World Health Organization

Ending the neglect to attain the Sustainable Development Goals

One Health: Approach for action against neglected tropical diseases 2021–2030

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The manmade dam in Keranso, Shone Woreda in Hadiya Zone traps water from the previous rainy season which the local community uses for washing clothes, bathing, swimming, taking home for household chores, as well as to provide water for their cattle. The pond is also home to freshwater snails that host schistosomiasis, otherwise known as bilharzia. Access to clean piped water, or even water from a clean protected source, is limited, and many people in the community rely on this and similarly unprotected pools, ponds streams and rivers for bathing, washing clothes and other household chores.

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Foreword

Yvonne Aki-Sawyerr OBE

Mayor of Freetown, Sierra Leone

January 2022

Neglected tropical diseases (NTDs) continue to cause hardship and harm to over one billion people worldwide – despite being preventable and having been successfully eliminated in many contexts already. They affect the most vulnerable: burdening people, families and communities who are already marginalised and disadvantaged. We need to address NTDs to relieve this burden, and build on global progress to reduce inequality, improve resilience, and promote sustainable development to unlock "a better and more sustainable future for all".

Taking a One Health approach that recognises the relationships between human, animal, and environmental health is key to sustainably address NTDs, and to achieve the targets set out in *WHO's Road map for neglected tropical disease 2021-2030* ("the road map"). Fundamentally, One Health is about understanding "whole-of-system" interactions and bringing together relevant stakeholders and sectors to take a coordinated approach where appropriate. For example, by designing interventions that address common human, animal, or environmental risk factors; or that build core capacities such as surveillance to strengthen health systems overall.

This companion document provides guidance on what actions are needed – by programme managers, countries, international organizations, and non-State actors – to take a One Health approach to achieve the road map targets. The first step is simple: explore where a One Health approach would be appropriate and beneficial to your context. Start now, start anywhere, with the context and resources available – and expand your approach as you build capability, connections, and momentum. Now is the time to act, together, to end the burden of NTDs for good.

Women and fishermen wade into the waters to fetch water and navigate their boats to and from the shallow water near the shore of Lake Hawassa in Tullu Kebele, located on the outskirts of Hawassa Town, Capital of Sidama Region. Lake Hawassa provides a conducive environment for freshwater snails that host the parasite that causes schistosomiasis or bilharzia, to thrive. Despite high prevalence rates (40 per cent and higher in some shoreline communities) for schistosomiasis, knowledge of the disease, what causes it and prevention methods, are little known. The hole at bottom left, is a latrine, further adding to the hygiene and sanitation pressure on the lake and the community that depend on its waters.

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WHO also acknowledges the invaluable contribution of the more than 150 people from over 57 countries who provided feedback on the draft document during the online public consultation.

Executive summary

This companion document to *Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021-2030* ("the road map") aims to support a range of stakeholders – including countries in which neglected tropical diseases (NTDs) are endemic, international organizations and non-State actors – to achieve the road map targets through a transdisciplinary, cross-cutting One Health approach.

The document has six sections.

Section 1

Section 1 introduces the One Health approach and why it is essential to sustainably achieve the road map targets.

One Health is an integrated, unifying approach that recognizes links between the health of people, animals and ecosystems.

This is especially important for NTDs which have significant zoonotic or environmental components.

One Health approaches consider and engage a range of stakeholders to find common ground for collaboration …

… and help to strengthen health systems, reduce duplication, and deliver sustainable and cost–effective results.

Section 2

Section 2 describes the priority One Health actions needed by major stakeholders to achieve the road map targets. The three main stakeholder groups are defined in this document as countries, international organizations and non-State actors. The priority One Health actions are summarized in the figure below for each group.

Achieve the 2030 road map targets

Countries

Identify and prioritize opportunities for cross-cutting integration

Develop a costed One Health plan that puts communities at the centre, and uses local protocols

Facilitate and implement transdisciplinary ways of working within and among stakeholders

Countries

Establish/adapt and fund governance mechanisms for coordination and leadership

Build sustainable and impactful engagement from relevant stakeholders

International organizations

Advocate for a One Health approach to be integrated into formal work programmes

Develop guidance and tools for countries and communities to operationalize One Health

Provide global leadership to engage and coordinate key stakeholders, and facilitate funding

Non-State actors

Advocate and build awareness of the benefit and applications of a One Health approach

Coordinate stakeholders and build relationships between existing and new networks

Conduct research, education and knowledge sharing to address gaps and challenges, and make products available

Section 3

Section 3 offers practical guidance for programme managers on how to support a paradigm shift towards One Health in national NTD programmes. A One Health approach can take many forms. Guidance is provided on how to identify - and activate - opportunities for integration among sectors and diseases to achieve shared or synergistic goals for five areas.

1. Stakeholder mapping during programme design
2. Community engagement and interventions
3. Workforce capability building
4. Integrated surveillance
5. Awareness and education

Road map pillars

Pillar 1
Accelerate programmatic action

Pillar 2
Intensity cross-cutting approaches

Pillar 3
Change operating models and culture to facilitate country ownership

Section 4

Section 4 gives examples of common challenges to cross-cutting approaches involving multiple sectors and stakeholders, especially in settings that are already over-burdened and under-resourced, and how they have been addressed or overcome. These challenges include:

1. *Bridging gaps between sectors*: structures and systems to address human, animal and environmental health are traditionally siloed, with different stakeholders and frameworks despite often having similar goals.

2. *Getting started:* interventions against human and animal diseases, or for environments, often remain separate – unless there is a driving force to change the status quo and bring them together.

3. *Incentivising collaboration:* competing priorities can disincentivize collaboration – but this is often key to sustainably addressing disease.

Section 5

Section 5 proposes three next steps for countries, international organizations and non-State actors to take in operationalizing this guidance.

1. Disseminate and support uptake of cross-cutting One Health interventions against NTDs for relevant stakeholders and in existing or new disease programmes.

2. Promote practical tools to support implementation of One Health approaches against NTDs; and support communities and countries to own and drive local programmes.

3. Assess opportunities to integrate guidance from this document into relevant forums (e.g. the Tripartite and UNEP collaboration) within and beyond NTDs.

Pursuing cross-cutting One Health approaches to NTDs - and quantifying their impact to demonstrate progress and drive investment – is critical to supporting the overarching aim of the road map and the United Nations Sustainable Development Goals: “to achieve a better and more sustainable future for all…”.

Section 6

Section 6 provides a list of references and key resources for further reading.

Click on the cover or scan the QR code to access the document

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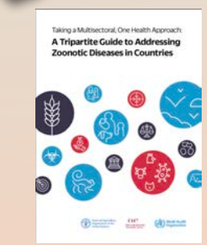


About this companion document

This companion document aims to support a range of stakeholders – including countries endemic for NTDs, international organizations and non-State actors – to achieve the road map targets through a transdisciplinary, cross-cutting One Health approach. Specifically, it provides guidance on the One Health actions needed by major stakeholders and how to support a paradigm shift towards One Health in national NTD programmes. Examples of common One Health challenges and how they can be overcome as well as illustrative case studies are provided throughout.

The companion document has six sections:

1. An introduction to One Health, including what One Health is and why it is essential to sustainably achieving the road map targets;

2. One Health actions needed by major stakeholders to achieve the road map targets, including countries, international organizations and non-State actors;

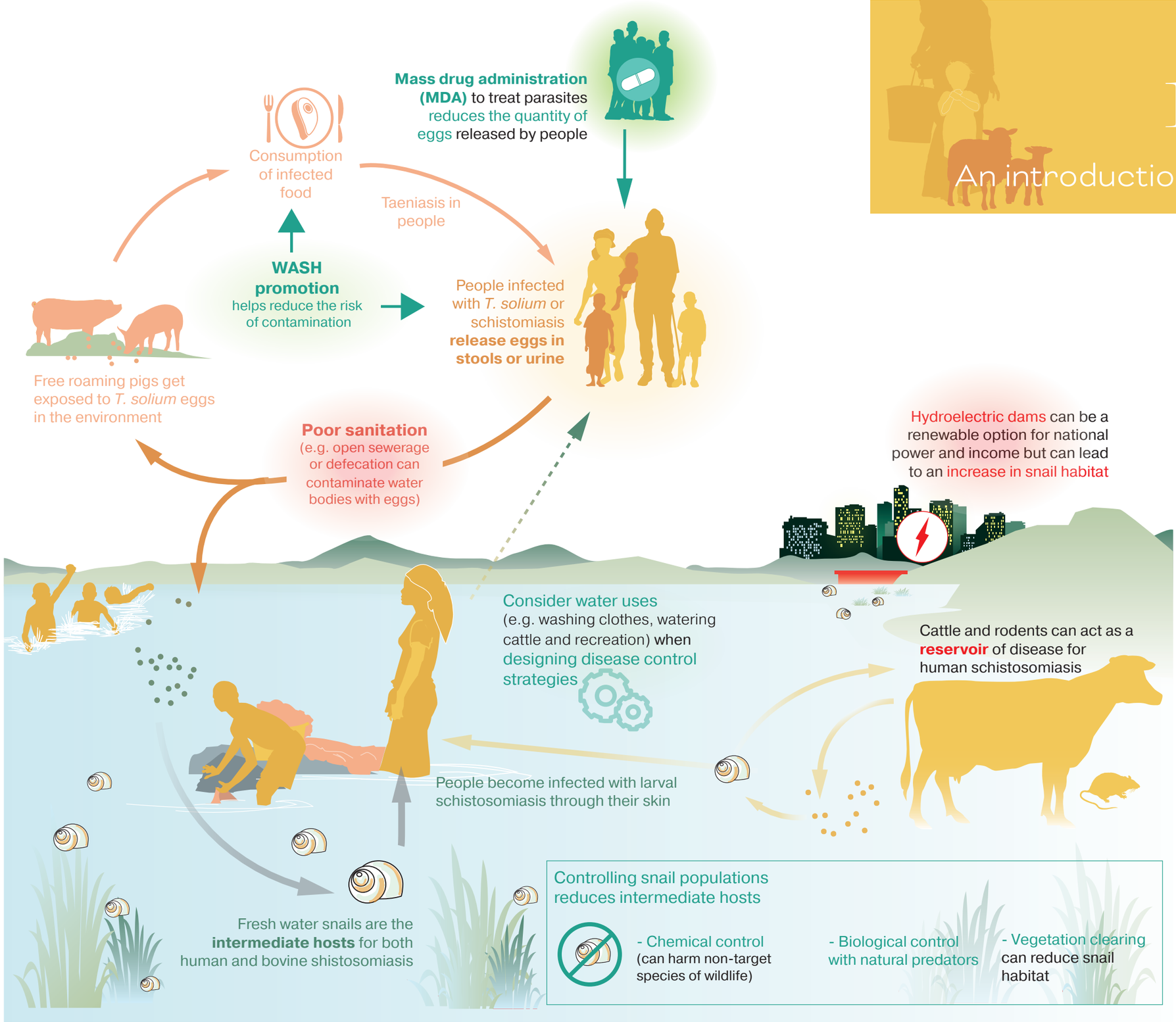
3. Guidance on how to support a paradigm shift towards One Health in national NTD programmes - from programme design to prevention, treatment, surveillance and community engagement;

4. Common challenges and how they can be overcome, including bridging capability gaps between sectors, reconciling conflicting systems, getting started and incentivising collaboration;

5. Next steps to operationalize this guidance; and

6. References and key resources for further reading.

The companion document was developed through a global consultative process involving stakeholder interviews, interactive workshops and online public consultation.



