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Towards zero human deaths from dog-mediated rabies by 2030

FAO's support to countries on rabies control in animals



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Contents

| | |
|----------------------------------------------------------------------------------------|----|
| Preface | v |
| Acknowledgements..... | vi |
| Bangladesh | |
| Long-lasting collars in the national mass dog vaccination..... | 1 |
| Cambodia | |
| Empowering youth through education and awareness..... | 2 |
| Cameroon | |
| Tackling a wildlife-mediated rabies emergency | 3 |
| Côte d'Ivoire | |
| National integrated rabies control programme | 4 |
| Ethiopia | |
| Improving rabies vaccination in dogs | 5 |
| Indonesia | |
| Ten years of the multisectoral One Health approach to tackle rabies | 6 |
| Syrian Arab Republic | |
| Rapid rabies risk assessment to estimate the disease burden in a conflict zone..... | 7 |
| Zambia | |
| Rabies vaccination gap assessment and risk map development | 8 |
| West Africa region (Guinea, Liberia and Sierra Leone) | |
| Joint vaccine campaigns against rabies and peste des petits ruminants (PPR) | 9 |
| FAO Reference Centre on rabies | |
| IZSve's support on rabies laboratory diagnostics capacity building..... | 10 |

Preface

Rabies is a 100 percent fatal disease in animals and humans once clinical symptoms develop. It disproportionately affects poor and marginalized communities and has a significant impact on lives and livelihoods in low-income countries.

Rabies is responsible for an estimated 59 000 human deaths every year, although the actual number could be much higher. The economic impact of rabies is also enormous, at an annual cost of USD 8.6 billion, with livestock losses accounting for six percent of that total. To fight against this disease, FAO partners with the World Health Organization (WHO), the World Organisation for Animal Health (WOAH) and the Global Alliance for Rabies Control (GARC) as co-convenors of the **United Against Rabies** (UAR) Forum, which supports countries to progress towards the global goal of **Zero by 30**: the elimination of dog-mediated rabies by 2030.

Upwards of 99 percent of rabies cases in humans are contracted after a person's having been bitten by a dog. Controlling rabies in animals, especially dogs, is essential not only to prevent human cases, but to also counter the negative impacts on food security and livelihoods. Work to combat rabies contributes directly towards three of the Sustainable Development Goals:

- SDG 1 – End poverty in all its forms everywhere;
- SDG 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture; and
- SDG 3 – Ensure healthy lives and promote well-being for all at all ages.

Rabies control contributes to a **better life** by safeguarding human and animal well-being, reducing economic burdens associated with treatment, and preventing unnecessary suffering. It contributes to **better production** by reducing livestock-related losses. By implementing rabies control programmes that target both human and animal populations, FAO also promotes a **better environment**, as rabies control

often requires the management of stray dogs, waste management and protection of wildlife species. Furthermore, the reduced prevalence of rabies supports **better nutrition** through improved food safety and higher livestock productivity. Therefore, combating rabies aligns with the holistic approach advocated by FAO's **four betters**, benefiting both society and the natural habitat.

FAO, in collaboration with partners, such as GARC, the U.S. Centers for Disease Control (CDC) and FAO Reference Centres, supports Members in their efforts to prevent and control rabies, including disease surveillance and outbreak response, laboratory capacity building, public awareness campaigns, vaccination of dogs, cross-sectoral collaboration (public health, wildlife, municipal and local communities) and national rabies control plan development and implementation through a **One Health** approach.

FAO, in collaboration with GARC, supports the development of National Rabies Elimination Plans in various countries using the **Stepwise Approach towards Rabies Elimination (SARE) assessment tool**. FAO and partners have also engaged in dog population management for public health and animal welfare, and have developed educational materials on rabies to be used in schools. Since the establishment of World Rabies Day (WRD) in 2007, FAO has actively contributed to the commemoration of this day at headquarters and at regional, national and local levels.

This report showcases some examples of FAO's endeavours in assisting countries across Africa, Asia and the Middle East in combating rabies through the holistic One Health approach. It is our aspiration that this report serve as a source of inspiration and as a catalyst for sustained action, motivating FAO, its Members and collaborative partners to continue their dedicated efforts to combat rabies. Let us stand united, committed to achieve the common vision of **Zero by 30**.

