoonotic diseases in animals.
4. Promoting public awareness and education on zoonotic diseases.
5. Strengthening the research and development of vaccines and treatments for zoonotic diseases.
6. Improving the collaboration and coordination between the different sectors involved in OH.

Within Mozambique, there are gaps and strengths in OH that have been identified through the baseline assessment. There is limited documentation on OH-specific publications, policy documents, and mandates pertaining to OH in Mozambique. This makes it challenging to assess the full breadth and extent of OH integration. Within Mozambique, there is a need for formalized policies to make the OH approach more cohesive and integrated. Both gaps in documentation and policy are related to limited awareness and integration of OH. Despite the gaps, their awareness of the importance of OH in Mozambique is growing, and the finalization of the OH strategy, and making the OH Platform fully operational will allow for stronger OH leadership, planning, and implementation. The OH strategic plan is in coordination with an inter-ministerial decree that has been drafted by the OH technical committee and is currently in the hands of legal services of the different ministries for approval by parliament (Fig. 2).



Fig. 2. OH strategic plan multisectoral OH technical working group meeting.

Education

From the baseline assessment, we have found that OH education in Mozambique is being promoted through various initiatives and programs, but there is still work to be done to address gaps in education and training and to promote evidence-based policies and practices. The strengths of OH education in Mozambique include the recognition from the KIs and FGD participants of the importance of collaboration and coordination between sectors, while the gaps include the need for more programs and research to support OH initiatives.

Some universities in Mozambique, particularly UEM, have started incorporating aspects of OH into their curricula. The Faculty of Medicine and the Faculty of Veterinary at UEM have been instrumental in offering courses related to zoonotic diseases, epidemiology, environmental health, and related subjects. Introduction to the OH concepts is often included in public health programs at universities. These programs typically cover topics such as infectious disease epidemiology, outbreak investigation, disease surveillance, and environmental health. While not explicitly labeled as “OH” programs, they contribute to creating a foundation for understanding the OH approach.

The Mozambique Field Epidemiology and Laboratory Training Program (MZ-FELTP) is a 2-year, competency-based, postgraduate training (requires a master’s degree) and service program designed to build sustainable public health capacity in applied (PASS for 2023–2027, (n.d.). Version approved in 2022). It was established in August 2010 by INS and the Public Health Directorate of the Ministry of Health (MISAU-DNSP), in partnership with the Medicine Faculty of UEM (FACMED) and the Center for Disease Control (CDC) and prevention support. The program aims to provide students with a comprehensive understanding of OH principles and practices and to equip them with the skills necessary to address complex health challenges.

There are some other training programs for healthcare professionals, veterinarians, and other relevant sectors that incorporate elements of OH such as the In-Service Applied Veterinary Epidemiology Training (ISAVET) program to develop skills in the animal health workforce, hosted by FAO Emergency Centre for Transboundary Animal Diseases (FAO-ECTAD). These programs aim to enhance the knowledge and skills of professionals to effectively address health challenges at the human-animal-environment interface.

The breadth of OH education in Mozambique is relatively broad, with programs and initiatives targeting various education levels and sectors. However, there are still gaps that need to be addressed. For example, there is a need for more undergraduate and postgraduate programs in OH, as well as more training opportunities for health professionals. Additionally, there is a need for more research and data to inform OH policies and practices. This gap in knowledge and information can hinder the development and implementation of effective OH education initiatives.

While there may be recognition of the importance of OH education, the absence of formalized policies or mandates specifically targeting OH curriculum development and implementation is a potential gap. Without clear policies and guidelines, it can be difficult to ensure that OH is integrated into relevant educational programs and that students receive adequate training and exposure to interdisciplinary approaches. Efforts are being made to integrate relevant topics into existing programs and build interdisciplinary collaborations among educational institutions. This is a positive trend that can help to address the gaps and strengthen the overall capacity for OH education and practice in the country.

Mozambique has the potential to strengthen partnerships and collaboration between universities, government entities, and international organizations to further develop and enhance OH education initiatives. By working together and sharing resources and expertise, stakeholders can overcome the challenges and gaps in OH education and promote a more integrated and holistic approach to health and well-being.

Implementation

Mozambique has made progress in implementing OH approaches to control and prevent zoonotic diseases. Collaborative efforts between the Ministry of Health, Ministry of Agriculture and Food Security, and other relevant stakeholders have resulted in improved surveillance, response systems, and public health interventions for diseases like rabies, anthrax, and brucellosis (PASS for 2023–2027, (n.d.), Version approved in 2022). The implementation of the Mozambique National Rabies Control Strategy (2020–2024) and the implementation of the National Action Plan against Antimicrobial Resistance (NAP-AMR) 2019–2023) help guide implementation that considers the use of an OH approach (PASS for 2023–2027,

(n.d.), Version approved in 2022). The implementation of the NAP-AMR 2019–2023 in Mozambique has resulted in the development of guidelines for managing common infections, the establishment of a national AMR surveillance system, increased awareness of AMR among healthcare professionals and the public, and improvements in laboratory capacity for diagnosis of infectious diseases. These outcomes will aid in reducing the development of resistance, guiding the appropriate use of antibiotics, and supporting effective treatment strategies.