1. An introduction to One Health

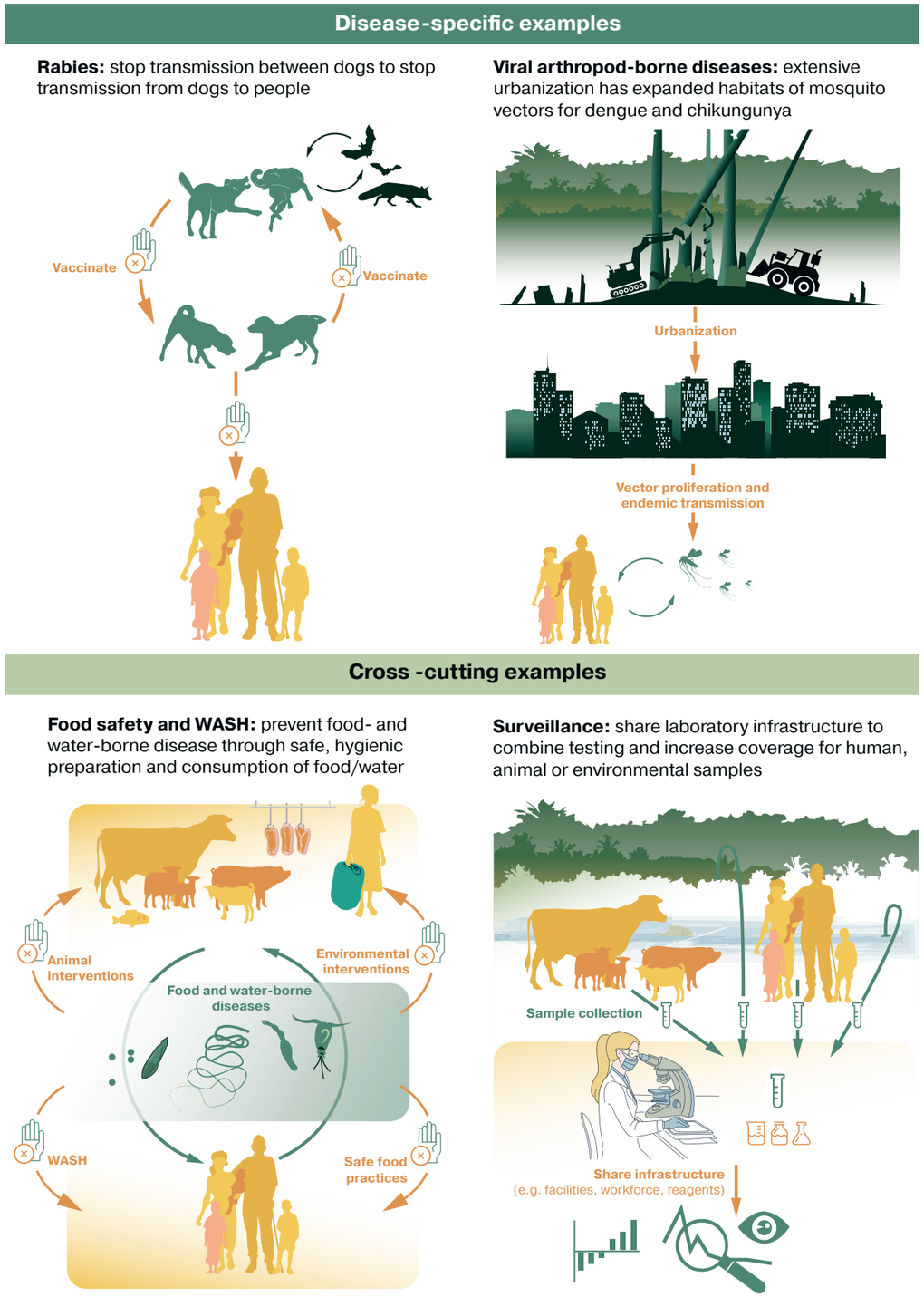
A One Health approach is defined by the One Health High Level Expert Panel[1] as:

> an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.

An example of a One Health approach is demonstrated through the interaction of systems surrounding shistosomiasis and taeniasis (Fig. 1). Identifying interactions between human, animal, and environmental health systems can support better understanding of disease drivers and inform sustainable control strategies.

[1] The One Health High Level Expert Panel is a multidisciplinary collaboration supported by the Tripartite (WHO, FAO, OIE) and UNEP that provides guidance on One-Health related matters to support improved cooperation among governments.

◀ Fig. 1. Examples of One Health interfaces for shistosomiasis and taeniasis



◀ Fig. 2. Examples of human-animal-environment interfaces for NTDs (disease-specific and cross-cutting)

It is also important to understand the entire system surrounding NTDs and how elements beyond the human health sector can influence disease transmission, or where actions to control, eliminate or eradicate NTDs can impact other sectors. Understanding this system can help to identify new avenues for collaboration or control and yield potential efficiencies and cost savings. This holistic approach is especially important in the context of concurrent environmental, health and other crises (e.g. climate change and the COVID-19 pandemic) and has implications for diseases other than NTDs – such as emerging zoonoses. This strategic shift from traditional, siloed approaches to addressing disease is especially important for NTDs, which often have a significant zoonotic or environmental component. These human, animal and environmental relationships can take various forms for different diseases and interventions (Fig. 2). For example:

- **rabies**, where most cases are transmitted by dogs to people through direct contact (bites and scratches), hence preventing disease in dogs is key to preventing disease in people; however, wildlife, particularly bats, can also play a role in transmission;

- **viral arthropod-borne diseases** (e.g. dengue and chikungunya), where extensive urbanization has expanded the habitat of the mosquito vector *Aedes aegypti*, leading to sustained, endemic transmission cycles;

- **cross-cutting interventions for food safety and water, sanitation and hygiene** (WASH), where food- and water-borne diseases such as taeniasis and cysticercosis, echinococcosis, food-borne trematodiases, dracunculiasis and Chagas disease are prevented through animal or environmental interventions to interrupt transmission cycles; and safe, hygienic preparation and consumption of food and water; and

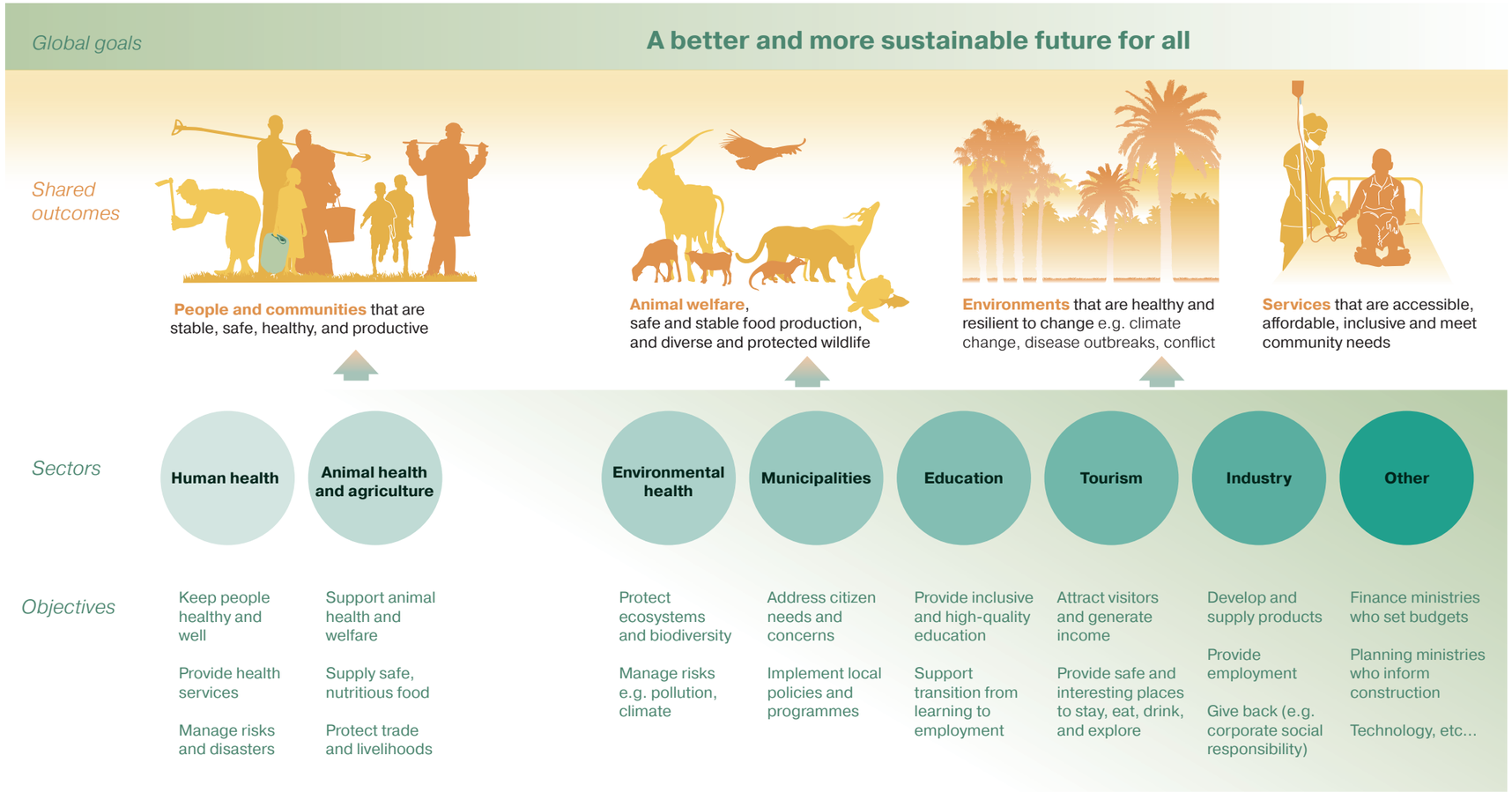
- **cross-cutting surveillance**, where laboratory infrastructure is shared for surveillance of multiple diseases or for analysing human, animal or environmental samples to support better quality and coverage of data systems and reporting.

In each example, effective and sustainable disease prevention requires cross-cutting action – i.e. a coordinated, transdisciplinary approach among human, animal and environmental health sectors. This may also involve non-health sectors such as local governments, urban planners, tourism, industry and others, depending on the local context. However, the motivation for different sectors to integrate NTD objectives into their programmes of work may not always be clear – such as where an animal disease poses a transmission threat to people but does not adversely affect animal health or productivity.

Incentivizing animal interventions solely to benefit human public health outcomes can be challenging. One example of this is cystic echinococcosis, where the causative agent (*Echinococcus granulosus*) is transmitted via the environment to dogs, livestock (usually sheep) and people. Although transmission can be prevented through deworming dogs and vaccinating sheep (or other livestock), *E. granulosus* is often not perceived as an important production problem in sheep, despite presenting a serious public health risk for people. Understanding objectives from the whole system is therefore important to help identify common ground for different sectors to collaborate in NTD control and drive shared outcomes (Fig. 3). Taking a holistic, systems thinking[2] approach is also critical to avoid unintended consequences such as environmental contamination or ecosystem devastation (e.g. parasiticides leaking into soil or waterways and impacting people and/or animal food chains).

[2] Systems thinking is defined by WHO as an approach to problem solving that views "problems" as part of a wider, dynamic system; and demands a deeper understanding of linkages, relationships, interactions and behaviours among the elements that characterize the entire system *(1)*.