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Bangladesh

Long-lasting collars in the national mass dog vaccination

To help achieve elimination of canine rabies in Bangladesh by 2030, the Government of Bangladesh, with technical support from FAO, prepared its national mass dog vaccination strategy in 2011 under the One Health approach, established thousands of vaccination teams around the country and rolled out national mass dog vaccinations to progressively control and eliminate rabies. Today, Bangladesh is the only country in Asia with a national mass dog vaccination programme entirely funded by government resources. Bangladesh is recognized by the FAO Regional Office for Asia and the Pacific as a Rabies Action Centre for Excellence (RACE).

In order to explore methods to increase and sustain high vaccination coverage, a case-control study to evaluate the social and epidemiological impacts of long-lasting collars in dog vaccination campaigns was designed by FAO and initiated in collaboration with the Government of Bangladesh. The long-lasting collars show each dog's vaccination status clearly.

Four dog vaccination teams conducted community outreach in the Savar and Narsingdi municipalities, followed by dog catching, vaccination, microchipping and marking with either long-lasting collars or with livestock paint. In total, 2 153 roaming dogs were vaccinated with relevant data captured by smartphone.

Transect walks were then conducted to assess longevity of the marking methods. To assess community perceptions of the community regarding free-roaming vaccinated dogs, two veterinary students (one female and one male) conducted 72 interviews across both study areas. Once completed, the study will be instrumental in determining the value of adding long-lasting collars as a standard component of mass dog vaccination programmes globally, including in Bangladesh.



Vaccination teams conducted community outreach in the Savar and Narsingdi municipalities followed by dog catching, vaccination, microchipping and marking with either long-lasting collars or with livestock paint.

Cambodia

Empowering youth through education and awareness

World Rabies Day 2023 served as a platform to rally a total of more than 500 students from one high school and one university in Svay Rieng province and more than 100 students from Svay Rieng University. A collaboration between FAO, the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Education, Youth and Sports and the Ministry of Health aimed to improve awareness within the community about the risk of rabies.

The organizers distributed 1 000 copies of rabies notebooks and 1 000 rabies leaflets, disseminating information crucial to reduce the prevalence of this deadly disease. According to the Institut Pasteur du Cambodge (IPC), some 600 000 people are bitten by dogs annually in Cambodia, half of whom are children under 15.

During the event, the children demonstrated a keen understanding of preventive measures, focusing on the importance of promptly cleaning wounds, seeking post-exposure prophylaxis (PEP) and notifying local authorities of any incidents. Their commitment extended beyond the event, as they pledged to share their newfound knowledge with family and community members.

The event's success was largely due to the support of the U.S. Agency for International Development (USAID), as an example of the global collaboration necessary to address public health challenges and to foster a safer, rabies-free future for communities in Cambodia.



More than 500 students from one high school and one university in Svay Rieng province and more than 100 students from Svay Rieng University attended the events organized for World Rabies Day in 2023.

Cameroon

Tackling a wildlife-mediated rabies emergency

The north of Cameroon is home to many national wildlife parks. The biggest one is Waza National Park, where hunting is banned. Wildlife from the park typically migrate south along a corridor that includes the village of Kalfou, in search of food during the rainy season. In August 2023, a hyena in the area bit five people and four sheep. Consequently, the hyena was culled and the head was shipped to the National Veterinary Laboratory (LANAVET) of Garoua, capital of the North Region, for rabies testing, and the local health authorities treated the five people with post-exposure prophylaxis (PEP).

FAO's Emergency Centre for Transboundary Animal Diseases (ECTAD) supported the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) to initiate a comprehensive investigation and community awareness campaign following the hyena-transmitted rabies outbreak. Outputs of the joint intervention included:

- Raising awareness among 165 people, including 22 women from local communities, about animal and human rabies and prevention methods;
- Surveying 73 households to assess behavioural risks;
- Strengthening the capacities of four health units and veterinary centres in bookkeeping and in post-exposure prophylaxis; and
- Enhancing collaboration among public services to notify cases of bites and to identify and treat those requiring post-exposure prophylaxis.

Awareness-raising meeting for the women of Kouro Mokdaye, September 2023.



This collaborative effort significantly improved coordination among local services in monitoring and managing rabies cases in humans, livestock and wildlife. The team underlined the importance of balancing the threat of rabies with the need to respect the integrity of protected areas, to minimize human-wildlife contact with the related risk of exposure to rabies.



World Rabies Day 2023: mobilization of dogs' owners in Yaoundé to prevent rabies transmission by vaccinating their pets, 28 September 2023.

