"One Health Approach" Towards Effective Health Services Delivery in Sixty Years of Independent Tanzania

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Abstract

The year 2021 marked sixty years of Tanzania's independence. Tanzania passed through different phases of development and attempted innumerable interventions, including a series of "development alternatives" to fight poverty, hunger, and infectious diseases. These efforts towards effective health services provision treated humans, animals, and environmental health separately. Due to the increase in human, livestock, wildlife, and environment interactions, the efforts did not result in the anticipated health outcomes. This prompted the government to search for an alternative approach. Cognizant of this, the government introduced the "One Health Approach (OHA)", which recognizes health as one, without a dividing line between humans, animals, and environmental health. This paper, therefore, analyzes (i) the debates for advancing effective health services delivery sixty years after independence; (ii) an emerging approach for interdisciplinary collaboration for human, animal, and environmental health, which is considered to have the potential for effective delivery of health services; and, (iii) the relevance of the OHA towards minimizing the undesirable impacts of human, livestock, and wildlife interactions on health. A documentary analysis (documentary research method) was employed to gather the information for the study. OHA is at its infancy stage, though this initiative signifies an essential landmark towards dealing with health-related challenges reflected at the convergence of humans, animals, and the environment. The milestone is outstanding as it leads to building fundamental capacities concerning public health, particularly regarding preparedness and response as per International Health Regulations. The OHA underscores the need for collaborative working efforts involving human, livestock, wildlife, and environmental health professionals for optimal human, animal, and environmental health attainment. There is a need to upscale the OHA and further understand the consequences of the interactions for optimum human, animal, and environmental health. Therefore, it conveys the idea that it is necessary to expand and enhance the OHA and the importance of comprehending the implications of the interactions for the well-being of humans, animals, and the environment.

Keywords: *Human-Livestock -Wildlife Interaction, Human-Animal -Environment Health, One Health Approach, Interdisciplinary Collaboration, Tanzania*

Introduction

Tanzania's mainland attained independence from the British colonialists in 1961. The country, right at the beginning of independence, was found at the yoke of several challenges, which necessitated the need to get rid of these challenges and drive towards national prosperity. Since then, Tanzania has passed into different development pathways, attempting innumerable

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interventions, discourses, and approaches. These included a series of "development alternatives" to fight poverty, hunger, and diseases (Mwabukojo, 2019; Mujinja & Kida, 2014; COWI *et al.*, 2007).

The government in Tanzania, towards the attainment of development goals, had to prioritize the interventions, with priority directed in the health sector. This was important for national development since adequate health services provision was expected to contribute significantly to creating a society with limited incidence of diseases. Unquestionably, *ceteris paribus*, national development attainment, *inter alia*, relies on population quality, a crucial parameter for economic development. The quality of the population is determined, leaving alone other factors, by good health. It remains uncontested that good health is a foundation stone of development in all societies (, 1993; Lennock & Ehrenpreis, 2003; URT, URT, 2003a, b; 2007a; IMF, 2004; WHO, 2010; WHO, 2012a; 2012b; Levin-Zamir *et al.,* 2017). This rests on an understanding that the health status of a society is viewed in the context of holding the potentiality of impacting the other sectors in the society in a given polity (politics, society, and the economy inclusive) (Baruch & Clancy, 2000; Bloom *et al.*, 2004; Kickbusch, 2005; Williamson, 2008; Sørensen *et al.,* 2015; Riegelman, & Wilson, 2016; World Bank, 2021; Ridhwan *et al.,*2022; Bloom *et al.,* Saltman, 2018; Rubenstein, 2020; Dawes *et al.,* 2022; Hargrove *et al.,* 2022; Muhanga & Mapoma, 2019).

The livelihood is intensely in the existence of good health that labor productivity can be boosted, educational goals can be attained, and efficient income can be generated; all will have a cumulative effect on poverty reduction (Udoh & Ajala, 2001; Bloom *et al.*, 2004). Inversely, the society, politics, and the economy of a particular society likewise impact the health status of individuals in a particular society (Sayah & Williams, 2012; Edwards *et al.,* 2012). It should be noted that in the context of ill-health and diseases, the chances for economic growth and transition to national development in least-developed countries seem to be illusive (Bloom & Canning 2000, 2004; Strittmatter & Sunde, 2011; WHO et al., 2013). In view of this, the Sustainable Development Goals (SDGs) have recognized the relevance of health towards prosperity and well-being and hence set aside an independent goal to deal with health; this is SDG 3 on "good health and well-being". Even the achievement of the rest of the sixteen (16)

goals depends on good health. This is also what the architects of national development in Tanzania recognized right after independence; hence, their vision had to focus on the fact that achieving development goals calls for improving the health status of a nation's population.