▶ Fig. 3. Finding common ground for collaboration - example sectors and their objectives involved in a cross-cutting One Health approach [Note: this is not exhaustive]



Coordinating among sectors by nature requires considering and engaging a range of stakeholders from the public and private sectors globally, regionally and nationally. For example, community members who demand or receive services; government ministries and municipalities that plan, fund and provide them; industry and academia that develop and share products, conduct research and share expertise; media and education agents that communicate, advocate and raise awareness; and international organizations that provide technical support, funding and guidance. By building system-wide capability and collaboration across stakeholders and sectors, One Health approaches can help to strengthen health systems, reduce duplication and deliver sustainable, cost–effective results (Box 1).

Cross-cutting approaches are advocated in the road map, which sets ambitious global targets to reduce the burden of NTDs in line with United Nations Sustainable Development Goal 3 “to end the epidemics ... of neglected tropical diseases” by 2030. The overarching high-level global targets for 2030 are:

- 90% reduction in people requiring interventions against NTDs;
- 75% reduction in disability-adjusted life years related to NTDs;
- 100 countries having eliminated at least one NTD; and
- two NTDs eradicated (dracunculiasis and yaws).

Specific targets are identified for zoonotic NTDs, where a cross-cutting One Health approach may be most explicitly relevant.

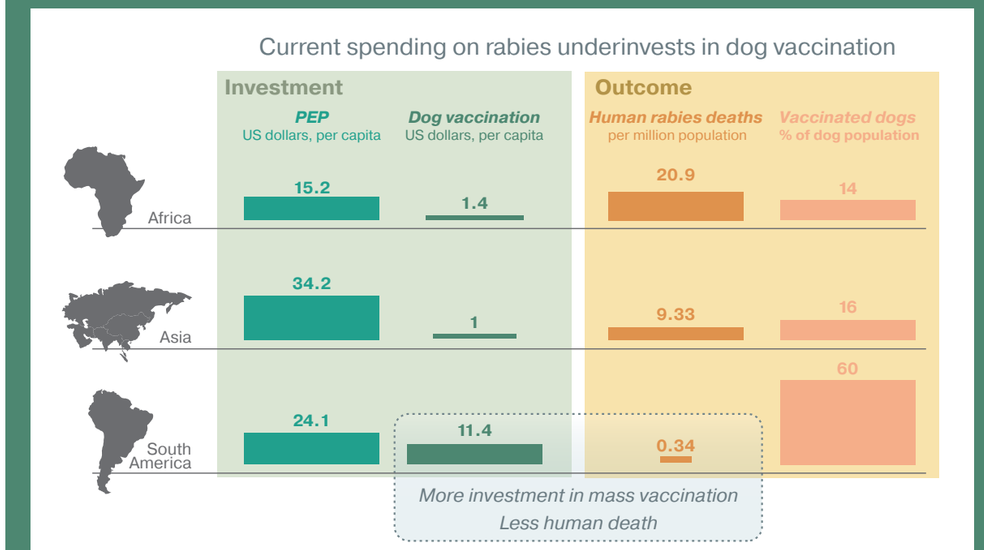
One Health actions include developing a One Health strategy; integrating NTDs into existing health platforms; developing national operational One Health plans; using a One Health approach to improve understanding of human–animal–environmental transmission of NTDs (including social and economic implications); and considering opportunities for joint intervention across planning, advocacy, implementation, surveillance and evaluation.

This companion document provides guidance on how countries, international organizations and non-State actors can take a One Health approach to achieve the road map targets – noting that an integrated approach will not be appropriate in all settings. It provides a starting point for this main group of stakeholders and highlights areas of shared interest across sectors for NTDs (Fig. 4). However, principles can be applied in a transdisciplinary way to engage a range of disciplines, sectors and stakeholders beyond health and NTDs alone - such as education, tourism, technology, social science, anthropology, civil society organizations, communities and others.

Box 1. Examples of successful One Health approaches

Improving vaccination coverage for hard-to-reach children[a] – combining livestock vaccination and veterinary care with childhood vaccination campaigns in Chad improved vaccination uptake and coverage for hard-to-reach children from nomadic pastoralist communities. Sharing logistics (e.g. personnel, transport, cold chain) also reduced total programme costs by up to 15% by running a single effort rather than separate campaigns.

Preventing rabies sustainably and cost–effectively[b] – vaccinating dogs against rabies is about 50 times cheaper than providing post-exposure prophylaxis (PEP) to people and is the only way to sustainably prevent human rabies deaths. In South America, investing in dog vaccination in combination with PEP resulted in significantly fewer people dying from rabies than in Asia, which has a similar total spend but primarily invests in PEP.



[a] Bechir M, Schelling E, Wyss K, Daugla DM, Daoud S, Tanner M, et al. [An innovative approach combining human and animal vaccination campaigns in nomadic settings of Chad: experiences and costs]. Med Trop (Mars). 2004;64(5):497–502 (in French).

[b] Hampson K, Coudeville L, Lembo T, Sambo M, Kieffer A, Attlan M, et al. Estimating the global burden of endemic canine rabies. PLoS Negl Trop Dis. 2015; 9(5):e0003786. https://doi.org/10.1371/journal.pntd.0003709

Protecting workers from snakebite envenoming[c] - building awareness, improving access to treatment and managing environments to limit snake populations or mitigate risk of contact. Snakebite envenoming is associated with a significant health and economic burden globally, including from human morbidity and mortality; treatment costs; and losses associated with animals (e.g. livestock).

For example, agriculture plantations create ideal environments for high density venomous snake populations due to an abundance of shelter (e.g. “windrows” of fallen timber interspersed with long grasses and undergrowth instead of forests) and prey. In one plantation in Papua New Guinea, 10% of workers were bitten by snakes each year. This was successfully reduced by:

- providing personal protective equipment (gumboots to prevent bites; high visibility vests to locate workers who are bitten inadvertently);
- investing in education for the workforce and community to increase awareness of local snake species, snakebite risk reduction strategies, and first aid or emergency protocols;
- training local health workers in snakebite management; and
- implementing environmental interventions, such as increasing the width of plantation pathways to make it easier to see snakes, and reducing non-native rodent populations that had provided a major food source for snakes.

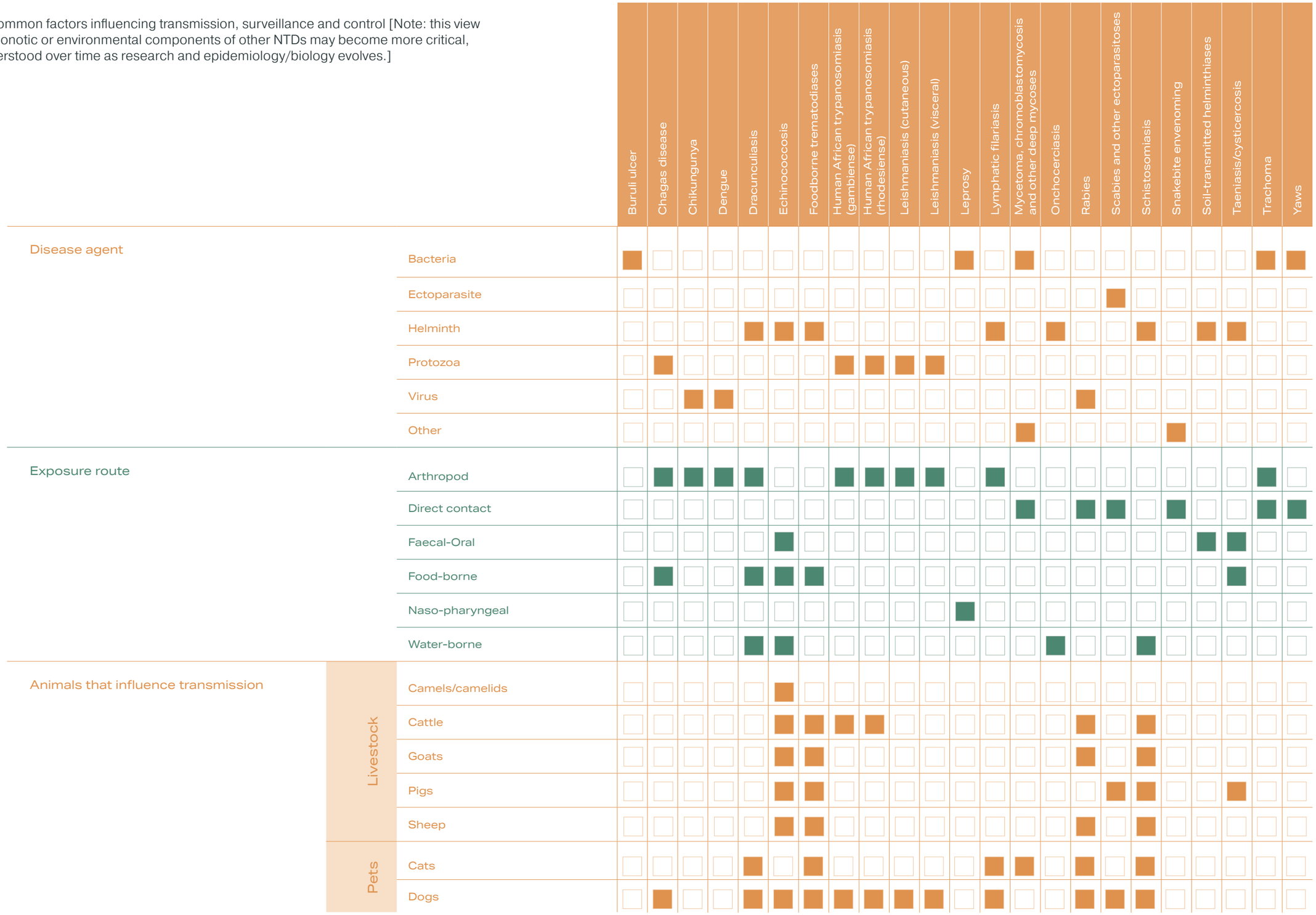
This combination of measures reduced the incidence of snakebites, improving the safety and productivity of workers.

Teaching communities how to provide safe, effective snakebite first aid in Papua New Guinea

© WHO/David J. Williams

[c] Expert interview with David Williams (not published), 2021.

▶ Fig. 4. NTDs and common factors influencing transmission, surveillance and control [Note: this view is not 'final', and zoonotic or environmental components of other NTDs may become more critical, recognized or understood over time as research and epidemiology/biology evolves.]



▶ Fig. 4 (continued). NTDs and common factors influencing transmission, surveillance and control [Note: this view is not 'final', and zoonotic or environmental components of other NTDs may become more critical, recognized or understood over time as research and epidemiology/biology evolves.]

		Buruli ulcer	Chagas disease	Chikungunya	Dengue	Dracunculiasis	Echinococcosis	Foodborne trematodiases	Human African trypanosomiasis (gambiense)	Human African trypanosomiasis (rhodesiense)	Leishmaniasis (cutaneous)	Leishmaniasis (visceral)	Leprosy	Lymphatic filariasis	Mycetoma, chromoblastomycosis and other deep mycoses	Onchocerciasis	Rabies	Scabies and other ectoparasitoses	Schistosomiasis	Snakebite envenoming	Soil-transmitted helminthiases	Taeniasis/cysticercosis	Trachoma	Yaws
Animals that influence transmission	Wildlife: Armadillos	☐	■	☐	☐	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	■	☐	☐	☐	☐	☐	☐	☐	☐
	Bats	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	☐
	Crustaceans	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Fish	☐	☐	☐	☐	■	☐	■	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Foxes/canids	☐	☐	☐	☐	☐	■	☐	☐	☐	■	■	☐	☐	☐	☐	■	■	☐	☐	☐	☐	☐	☐
	Primates	☐	■	☐	☐	■	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	■	☐	☐	☐	☐	☐
	Rodents	☐	■	☐	☐	☐	☐	■	☐	☐	■	■	☐	☐	☐	■	☐	☐	■	☐	☐	☐	☐	☐
	Snakes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐
	Snails	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐
Environmental factors that influence transmission	Climate change	☐	■	☐	■	■	■	☐	☐	☐	■	■	☐	☐	☐	■	■	☐	■	■	☐	☐	■	☐
	Deforestation	☐	■	■	■	☐	■	☐	■	■	■	■	☐	■	☐	☐	☐	☐	■	■	☐	☐	☐	☐
	Ground/soil	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	■	☐	■	☐	■	■	■	☐	☐
	Human/animal migration	☐	■	☐	☐	■	■	☐	■	■	■	■	☐	☐	☐	☐	■	☐	■	■	☐	■	☐	☐
	Man-made ecological change	☐	■	■	■	■	■	■	■	■	■	■	☐	■	☐	☐	☐	☐	■	■	☐	■	☐	☐
	Urbanization	☐	☐	■	■	☐	■	☐	■	■	■	■	☐	■	☐	■	■	☐	☐	■	☐	■	☐	☐

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2.

