



One Health and International Cooperation

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Abstract

One Health is a concept that embraces the complex interaction between human, animal and plant health, food security, climate crisis and environmental sustainability. Different International Organizations, as the World Health Organization (WHO), Food and Agriculture Organization (FAO), World Organization for Animal Health (WOAH), European Union and the Parliamentary Assembly of the Mediterranean (PAM), fully support this concept. Implementation of the approach is crucial to allow countries to better identify, prevent and respond to health threats.

The implementation of the One Health approach has direct beneficial influence of food security, which however, still remains highly problematic. Although some regions have experienced declining hunger, trends remain globally uneven and far away from the 2030 Sustainable Development Goal of Zero Hunger. Nevertheless, efforts to improve food security have to consider the tight link between food security and food safety. Only safe food guarantees food security, and food safety, in turn, can be achieved ensuring animal health and welfare. Therefore, the evaluation of control and prevention of transboundary and emerging diseases, also zoonotic, from studying strategies up to research on new vaccines, is part of the various topics to be taken into account. Vaccination constitutes the most important means of prevention. Reluctancy to vaccination is a concern for a successful implementation of prophylactic measures. It is therefore important to promote awareness and improve safety of vaccines. There is the need of new vaccines against emerging pathogens, with evolving epidemiological features, possibly also due to climate changes. Taking into account the arbovirus geographic extension, prevention and control of vector-borne diseases, as Rift Valley Fever and Akabane, deserve particular attention. With concern to animal welfare, issues are particularly linked to inadequate standards applied during transport.

However, efforts to improve global health and welfare of humans, animals and natural environment may be hampered by human vicious and particularly dangerous actions as bioterrorism and, more in general, agroterrorism. Preparedness against such threats is therefore essential, requiring the full involvement of policy makers and competent authorities and, education and training is necessary at central and local levels.

Finally, as the protection of the environment is essential to complete an harmonized application of the One Health approach, specific research and supportive activities such as wildlife conservation, are also necessary.

Keywords: Bioterrorism, Food security and safety, International Organizations, One Health, Pathogens, Prevention, Vaccines, Welfare, Wildlife conservation.

Introduction

1. One Health recognizes the interdependency among human, animal and plant health, food security and environmental sustainability. The implementation of this approach helps to better identify, prevent and respond to health threats. One Health become more and more a frequent argument, but still the approach in current practice is often disattended. It is therefore necessary to undertake real efforts to embrace this principle. The task is obviously not negligible, given the particularly complex framework, and there is the fear that it is impossible to acquire knowledge on so many interconnected fields. Nevertheless, it is fundamental to understand that multidisciplinary is essential.
2. Different International Organizations as World Health Organization (WHO), Food and Agriculture Organization (FAO) and World Organization for Animal Health (WOAH) (founded as Office International des Epizooties – OIE), as well as the Parliamentary Assembly of the Mediterranean, fully support this concept. In the European Union (EU), a One Health task force was recently established. The European Centre for Disease Prevention and Control (ECDC), the European Chemicals Agency (ECHA), the European Environment Agency (EEA), the European Food Safety Authority (EFSA) and the European Medicines Agency (EMA) are the five EU agencies partner of this task force. The transdisciplinary cooperation between EU agencies is aimed to strengthen cooperation in support of the implementation of the One Health Agenda in EU, for a duration of 3 years (2024-2026) and with five strategic objectives: coordination of implementation of the One Health approach; research coordination and establishment One Health-based agenda; capacity building on One Health; One Health communication and stakeholder involvement; and partnership development by joint One Health activities. Through the strengthening of scientific evidence base for One Health, increasingly integrate scientific advice and risk assessment, the development of One Health skills and competences and the concrete actions with multi-disciplinary, cross-sectoral and integrated approach with also veterinary doctors as protagonists, the interdisciplinary collaboration should result in mitigate impact and social cost of threats, prevent threats, contribute to reduce human pressures on the environment and safeguard key social needs as food security and clean air and water.
3. The Parliamentary Assembly of the Mediterranean, from its side, is engaged in long term activities of awareness on human security and health, and this includes also the consideration of One Health. Among One Health PAM's fields of interventions, a number

of topics are considered priorities: advocacy for global health and immunization, also by the partnership with Gavi, the vaccine alliance, food security and safety, bioterrorism, animal welfare and protection of the environment and conservation.

