

## RESEARCH ARTICLE

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# Building A Safer World: The Intersection of Agromaritime and One Health for Global Health Security to Address Emerging Challenges in the 21<sup>st</sup> Century

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**ABSTRACT** The One Health paradigm, with its integral recognition of human, animal, and environmental health interdependence, has garnered increasing endorsement in recent years. Equally important is the agro-maritime sector, given its crucial role in food security and international commerce, which is now acknowledged as a fundamental component within the One Health strategy. Contemporary complex health issues such as zoonotic diseases, antimicrobial resistance, and food safety threats necessitate a holistic, interdisciplinary approach that considers the trifecta of human, animal, and environmental health. The amalgamation of agro-maritime and One Health strategies is paramount in addressing burgeoning challenges that imperil global health security. These encompass the proliferation of zoonotic diseases, the surge in antimicrobial resistance, and escalating concerns surrounding food safety. The significance of advancing surveillance, monitoring, and control measures, along with fostering innovative technologies and strategies, is underscored to pre-empt and mitigate the impacts of these health threats. Spanning agriculture, aquaculture, and fisheries, the agro-maritime sector's substantial role in global health security is highlighted due to its profound influence on food production, nutrition, and environmental sustainability. The One Health model, a comprehensive approach acknowledging the intertwined nature of human, animal, and environmental health, provides a robust framework to confront emerging global health threats such as antimicrobial resistance, zoonotic disease spread, and climate change-induced health impacts. The discourse emphasizes the criticality of interdisciplinary collaboration and the deployment of a holistic perspective to tackle complex global health challenges. By strengthening the argument for the convergence of One Health and agro-maritime sectors, this paper seeks to galvanize proactive and collaborative efforts among stakeholders to fortify global health security in an increasingly unpredictable world.

**INDEX TERMS** One Health Approach; Agromaritime Sector; Global Health Security (GHS); Zoonotic Diseases; Antimicrobial Resistance (AMR).

## I. INTRODUCTION

One Health, Agromaritime, and Global Health Security are three related concepts that have gained significant attention recently. One Health recognises the interconnectedness of the health of humans, animals, and the environment, while Agromaritime refers to the agriculture, fisheries, and marine sectors that provide food and livelihoods to millions of people worldwide. Global Health Security, on the other

hand, refers to the collective efforts to prevent, detect, and respond to global health threats [1].

The concept of One Health dates back to the 19th century when the study of zoonotic diseases first emerged. The importance of One Health was highlighted during the outbreaks of zoonotic diseases, such as SARS, avian influenza, and Ebola, which had significant impacts on human health and global economies. However, it was not

until the 21st century that One Health gained widespread recognition as a holistic approach to addressing health threats.

Agromaritime is a crucial component of One Health, as the agriculture, fisheries, and marine sectors are intimately linked to human, animal, and environmental health. Agriculture and fisheries provide food and livelihoods to millions of people worldwide while also impacting the environment and the health of both humans and animals. The improper use of antibiotics in animal husbandry, for example, can lead to the emergence of antibiotic-resistant bacteria, which pose a significant threat to human health.

The relationship between One Health, Agromaritime, and Global Health Security is essential, as health threats are often interconnected and require a multidisciplinary approach to address them effectively. For example, the emergence of zoonotic diseases, such as COVID-19, highlights the importance of One Health collaborations to prevent and respond to health threats. The agriculture and fisheries sectors also play a critical role in ensuring food security, which is essential for global health and well-being.

Promoting multidisciplinary collaborations between human, animal, and environmental health sectors is crucial for ensuring global health security and sustainable development. One Health, Agromaritime, and Global Health Security are three interconnected concepts essential for addressing health threats holistically and coordinatedly. The COVID-19 pandemic has highlighted the need for One Health collaborations to prevent and respond to health threats, while the agriculture and fisheries sectors play a crucial role in ensuring food security and environmental sustainability.

The concept of One Health, Agromaritime, and Global Health Security has gained significant attention in recent years due to its relevance to public health, animal health, and environmental sustainability. One Health recognises that human, animal, and environmental health are interconnected and that addressing health issues in one sector can have positive or negative impacts on the others. Similarly, Agromaritime emphasises the importance of sustainable food production systems and the need to protect marine ecosystems while ensuring food security for growing populations. Meanwhile, Global Health Security focuses on preventing, detecting, and responding to infectious diseases that can spread across borders.