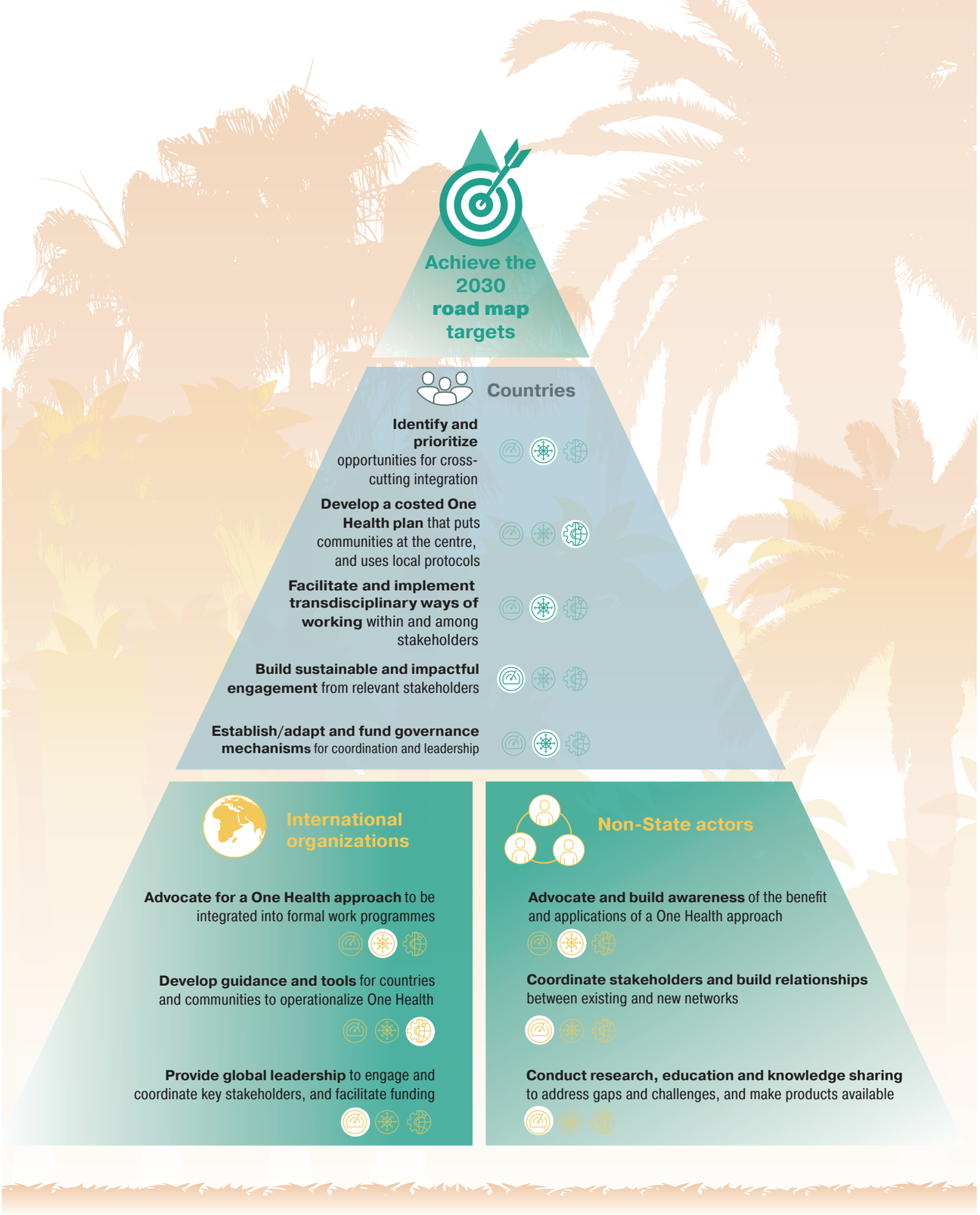
One Health actions needed to achieve the road map targets

This section outlines critical One Health actions needed by major stakeholders to achieve the road map targets. The three main stakeholder groups are defined as countries, including State and local governments, communities and citizens; international organizations, such as the United Nations, WHO, FAO, OIE, UNEP and others; and non-State actors, such as academia, industry and nongovernmental organizations (NGOs). Each group plays an important role across the three pillars of the road map, namely: to accelerate programmatic action, intensify cross-cutting approaches, and change operating models and culture to facilitate country ownership (Fig 5).

The priority One Health actions needed by each group to achieve the road map targets are summarized in Fig. 6 and detailed further below and in Annex 1.

Road map pillars	*Areas that require concerted action:*
1. Accelerate programmatic action: **Integrate One Health into NTD programme design and delivery**	• **Technical progress** e.g. evidence base and guidance on integrated interventions • **Strategy and service delivery** e.g. surveillance, joint risk assessment • **Enablers** e.g. integrated funding pathways, advocacy collaboration and multisectoral action
2. Intensify cross-cutting approaches: **Coordinate and integrate action on NTDs across key sectors**	• **Integrating** NTDs in common delivery platforms that combine work on human and animal diseases • **Mainstreaming** NTDs within national human, animal and environmental health systems to improve the quality of NTD interventions • **Coordinating** with other sectors within and beyond health on NTD-related interventions e.g. establishment of cross-sectoral coordination mechanisms
3. Change operating models and culture to facilitate country ownership: **Nurture and sustain country-led One Health action**	• **Ownership** at national and subnational levels e.g. responding to the specific needs of populations and the global health security agenda • **Clear stakeholder roles** throughout NTD work; managing competing priorities both across sectors and between nations • **Organizational set-ups**, operating models and thinking aligned to achieve the 2030 targets

▲ Fig. 5. A One Health approach applied to the three pillars of the road map



Countries, including State and municipal governments, communities and citizens

• **Identify and prioritize opportunities for cross-cutting integration** within NTD programmes, and between NTD programmes and other sectors. This aims to pinpoint where a cross-cutting approach might be appropriate to improve health outcomes or to solve a specific problem. Typically, it would start with an assessment to identify areas of potential synergy among, for example, programme priorities, workforce capabilities, stakeholders and communities.

This can also be an opportunity to identify synergies that save costs, or go beyond traditional collaborations, to unlock new, exciting possibilities based on the local context across endemic and epidemic diseases – and in pandemic outbreaks. Examples of different levels of integration include:

- **integration within NTD programmes, by combining delivery platforms across human and animal diseases** – e.g. joint surveillance or control of common vectors such as tsetse flies which transmit both human and bovine trypanosomiasis;

- **integration with other health programmes, by mainstreaming NTDs within human, animal or environmental health systems**– e.g. combining MDA with distribution of insecticide-treated nets for treatment of lymphatic filariasis and malaria *(2)*; integrating NTD objectives into pig health programmes through combining strategies to address taeniasis/cysticercosis in people (e.g. food safety awareness, MDA) with pig vaccination; and

- **integration among sectors within and beyond health** – e.g. engaging social scientists to understand cultural or behavioural barriers; understanding the impact of changing climates on snake or vector habitats; involving WASH or waste management in relevant interventions to minimize exposure to disease agents; or drawing on private sector supply chains to provide products or services.

Integration will also not be appropriate in all settings, for example for diseases that do not share similar risks or intervention strategies; or where programmes are highly mature and integration would distract from the objective of eradication. Integration should therefore be considered only where it is "worth the effort" and does not divert time, energy and funding from more effective approaches. Opportunities for integration can be considered along a spectrum (Fig. 7) and may be pursued to different degrees even within a single programme of work. For example, interventions against trachoma in Ethiopia integrated facial cleanliness with MDA and school health programmes, linked with WASH by inviting WASH stakeholders to trachoma task force meetings; coordinated with WASH to deliver relevant interventions; and had no integration for surgical interventions *(3)*.

Ideally, this identification exercise should be followed by a prioritization exercise to inform where to start. This could involve ranking opportunities based on likely impact (considering reach, effect size, etc.) and ease of implementation (considering cost, resources, time, complexity, etc.). Not all opportunities will be feasible to pursue, or make sense to pursue first – and integration, although it can have great benefits, will require a paradigm shift that requires time, cost, effort and leadership to implement effectively. Section 3 provides guidance on how this shift can be approached in national or local programmes, for instance by programme managers.

◀ Fig. 6. Priority One Health actions needed by countries, international organizations and non-State actors to achieve the road map targets through a cross-cutting approach

• **Develop a costed operational One Health plan** that outlines a clear pathway towards a cross-cutting approach to NTDs, for example based on the opportunity assessment and prioritization exercise described above. A robust operational plan should have a clear purpose and targets; specific objectives; describe the activities needed to meet the objectives (including timelines, responsibilities and resources); estimate budget requirements; and identify metrics to monitor and evaluate performance.

Ideally, the plan should have the political support and funding to ensure effective and sustainable implementation; and be harmonized with other health plans, policies and metrics within the country context. This may involve developing or adapting existing local protocols to operationalize One Health (e.g. drawing on international tools and guidance). It can also be an opportunity to advocate for incorporating NTDs into broader health policies, and to work with novel stakeholders across health and non-health sectors.

The plan should put communities at the heart of programmatic efforts, through an inclusive, participatory design process that: (i) supports early community and cross-sectoral engagement in policy development, decision-making and local solutions, including for underrepresented groups (e.g. indigenous people, women); (ii) prioritizes community leadership; and (iii) ensures that policies reflect local values, objectives and contexts. Although consultation is important, it is also essential to keep focus on implementation, and to ensure that engagement helps to drive action and impact. Box 2 provides an example of a One Health Strategic Plan developed in Bhutan.

Box 2. Case study: One Health Strategic Plan developed in Bhutan[a]

CONTEXT: In 2019, the Ministry of Health and the Ministry of Agriculture and Forests of the Government of Bhutan launched a One Health Strategic Plan the aim of which was to (i) institutionalize a One Health approach involving relevant stakeholders, (ii) strengthen surveillance, (iii) facilitate joint outbreak investigation and response; and (iv) promote collaborative research activities for prioritized zoonoses, foodborne diseases and antimicrobial resistance

APPROACH: The plan was developed and is being implemented by the Government of Bhutan's established One Health Secretariat, which sits within a central department yet has a rotating Chair sourced from relevant ministries, for example, Health, Agriculture and Forests. The Secretariat acts as a focal point for coordinating all national activities related to One Health and for allocating funds from relevant ministry budgets on a project-by-project basis.

IMPACT: The plan, underpinned by the One Health Secretariat, has helped to mainstream awareness and implementation of One Health approaches within Bhutan, strengthen cross-sectoral collaboration and promote community participation. Shared leadership among ministries has also helped to ensure equal participation and buy-in from relevant sectors. However, environmental health objectives are not explicitly included, and the absence of a dedicated One Health budget continues to hamper full integration.