In the efforts to fight diseases and improve the health of the population in the country, the government of Tanzania had to massively invest in primary health care services provision, which was mostly by then under the ownership of the government (Kanyabwoya, 2021; Mboera, 2012). It is reported by Wangwe *et al.* (1998) that around the 1980s, Tanzania experienced a severe economic crisis, which significantly affected the management and financing of basic social amenities and inclusive healthcare services. After experiencing the crisis, the government of Tanzania found it worthwhile to involve the private sector in health services delivery. It should be noted that Tanzania has attempted countless efforts in the realization of effective health services delivery since its independence in 1961 (Dominicus & Akamatsu, 1989; MOHCDGEC, 2016; Yahya & Mohamed, 2018). However, throughout the observed period, concerning health services, aspects of humans, animals, and environmental health were treated as independent entities; humans, animals, and environmental health were not recognized as one.

Undeniably, there have been innumerable developments in the health services provision environment since Tanzania attained political independence in 1961. These developments resulted in new demands which ultimately necessitated dramatic changes in the delivery of health services in Tanzania within the sixty years of independence (Renggli *et al.*, 2019; Kessy *et al.,*2008; Boex *et al*., 2015; Kanyabwoya, 2021*;* Kapologwe *et al.,* 2020). This notably includes the changes brought by the circumstances that unfolded in the past decade, forcing a broad shift in approach and policy. The shift in approach, *inter alia*, was observed from the former, which focused on treating health services provision aspects separately for animals, humans, and the environment, to an interdisciplinary collaborative approach, which recognizes health as one. It is well documented (Woodroffe *et al.,* 2005; Magige, 2012; Verdade *et al.*, 2014; Nicole, 2019) that there has been a notable increase in human, livestock, environment, and wildlife interactions which significantly contributed to the shift in approach. Despite the reported unavailability of national or regional statistics on the magnitude of human-wildlife conflicts (HWCs) and human-wildlife interactions (HWIs) in particular (Conover, 2002), observations made confirm the increase in terms of the magnitude of the phenomenon globally and Tanzania in particular.

This escalation in HWIs is largely tied to innumerable consequences. The highly recognized consequences include those on biodiversity conservation and economic development globally, *inter alia*, the most notable being on humans, animals, and environmental health. These consequences are connected to human practices/behaviors exhibited by individuals living near nature, and these are the areas with livestock holdings and crop fields forming a significant proportion of people's livelihoods (CDC, 2017; Muhanga & Malungo, 2018a; 2018b; Muhanga, 2019). Human practices such as killing wildlife to get bush meat for household consumption, consequently, exchange of disease between livestock and wildlife (Shemweta & Kidegesho, 2000; Nyahongo, 2007; Saru, 1999 cited in Shemwetta & Kideghesho, 2000) have been reported to have health impairing outcomes to both humans and animals (Muhanga, 2019). This context led to a need for alternative development in the health sector to fight infectious diseases.

Mindful of this, the government of Tanzania had to introduce One Health Strategic Plan (2015–2020). It is by this plan that the need to treat "health as one" was recognized. This is an attempt to accommodate the changes that unfolded in the health services provision environment in the past decade. One Health Strategic Plan (2015–2020) responds to the need for a broad shift in approach and policy in health services delivery. It facilitates, among others, the shift, which involves moving from treating health services delivery aspects separately for animals, humans, and the environment to an interdisciplinary collaborative approach, namely *"One Health Approach (OHA)*", which recognizes "humans, animals, and environmental health as one". Though the approach is still in its infantile stage, there is logic in "*OHA*", convincing enough for this approach to be the most potent in minimizing the undesirable consequences of human, livestock, and wildlife interactions on human, animal, and environmental health. The purpose of this paper is to introduce, debate, and analyze the OHA and its relevance towards effective health services delivery in Tanzania. It aims to provide insights into the potential benefits and challenges associated with implementing OHA in the context of the changing health services landscape in the country. Specifically the paper focused to: (i) Critically examine the debates surrounding the effective delivery of health services in Tanzania, sixty years after independence, considering the various development interventions and their impact on poverty alleviation, hunger reduction, and control of infectious diseases; (ii) Analyze the OHA as an emerging

approach of interdisciplinary collaboration, and as a potential solution for addressing the interconnectedness of human, animal, and environmental health in Tanzania's context; (iii) Assess the relevance of OHA in minimizing the adverse effects of human, livestock, and wildlife interactions on health outcomes; (iv) Conduct a documentary analysis to gather information and insights on the current status of OHA implementation, its achievements, challenges, and future prospects in Tanzania; (v) Highlight the significance of OHA in building essential capacities for public health preparedness and response, particularly in addressing health-related challenges at the convergence of humans, animals, and the environment; (vi) Emphasize the need for collaborative efforts among professionals in human, livestock, wildlife, and environmental health sectors, underscoring the importance of upscaling the OHA to achieve optimal human, animal, and environmental health outcomes.