Food security

4. With concern to food security, it is important to recall that, according to the latest FAO, International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP) and WHO joint Report (FAO, IFAD, UNICEF, WFP, WHO, 2024), more than seven hundred million people may have faced hunger in 2023, one out of eleven people in the world, and one out of every five in Africa. Although some regions have experienced declining hunger, trends remain globally uneven and far away from the 2030 Sustainable Development Goal of Zero Hunger.
5. Food security, safety and sustainable food production have always been at the core of PAM priorities and activities. Today, global food security is threatened by multiple causes. The Russian war of aggression against Ukraine has contributed to food inflation and is threatening the global food system, which has become even more vulnerable following the unilateral termination by Russia of the UN-backed Black Sea Grain Initiative. PAM joins the international community' calls for a renewal of the deal to ensure regional and global food security, and wish to thank the government of Ukraine, Romania and Türkiye for their efforts to keep the corridor operational. Similarly, PAM also remains deeply concerned over the humanitarian crisis in Gaza, where according to the to the WFP a famine is imminent. PAM demands safe passage for all humanitarian efforts providing food to the civilian population and strongly condemns all forms of food weaponization.
6. The deterioration of food security worldwide and at the regional level demands immediate and coordinated efforts to address its root causes, and PAM stands ready to cooperate with FAO towards this goal. On this, PAM and FAO are currently working on finalizing a Memorandum of Understanding (MoU), to increase a mutual cooperation and reinforce the regional parliamentary engagement on issues of common concern.
7. Furthermore, in line with the 2024 Action Plan and Policy Recommendations of the Committee on World Food Security (CFS) (CFS, 2024), PAM is working with its member parliaments and relevant international partners to foster the harmonization process of relevant legislative frameworks at the regional level, which are in turn essential to increase global food security and safety. This include, among others, artificial intelligence (AI) applications and nuclear techniques to transform the world's agrifood production

systems, in line with FAO/ International Atomic Energy Agency (IAEA) commitment to the Atoms4Food Initiative and in addition, the importance of reinforcing food safety, with a One Health approach is not neglected.

Transboundary and emerging diseases

8. The evaluation of control and prevention of transboundary and emerging diseases, also zoonotic, from studying strategies up to research on new vaccines, is part of the various topics taken into account by the PAM experts. Concerning the need of new vaccines in veterinary medicine, with the PAM' own Center for Global Studies, research activities focus on fighting against pathogens with potential negative impact on the zootechnics sector and with possible public health implications. There is the need of new vaccines against emerging pathogens, with evolving epidemiological features, possibly also due to climate changes. Taking into account the arbovirus geographic extension, prevention and control of vector-borne diseases deserve particular attention. Focus on containing the spread of pathogens such as the Akabane virus and the Rift Valley Fever (RVF) virus is therefore important. RVF is an arthropod-borne (mosquitoes are potential carriers), acute viral disease of sheep, goats, cattle and people, responsible for high mortality rate in young animals and high abortion rate in ruminants. In other domestic species as in water buffalo infection causes up to 50% abortion rate. In camels the disease may be clinically inapparent, except abortions. However, widespread abortion waves occur during outbreaks. In addition, two clinical forms were reported in camels: per acute form with sudden death within 1 day and acute form with fever, systemic lesions, abortions, possible hemorrhagic signs and death in few days. First reported in Kenya in 1950, caused first serious epidemics in late 50' in South Africa, 100,000 sheep died and 500,000 aborted. In 2000, outbreaks of RVF occurred in Saudi-Arabia and Yemen, showing the RVF potential for further international spread. In 1977 and 1978, and again in 1993, in Egypt the disease caused losses in animals and seriously diffused in human population also causing lethal cases. Humans are very susceptible (major zoonosis). The clinical course is characterized by an influenza-like syndrome. However, complications occur in 8-10% of patients: retinopathy, blindness, meningoencephalitis and hemorrhagic syndrome with death (<1%). Vaccination is the most effective means to control RVF. However, it is not recommended once evidence of epizootic virus activity has been confirmed. In this case, it is too late and too risky (needle propagation of virus). Live and killed vaccines are both available. The inactivated vaccine is suitable for use in

pregnant ewes but immunity lasts 6 to 12 months. The modified live Smithburn neurotropic strain (SNS) likely provides lifelong immunity, but it is only safe for use in pregnant cattle. In pregnant sheep (5-10 weeks), it induces abortion or fetal abnormalities in up to 30% (usually less in indigenous breeds). A possible consequence of the live modified Smithburn vaccine in pregnant ewes is hydrops amnii, with the amnion containing up to 20 liters of fluid. Other vaccine reactions are arthrogryposis and partially developed midbrain and medulla oblongata, hydranencephaly, and total absence of brain. Therefore, further studies are necessary to develop fully safe and efficient vaccines. Furthermore, for the prevention of RVF, systematic vaccination is not justified because of the long intervals between successive epidemics. Given the epidemiological dynamic of the disease, specific preventive strategies are required. Preventive vaccination is only carried out when there is a high risk for an outbreak. Therefore, early detection of RVF is crucial for an effective control of the disease. Early detection can be done using sentinel herd monitoring or using satellite imagery.