[a] Bhutan One Health strategic plan 2018-2023, second edition. Thimphu: Ministry of Health; 2019 (Bhutan_One_Health_Strategy_Plan-1.pdf (bohnet.bt), accessed 14 December 2021).

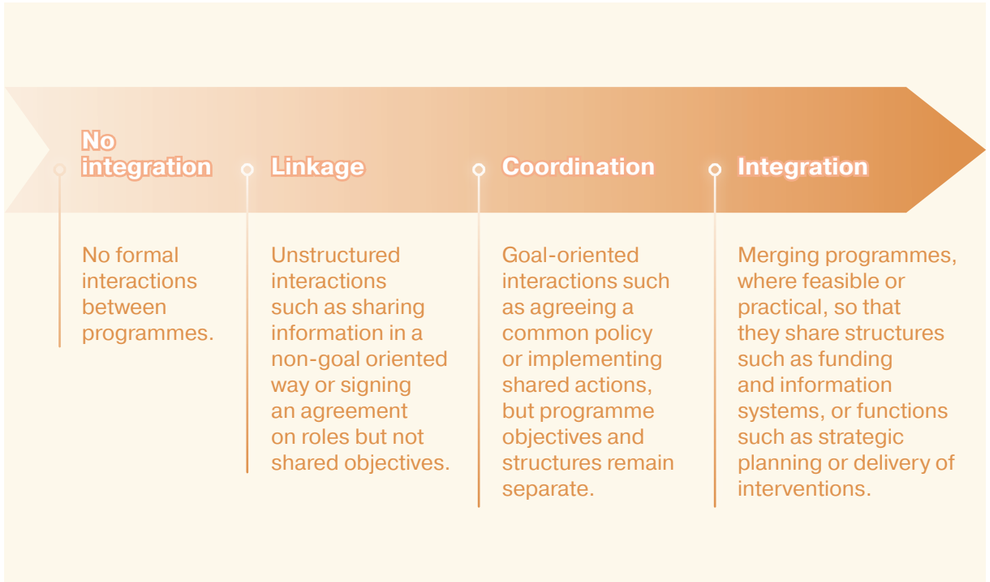


Fig. 7. Spectrum of integration for programmes to consider (adapted from reference *4*).

• **Facilitate and implement transdisciplinary ways of working** within and among sectors, and with other stakeholders (e.g. NGOs, academia, industry). This is simpler where incentives are aligned (e.g. through shared goals or budgets), and roles and responsibilities of contributors are clear. For example, where different sectors agree to build joint capability in a particular area, and there is a clear ownership of and accountability for associated training. One Health "champions" can also help to catalyse collaboration, by building relationships proactively, identifying areas of shared interest and involving new or tentative stakeholders in a cross-cutting approach.

Where sectors or stakeholders have, or are perceived to have, competing interests, shared incentive structures can be used to encourage collaboration over competition. For example, programmes to control cystic echinococcosis encourage infected offal to be destroyed to avoid consumption by dogs and transmission to livestock and people. However, this comes at a cost to the farmer, who would otherwise be able to sell it at a low price and feed infected parts to dogs. This brings income to the farmer, but sustains the transmission cycle of the disease, thereby posing a further risk to buyers and their community.

• **Establish or adapt governance and funding mechanisms** to support coordination and leadership in pursuit of shared goals. This involves cultivating strong leadership and political will; clearly defining the roles and responsibilities of different stakeholders; allocating resources proportionately; setting up clear pathways for decision-making and conflict resolution; and having structures to coordinate and share information and activities among different groups (e.g. governments, NGOs). This may not require new mechanisms per se, but rather adapting operating culture or funding arrangements to promote or coordinate

a joint approach. Ideally, funding should be long term and focussed on programmes that are integrated within local systems, although it may be kick-started by development partner contributions (e.g. financial, in-kind).

A successful example of One Health governance is Kenya's One Health Zoonotic Disease Unit. The Unit is jointly headed by the national Director-General of Health and the Director of Veterinary Services, who support a cross-functional zoonotic technical working group and disease unit, which interface with One Health units in counties. State Directors for the Department of Environment and the Department of Wildlife are co-opted on an as-needs basis. This structure supports a collaborative approach whereby county One Health units deliver joint surveillance and outbreak investigation, and data and information-sharing among health, veterinary and environmental services and the community to address zoonoses. The work of the Unit has resulted in improved data on zoonotic diseases and improved outbreak responses, Importantly, it has provided a successful model for other countries to emulate *(5)*.

Long-term sustainable financing requires programmes to be included in local government budgets; example mechanisms include *(6)*:

- joint budget allocation by different government ministries to address specific issues or shared targets, for example based on formal inter-ministry agreements;
- dedicated funding for cross-sectoral work to achieve health objectives; for example, Canada's Health Innovation Strategy allocates multi-year financing to population health interventions that specifically involve cross-sectoral partners *(7)*;
- independent bodies with dedicated funds that set their own priorities. Funds could be sourced independently (e.g. from budgets or tax revenues), or from contributing bodies or development partners. For example, the Antimicrobial Resistance Multi-Partner Trust Fund supports countries to counter threats of antimicrobial resistance through a One Health approach *(8)*.

• **Build sustainable, impactful engagement from relevant stakeholders** – including non-traditional stakeholders – by identifying shared outcomes, dependencies, drivers, levers and conflicts of interest; and engaging stakeholders early and transparently in planning. This might involve collaborating with academia, industry, the public sector and local communities to find areas of shared interest, invite investment or deliver interventions.

Early engagement with communities helps to build buy-in, identify surface social or cultural factors that may impact success, and drive effective and sustainable implementation. For example, in Morocco, early community engagement for an environmental strategy to control schistosomiasis resulted in local ownership to deliver the strategy. Community volunteers performed a higher frequency of vegetation clearing to reduce the habitat for the intermediate snail host than a similar programme and continued to fund the programme after the study finished (9). Where possible, communities – and local government units responsible for implementation - should be engaged, supported and encouraged throughout the design and delivery of interventions.

International organizations including the United Nations, WHO, FAO, OIE and UNEP

• **Advocate a cross-cutting One Health approach** to formal work programmes internally, among other international organizations, and in regions and countries. For example, include specific One Health targets, indicators and actions in the next WHO General Programme of Work and in relevant workplans of other United Nations agencies where appropriate. This could also be an opportunity to include NTDs in other relevant programmes that have shared outcomes or require similar capabilities or infrastructure to deliver; and generate momentum for country action.

• **Develop guidance and tools** for countries and communities to operationalize One Health practices and to support and assess their implementation, for example by:

- collating evidence to support national decision-making, for instance, by facilitating cross-border or regional data-sharing for sensitive topics (such as notifiable diseases);
- enabling countries to identify shared outcomes and incentives among NTD and other health and non-health sectors and stakeholders to encourage integration where appropriate (for example, through initiatives such as the WHO-OIE bridging workshops);
- enabling countries to design sustainable financing and governance mechanisms to support One Health collaboration, and promoting "last mile" action for eradication;
- catalysing countries – either directly or in collaboration with other stakeholders – to adopt a cross-cutting approach to NTDs, for example, by adapting guidance to local contexts;
- fostering research agendas to define and improve impact, cost-effectiveness and sustainability of One Health approaches to promote health outcomes; and other using critical enablers such as appropriate diagnostics and data systems.

• **Provide global leadership to engage and coordinate key stakeholders**, including through:

- promoting country ownership and participation, while galvanizing international collaboration to support greater uptake of One Health approaches where relevant;
- integrating NTDs into global One Health initiatives, such as the Tripartite Alliance, which was extended in 2020 to include UNEP (Box 3), pandemic preparedness and other strategies; and One Health initiatives with NTDs;
- supporting fair representation of partners' priorities in international meetings where appropriate, for example, highlighting One Health priorities at the World Health Assembly of WHO or at the General Assembly of the United Nations;
- facilitating financing for cross-cutting NTD programmes (for example, from development partners and others).

Box 3. Case study: Tripartite + UNEP Alliance

CONTEXT: The Tripartite + UNEP Alliance (FAO, OIE, WHO and, as of 2020, UNEP) aims to prevent and control health risks at the human–animal–ecosystems interface. The Alliance formalizes historical collaboration on areas of mutual interest and has a rotating Tripartite Secretariat to ensure structured follow-up of decisions.

APPROACH: Their mandate is to develop global strategies and tools jointly to ensure a consistent, harmonized approach to One Health worldwide and to better coordinate human, veterinary and environmental health policies nationally and internationally. Each organization contributes human and financial resources to the Alliance. Key initiatives include:

- setting consistent standards across partner organizations;
- coordinating prevention and control efforts (e.g., global strategies and guidance);
- designing a Global Early Warning System to share data on global health events;
- complementing the Global Health Security Agenda with input on antimicrobial resistance and rabies;
- deploying joint missions to address Avian influenza and Middle East respiratory syndrome coronavirus; and
- strengthening diagnostic capacity for rabies through the RESOLAB network.

IMPACT: The Alliance demonstrates that collaboration across key technical agencies is a feasible, effective and cost-effective approach to address complex problems at the human-animal-ecosystems interface. This model encourages and supports similar collaboration across regional, national and subnational networks.

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Non-State actors, such as academia, industry and NGOs

• **Advocate and build awareness** of the benefits and applications of a One Health approach, including through identifying and demonstrating areas where NTDs can be integrated with other policy or programmatic priorities. This may extend to supporting implementation and funding of such integration, in alignment with national priorities and plans, and is typically within the remit of NGOs.

• **Coordinate non-State actor stakeholders and build new relationships**, for example through:

- developing existing and new networks for collaboration and partnership (e.g. through building a One Health community of practice);
- identifying and engaging novel stakeholders (e.g. from industry and other sectors such as education, tourism, nutrition, etc) – to drive broader involvement in NTD programmes;
- introducing NTD stakeholders to broader One Health and cross-sectoral conversations (e.g. through identifying and supporting One Health champions to engage with other sectors).

This coordination could be undertaken by NGOs in some countries, with input from academic and industry networks.

One example of a novel stakeholder becoming involved in health is patient-led research into olfactory markers of disease detected by dogs. Patients anecdotally reported their dogs detecting cancer or COVID-19 before they were diagnosed. Researchers and NGOs investigated, opening a new avenue for diagnostic research in infectious and noncommunicable disease *(10, 11)*.

• **Conduct research, education and knowledge sharing** to address gaps and challenges to cross-cutting NTD control and availability of products. This includes:

- engaging in multisectoral research to identify gaps, and developing and promoting tools for countries and communities to operationalize One Health;
- developing and making available relevant tools and products (e.g. vaccines, medicines and biologicals) to implement One Health approaches;
- sharing knowledge – including data, technological advances and programme feedback – and facilitating information flow across sectors and stakeholders in participatory design;
- educating future practitioners and the workforce on the benefits of cross-cutting approaches, e.g. through inclusion of concepts in school or university curricula;
- conducting training in key competencies to facilitate greater integration between sectors;
- supporting delivery of One Health interventions (e.g. sample collection, surveillance) and innovation and adaptation of approaches to local contexts.

These actions sit primarily with academia and industry; however NGOs may also play a role particularly in sharing knowledge, conducting training and supporting delivery (Box 4).

These priority actions provide a starting point for countries, international organizations and non-State actors to take a One Health approach to address NTDs and achieve the road map targets. They can be complemented by the key resources described in section 6 and in the following sections, which provide guidance on how a paradigm shift towards One Health can be supported by national programmes, and how common One Health challenges can be overcome.