Research Methodology

This review employed a documentary analysis (documentary research method) to gather relevant information for the study. This method is useful in a desk review study. Through this method, the researcher managed to categorize, examine, and interpret written publications. The method involves examining the documents comprising information on or associated with the subject studied (Haule & Muhanga, 2021; Mshingo & Muhanga, 2021). The documentary analysis research process was used to collect information from books, conference proceedings, and peer-reviewed journal articles from different search engines. Key search terms were "health services in Tanzania," "history of health provision in Tanzania," "human-wildlife interactions," "human-wildlife conflicts," "one health approach in Tanzania," and "the relevance of one health approach". Publications both in Kiswahili (Tanzanian language) and English languages were reviewed. Quality assessment and data extraction were conducted for those articles which met the specified criteria. During the search, 1012 publications were identified; thereafter, 991 qualified publications were involved in abstract screening, and only 440 full-texts of the identified publications were screened for eligibility, whereby 71 articles mirrored the theme under the review.

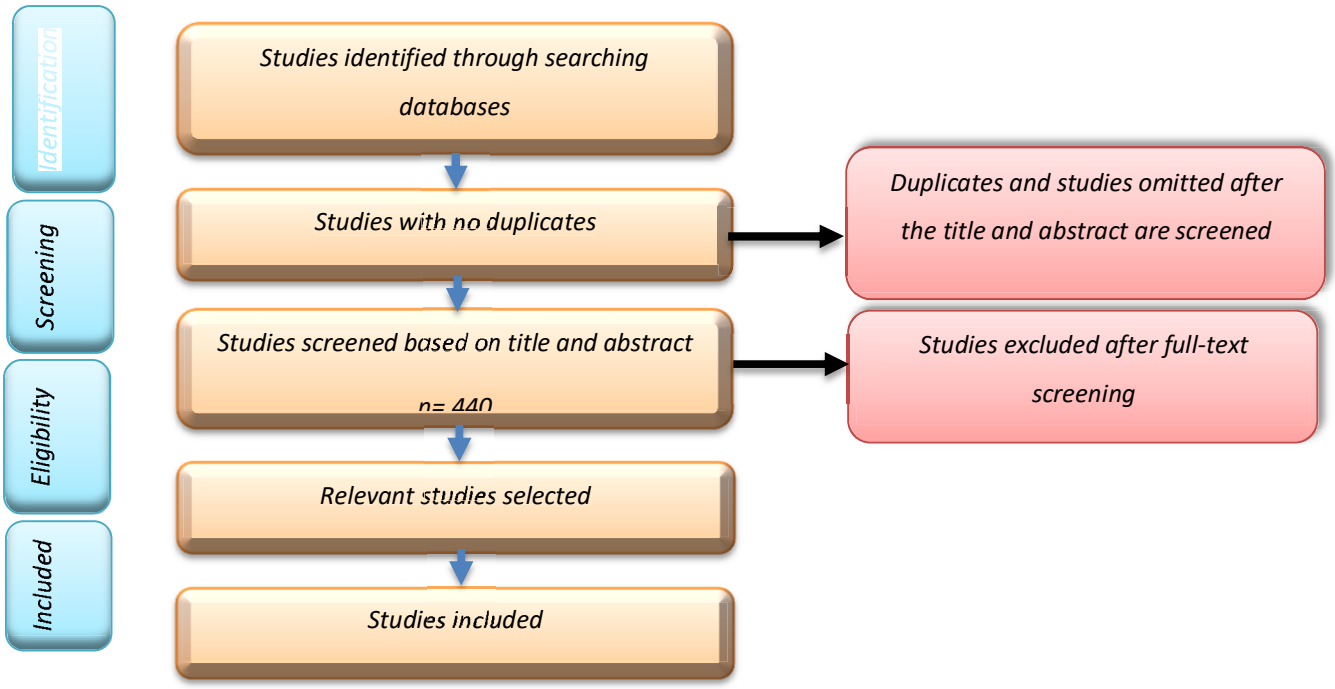

Figure 1: Articles selection process

Interactions between Humans, Livestock, and Wildlife: Consequences, Disease Transmission, and the Relevance of "*One Health Approach*" in Tanzania