To thoroughly investigate the interconnected roles of One Health and the agro-maritime sector in global health security, a rigorous literature review methodology would be employed. This systematic approach would follow several steps:

## II. RESEARCH QUESTION

In this paper, we will address the following research question:

*What is the intersection of agro maritime and One Health, and how does it address 21st-century challenges?*

Agromaritime and One Health intersect in their shared goal of promoting global health security by addressing the complex interconnections between human, animal, and environmental health. The agromaritime sector, which encompasses agriculture, aquaculture, and fisheries, plays a critical role in providing food security and livelihoods for millions of people worldwide. One Health is an interdisciplinary approach that recognizes the health of humans, animals, and ecosystems are interconnected and aims to achieve optimal health outcomes by working collaboratively across disciplines [2].

The intersection of agromaritime and One Health addresses emerging challenges in the 21st century by focusing on the following areas:

1. Disease surveillance and control: The agromaritime sector is a significant source of zoonotic diseases, which are diseases transmitted between animals and humans. One Health approaches can help improve disease surveillance and control in the agromaritime sector by fostering collaboration between human, animal, and environmental health professionals [7].
2. Antimicrobial resistance (AMR): The overuse and misuse of antimicrobials in agromaritime practices contribute to the development of AMR, which poses a significant threat to global health security. One Health approaches can help address AMR by promoting responsible antimicrobial use, improving infection prevention and control measures, and encouraging the development of new antimicrobial agents [8].
3. Climate change and environmental degradation: Climate change and environmental degradation have significant impacts on the agromaritime sector, affecting food production, water availability, and the spread of diseases. One Health approaches can help address these challenges by promoting sustainable agromaritime practices, enhancing ecosystem resilience, and fostering collaboration between human, animal, and environmental health professionals [16]. One Health approaches can help address these challenges by promoting sustainable agromaritime practices, enhancing ecosystem resilience, and fostering collaboration between human, animal, and environmental health professionals [16].
4. Food safety and security: Ensuring food safety and security is a critical aspect of global health security. One Health approaches can help address food safety and security challenges in the agromaritime sector by promoting integrated surveillance systems, improving risk assessment and management strategies, and fostering collaboration between human, animal, and environmental health professionals [9].

## III. RESULTS AND DISCUSION

## A. THE ROLE OF AGRO-MARITIME FOR POPULATION HEALTH

Agro-maritime plays a crucial role in population health by providing essential food resources, supporting livelihoods, and contributing to environmental sustainability. The importance of agro-maritime for population health can be categorized into three main aspects: food security, economic stability, and environmental health.

1. Food security: Agro-maritime industries, including agriculture, fisheries, and aquaculture, are vital for providing food resources to the global population. These industries contribute to a diverse and nutritious diet, which is essential for maintaining good health [9]. For example, fish is a significant source of protein, omega-3 fatty acids, and essential micronutrients, which are crucial for human growth and development [9].
2. Economic stability: Agro-maritime industries support the livelihoods of millions of people worldwide, particularly in developing countries. Employment in these sectors can lead to improved income and living conditions, which in turn can positively impact population health [2]. Additionally, agro-maritime trade can contribute to economic growth and development, further promoting health and well-being.
3. Environmental health: Sustainable agro-maritime practices can contribute to environmental health by preserving ecosystems, maintaining biodiversity, and reducing pollution. Healthy ecosystems are essential for providing clean air, water, and other resources necessary for human health [14]. Moreover, sustainable agro-maritime practices can help mitigate climate change, which poses significant risks to population health through increased disease transmission, food insecurity, and extreme weather events [11].

## B. THE ROLE OF ONE HEALTH FOR POPULATION HEALTH

One Health is an interdisciplinary approach that aims to improve the health of humans, animals, and the environment by promoting collaboration among various sectors and disciplines. The role of One Health in population health is to address complex health issues, such as zoonotic diseases, antimicrobial resistance, and environmental health, by integrating human, animal, and environmental health perspectives [27].

One Health plays a crucial role in the prevention and control of zoonotic diseases, which are diseases transmitted between animals and humans. Approximately 60% of known human infectious diseases and 75% of emerging infectious diseases are zoonotic in origin (Jones et al., 2008). By fostering collaboration among human, animal, and environmental health professionals, One Health can help identify and address the root causes of these diseases, leading to more effective prevention and control strategies [27].