Box 4. Case study: HORN One Health Regional Network for the Horn of Africa[a]

CONTEXT: Livestock provide > 60% of gross domestic product in the Horn of Africa, yet disease outbreaks impact productivity and can affect people's health and wealth. The HORN project is an international partnership that aims to address gaps in evidence on livestock and zoonotic infections regionally and strengthen the capacity of different sectors to undertake research.

APPROACH: HORN took a five-step approach to strengthening cross-sectoral research capabilities:

1. Undertaking research capability assessments of partner institutions in the Horn of Africa and proposing, implementing and monitoring plans to develop target capabilities
2. Advancing capability of research partners in generic, laboratory and subject-specific skills
3. Training non-research staff from partner institutions in leadership and laboratory skills
4. Undertaking basic and applied One Health research
5. Creating a One Health Regional Network (HORN), to support partnership, research placements and mobility of staff among participating countries

IMPACT: HORN has developed a network of individuals and organizations in One Health disciplines across the Horn of Africa to improve the quality of research into linkages between people's health and wealth and that of livestock and the environment. This has helped to build relationships and collaboration across sectors and disciplines within the region.

[a] HORN One Health Regional Network for the Horn of Africa [website]. 2021. (https://onehealthhorn.net/, accessed 17 December 2021).

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3.

Guidance on how to support a paradigm shift towards One Health in national NTD programmes

This section is directed towards NTD or disease control programme managers and provides guidance on how to support a paradigm shift towards One Health in national programmes. A One Health approach can take many forms, depending on the context of the programme, setting, stakeholders and resources available. Fundamentally, it is about identifying - and activating - opportunities to integrate efforts among sectors and diseases to achieve shared or synergistic goals.

This can be started anywhere, at any time, for any relevant programmatic activity, depending on country context – although will need funding and investment to implement. Ideally, these activities should be integrated with existing local efforts and be supported in parallel by other groups (e.g. international organizations and non-State actors) to foster an enabling environment for change. The following examples outline how a One Health approach can be practically applied to different aspects of NTD programmes and provide links to additional resources where relevant and available.

Stakeholder mapping during programme design

General principles of programme design continue to apply when taking a One Health approach (Annex 2). However, steps that become even more important include stakeholder mapping to identify the sectors or stakeholders who should be involved in programme design or implementation and their motivations. Broader stakeholder analysis may also be helpful to assess needs, ability to act, strengths and weaknesses, opportunities to influence outcomes and barriers to action for each stakeholder. Where multiple stakeholders are involved, it is also critical to agree clear roles and responsibilities for implementation; and set up clear channels and routines for coordination and communication.

For example, to design a rabies prevention programme involving both human and animal interventions, stakeholder mapping might identify four key sectors to involve in delivery: human health, animal health, education, and municipalities. Clear roles and responsibilities would then need to be agreed with relevant focal points from each sector to achieve programme targets, for example:

- **human health ministry** – responsible for rabies awareness campaigns; providing rabies pre- and post-exposure prophylaxis to bite victims; and collating data on rabies cases and bite burden, noting that some of these tasks (e.g. awareness, surveillance) may be shared with animal health;
- **animal health ministry** – responsible for conducting mass dog vaccination campaigns, collecting and sharing surveillance data on animal rabies cases, dog population management, and surveillance and control measures for livestock and wildlife;
- **education ministry** – responsible for implementing rabies awareness in school curricula; and

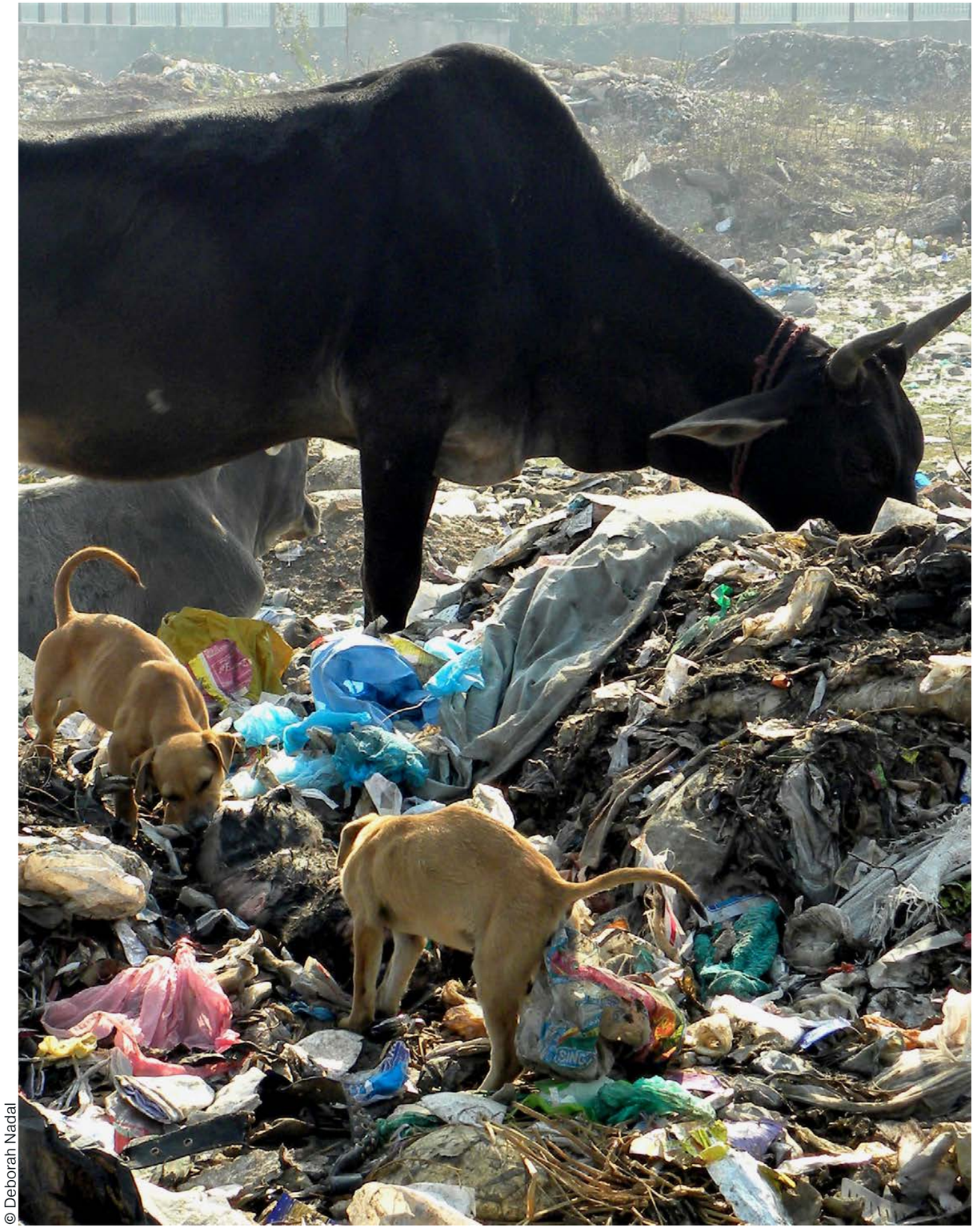
- **municipalities** – responsible for implementing community-based interventions, with support from human and animal health ministries.

An effective programme might also **engage communities** to understand social or cultural factors affecting behaviour (e.g. attitudes toward dog ownership, stray dogs or dog population management); **environmental factors** affecting disease epidemiology (e.g. impact of ecological changes such as deforestation on wildlife populations, biodiversity and frequency of human-wildlife interactions); or **industry** to ensure procurement and supply of essential pharmaceuticals or diagnostics. The above example is not exhaustive, and the stakeholder groups identified may be relevant to programme design for other NTDs also. Identifying a champion can also be helpful to drive progress, coordination and leadership throughout the process.

Stakeholder mapping can also help to identify other points of integration. For example, in Morocco, dog rabies vaccination campaigns were successfully combined with deworming treatments for echinococcosis and insecticide collars for sand flies to prevent leishmaniasis; and human health education for each of these diseases *(12)*. A system-wide approach involving relevant stakeholders early can also help to avoid unexpected outcomes. For example, introducing COVID-19 hand-washing stations in Burkina Faso increased the vectors and incidence of dengue fever in those locales. Had this been flagged earlier as a risk, endemic diseases and their ecology might have been considered more fully in the design of the intervention *(13)*.

Where multiple stakeholders are involved in a programme, mechanisms for coordination and communication are critical to support effective delivery. For example, through designating a focal point, conducting regular meetings, and using informal and formal communication channels (e.g. instant messaging Apps, email), and combined trainings or in-person events to share expertise and build relationships.

ACTION: apply a One Health approach to programme design by mapping stakeholders, assessing their needs and abilities; existing collaborations and opportunities for engagement; agreeing clear roles and responsibilities to reach shared outcomes; and setting up mechanisms to support coordination and communication early in the process. This can be supported by stakeholder mapping *(14)* to identify who is responsible, accountable, consulted and informed for different initiatives within the programme, convene regular meetings or shared communication platforms and identify One Health champions.



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Workforce capability-building

Building workforce capability in different sectors improves overall capability and allows skilled personnel to be shared or redeployed in times of high need (e.g. during a pandemic). It can also serve to break down organizational siloes and improve transdisciplinary ways of working. For example, in Pakistan, teams trained in participatory disease surveillance for rinderpest were successfully redeployed for other disease programmes and emergencies (e.g. earthquakes, droughts and insecurity) *(15)*. Similarly, in Brazil, veterinarians from multidisciplinary Unified Health System teams were redeployed during COVID-19 to support education and food safety campaigns, train health workers and conduct COVID-19 testing and surveillance, thereby overcoming critical skills shortages.

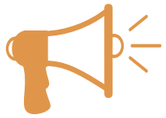
Examples of common skills required for effective NTD programmes across human, animal and environmental health sectors include those for:

- understanding disease burden and epidemiological data analysis,
- modelling impact of interventions and economic implications,
- mapping country contexts and systems,
- surveillance system design,
- laboratory diagnosis of disease,
- collecting and reporting data,
- monitoring and evaluating programme performance,

- planning and programming, including decision science for trade-offs and policy,
- communication and community awareness and engagement, and
- logistics (e.g. forecasting and distribution).

Examples of where a more integrated workforce may make sense include understanding disease epidemiology; implementing shared interventions across sectors (e.g. surveillance, risk assessments and evaluations); and where leadership, facilities or infrastructure are common across programmes.

ACTION: explore opportunities for cross-sectoral training to build workforce capability for critical gaps and/or secondments for skilled personnel to share expertise within and among programmes or departments. Where relevant, encourage transdisciplinary training locally, regionally and globally.



Awareness and education

Often, awareness messages and their target audiences for a given disease or intervention are cross-cutting for different NTDs. For example, WASH and safe food preparation practices are essential to prevent infection from dracunculiasis, foodborne trematodiases, taeniasis and cysticercosis. Coordinated campaigns that distil and share common messages for awareness and prevention are efficient, reinforcing and reduce information overload for recipients. Decisions on the type of awareness or education platform should be evidence-based and can be supported by cognitive behavioural principles and nudging to facilitate the motivation, empathy, value and behavioural change needed to act on key messages.

The target audiences for awareness campaigns are also often similar – e.g., livestock, dog owners or other community members may all receive information on strategies to prevent cystic echinococcosis, schistosomiasis and foodborne trematodiases (if they own, consume or have contact with livestock such as cattle, goats or sheep; or if they own dogs), and for taeniasis and cysticercosis (if they own, consume or have contact with pigs). Awareness campaigns in places where people congregate (e.g. schools, markets, livestock markets and religious gatherings) can be helpful to disseminate information – particularly in remote or sparsely populated areas, where it is hard to reach every household. Awareness campaigns should also consider different groups within communities such as women (who are often responsible for caring for animals and food preparation) and children (who often play with animals, or carry messages from school to home); and how best to engage them (e.g. informed by cultural norms, literacy, etc.).