Innumerable studies (Dickman, 2010; Gebreyes *et al*., 2014; Pimentel *et al.,*2005; Barlow, 2009; Thirgood et al., 2005; Perez & Pacheco, 2006; Loe & Roskaft, 2004; Packer et al., 2005) have reported the consequences, and intensity of humans, livestock, and wildlife interface at the global level. Due to what has been observed in the biologically diverse areas resulting from the growth of human populations and modern development, plus the emerging competition for resources with wildlife, notable incidences of environmental destruction, degradation, and fragmentation have been registered (Lamarque *et al.,* 2009). The literature reports countless negative consequences of both wildlife on people and people on wildlife. These include but are not limited to, the exchange and transmission of diseases involving humans, livestock, and wildlife at their interfaces (Nyahongo, 2007; Kazwala, 2016). The most commonly reported diseases resulting from the interaction between humans and animals include human brucellosis, rabies originating from both traditional and dairy animals (Kambarage *et al.,* 2003; Karimuribo *et al.,*

2007; Kayunze *et al.,* 2012). It is reported by Gamassa (1998) that there are related incidences around Lake Manyara National Park and Ngorongoro Conservation Area which have also been observed. Similar observations have been made by Saru (1999), as cited by Shemwetta & Kideghesho (2000), in a study at Arusha National Park. Transmission of diseases remains the main problem in areas with the coexistence of pastoralism and agropastoralism activities. In a report by ILRI, as cited by Grace *et al*. (2012), zoonoses have been identified as the key obstacles to poverty alleviation, which affect a substantial population of livestock keepers.

If left unattended, disease transmission stands a good chance to impact human and livestock health negatively. Evidently (URT, 2003a; URT, 2003b; IMF, 2004; URT, 2007a; WHO, 2010; WHO, 2012a; 2012b) posit that good health is a keystone toward societal development. Undeniably, the health status of a particular society can significantly affect the rest of the sectors in that society, including the political, social, and economic aspects (Sayah & Williams, 2012; Muhanga, 2020). It is in this context that good health is seen to have the potential to influence the quality of a population in society, much as it is very clear that the quality of the population is an essential parameter for economic development (URT, 2003b; URT, 2007a; Lutz, 2014). In light of this, it should remain apparent that good health boosts labor productivity, educational achievement, and income, hence lessening poverty (Bloom *et al.,* 2004). Diseases and ill health are considered obstructions to economic prospects, growth, and national development worldwide (Strittmatter & Sunde, 2011; WHO *et al.,* 2013). It is therefore apparent that attaining the development goals requires significant enhancement on the health status of the population in a respective nation; however, it is evident several challenges exist towards the attainment of good health (Mamdani & Bangser, 2004; Sanders & Chopra, 2006). HWCs stand among the challenges in attaining good health despite the inherent benefits.

The possibility of fully discouraging or limiting the HWI remains elusive; what looks feasible is accommodating positive interactions while dealing with the materialization of HWC. Imagine what kind of interventions could be institutionalized to prevent an interaction between humans and wildlife in places such as Doma in Mvomero in Morogoro Region, where the Mikumi National Park is less than 20 kilometers from the village. In such circumstances, the concern should be reviewing some interaction aspects involving human-wildlife; this goes hand in hand with devising a modality to improve livelihoods and wildlife sustenance appropriately. In dealing with issues to improve livelihoods, health, and related aspects will have to be considered since

good health is a mother to all. HWCs seem to have the potential to lead to ill health and diseases if serious interventions are not put in place. Such interventions will only be effective, and optimal health will be attained if conceptualized based on recognizing the fact that an inextricable link exists between the health of the people, animals, and the environment (CDC, 2017; Muhanga & Malungo, 2018a; 2018b). It is against this that OHA in Tanzania is considered relevant in reducing the impacts of HWCs on humans, animals, and environmental health.

Balancing Interactions between Humans, Livestock, and Wildlife: Mitigating Consequences and Advancing the "*One Health Approach*"

The notable increase in the world's population has been going hand in hand with the growing demand for resources and space; hence, the population extends to wild animal habitats and displaces their natural wildlife territory (Sillero-Zubiri & Switzer, 2001; Magige, 2012). It is obvious that governments all over the world have been preferring and struggling to minimize the interactions between humans and wildlife by imposing numerous restrictions or just thinking about the best ways such interactions could continue, but the consequences are minimized. The main observation is that the restrictions imposed have not always been translated into success for community-based conservation. There could be various explanations for the failure of community-based conservation. One of the observations here is that people living around the protected areas may not be allowed to continue facing challenges in the quest for their livelihoods at the expense of the prospects of wildlife. This tells us that HWCs cannot be eliminated in some ways, but rather, the consequences should be mitigated since there are also some positive consequences. The health-related consequences can be minimized by advocating the One Health Approach as the most potent approach to lessen the negative effects of human, livestock, and wildlife interactions on human, animal, and environmental health.