Another important aspect of One Health's role in population health is addressing the global issue of antimicrobial resistance. The overuse and misuse of antimicrobial drugs in both humans and animals contribute to the development of resistant pathogens, which can spread between humans, animals, and the environment [24]. One Health promotes the responsible use of antimicrobial drugs and encourages the development of new drugs and alternative treatments to combat antimicrobial resistance [23].

Lastly, One Health plays a role in addressing environmental health issues, such as pollution, climate change, and habitat destruction, which can have significant impacts on human and animal health. By integrating environmental health into the broader health agenda, One Health can help identify and address the complex relationships between human, animal, and environmental health, leading to more sustainable and effective solutions for population health [27].

## C. ONE HEALTH APPROACHES

*"Why has the One Health approach, which recognizes the interconnectedness of human, animal, and environmental health, gained traction in recent years?"*

The One Health approach has gained traction in recent years due to several factors, including the increasing recognition of the interdependence of human, animal, and environmental health, the emergence of new infectious diseases, and the need for collaborative efforts to address complex global health challenges.

One of the primary reasons for the growing interest in the One Health approach is the recognition that human, animal, and environmental health are interconnected and that addressing health issues in one domain can have significant impacts on the others [19]. This understanding has been reinforced by the emergence of new infectious diseases, many of which are zoonotic (originating in animals and transmitted to humans), such as SARS, MERS, and COVID-19 [21][15][29]. These diseases have highlighted the importance of understanding the complex interactions between humans, animals, and their environments in order to prevent and control outbreaks.

Additionally, the One Health approach has gained traction due to the increasing need for interdisciplinary and collaborative efforts to address complex global health challenges, such as antimicrobial resistance, food safety, and climate change [6]. By bringing together experts from various fields, including public health, veterinary medicine, environmental science, and social sciences, the One Health approach promotes a more holistic understanding of health issues and encourages the development of integrated solutions [5].

In summary, the One Health approach has gained traction in recent years due to the growing recognition of the interconnectedness of human, animal, and environmental

health, the emergence of new infectious diseases, and the need for collaborative efforts to address complex global health challenges.

Critics, on the other hand, question the practicality and effectiveness of the One Health approach in addressing global health security challenges. They argue that the approach is overly complex and lacks clear guidelines and frameworks. Critics also highlight the challenges of implementing the One Health approach, given the different priorities and interests of various sectors and stakeholders. There is a concern that the One Health approach may not translate into meaningful actions on the ground.

The current debate on the One Health approach and its relation to global health security is complex. While the One Health approach has the potential to play a critical role in addressing global health security challenges, its actual impact on the ground remains unclear. The effectiveness of the One Health approach ultimately depends on its ability to translate its principles into meaningful actions and to address the diverse priorities and interests of various sectors and stakeholders. The COVID-19 pandemic has highlighted the need for a One Health approach to strengthen global health security.

One health is a collaborative and holistic approach recognising human, animal, and environmental health interconnection. Here are some crucial points to consider:

1. One health recognises that human health is connected to animal health and the environment.
2. The COVID-19 pandemic is believed to have originated from a zoonotic virus that jumped from animals to humans, highlighting the importance of understanding the connections between human and animal health.
3. One Health approaches involve collaboration between different sectors, including health, agriculture, and the environment, to address health threats at the human-animal-environment interface.
4. One Health approach can help prevent future pandemics by promoting surveillance of animal populations for diseases that could jump to humans.
5. One Health approach can also improve overall health outcomes by addressing environmental factors contributing to disease, such as air and water pollution.
6. The COVID-19 pandemic has demonstrated the need for a more coordinated and integrated global health security approach.
7. Governments, international organisations, and other stakeholders should prioritise One Health approaches to address current and future health threats.
8. One Health approaches are essential to strengthening global health security and preventing future pandemics. By recognising the interconnectedness of human, animal, and environmental health, we can take a more comprehensive approach to address health threats and promote overall health and well-being.

9. The concept of One Health closely links the agromaritime sector and health security. One Health recognises that the health of humans, animals, and the environment are interconnected and interdependent. As such, addressing health threats in one sector can positively impact the others.