9. Akabane disease was first isolated in Japan in 1959 and further diffused to Asia, Middle East, Africa and Australia. Considered in the endemic regions as one of the main etiological agents of congenital abnormalities and abortions in ruminants: up to 80% of newborn calves may be affected of arthrogryposis-hydranencephaly syndrome. The transmission is ensured by *Culicoides* spp., including *C. longipennis* and *C. brevitarsis*, the first detected also in Serbia, in 2018, and the second widely diffused in Australia. The disease is characterized by long interepidemic periods, remaining latent for 5 to 10 years. In Iran, outbreaks have occurred in 2002, 2013, and 2020. Outbreaks are thus expected within 10 years in the region. It is questionable if the epidemics will once cross further distances reaching European regions where vectors are present and capable to maintain the infection. No antiviral molecules or vaccines are available to prevent the disease. However, not only there is the need of therapeutics and vaccines, but the epidemiological dynamic of the disease, being similar to RFV, requires specific preventive strategies to be studied.
10. The need of new vaccines is not limited to veterinary medicine, but extended also to specific aspects of public health. This includes, the consideration of emerging threats, for example, due to changes in the epidemiological features of pathogens as it is the recent case of Parvovirus B19 in humans. Parvovirus B19 is a pathogenic virus which infects all gender and ages. Through a transmission by air, generally, the virus causes a self-limiting disease in children, characterized by fever and erythema, also known as the 5th disease. The virus

is regularly screened in rheumatology for Parvovirus B19 IgG, IgM and DNA by PCR, since acute parvovirus B19 infection can cause acute symmetric polyarthrititis in adults. Higher risk of severe consequences occurs in patients suffering from blood disorders or immunosuppression. While the virus is well known, with a seasonal occurrence in winter-spring and epidemic episodes every 4-6 years, current change in epidemiology rises concerns among pregnant, the most exposed risk category. A marked increase of Parvovirus B19 was observed first in Israel in 2023. Since the end of 2023 and then in 2024, increased number of cases were reported in Denmark, Ireland, Norway and France. Parvovirus B19 infection may occur in pregnant. The 50-75% of women of reproductive age are infected, with a worldwide prevalence. During first 5 months of pregnancy 10-30% may suffer from serious gestational complications: fetal anemia and myocarditis, fetal death and abortion. No prophylaxis can be made and no antiviral therapy is available (no vaccines or antivirals). Patients receive only monitoring and in case of critical conditions of the fetus, highly specialized and very expensive intrauterine transfusions are applied. This causes a severe psychological impact for months. Therefore, it will be important to study and develop new prophylactic means to prevent the disease and provide physical and psychological wellbeing in pregnant women.

Health crisis, bioterrorism and preparedness

11. Chemical, Biological, Radiological, and Nuclear (CBRN) risks, to effectively be countered, demands knowledge and analysis on causing agents, diffusion dynamic and impact of their effects. The management of accidents caused by CBRNs has similarity with crisis determined in various kinds of circumstances, natural or not, and common legal provisions on emergency plans exist and should be applied. The EU Regulation 178, 2002 (EU, 2002) foresees a general plan for crisis management (Art. 55) for food and feed representing risk for human or animal health. The plan should include the competent authority, competencies and responsibilities, as well as the information procedures and channels to be followed. The Regulation envisages different risk situations and determines procedures to be applied in case standard measures are insufficient to control the emergence. The Regulation defines the establishment of a crisis unit managed by the European Commission in collaboration with EFSA (Art. 56). The duties of the crisis unit are to collect and analyze data, identify containment measures, seek assistance and inform the public (Art. 57). It is foreseen that, for the execution of the tasks, the Commission shall be assisted by a permanent committee (competent for plants, animals, food and feed)