The governments have taken recent initiatives to legalize the bush meat trade to deter poaching activities in protected areas (Bowen-Jones *et al*., 2002; Wilkie *et al., 2006*). Such initiatives, despite having observed that potential, if not properly monitored, are likely to lead to the extinction of wild animals, creating imbalances in the ecosystem. It will also, if not well regulated, open up a chance of further transmission of infectious diseases through a lively black market for cuts of meat from these animals. Certain practices/behaviors related to eating habits,

food preparation, and consumption can lead to zoonotic diseases. There is an obvious possibility for these cases of zoonoses to be reduced through "*One Health Approach"* based interventions. It will be difficult to ensure that bush meat brought to the market has veterinary clearance.

The need for stakeholders' involvement and readiness to implement conservation-based behaviors is one of the most important debatable aspects under the HWCs. This aspect remains important as it has been realized that HWCs have both positive and negative impacts. The destruction caused by native wildlife is reported to be considerable, but the associated benefits have not sometimes been underlined. Sillero-Zubiri and Switzer (2001) have observed the development of negative attitudes with respect to protected areas, wildlife, and conservation in general. Numerous perspectives are attached to this negative attitude. Some have developed this attitude based on the destruction experienced on their crops made by wild animals, while others have emanated from the fact that they feel denied access to certain resources found in the protected areas, i.e., firewood, wild fruits, etc. To others, those health-related negative consequences have made them develop negative attitudes toward wildlife, protected areas, and conservation.

Stakeholders' involvement can enable understanding of the existing health issues generated from the convergence of environmental, human, and animal domains. This has to consider the concept and practice of One Health. It matters a lot when society shares with the professionals views on the conflicts and ways to moderate such conflicts. Community views and opinions have a vital role in wildlife management and planning. Information with respect to attitudes of the community on wildlife has to be unceasingly considered as an essential aspect in designing optimal management strategies. The same has been underlined by Brown & Decker (2005) and Wambuguh (2008).

Minimizing Consequences of Human-Wildlife Conflicts (HWCs): Advancing the "*One Health Approach*" for Health and Environmental Well-being

HWCs have numerous consequences (Parker *et al.,* 2007; Messmer, 2009; Nyahongo & Røskaft, 2011; Noe *et al.,* 2022; Bollig, 2022). Since HWCs are reported to exist with the emergence of human civilization, the phenomenon is currently observed to contribute to severe environmental and human health challenges. HWCs are there to stay despite the efforts by governments all over the world to minimize the interactions between humans and wildlife by imposing numerous restrictions. Given the factors that promote HWCs, it is evident that the best alternative is to

think about how the consequences could be minimized, starting with those negatively impacting health. The main observation is that the restrictions imposed have not always translated into success for community-based conservation. The failure of community-based conservation is significantly linked to the fact that people living around the protected areas may not be allowed to continue facing challenges in the quest for their livelihoods at the expense of the prospects of the wildlife. One Health Approach, if thoughtfully implemented, has the potential to minimize health-related consequences while the coexistence of humans, livestock, and wild animals is promoted.

The Theoretical Context of "*One Health Approach*"

Embracing "One Health Approach": A Collaborative Solution for Global Health Challenges

One Health Approach is a modern global movement promoting collaborative efforts between different health-related professionals (medical doctors, veterinarians) and other scientific, environmental, and related disciplines. One Health approach recognizes that various disciplines cutting across numerous sectors will likely provide solutions to the complicated problems confronting public health. This approach employs a holistic approach toward addressing animal, human, and ecosystem health. It emphasizes multi-sector, transdisciplinary action across professions to warrant well-being within human, animal, and ecosystem interfaces (Papadopoulos *et al*., 2011).