The Joint External Evaluation and Plan of Action for Health Security initiatives have played a crucial role in improving health security in Mozambique. The implementation of these initiatives has led to significant improvements in disease surveillance systems, laboratory capacity, emergency response systems, and food and chemical safety (PASS for 2023–2027, (n.d.). Version approved in 2022). However, there is still work to be done to ensure that Mozambique's health system is fully prepared to prevent, detect, and respond to public health threats.

OH implementation in Mozambique has also focused on wildlife conservation and ecosystem health. Efforts by organizations such as the National Administration of Conservation Areas (ANAC) and the Biotechnology Center (CB/UEM) have contributed to the understanding of the relationship between wildlife, human health, and environmental integrity.

Project Impact

In Mozambique, the COHESA project promoted the initial engagement with the government and other OH stakeholders. The activities started with a stakeholder net-mapping exercise in 2022, which was very important to understand the key actors of the implementation of OH in Mozambique and their relationships at the onset of the project. Stakeholders from different ministries (Agriculture, Health, Environment, and Fisheries), academia, and the private sector, took part to the workshop. Net-mapping is the process of determining who influences a process or approach, and in this case the aim was to determine who the key influencers were in implementing an OH approach in Mozambique.

Later, an OH assessment tool was implemented using a literature review and key informant interviews (KII) followed by a group discussion (GD). The interviews with the key informants started in November 2022 with the plan to interview 15 members, from Government institutions (5), private institutions (5), and academic institutions (5), respectively. As a result of the interviews, private stakeholders represented 26.6%; Government entities 33.3%, academic institutions 26.6%, and research institutes 13.5%.

Overall, of the 15 people interviewed, 47% were female and 53% were male. The KII gave us an overview of the OH state and process in Mozambique in different institutions, gaps, weaknesses, opportunities, and issues that must be enhanced. The GD was attended by 9 participants (5 females and 4 males) from different institutions such as the government, academia, private sector, and research institutions.

The main outputs revealed that the OH approach in Mozambique is at an early stage, and there is a need for greater dissemination of the activities being undertaken to allow for more comprehensive knowledge. There are gaps in all areas of training as information to the citizens is important to change the way they behave. These gaps are seen from the lowest level of education/training to a professional with higher education.

OH policies and advocacy will be a foundation for the implementation of the OH approach in all other areas. Secondly, it turned out that the education of professionals on the importance of the OH approach at health events was found to be important. This education/training can be anchored in educational institutions to further integrate OH in Mozambique. After the baseline and net-mapping findings were shared with the different stakeholders, a collaborative multisectoral and multidisciplinary group needs to be trained on the OH approach to move this approach forward in Mozambique.

Project Outlook/Conclusions

OH, requires collaboration among different sectors, including human health, animal health, agriculture, environment, wildlife, and the education sector. In Mozambique, there have been efforts to build OH capacity through various initiatives. The Ministry of Health has established an OH TWG to coordinate OH activities. The government has also partnered with international organizations to implement OH projects, such as the USAID-funded OH Workforce project. It is important to enhance the advocacy to the higher

levels of government to improve the implementation of the OH activities. COHESA plans include advocacy training in Mozambique to further strengthen the OH institutionalization within the government and more broadly. One challenge in OH implementation is the need for enhanced capacity building at various levels, including healthcare professionals, veterinarians, and other relevant sectors. Strengthening educational programs and training opportunities can help to create a multidisciplinary workforce capable of addressing complex health issues. Within COHESA, there are initiatives in Mozambique to strengthen OH education at the higher education level, and this will help prepare the future OH workforce to work within the new OH strategy being finalized for Mozambique.

Group Discussion Questions

1. Which stakeholders would you consider to evaluate the One Health capacities in Mozambique?
2. Do you think there is a broad enough spectrum of disciplines and fields of expertise currently working on OH in your country?
3. Do you feel there are any gaps in OH education in your country? Please explain where these gaps are.
4. Does your country have a common OH plan/objectives to guide OH work? Do you follow it – why or why not?

Conflict of interest

The authors have no conflicts of interest to declare.

Acknowledgments

Ministry of Health (MISAU), Ministry of Agriculture (MADER), Ministry of Fishery (MIMAPI), Ministry of Land and Environment (MTA), Non-Governmental Organizations (NGOs), Civil Society, Manhiça Research investigation (CISM), Veterinary Faculty (FAVET), Medicine Faculty (FAMED) Faculty of Biology and Science – UEM, Faculty of engineering – UEM for participating on the discussion related to One Health issues.

Funding statement

Capacitating One Health in Eastern and Southern Africa (COHESA) FED/2021/428-198 is co-funded by the OACPS Research and Innovation Programme, a programme implemented by the Organization of African, Caribbean and Pacific states (OACPS) with the financial support of the European Union.

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