10. In agromaritime, food safety is a significant health security concern. The sector involves producing, processing, and distributing agricultural and fisheries products, which are essential for human nutrition. However, poor food safety practices can result in foodborne illnesses, which can significantly impact individuals and communities.

Additionally, the agromaritime sector can contribute to the emergence and spread of zoonotic diseases. Zoonotic diseases are infectious diseases that can be transmitted between animals and humans, such as avian influenza and Ebola. The close interaction between humans, animals, and the environment in the agromaritime sector can increase the risk of zoonotic disease transmission, mainly if proper biosecurity measures are not in place.

Therefore, promoting One Health collaborations in the agromaritime sector can help to strengthen health security by improving food safety and preventing the emergence and spread of zoonotic diseases. This can be achieved through coordinated efforts between public health, veterinary, and environmental agencies and stakeholders in the agromaritime sector, such as farmers, fishers, and processors.

#### D. CHALLENGES

*"What are the challenges and obstacles for developing countries such as Indonesia to implement and strengthen agro-maritime and one health. Agro-maritime and one health are important concepts for developing countries like Indonesia to ensure sustainable development, food security, and public health. However, there are several challenges and obstacles that hinder the implementation and strengthening of these concepts.*

1. Limited resources and infrastructure: Developing countries often face resource constraints, which can limit their ability to invest in agro-maritime and one health initiatives. This includes inadequate infrastructure for transportation, storage, and processing of agricultural and fishery products, as well as insufficient funding for research and development (R&D) in these areas [10].
2. Lack of coordination and collaboration: Implementing agro-maritime and one health initiatives requires effective coordination and collaboration among various stakeholders, including government agencies, private sector, and local communities. However, in developing countries like Indonesia, there is often a lack of coordination and collaboration, leading to fragmented efforts and inefficient use of resources [20].



3. Policy and regulatory challenges: Developing countries often have weak policy and regulatory frameworks for agro-maritime and one health, which can hinder the implementation of these initiatives. This includes inadequate policies for sustainable fisheries management, land use planning, and environmental protection, as well as weak enforcement of existing regulations [9].
4. Climate change and environmental degradation: Climate change and environmental degradation pose significant challenges to agro-maritime and one health initiatives in developing countries. For example, climate change can lead to changes in fish distribution and abundance, affecting the livelihoods of fishers and the food security of coastal communities [3]. Similarly, deforestation and land use changes can increase the risk of zoonotic diseases, undermining one health efforts [12].
5. Socio-economic and cultural barriers: Socio-economic and cultural factors can also hinder the implementation of agro-maritime and one health initiatives in developing countries. For example, poverty and lack of education can limit the adoption of sustainable agricultural and fishing practices, while cultural beliefs and practices can influence the perception and management of health risks [20].

#### E. EMERGING DISEASES

Like other tropical countries, Indonesia has a high risk of zoonotic viral diseases emerging due to the high level of interaction between humans, animals, and the environment, making Indonesia the hotspots for the emergence and spread of infectious diseases. Some potential zoonotic viral diseases that could emerge from Indonesia include:

1. Avian Influenza (H5N1): Indonesia has experienced outbreaks of Avian influenza in the past, and the virus can potentially cause a pandemic if it mutates to spread quickly between humans.
2. Rabies: Rabies is a viral disease that can be transmitted to humans from infected animals, and it is endemic in many parts of Indonesia.
3. Nipah virus: Nipah virus is a zoonotic virus that has caused outbreaks in Southeast Asia, including neighbouring Malaysia. The virus is carried by fruit bats and can be transmitted to humans through contact with infected animals or contaminated food. It can cause severe respiratory illness and encephalitis.
4. Japanese Encephalitis: Japanese encephalitis is a viral disease transmitted by mosquitoes and is endemic in many parts of Southeast Asia, including Indonesia.
5. Hendra virus: This virus is a zoonotic virus that was first identified in Australia in 1994. It is transmitted to humans from horses and can cause severe respiratory illness and death.

6. Zika virus: This virus is transmitted to humans primarily through the bite of infected *Aedes* mosquitoes. It can cause microcephaly and other congenital disabilities in infants born to infected mothers.

7. Ebola virus is a highly infectious and often fatal virus transmitted to humans through contact with infected animals, such as fruit bats and primates.