Côte d'Ivoire

National integrated rabies control programme

Rabies is a priority zoonosis of Côte d'Ivoire. The annual incidence of laboratory-confirmed rabies is approximately 20 human cases and 10 animal cases. Working with development partners, FAO provides financial and technical support to the country's National Integrated Rabies Control Programme (NIRCP) 2018-2030. Multisectoral collaboration on rabies prevention and control has been strengthened within the national One Health platform through regular meetings of the animal health thematic group. The initial phase of the NIRCP implementation included the promulgation of Law N°2020-995 of December 30, 2020, related to the Veterinary Public Health Code, and its dissemination to the administrative authorities included regulations on rabies control, such as controls on the importation of live animals.

FAO is actively involved in the annual celebration of World Rabies Day, including by disseminating educational and communication materials, supporting mass animal vaccinations (covering approximately 10 000 animals, of which 93 percent received their initial vaccinations in the Gbêkê and San-Pédro regions in 2022), training of 760 certified rabies trainers, including media personnel and local awareness-raising campaigns that reached more than 2 300 people in 2022-2023.

Early warning and detection have been improved through FAO's support of disease data collection, reporting and surveillance tools, such as the Event Mobile Application (EMA-i), veterinary service information collection tools and by training animal health personnel in frontline epidemiology and Geographic Information Systems (GIS) technology. This resulted in an increase in the number of reported and investigated suspected cases of animal rabies by more than 240 percent in 2023. The capacities of veterinary laboratories have been strengthened to improve rabies diagnosis through the supply of equipment, reagents and consumables, and by participation in interlaboratory tests. Veterinary laboratories analysed 40 samples, of which 80 percent were positive over the past three years. Ultimately, the programme will accelerate progress towards eliminating dog-transmitted rabies by maintaining vaccination levels and by continuous awareness raising.



Annual celebration of World Rabies Day included animal vaccinations, training and local awareness-raising campaigns.

Ethiopia

Improving rabies vaccination in dogs

The fight against rabies in Ethiopia has witnessed remarkable progress. FAO-supported interventions in recent years include a series of community-level rabies awareness campaigns in different parts of the country, accompanied by pilot dog vaccination programmes in those communities. Since October 2021, more than 357 000 dogs have been vaccinated, making a substantial impact in reducing the prevalence of rabies in the targeted areas. Based on outbreak reports to the animal health department, there was a 60 percent reduction in reported cases from 2021 to 2022.

Despite these efforts, the overall rabies vaccination coverage is still very low, estimated to be five percent of the total dog population, which is far below the 70 percent needed to halt the transmission of canine rabies. The pilot vaccinations supported by FAO were mainly restricted to large towns and cities for owned dogs, which are kept within the owner's property and therefore do not have a significant role in the transmission of rabies. Nonetheless, these pilot activities did result in significant improvements in rabies awareness at a local level. Informational posters and Social and Behaviour Change Communication (SBCC) materials were developed and disseminated to subnational levels and wider communities during mass dog vaccination campaigns. In addition, a consultative workshop was conducted in February 2022 in Addis Ababa on private sector engagement and the potential application of public-private partnerships (PPP) in rabies vaccination and dog population management.

Dog vaccination campaign and hands-on practice.



Greater efforts and investments are required to scale up these pilot activities into national programmes to increase vaccination coverage (including owned free-roaming and non-owned stray dogs). Availability of high-quality cell culture-based vaccine for dog vaccination and human post-exposure prophylaxis (PEP) is still limited in Ethiopia. The country has started using locally-produced cell culture vaccines for dog vaccinations produced by the National Veterinary Institute. To meet national demand, the quality and quantity of vaccine production still need significant improvements.



Rabies diagnostic laboratory inaugurated at Animal Health Institute in collaboration with Onderstepoort Veterinary Institute, South Africa.



Indonesia

Ten years of the multisectoral One Health approach to tackle rabies

Rabies has been documented in Indonesia since the late 1800s, and since then, it has spread to nearly three-quarters of the provinces in the country, even as a nation made up of thousands of archipelagos, with some extremely remote islands. According to data from the Indonesian Ministry of Health, an estimated 100 000 dog bites occur every year, resulting in 150 to 300 human deaths. Significant endeavours have been undertaken in regions with a high prevalence of rabies to progress towards elimination.