(Art. 58). The Commission's exercise of implementing powers, referred to Decision 1999/468 in the Regulation 178, are in fact replaced by the Regulation 182/2011 (EU, 2011), since the Decision is no longer in force. In Articles 53 and 54 of Regulation 178, a rapid alert system is foreseen to support operations in case of emergency and crisis. The same articles provide indications on urgent measures to contain the risk to be taken by the Commission and Member States, respectively. In a first instance, the Commission may order the suspension of admission on the market or determine particular conditions or take other appropriate measures. A Member State may apply urgent provisional measures and inform the Commission and other Member States. Meanwhile, within 10 days, the permanent committee is engaged to provide expertise. Relevant definitions are provided by other laws. Decision 2019/300 defines incident, outbreak and crisis coordinator (Art. 4) (EU, 2019). Directive 2003/99 on zoonoses, defines as foodborne outbreak an incidence of 2 or more cases in people affected by the same pathogen or disease (Art. 2) (EU, 2003). As foreseen by the Regulation 2017/625 (Official Controls Regulation) (EU, 2017), it is compulsory for competent authorities to dispose of contingency plans for food and feed crisis management, setting out measures to be applied without delay when food or feed is found to pose a serious risk to human or animal health either directly or through the environment (Art. 115).

12. Bioterrorism and, more in general, agroterrorism represent particularly vicious and dangerous deliberate human actions, which may severely affect the global health and welfare of humans, animals and natural environment. This requires awareness and preparedness of all stakeholders involved in emergency management. Against such threats, it is therefore essential the full consciousness and implication of policy makers and competent authorities and, *ad hoc* education and training is necessary at central and local levels. In this framework, PAM contributed to the international course on "Agrocrime, Agroterrorism and Threats to Food Supply Chains", held in Agropoli, Italy, in 2-5 October and 6-7 December 2023. The dedicated course was organized by the European Center Disaster Medicine (CEMEC), a specialized center of the Council of Europe based in San Marino, in collaboration with the Regional Center for Prevention and Management of Emergencies (CeRVEnE). PAM's senior advisor on One Health, together with senior staff of the Secretariat, represented the Assembly by actively contributing to the discussions with lectures on bioterrorism, organized transnational crime and international cooperation. The course was aimed at addressing agro-crime, agro-terrorism, and biological threats,

stressing their impact on food supply chains, whilst focusing on the strategies to enhance resilience in the agri-food sector. Throughout the course, experts have considered the interconnections among human, animal, and environmental health, emphasizing the importance of maintaining an interdisciplinary method in crisis management and prevention within the field of food security. In pursuit of this objective, it was underlined that the One Health approach should be adopted to sustain effective cooperative, multisectoral and interdisciplinary strategies. Lectures explored lessons learned and best practices related to animal health, infectious diseases, and transmissible animal diseases within the framework of bioterrorism. Historical instances of epidemic outbreaks and bioterrorism up to present days were examined. Furthermore, it was underlined the importance to reinforce and harmonize international surveillance network to proactively address and manage potential emerging health and security challenges, supported by harmonized national and international legislative frameworks.

13. Recognizing the current international threats faced by the agri-food sector and its implications for the global food security and safety, PAM is committed to participating in the global effort to strengthen the resilience of the food supply chains and reduce potential risks of bioterrorism. PAM will continue to closely work with CEMEC in all the relevant and related areas of cooperation, including the CBRN risks, that were also approached at the meeting of the “World Congress on CBRNe Applied Science and Consequence Management” in Croatia, October 2024.

Animal welfare

14. In the context of One Health, also animal welfare assumes a relevant role, linked to animal health, food safety and public health, thus important and integrant part of the “Farm to Fork Strategy” of the European Union. In food producing animals, stress factors induce inadequate welfare, contributing to heightened vulnerability of animals to transmissible diseases, with associated risk of spread of zoonotic agents and risk of antimicrobial resistance. Especially transport may negatively affect animal welfare. Problems remain especially in developing countries. One important aspect is the absence of approved control posts (premises for resting animals during long journeys) outside the EU (except United Kingdom). The lack of such infrastructures, compulsory to guarantee welfare of animals transported for long distances, represents a concern for the EU’s competent authorities, due to the difficulty in verifying appropriate conditions for unloading animals at designated stops once they leave the EU. It is important to note that any operator transporting animals

from/to Europe must comply with the EU regulation even outside the EU borders. Given the intense trade of live animals among EU and countries like Turkey, Libya, Jordan or United Arab Emirates, cooperation efforts should focus on the support of animal health and welfare policies and regulations of these partner countries and extended to the realization of adequate infrastructures necessary for long journey transports to be approved in line with EU requirements, applying the One Health approach.