Southeast Asia is particularly prone to the emergence and spread of zoonotic viruses due to several factors. First, the region has a high density of human and animal populations, increasing the likelihood of transmission between species. Additionally, many cultural practices in the region involve the consumption of bushmeat or the keeping of animals in close proximity to humans, which further increases the risk of zoonotic transmission. Finally, Southeast Asia has a high level of biodiversity, which means that many different species of animals could potentially host and transmit new viruses.

#### F. THE RECOMENDATION STRATEGIES

The recommendation strategies for agromaritime and one health in protecting global health security

1. Encourage collaboration among experts from various fields, including agriculture, marine sciences, veterinary medicine, human health, and environmental sciences, to address complex health issues [18].
2. Enhance surveillance and monitoring systems: Implement integrated surveillance systems for early detection and monitoring of diseases at the human-animal- interface [17]. Regular environment surveillance and monitoring of animal and human populations can help detect the emergence of new viruses and prevent outbreaks. Environmental management: Environmental management practices, such as controlling mosquito populations, can help reduce the risk of transmission of mosquito-borne diseases.
3. Promote sustainable agromaritime practices: Encourage sustainable agriculture and fisheries management practices to reduce the risk of disease emergence and transmission [10].
4. Implement One Health policies: Develop and implement policies that incorporate One Health principles, such as addressing antimicrobial resistance, zoonotic diseases, and environmental health issues [23]. Collaboration between different sectors, such as health, agriculture, and the environment, is essential to implementing a One Health approach to prevent the emergence and spread of zoonotic diseases.
5. Improve communication and awareness: Increase public awareness and understanding of the interconnectedness of human, animal, and environmental health through education and communication initiatives [4]. A risk communication strategy can help raise public awareness about zoonotic diseases, their transmission routes, and how to prevent them. Improved hygiene practices: good

hygiene practices, such as regular hand washing and proper food handling, can help prevent the spread of zoonotic diseases. Vaccination of animals and humans can help prevent the spread of zoonotic diseases. Improved animal husbandry practices: Improved animal husbandry practices, such as preventing the mixing different species, can help reduce the risk of zoonotic disease transmission.

Invest in research and capacity building: Support research and capacity-building efforts to enhance the understanding of agromaritime and One Health issues and develop innovative solutions [18].