To achieve zero human deaths from dog-mediated rabies, Indonesia has published two national guidelines for the general public, complemented by several technical guidelines for both animal health sector workers and related multisectors, applied at the field level. Capacity building and the implementation of dog vaccination programmes and integrated bite case management (IBCM) were introduced in rabies-endemic Indonesian provinces more than a decade ago. To strengthen cross-sectoral coordination in responding to bite cases, *Sistem Informasi Zoonosis dan EID (SIZE)*, a national zoonotic and emerging infectious disease surveillance information system linking the information systems from three different sectors, was further developed and applied. Authorities are exploring the use of village-level pooled funds as extraordinary financial resources to strengthen rabies prevention and elimination. With FAO support, dog population management was piloted in Bali, focusing on community volunteering as a framework to educate communities and promote responsible dog ownership, which is used as one of the pillars for developing local zoonotic disease knowledge to support rabies response and control. Awareness-raising activities for students have been regularly carried out by field officers. More recently, teachers are being empowered to raise awareness.

The Government of Indonesia is dedicated to eliminating rabies through the implementation of mass dog vaccination as its primary approach. Efforts to improve dog vaccination, including the use of capture-vaccinate-release (CVR) techniques led to a reduction in cases in Bali by approximately 80 percent in animals and by 90 percent in humans. Challenges still exist in capturing dogs using the CVR method, which prompted a collaboration between FAO, the government and other agencies to explore oral rabies vaccination (ORV) bait trials in Bali and East Nusa Tenggara provinces. On World Rabies Day 2023, the Government officially licensed commercial production of ORVs for scaled-up dog vaccinations, targeting stray dogs especially.



Awareness-raising activities for students have been carried out by field officers. Recently, teachers are being empowered to raise awareness.

Syrian Arab Republic

Rapid rabies risk assessment to estimate the disease burden in a conflict zone

Rabies transmission in the northwest of the Syrian Arab Republic is driven predominantly by the large stray dog population. Before the Syria conflict in 2011, government-led annual stray dog culling campaigns kept both the stray dog population and rabies incidence low. Since 2011, the stray dog population has been left completely uncontrolled and has multiplied exponentially. Consequently, rabies cases in humans and in grazing livestock have been on the rise for the past 12 years. The issue is exacerbated by the insufficient rabies vaccination coverage among privately-owned dogs and by a significant number of families living permanently in tents and makeshift structures, which offer minimal protection from animals. In 2023, medical and veterinary professionals in the area reported a dramatic surge of human and livestock rabies cases, surpassing previously recorded incidence levels.

In October 2023, the FAO office in Gaziantep, Turkey, hosted the Northwest Syria Food Security and Livelihoods (FSL) Cluster Livestock Technical Working Group (LTWG) meeting, which included an analysis of human cases from the greater Idlib region as collected by WHO. Information from Idlib indicated that local hospitals and medical facilities treated 1 206 cases of dog bites in humans during the first half of 2023. Of these, 85 percent were bites by stray dogs and 60 percent of human cases were in children and youth aged five to 18 years. A comparison is being completed with pre-2011 dog bite incidence data from the Idlib Medical Directorate.

Anecdotal information has indicated an increase of rabies cases among grazing animals. To corroborate indicative data on the increasing rabies burden and risk, a field survey questionnaire was developed by FAO and administered by Syrian NGOs for feedback. The questionnaire collected data and information from community health workers and veterinary field practitioners on animal bite data, human PEP data, rabies cases in both animals and humans, etc. FAO and WHO are also collaborating on developing a joint One Health proposal to mitigate rabies incidence rates and associated risks for humans and livestock in greater Idlib. This includes:

- **Training** for medical and veterinary professionals and field staff to enhance their rabies expertise, paired with establishing a rabies surveillance and reporting system;
- **Running rabies awareness campaigns** in villages, schools, camps for internally displaced persons (IDPs) and informal settlements to educate the community about the risk of rabies;
- **Equipping medical facilities** with adequate vaccines, medicines and consumables for correct post-exposure treatment of suspected and probable rabies cases in humans;
- **Vaccinating privately-owned dogs**, by providing parenteral (injected) rabies vaccine to enhance protection against rabies in owned dogs; and
- **Identifying rabies hotspots** to be targeted by a pilot rabies vaccination campaign in the northwest for stray dogs, using oral rabies vaccinations, in line with FAO guidelines.

Considering the recently more stable working and security conditions, a pilot intervention for rabies control in greater Idlib is envisaged for 2024, with plans for replication in the northern Aleppo region.

Zambia

Rabies vaccination gap assessment and risk map development

There was a significant surge in rabies outbreaks in Zambia in November 2022. By June 2023, the Department of Veterinary Services within the Ministry of Fisheries and Livestock (MFL) had documented rabies outbreaks in 29 districts across nine out of Zambia's ten provinces. To address the situation, the MFL formally requested assistance from FAO, and in response, FAO's Emergency Centre for Transboundary Animal Diseases (ECTAD) in Zambia led a comprehensive epidemiological case study. The primary objective of this review was to identify gaps in rabies control and prevention, and to inform future rabies control strategies and surveillance.