One Health is defined by AVMA (2008:3) as the "collaborative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, and our environment". The efforts to control the transmission of infections to animals and humans face numerous challenges, and the absence of or limited joint approach across professions has mostly been cited (Muhanga, 2018a, 2018b). Thus, the need for joint action with a combination of technologies and collaboration between both medical and veterinary professionals is paramount (Mbugi *et al*., 2012). According to the World Bank (2010), zoonotic diseases are reported to have a direct cost, estimated to stand at more than $20 billion over the last decade, while indirect losses to affected economies are reported to stand at over $200 billion. FAO (2002) reports that 70% of the rural poor globally livelihoods rely on working animals and livestock; given this

situation, animals cannot be excluded from the solutions. Zoonoses control is unique in that effective interventions may lie outside the health sector, much as transmission frequently does not occur between humans but only from animals to humans in rabies or brucellosis (Zinsstag, 2005). The term One Health is used to denote the inextricable link between animal health, human health, and the health of the ecosystems they populate.

The Benefits and Competencies of a "One Health Approach": Advancing Collaboration for Global Health Challenges

According to AVMA (2008, p.3), a One Health approach has several benefits, including "(i) improving animal and human health globally through collaboration among all the health sciences, especially between the veterinary and human medical professions to address critical needs, (ii) meeting new global challenges head-on through collaboration among multiple professions - veterinary medicine, human medicine, environmental, wildlife, and public health, (iii) developing centers of excellence for education and training in specific areas through enhanced collaboration among colleges and schools of veterinary medicine, human medicine, and public health, (iv) increasing professional opportunities for veterinarians, and (v) adding to our scientific knowledge to create innovative programs to improve health." One Health competency has the potential to contribute to the development of skills toward effective and efficient collaboration among disciplines for solving shared health challenges; this may include food and nutrition security. Food and nutrition security stands a good chance of improving the population's quality, which is vital to national development. The skills targeted here comprise sharing knowledge, information, and data, strengthening the relationships and interdependencies between human health and other health-related disciplines such as social sciences, animal health, and ecosystem health.

Strengthening One Health in Tanzania: A Landmark Initiative to Address Health Challenges at the Human-Animal-Environment Interface

The Government of Tanzania, on February 13, 2018, inaugurated the One Health Coordination Desk and the National One Health Strategic Plan. This signifies an essential landmark in dealing with health-related challenges reflected in the convergence of humans, animals, and the environment. This particular landmark highlights the commitment of the government to reinforce mechanisms for outbreak detection, prevention, and responses. The milestone is outstanding in

that it leads to the building of fundamental capacities concerning public health events, particularly when it comes to preparedness and response as per International Health Regulations.

This step is cognizant that over 60% of emerging, re-emerging, and endemic human diseases originate from animals. It is now that humans are at higher risk of contracting diseases of animal origin. This situation is amplified by an extensive range of interconnected variables, comprising large-scale livestock production, mass urbanization, and increased travel. Given the circumstances, initiatives to bond the sectors that protect animals, humans, and the ecosystem remain vital. It is within the concept of One Health Approach (OHA) that this idea is embodied; here is where public health events are addressed at the animal, human, and environmental interface.

Using a One Health Approach, the government of Tanzania made countless efforts to identify zoonotic diseases of utmost national concern. In this task, representatives of livestock, human health, wildlife, agriculture, research, higher education, and environment sectors availed their inputs. Through this exercise, zoonotic diseases relevant to Tanzania were identified, followed by defining the criteria for prioritization. A tool was prepared for identifying Tanzania's priority zoonotic diseases, named the OH Zoonotic Disease Prioritization tool. The U.S. Centers for Disease Control and Prevention (CDC) developed and coordinated this semi-quantitative selection (Rist *et al.,* 2014; Centers for Disease Control and Prevention, 2017). According to the Centers for Disease Control and Prevention (2017), national representatives identified zoonotic disease prioritization; this was the first step in addressing public health challenges emanating from zoonotic disease threats using an OHA. This was followed by training organized by CDC for nine local partners from the animal, human, and environmental health sectors. The training is meant to create in-country capacity to facilitate future OH prioritization workshops. The in-country facilitator training was conducted on March 20–22, 2017. The workshop on OH Zoonotic Disease Prioritization employed a multisectoral OH approach in prioritizing endemic and emerging zoonotic diseases of public health and animal health concern. The target is identifying diseases that may be jointly addressed using an inter-ministerial partnership involving human health, agriculture, livestock, wildlife, environment, research, and higher education partners. A total of 6 zoonotic diseases of the highest priority to Tanzania were

identified. The identified diseases are to be used to advocate for and build capacities in numerous areas, including surveillance and laboratory detection systems, improving prevention and control across the key OH sectors in the country (Centers for Disease Control and Prevention, 2017).