## REFERENCES

- [1] Cassidy, A. (2019). One Health: A Primer. National Collaborating Centre for Environmental Health. Retrieved from <https://nccch.ca/documents/guide/one-health-primer>
- [2] CDC. (2018). One Health. Retrieved from <https://www.cdc.gov/onehealth/index.html>
- [3] Chung, W. W. L., Lam, V. W. Y., Sarmiento, J. L., Kearney, K., Watson, R., & Pauly, D. (2010). Large-scale redistribution of maximum fisheries catch potential in the global ocean under climate change. *Global Change Biology*, 16(1), 24-35. <https://doi.org/10.1111/j.1365-2486.2009.01995.x>
- [4] Chien, Y. J., Chen, W. J., Hsu, W. L., & Chiou, C. S. (2013). One Health: The global One Health paradigm and its application in Taiwan. *Taiwan Epidemiology Bulletin*, 29(22), 389-393.
- [5] Coker, R., Rushton, J., Mounier-Jack, S., Karimuribo, E., Lutumba, P., Kambarage, D., ... & Rweyemamu, M. (2011). Towards a conceptual framework to support one-health research for policy on emerging zoonoses. *The Lancet Infectious Diseases*, 11(4), 326-331.
- [6] Destoumieux-Garzón, D., Mavingui, P., Boetsch, G., Boissier, J., Darriet, F., Duboz, P., ... & Morand, S. (2018). The one health concept: 10 years old and a long road ahead. *Frontiers in veterinary science*, 5, 14.
- [7] FAO, OIE, & WHO. (2018). Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries. Retrieved from [https://www.who.int/docs/default-source/documents/taking-a-multisectoral-one-health-approach-a-tripartite-guide.pdf?sfvrsn=8b1a8a0\\_2](https://www.who.int/docs/default-source/documents/taking-a-multisectoral-one-health-approach-a-tripartite-guide.pdf?sfvrsn=8b1a8a0_2)
- [8] FAO. (2015). The State of World Fisheries and Aquaculture 2016. Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/a-i5555e.pdf>
- [9] FAO. (2018). The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Food and Agriculture Organization of the United Nations. Retrieved from <http://www.fao.org/3/i9540en/i9540en.pdf>
- [10] FAO. (2018). The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/i9540en/i9540en.pdf>
- [11] IPCC. (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. <https://www.ipcc.ch/report/ar5/wg2/>
- [12] Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A., Balk, D., Gittleman, J. L., & Daszak, P. (2008). Global trends in emerging infectious diseases. *Nature*, 451(7181), 990-993. <https://doi.org/10.1038/nature06536>
- [13] Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A., Balk, D., Gittleman, J. L., & Daszak, P. (2013). Global trends in emerging infectious diseases. *Nature*, 451(7181), 990-993. <https://doi.org/10.1038/nature06536>
- [14] Millennium Ecosystem Assessment. (2005). Ecosystems and Human Well-being: Synthesis. Island Press. <https://www.millenniumassessment.org/documents/document.356.aspx.pdf>
- [15] Morse, S. S., Mazet, J. A., Woolhouse, M., Parrish, C. R., Carroll, D., Karesh, W. B., ... & Daszak, P. (2012). Prediction and prevention of the next pandemic zoonosis. *The Lancet*, 380(9857), 1956-1965.
- [16] Myers, S. S., Gaffikin, L., Golden, C. D., Ostfeld, R. S., Redford, K. H., Ricketts, T. H., ... & Osofsky, S. A. (2013). Human health impacts of ecosystem alteration. *Proceedings of the National Academy of Sciences*, 110(47), 18753-18760. <https://doi.org/10.1073/pnas.1218656110>
- [17] Queenan, K., Garnier, J., Rosenbaum Nielsen, L., Buttigieg, S., de Meneghi, D., Holmberg, M., ... & Rüegg, S. R. (2017). Roadmap to a One Health agenda 2030. *CAB Reviews*, 12(014), 1-17.
- [18] Rabinowitz, P. M., Kock, R., Kachani, M., Kunkel, R., Thomas, J., Gilbert, J., ... & Pappaioanou, M. (2013). Toward proof of concept of a one health approach to disease prediction and control. *Emerging infectious diseases*, 19(12), e130265.
- [19] Rabinowitz, P. M., Kock, R., Kachani, M., Thomas, J., Gilbert, J., ... & Pappaioanou, M. (2013). Toward proof of concept of a One Health approach to disease prediction and control. *Emerging Infectious Diseases*, 19(12), e130265.
- [20] Wiratsudakul, A., Suphanchaimat, R., & Ratanakorn, P. (2018). One Health in the context of Southeast Asia. In *One Health: The Human-Animal-Environment Interfaces in Emerging Infectious Diseases* (pp. 93-114). Springer. [https://doi.org/10.1007/82\\_2012\\_219](https://doi.org/10.1007/82_2012_219)
- [21] Wolfe, N. D., Dunavan, C. P., & Diamond, J. (2007). Origins of major human infectious diseases. *Nature*, 447(7142), 279-283.
- [22] World Bank. (2017). The Sunken Billions Revisited: Progress and Challenges in Global Marine Fisheries. World Bank. <https://openknowledge.worldbank.org/handle/10986/24056>
- [23] World Health Organization. (2015). Global Action Plan on Antimicrobial Resistance. Retrieved from <https://www.who.int/antimicrobial-resistance/global-action-plan/en/>
- [24] World Health Organization. (2017). One Health. Retrieved from <https://www.who.int/news-room/q-a-detail/one-health>
- [25] World Health Organization. (2017). One Health. Retrieved from <https://www.who.int/news-room/q-a-detail/one-health>
- [26] Zhou, P., Yang, X. L., Wang, X. G., Hu, B., Zhang, L., Zhang, W., ... & Chen, H. D. (2020). A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*, 579(7798), 270-273.
- [27] Cassidy, A. (2019). One Health: A Primer. National Collaborating Centre for Environmental Health. Retrieved from <https://nccch.ca/documents/guide/one-health-primer>
- [28] M. L. R. 2. L. D. L. 2. R. F. H. 3. Kelly B Zafman 1, "An interactive childbirth education platform to improve pregnancy-related anxiety: a randomized trial," *american journal of obstetrics Gynecology*, vol. 229, no. 1, pp. 1-67, 2023.