One key outcome of this gap assessment included an assessment of district-level capabilities and preparedness to manage rabies outbreaks. Among the findings, it emerged that local authorities were not effectively enforcing regulations related to dog population management. Protocols for outbreak investigation were also lacking, and responders were not always provided personal protective clothing and equipment during outbreaks. The ability to diagnose rabies was primarily limited to regional laboratories, while district-level laboratories lacked the capacity for disease testing.

Following the study, with support from the USAID-funded Global Health Security (GHS) Program, FAO procured equipment and supplies for rabies sample extraction, diagnosis and personal protective equipment (PPE). In addition, this initiative generated data for rabies risk maps and supported the training of subnational personnel in rabies risk mapping to inform the planning of control interventions. The teams developed protocols for investigating rabies outbreaks and a comprehensive surveillance plan for frontline animal health workers.



With support from the USAID, FAO procured equipment and supplies for rabies sample extraction, diagnosis and personal protective equipment.

West Africa region (Guinea, Liberia and Sierra Leone)

Joint vaccine campaigns against rabies and peste des petits ruminants (PPR)

To maximize cost-effectiveness and community engagement, FAO has been supporting integrated vaccination campaigns in West Africa, where veterinary services and the public health sector are joining forces to strengthen the fight against peste des petits ruminants (PPR) and rabies. The PPR Global Eradication Programme (jointly managed by FAO and WOAH), working with the relevant FAO Country Offices and supported by funds from the United Against Rabies (UAR) Forum, helped implement joint PPR/rabies vaccination campaigns in Sierra Leone, Liberia and Guinea in 2022.

This funding contributed to the impact of the joint PPR/rabies campaigns in the three countries, in particular by engaging communities at the grassroots level. For example, funds were used to support community meetings, radio broadcasts and jingles that raised community awareness of the integrated PPR/rabies vaccination campaigns and their benefits.

Vaccinating small ruminants against PPR and dogs against rabies during a single coordinated campaign benefits communities, who need only gather their animals once. A campaign organized jointly between the ministries responsible for human and animal health also leverages their combined workforce and logistics, and enables them to share resources, such as vaccine storage facilities and vehicles.

Recognizing the advantages of joint PPR/rabies campaigns in neighbouring Sierra Leone and Liberia, Guinea piloted this approach for the first time in 2022, in its Nzérékoré prefecture. All three countries reported cost savings as well as improved community awareness, higher willingness to participate and community engagement as a result of the joint PPR/rabies communication and sensitization campaigns.

René Bessin, ECTAD Country Team Leader with FAO Sierra Leone, said, *“The combined support of FAO, USAID, the Government of Sierra Leone and UAR for joint PPR/rabies vaccination campaigns has proven to be an innovative approach to tackle two major diseases of high health and economic importance in Sierra Leone. As a result, vaccination coverage increased within targeted communities.”*



FAO has been supporting integrated vaccination campaigns in West Africa.

FAO Reference Centre on rabies

IZSve's support
on rabies
laboratory
diagnostics
capacity building

Istituto Zooprofilattico Sperimentale delle Venezie (IZSve)

IZSve is the FAO Reference Centre for rabies based in Padua, Italy. The Institute provides support to FAO Members on rabies-related laboratory capacity building and on harmonizing laboratory diagnosis in animals through:

- i.** the standardization and validation of diagnostic protocols;
- ii.** the organization of international proficiency testing;
- iii.** the provision of Standard Operating Procedures (SOPs) and reference materials; and
- iv.** technical assistance provided both remotely and in situ.

The Reference Centre IZSve has endeavoured to conduct innovative research, including more stable or easy-to-use diagnostic reagents in laboratories that might not have the most advanced equipment. IZSve has also developed infectious and non-infectious reference materials in an innovative way without using laboratory animals, in compliance with the 3Rs (Replacement, Reduction and Refinement) international principles. The Institute routinely organizes interlaboratory proficiency tests upon request from veterinary laboratories from other countries. The most recent exercise took place in 2022 and involved 26 veterinary laboratories, mostly from sub-Saharan Africa. IZSve also provides training support and assistance to laboratories upon request. Although at the height of the COVID-19 pandemic, the possibility to carry out support activities in-person was dramatically reduced, IZSve managed to distribute more than 20 SOPs and to provide remote assistance for their implementation.



On-site training on rabies diagnosis at the veterinary laboratory in Monrovia, Liberia.