While engaging communities is key, building awareness of political and other leaders is also important to promote buy-in and investment in cross-cutting programmes, for example by highlighting the impact of successful programmes, educating leaders and building political will to act.

ACTION: explore opportunities to integrate awareness and education interventions within communities and across NTDs and other relevant topics (e.g. through coordinating key messages or target audiences). In parallel, build political will by educating political leaders and celebrating successes.

Community engagement and interventions (prevention and treatment)

The overlap of transmission routes, animal hosts or control and prevention strategies among NTDs creates opportunities to:

- **understand ecological conditions and trends** that may impact the incidence of shared vectors or environmental reservoirs. For example, different approaches are required to control echinococcosis in contained settings such as islands where transmission is limited largely to dogs and domestic ruminants than in settings where intermediate hosts include wildlife, where there is cross border movement, and where habitats and endemicity are impacted by environmental changes;
- **combine cross-cutting interventions** for disease(s). For example, in Jordan, targeted behavioural change activities and movement controls improved vaccination of sheep and significantly reduced human brucellosis (rather than just treating reservoir and host) *(16)*;
- **draw on existing community relationships** to introduce or accelerate new interventions. For example, in KwaZulu-Natal (South Africa), strong community relationships built through sustained rabies control efforts enabled the successful initiation and implementation of a brucellosis control programme using the same network. Environmental stakeholders (e.g. NGOs) are often embedded with long-term horizons for action and can hence make good partners within communities.
- **build public-private partnerships** based on areas of shared interest. For example, companies that export fruit and vegetables have a common interest to reduce soil-transmitted helminths or other foodborne parasites in the environment that originate from human and animal sources. Managing food safety risks can be supported by interventions to prevent foodborne NTDs, for example through human screening and treatment, restricting livestock access to pastures, assessing risk from composted animal and human faeces as fertilizer and ensuring local water quality *(17)*.

When designing interventions, it is critical to engage communities early and understand or adapt to the local context. For example, in Papua (Indonesia), a programme to increase housing for pigs restricted their movement and prevented access to human faeces because people were practising open defecation. This reduced the incidence of cysticercosis but increased community resistance because pigs "cleaned" the environment of human faeces; the programme eventually reverted back to free-roaming pigs.

ACTION: explore opportunities to combine interventions to target multiple NTDs and other health outcomes or use existing infrastructure and relationships to introduce or accelerate new interventions within and beyond NTDs.

Dog vaccination campaign in KwaZulu Natal (South Africa)

© WHO / Bernadette Abela-Ridder

Integrated surveillance

Robust, integrated surveillance systems and disease investigation across human, animal or environmental elements allow understanding of the usual - and detection of the unusual – with implications for the health of all. For example, wildlife can be used to monitor environmental contaminants (e.g. from industrial mining) or antimicrobial resistance *(18, 19)*. Assessing data on changing climates can also inform predictions of animal habitats (e.g. migration of snake species and their implications for snakebite envenoming *(20)*. Data assessment should be supported by appropriate diagnostic tools and data systems that facilitate collection and flow of data from the frontline to system leaders for use in decision-making.

Sharing information from existing surveillance systems among sectors can also be critical to inform appropriate treatment and follow-up. For example, an animal that tests positive or negative for rabies will inform treatment options in a potentially exposed person and any requirement for tracing and follow-up of potential further contacts. Broader information exchange is also important to raise awareness of prevalent diseases that may be overlooked. For example, in a Tanzanian study, > 60% of patients with fever were diagnosed with malaria; however, further investigation revealed that only 1.6% of febrile patients had malaria, and 26% and 8% of cases were due to bacterial zoonoses and chikungunya, respectively *(21)*. Pooled databases across endemic countries can also be helpful to understand disease epidemiology across regions.

An integrated approach is also key where multiple diseases affect the same population and can be detected using the same samples or logistics. For example, transmission assessment surveys for lymphatic filariasis were successfully combined with surveys for malaria and soil-transmitted helminthiases in Haiti *(22)*; and with surveillance for soil-transmitted helminthiases (using Kato-Katz) in schoolchildren in Sri Lanka *(23)*.

ACTION: explore opportunities for intersectoral collaboration to share information, integrate surveillance for diseases that use the same samples or affect similar populations, and strengthen animal, human and environmental disease surveillance systems overall.

Preparation of blood samples that are part of a cross-sectional study to determine the prevalence of brucellosis, Q fever and Rift Valley fever.

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4.

Common challenges and how they can be overcome

A cross-cutting approach that involves multiple sectors and stakeholders, while effective, can bring challenges, especially in settings that are already over-burdened and under-resourced. This section aims to support people interested in taking a One Health approach to understand common challenges, and provide examples of how these challenges have been addressed or overcome in different contexts – while acknowledging that One Health approaches continue to evolve and more work is needed to understand effectiveness, cost-effectiveness and challenges to cross-cutting approaches.

Examples of common challenges include:

Existing human, animal and environmental health systems are siloed and difficult to reconcile: structures and systems to address human and animal diseases are traditionally separate, with different stakeholders and frameworks despite often having similar goals.

Case study: WHO IHR-OIE PVS Joint External Evaluation Bridging Workshops

Joint training of animal and human health workers helped to dismantle siloes, build relationships and increase equality between sectors.

CONTEXT: Historically, different frameworks to evaluate capacity were used by human and animal health sectors, i.e. the International Health Regulations (IHR) Monitoring and Evaluation Framework (IHR-MEF) for public health and the OIE Performance of Veterinary Service Pathway (OIE-PVS) for animal health. There was opportunity to bridge the separate frameworks and jointly undertake training with countries to build communication, relationships and capacity across sectors.

APPROACH: WHO and OIE collaborated to assess differences and synergies between the frameworks, and conducted joint workshops in countries to identify priorities for capability-building. This led to a series of IHR-PVS national bridging workshops *(24)* at which stakeholders from relevant sectors diagnosed challenges to collaboration for specific scenarios and jointly developed an action plan to overcome these gaps. Specific activities included:

- understanding the contribution of veterinary services in implementing the IHR (2005) and using the results of the Performance of Veterinary Services Pathway to explore strategic planning;
- examining current strengths and weaknesses in collaboration between animal and human health services for core technical areas; and
- identifying practical next steps and activities to design and implement joint national road maps to strengthen collaboration and coordination.

IMPACT: By December 2021, national bridging workshops had been conducted in 32 countries across Africa, the Americas, Asia and Europe, with 1962 stakeholders and high-level engagement. Reports, road maps and materials are publicly available *(25)*, including a summary video with reflections from participants *(26)*.

KEY LESSONS:

- National bridging workshops helped national governments to diagnose needs and gaps and develop an action plan to support collaboration across human and animal health sectors.
- Practical, scenario-based sessions helped different sectors build relationships and gain new perspectives on operational activities.

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Working session of participants at the International Health Regulations (IHR)-Performance of Veterinary Services (PVS) National Bridging Workshop in Liberia, 2018.

It is difficult to get started: interventions against human and animal diseases, or for environments, often remain separate unless there is a driving force to change the status quo and bring them together.

Case study: One Health champion catalyses cross-sectoral collaboration to control cystic echinococcosis in Argentina

CONTEXT: In the 1970s, cystic echinococcosis was a serious health problem in indigenous Mapuche communities in Rio Negro province of Argentina. Decades of disease control efforts involving MDA for dogs and education campaigns for people reduced the incidence of infection – but some cases persisted. In 2009, a new stage of the programme was launched, involving vaccination for sheep and building on existing programme foundations *(27)*.

APPROACH: A One Health champion from the animal sector who was responsible for control of cystic echinococcosis instigated a joint approach between health care workers and veterinarians. Initially, health workers dewormed dogs with praziquantel during quarterly household visits, while veterinarians were responsible for surveillance systems. Today, health care workers and veterinarians work together to design education strategies targeting schoolchildren and rural householders. In 2009, sheep vaccination was introduced for lambs.

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IMPACT: In 2015 - 6 years after introducing vaccination for sheep – the number of producers with infected animals decreased from 95% to 24% and that of new cases of the disease to 3 in 2016. This collaborative approach between human and animal health workers continues *(28)*.

KEY LESSONS:

- A One Health champion effectively catalysed collaboration to address cystic echinococcosis.
- Collaboration became progressively embedded over time – but it had to start somewhere.
- Both sectors found value in a shared approach, and therefore it has continued.

Why should agriculture ministries treat or vaccinate animals for a disease that does not impact production?: competing priorities for NTD objectives between sectors.

For example, where livestock transmission poses a threat to human health but does not negatively impact animal productivity, it can disincentivize animal treatment. However, combined human and animal treatment is often the most effective and sustainable way to address disease in people.

Case study: Shared funding incentivizes One Health collaboration for interventions against *Taenia solium* in Madagascar

CONTEXT: In Madagascar, human taeniasis in Antanifotsy district was treated for 3 consecutive years with MDA with praziquantel by the Ministry of Health. This successfully reduced the baseline prevalence of taeniasis from 4.90% to 0.61%; however, 12 months later taeniasis prevalence increased to 4.17%, similar to its original levels. A new opportunity became available to combine treatment for people with pig vaccination to sustainably reduce the disease prevalence *(29, 30)*.

APPROACH: A shared funding arrangement for activities, coordinated by a central organization, incentivized collaboration between stakeholders from the Ministry of Health (responsible for implementing MDA) and the Ministry of Agriculture (responsible for vaccinating pigs). Collaboration was strengthened through open communication (informally, and through weekly and monthly meetings), and joint trainings and field visits for the workforce. This joint approach also required recalibration and integration with other programme schedules –MDA for taeniasis was combined with MDA for schistosomiasis, and the scheduled timing of MDA campaigns was moved until after pig vaccination rounds were complete.

IMPACT: Although the project is under way, it has already built stronger relationships and improved communication among stakeholders from the human and animal health sectors. Overall, it aims to validate the effectiveness of this model in sustainable elimination of *T. solium* as a public health problem in the programme areas *(13).*

KEY LESSONS:

- Interventions in people alone are effective, but may not be sustainable in the long term.
- Shared funding arrangements incentivize collaboration but must be underpinned by strong coordination, open communication and joint activities (e.g. training and field visits).
- Integrating interventions may require extra effort initially (e.g. to make connections and calibrate schedules), but it is expected that they become routine.

5. Next steps to operationalize guidance

The priority actions highlighted in section 2 (supported by the detailed action framework in Annex 1) and the guidance for programme managers in section 3 provide a starting point for countries, international organizations and non-State actors to take a One Health approach to address NTDs and achieve the road map targets.

To further support operationalizing these findings, three next steps are recommended in line with the road map pillars to accelerate programmatic action; intensify cross-cutting approaches; and facilitate country ownership:

4. Disseminate the companion document and support uptake of cross-cutting One Health interventions against NTDs for relevant stakeholders, and in existing or new disease programmes;
5. Further develop and promote practical tools to support implementation of One Health approaches to NTDs; and support communities and countries to own local programmes;
6. Assess opportunities to integrate NTD objectives into relevant existing forums (e.g. the Tripartite and UNEP collaboration) and policies beyond human health.

Pursuing cross-cutting One Health approaches to NTDs - and quantifying their impact to demonstrate progress and drive investment - is critical to supporting the overarching aim of the road map and the United Nations Sustainable Development Goals “to achieve a better and more sustainable future for all …”.