Unveiling the Complexities of Human-Wildlife-Environment Interactions: Embracing a "*One Health Approach*"

The incidences of HWCs are much more registered as more and more people crowd onto less land. The convergence of humans, animals, and our environment has resulted in a new dynamic whereby inextricable interconnectedness is observed for the health of each group. The challenges connected to such a dynamic are profound, demanding, and unprecedented. It was anticipated that there would be an increase of 50% by 2020 in terms of the need for animal-based protein; while this was anticipated, animal populations were almost subjected to intensified pressure for their survival. It was further anticipated that there would be a significant loss of biodiversity (Gibbs, 2005; AVMA, 2008).

On top of that, Graham *et al.* (2008) report that out of 1,461 incidences of diseases found in humans, nearly 60% have been resulting from multi-host pathogens that move across species lines. AVMA (2008) reports that over the last three decades, zoonotic diseases have accounted for roughly 75% of new emerging human infectious diseases. Humans growing interdependence on animals and their products could be the most serious risk factor to human health and well-being regarding infectious diseases.

There is an intensifying worry that the world's latest generation will be the first in history to face a decline in life expectancy and health in general. Despite that worry, veterinary and human medicines are currently regarded as isolated entities and even worse when the apparent links between these disciplines are often disregarded. It has been observed that the traditional approaches, levels of knowledge, and past obligatory skills may not conform to the fast changes, new demands of food-animal industries, and the shifting requirements desirable for corporate and public opportunities in the future (AVMA, 2008).

Simultaneously, contamination and pollution of our environment have significantly reduced the health and sustainability of our environment. Environmental degradation encourages the increase of infectious diseases and non-infectious threats. In events of environmental degradation, it is anticipated that favorable settings for the growth of existing infectious diseases will be created;

along with this, an apparent increase in acute and chronic non-infectious disease events harmful to animal and human health is expected. Similarly, this may include non-infectious threats comprising toxins and chemical contaminants (endocrine-disrupting chemicals in the environment) (Colborn *et al.,* 1996). These also comprise fire-retardant carpet chemicals resulting in adverse effects in pet cats, the melamine contamination of pet foods, and marine toxins in manatees (Gardner, 2007). Transmission of certain diseases (i.e., malaria) is attributed to environmental conditions; in this context, regulating such conditions is likely to ease the disease burden. In the views of Randell, (2008) draining stagnant water and eliminating mosquito breeding habitats as environmental management practices for disease control if implemented at the community level have the potential to complement other malaria control methods.

One strategy to understand and perfectly deal with the existing health issues emanating from human, animal, and environmental interactions is the concept of One Health. Humans' increasing interdependence on what is produced by animals has prompted the medical and veterinarian professions to promote a need for a holistic, collaborative approach. This approach encourages local, national, and global joint efforts involving multiple disciplines working to attain optimal health for people, animals, and our environment (AVMA, 2008; Zinsstag *et al.,* 2005).

Assessing the Progress and Challenges of Implementing "*One Health Approach*" in Tanzania: A Pathway to Enhancing Health Services Delivery

Despite having OHA successfully established in Tanzania (Karimuribo *et al.,* 2012; Ladbury *et al.,* 2017; Muhanga *et al.,* 2019; Kitua *et al.,* 2019; USAID, 2018; WHO, 2019). It should be, however, noted that the health sector within the sixty years of Tanzania's independence has registered both advancements and hindrances. Notably, the OHA itself has encountered numerous challenges in its implementation and operationalization (Kayunze *et al.,* 2014; Kitua *et al.,* 2019; Muhanga *et al.,* 2019). Nevertheless, this should not be treated as very specific to Tanzania but rather exist in other countries where the same has been implemented. Similarly, neighboring Kenya and Uganda have been noted to have faced various challenges (Munyua *et al.,* 2019; Buregyeya *et al.,* 2020).

At any rate and standards, Tanzania, after sixty years of political independence, cannot claim to have fully maximized the inherent advantages connected to the "One Health Approach" toward effective health services delivery. There is room for Tanzania to expand the horizon and the way forward. This can be captured by taking advantage of the recommendations made through "Multisectoral Coordination that Works" by the USAID Preparedness and Response (P&R) project (Kitua *et al.,* 2019). The recommendations identified five dimensions most critical to creating effective and sustainable OH platforms: "joint planning and implementation, management and coordination capacity, political commitment, institutional structure, financial and technical resources (Kitua., *et al.,* 2019, p.2)". The case study designates Tanzania's experience using these dimensions to establish a functional One Health platform. This indicates that Tanzania has made significant progress in institutionalizing the OHA, though there is room to implement the approach further.

Conclusion

This paper aimed to shed light on the effective delivery of health services in Tanzania, particularly in the context of the country's six decades of independence. It critically examined the debates surrounding the various development interventions implemented to combat poverty, hunger, and infectious diseases. It became evident that previous efforts, which treated humans, animals, and environmental health separately, could have achieved the desired health outcomes due to the increasing interactions among humans, livestock, wildlife, and the environment.