Wildlife conservation

15. In order to achieve optimal health for humans, animals, and our environment, the "One Health" approach proactively engages various disciplines, including environmental health sciences. Therefore, wildlife conservation assumes a relevant role in this context. An example of PAM's engagement in this field is the ongoing collaboration with the Sultanate of Oman.
16. In the last decades, the Omani authorities were actively engaged to protect wildlife and natural environment. In 1994, the Arabian Oryx Sanctuary was created under the patronage of the Royal Diwan. Recently, the Environment Authority was established, and the plan "Vision 2040" was conceived with the ambitious target for Oman to become one of the 20 top countries for wildlife protection. The Sultanate a country with an immense biodiversity. Two species in particular show the amplitude of the efforts necessary to preserve this natural heritage and their survival: the oryx of Arabia (*Oryx leucoryx*) and the green turtle (*Chelonia mydas*). The oryx is not only a national symbol but, from extinction in nature, its return is also a success for the Omani sanctuary. The green turtles elected as second reproduction site in the world the Omani coasts. The sea of Oman is an immense reserve of turtles. Its coasts constitute a privileged site of nesting for marine turtles. The 90 % of the Indian Ocean turtle population nests on the coasts of Oman. Out of the world's seven species of sea turtles, five species can be found in the sea of Oman. The green turtles are the main important marine species present in the Omani sea. The population of Oman's green turtles is one of the largest in the world. Almost all turtles living in the northern Indian Ocean come to lay on the beaches of the Sultanate. More than 20,000 females of green turtles flock here every year to reproduce. In addition to the green turtles, other turtles of the *Cheloniidae* family nest in Oman. The Loggerhead turtle (*Caretta caretta gigas*) of the Pacific Ocean, different from the subspecies of the Atlantic Ocean (*Caretta caretta caretta*), the Hawksbill turtle (*Eretmochelys imbricata*) and the Olive Ridley turtle (*Lepidochelys olivacea*), known commonly as the Pacific ridley sea turtle. The Leatherback

turtle (*Dermochelys coriacea*), *Dermochelyidae* family, is also found in Omani waters but does not nest in the Sultanate. The Leatherback turtle is the biggest and heaviest among the Omani sea turtles, reaching lengths of up to 1.8 meters and weights of 500 kilograms. All they have conservation concerns according to IUCN: Loggerhead turtle, Olive Ridley turtle and Leatherback turtle are vulnerable, green turtle is endangered and Hawksbill turtle critically endangered. The delicate equilibrium of wild fauna in Oman requires to be studied and supported. Only through accurate planning and implementation of research and management of the natural resources for the preservation of the unique wild territory of Oman, the survival of this endangered wildlife will be ensured.

Perspectives

17. The strengthening of cooperation is certainly the crucial point to achieve sustainable One Health. A collaboration agreement between CEMEC and CeRVEnE was ratified in Rome, in December 2024. This was based on previous undertaken joint activities. During the meeting, to date and future programmes were shared. The importance of collaboration between the centers involved was highlighted, ensuring a coordinated approach in line with the objectives set, giving an opportunity to strengthen dialogue between the parties, underlining the strategic value of activities undertaken and planned, and reaffirming the mutual commitment to the success of joint initiatives. In addition, the networking activities carried out by the different centers were illustrated, aimed at developing relations with similar organizations, bodies and institutions according to type of activity or scope. The aim is to broaden opportunities for collaboration and create useful synergies for achieving common objectives.
18. PAM is engaged to promote awareness among all member States from Mediterranean basin and Arabian Peninsula and provide technical assistance to consolidate and develop best knowledge on animal farming and food production practices to ensure safe and quality food with minimal environmental impact for a sustainable food security. It might be desirable and beneficial that a similar agreement should be realized between CeRVEnE and PAM, also taking into account that with CEMEC, PAM has already recently signed a cooperation agreement. The synergy among the three Institutions might give light on new initiatives of broad value, as, for example, the creation of a reference international school on health crisis management in Salerno, Italy.
19. Furthermore, awareness should be enhanced and preparedness training courses should be continued and fostered, similar to previous activities, as for example, among

others, the summer school entitled “One Health in Emergency” a recent event organized in collaboration with CeRVEnE, the Experimental Zoo prophylactic Institute of Southern Italy (IZSM) and PAM, held in Palinuro (Salerno), 15-19 July 2024.

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