Mass drug administration in Antanifotsy district.

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6.

References and key resources

Key resources

NTDs, road map and companion documents

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Annexes

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Annex 1. A One Health framework for action against NTDs, by road map pillar

PILLAR 1. Accelerate programmatic action: Integrate One Health into NTD programme design and delivery

Support NTD stakeholders to understand and utilize systems thinking; identify key entry points for One Health; and advocate for One Health interventions against NTDs. Achieving this will require action in the following areas:

1. Technical progress e.g. evidence base and guidance on integrated interventions	
Countries	• Map stakeholders for relevant NTDs to identify human-animal-environment interfaces and investigate potential areas for integrated One Health approaches. • Share data across sectors and facilitate cross-sectoral use. • Identify suitable metrics (existing or new) to monitor and track relevant One Health targets.
International organizations	• Develop guidance and tools for countries to operationalize One Health practices and support their implementation.
Non-State actors	• Conduct research, education and knowledge sharing to address gaps and challenges to cross-cutting NTD control e.g. through multisectoral research to better understand the human-animal-environment interface; knowledge sharing and training.
2. Strategy and service delivery e.g. surveillance, joint risk assessment	
Countries	• Identify and prioritize opportunities for cross-cutting integration based on local needs, and use co-design and adaptive programme design to inform delivery. • Develop a strategic One Health plan that sets clear targets for One Health integration and outlines activities, resourcing and monitoring required to reach targets. • Facilitate transdisciplinary ways of working between sectors and stakeholders e.g. through aligning incentives, delineating governance structures and testing novel mechanisms.
International organizations	• Support and catalyse countries to co-design cross-cutting processes and ways of working. • Promote One Health approaches to drive political buy-in at country level.
Non-State actors	• Identify and coordinate non-State actor roles in systems maps and fill evidence gaps.
3. Enablers e.g. integrated funding pathways, advocacy collaboration and multisectoral action	
Countries	• Identify systematic barriers to cross-cutting approaches • Integrate funding for integrated actions and support sharing of knowledge and capacity across sectors. • Build One Health capacity e.g. by developing or integrating One Health approaches into existing curricula to dismantle siloes and encourage cross-sectoral collaboration. • Advocate for a One Health approach to NTDs.
International organizations	• Engage NTD community in One Health and One Health community in NTDs • Enable One Health action by supporting suitable financing and governance mechanisms • Lead by example by delivering high-level multisectoral action between United Nations agencies.
Non-State actors	• Target and fund capacity-building and delivery of One Health for NTDs; address evidence gaps; offer suitable financing mechanisms. • Build relationships in existing and new networks to share knowledge. • Focus education and training on competencies to facilitate greater integration in common areas between health sectors.

PILLAR 2. Intensify cross-cutting approaches: Coordinate and integrate action against NTDs across key sectors

Demonstrate interconnections between sectors and highlight shared outcomes; facilitate conversations and nurture relationships; integrate NTDs into existing structures. Achieving this will require action in the following areas:

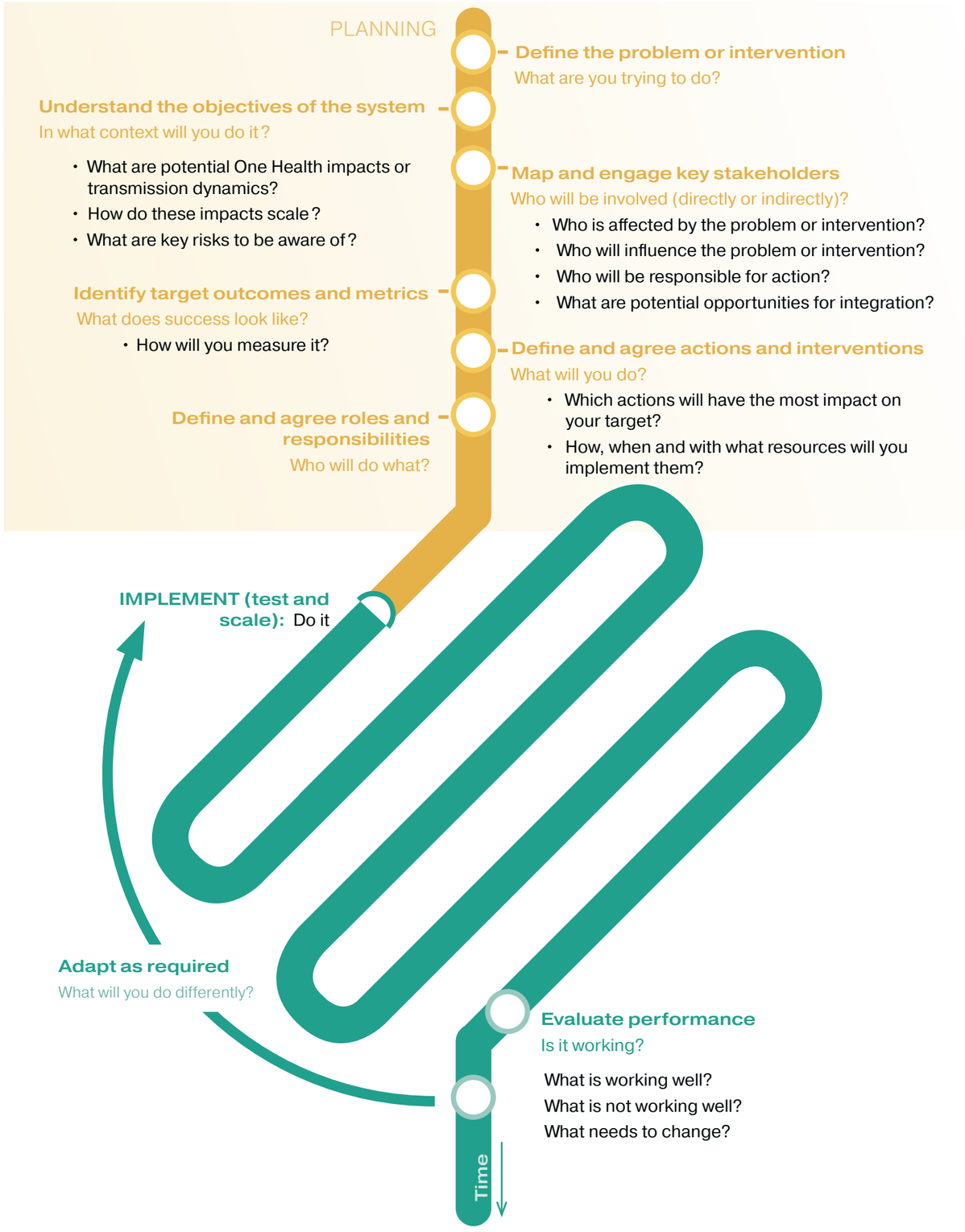
1. Integrating NTDs in common delivery platforms that combine work on human and animal diseases	
Countries	• Identify opportunities for integration – e.g. efficiencies, entry points and shared priorities for NTD programmes with non-NTD sectors. • Facilitate transdisciplinary ways of working and sectoral equity in their integration. • Frame problems and set objectives by placing the patient and community at the heart of objective setting. Shift programmatic focus to be cross-cutting.
International organizations	• Integrate approaches to NTD programmes within United Nations agency governance and policies and strengthen the institutions, governance and leadership structures needed to deliver. • Support countries to identify entry points for integrating NTDs in other sectors. Collate evidence and support country level decision-making.
Non-State actors	• Identify novel stakeholders to integrate following One Health analysis and support integration in prioritized areas.
2. Mainstreaming NTDs within national human, animal and environmental health systems to improve the quality of NTD interventions	
Countries	• Promote clear One Health targets in relevant national and local NTD policies and include NTDs in national One Health strategies. • Develop One Health champions to link NTDs to other health and non-health sectors at national and global levels.
International organizations	• Support inclusion of NTD targets in other sectors and One Health policies. • Support countries and sectors to establish and sustain One Health ways of working and engage with national One Health champions.
Non-State actors	• Identify and advocate for opportunities for NTDs to be included in other policy areas. • Support NTD stakeholders to join wider health sector conversations such as those on pandemic preparedness, and help in their co-design process to reap gains for NTDs.
3. Coordinating with other sectors within and beyond health on NTD-related interventions e.g. establishment of cross-sectoral coordination mechanisms	
Countries	• Identify non-health stakeholders and their role in delivery and uptake of One Health for NTDs. Establish national and local/subnational mechanisms to coordinate all stakeholders. • Develop governance mechanisms to support coordination and leadership.
International organizations	• Help identify shared outcomes between NTDs and non-health sectors and support coordinated responses and reporting across sectors. • Integrate NTDs into global One Health activities such as the Tripartite+ and pandemic preparedness strategies.
Non-State actors	• Advocate for collaboration outside health e.g. education, tourism, nutrition and coordinate between sectors for joint advocacy, funding and implementation. • Develop public private partnerships to fill gaps and facilitate a One Health approach to NTDs.

PILLAR 3. Change operating models and culture to facilitate country ownership: Nurture and sustain country-led One Health action

Put communities and countries at the core of decision-making; One Health champions to lead transition to One Health working, sectoral equity and ownership in achieving shared outcomes; proportionate resourcing according to One Health system. Achieving this will require action in the following areas:

1. Ownership at national and subnational levels e.g. responding to the specific needs of populations and the global health security agenda	
Countries	• Put communities at the heart by supporting community engagement in early in policy development, decision making and local solutions. Ensure policies reflect local values, objectives and contexts. • Build sustainable and equitable engagement from all stakeholders (including non-traditional stakeholders) in One Health for NTDs with identification of shared outcomes, dependencies, drivers, levers and conflicts of interest; manage conflicts; engage stakeholders early in the planning and be transparent.
International organizations	• Offer global leadership while facilitating country ownership of NTD programmes and galvanize international collaboration. • Provide guidance on participatory approaches to increase country ownership.
Non-State actors	• Facilitate information flow to support delivery of participatory approaches to One Health for NTDs. • Identify community/stakeholder priorities and represent locally specific contexts to national or global interests.
2. Clear stakeholder roles throughout NTD work; managing competing priorities both across sectors and between nations.	
Countries	• Lead by example and give confidence to others to engage in One Health for NTDs. • Clearly define State and non-State roles and distribute responsibilities for NTDs and assign proportional resources and governance. • Conduct capacity review to identify weak links.
International organizations	• Offer guidance on distributing responsibility for One Health across stakeholders, public and private. • Ensure accountability systems in place at country level to support country and sectoral ownership of roles and responsibilities.
Non-State actors	• Collaborate across sectors to identify shared aims and build sectoral equity and support community-led development. • Give policy-makers a single route to advice from across One Health stakeholders.
3. Organizational set-ups, operating models and thinking aligned to achieve the 2030 targets	
Countries	• National governance: Deliver local solutions with a global vision. Facilitate and sustain truly transdisciplinary One Health action between government sectors, ensuring sectoral equity and adequate resource allocation. Consider suitability of existing organizational structures to enable sustainable collaboration and action towards shared or complementary targets, able to resolve potential conflicts in priority setting. • Employ inclusive design processes with the needs of the community at its core e.g. participatory and co-design processes with structured management of stakeholder input. • Facilitate public private partnership opportunities.
International organizations	• Support countries to use organizational set ups to plan long-term impact, value sustainability and achieve “last mile” stages to eradication where appropriate.
Non-State actors	• Adapt to changing governance structures adopted at national or international level; facilitate others to do the same. • Commit to cross-sectoral (broad) continuous feedback and evaluation loops in programme design and implementation, communicate findings with policy-makers.

Annex 2. General principles of good programme design



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