The Tanzanian government introduced the "*One Health Approach*" (OHA) to address this challenge, recognizing health as a unified concept without dividing lines between humans, animals, and the environment. The paper analyzed the OHA as an emerging approach for interdisciplinary collaboration, presenting it as a potential solution to deliver health services effectively. By adopting a holistic perspective that considers the interconnectedness of human, animal, and environmental health, the OHA holds promise for mitigating the adverse effects of interactions between these domains on health outcomes.

Through a documentary analysis, the paper provided insights into the current status of OHA implementation in Tanzania, including its achievements, challenges, and future prospects. While the OHA is still in its infancy, it represents a significant milestone in addressing health-related challenges at the convergence of humans, animals, and the environment. Notably, the OHA plays

a crucial role in building essential capacities for public health preparedness and response, aligning with international health regulations.

The paper emphasized the necessity of collaborative efforts among professionals in human, livestock, wildlife, and environmental health sectors to optimize the outcomes of the OHA. It underscored the importance of upscaling the approach to achieve optimal human, animal, and environmental health outcomes. To achieve this, recommendations were proposed, including strengthening collaboration, promoting awareness and education, enhancing capacity building, establishing multisectoral coordination mechanisms, conducting research and surveillance, integrating One Health into policy and planning, securing funding and resources, and monitoring progress.

The paper highlighted the significance of the One Health Approach in Tanzania's journey towards effective health service delivery. By recognizing the interconnectedness of human, animal, and environmental health, the OHA offers a framework for addressing complex health challenges. Expanding and enhancing the OHA will be vital in comprehending the implications of these interactions and promoting the well-being of humans, animals, and the environment. With concerted efforts and a multisectoral approach, Tanzania can maximize the benefits of the OHA and pave the way for improved health outcomes for all.

Based on the analysis of the "*One Health Approach*" (OHA) and its relevance in the context of human, animal, and environmental health interactions in Tanzania, the following recommendations are proposed:

i. Strengthen Collaborative Efforts: Encourage and facilitate collaboration among human health professionals, veterinary professionals, environmental experts, and other relevant stakeholders. Foster interdisciplinary partnerships and joint initiatives to address health challenges at the interface of humans, animals, and the environment.

ii. Promote Awareness and Education: Raise awareness about the One Health concept among policymakers, healthcare providers, researchers, and the general public. Implement educational programs emphasizing the interconnectedness of human, animal, and environmental health, highlighting the potential benefits of a holistic approach.

iii. Enhance Capacity Building: Invest in training and capacity-building programs to develop a skilled workforce capable of effectively implementing the One Health Approach. This includes providing education and professional development opportunities for professionals from diverse disciplines, such as human medicine, veterinary medicine, environmental science, and public health.

iv. Establish Multisectoral Coordination Mechanisms: Create dedicated platforms or committees at national, regional, and local levels to facilitate coordination and information sharing among different sectors involved in health, agriculture, environment, and wildlife. These mechanisms should encourage dialogue, collaboration, and joint decision-making to address health challenges comprehensively.

v. Conduct Research and Surveillance: Support research initiatives investigating the complex interactions between humans, animals, and the environment, focusing on identifying and mitigating health risks. Foster robust surveillance systems that enable early detection, monitoring, and response to emerging infectious diseases and other health threats.

vi. Integrate One Health into Policy and Planning: Incorporate One Health principles and strategies into national health policies, plans, and frameworks. Encourage government agencies to adopt a multisectoral approach in their decision-making processes, ensuring that health interventions consider the interconnectedness of humans, animals, and the environment.

vii. Secure Funding and Resources: Allocate sufficient financial resources to support implementing and expanding One Health programs and initiatives. Seek partnerships with international organizations, donors, and development agencies to secure additional funding and technical support for capacity building, research, and infrastructure development.

viii. Evaluate and Monitor Progress: Establish mechanisms to assess the effectiveness and impact of One Health interventions. Regularly monitor and evaluate the implementation of One Health programs, policies, and strategies, ensuring that they achieve their intended outcomes and positively contribute to human, animal, and environmental health.

Therefore, by following these recommendations, Tanzania can advance its efforts towards effective health services delivery, mitigate the undesirable impacts of human, livestock, and wildlife interactions on health, and enhance the overall well-being of humans, animals, and the environment.

Funding Declaration

The Sokoine University of Agriculture (SUA), Tanzania, financially supported the research.

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