Food and Agriculture Organization of the United Nations

Progressive Management Pathway for Terrestrial Animal Biosecurity (FAO-PMP-TAB)

Background

The Food and Agriculture Organization of the United Nations (FAO) defines the term biosecurity as a strategic and integrated approach to analysing and managing risks to human, animal and plant life and health, and associated risks to the environment. It is a holistic concept that encompasses health policy, regulation and practices to protect agriculture,[1] food and the environment from biological risks (FAO, 2003).

Under the FAO Strategic Framework's aspiration of "Better Production", the One Health priority programme area (OHPPA) seeks to prevent and contain the rising losses to agricultural production and adverse ecosystem effects. These effects may be caused by the spread of biological threats in the crop, animal and aquaculture sectors, including zoonotic infections of pandemic potential and antimicrobial resistance (FAO, 2021). Strengthening biosecurity is one of the key thematic components of OHPPA.

FAO has pioneered the progressive management pathway (PMP) approach to assist countries, industries and producers to gradually implement improved and sustainable levels of risk management. To date, the PMP approach has been applied to aquaculture biosecurity (PMP/AB), antimicrobial resistance (PMP-AMR) and biosecurity in beekeeping (PMP-BMB). Now, a PMP for terrestrial animal biosecurity (FAO-PMP-TAB) is being developed to strengthen biosecurity in terrestrial animal production and associated value chains.

FAO-PMP-TAB is a collaborative, stepwise approach to assessing and managing biological risks, supported by the provision of appropriate tools with shared public-private responsibilities. It will include planning of policies, laws, regulations, institutional framework, guidelines and field interventions. The development of sustainable biosecurity management systems in terrestrial animals will contribute to One Health and ultimately benefit people, animals and ecosystems (FAO *et al.*, 2022).


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Objective

To contribute to enhanced community resilience and sustainable terrestrial animal sector(s) by strengthening biosecurity management for terrestrial animals at enterprise, community and national levels.

FAO-PMP-TAB implementation will result in reduced burden and impact of animal diseases (including zoonoses), reduced transboundary spread of diseases, improved socioeconomic benefits in the terrestrial animal sectors, reduced antimicrobial resistance and, ultimately, enhanced One Health outcomes.

[1] With "agriculture" used in its broadest sense to include agronomy, livestock, forestry, fisheries and related environmental aspects.

Scope

FAO-PMP-TAB is concerned with strengthening biosecurity along terrestrial animal value chains (livestock, poultry and wildlife) from production up to and including the point of slaughter.

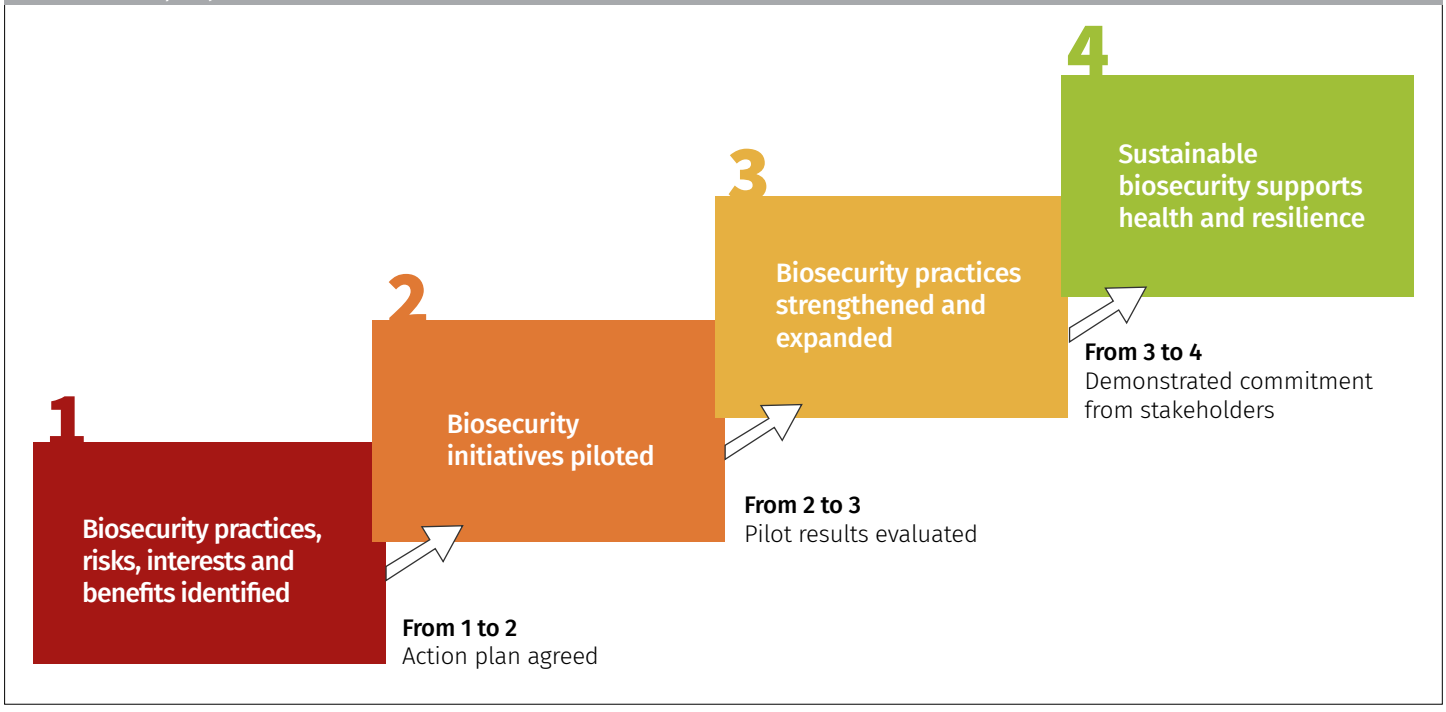
Post-slaughter stages in the value chain are out of scope. However, FAO-PMP-TAB will be designed in a way to facilitate integration of respective control approaches and frameworks (for example, Hazard Analysis Critical Control Point, Codex Alimentarius, etc.). Moreover, FAO-PMP-TAB will be inclusive of different systems from backyard to large-scale settings with an emphasis on smallholders given their low compliance with biosecurity, growing abundance in many low- and middle-income countries, and importance for local communities. Physical and chemical health hazards are out of scope. FAO-PMP-TAB will focus on stakeholders' priorities and integrate existing tools and initiatives under a single umbrella.

Principles

The following principles shall guide the development of FAO-PMP-TAB:

1. Through **consensus with stakeholders**, initiatives that progressively improve biosecurity management will be developed using the FAO-PMP-TAB framework.
2. The foundation of FAO-PMP-TAB will be to encourage **good practices related to production, hygiene and sanitation** to mitigate biological risks and hazards. There may be a focus on specific species or threats including zoonoses, endemic, exotic, or new and emerging pathogens, as per stakeholders' priorities.
3. **One Health and public-private partnership approaches** are integral to the FAO-PMP-TAB.
4. The FAO-PMP-TAB is strongly founded on applicability at **community level**, leading to local acceptance, applicability and uptake, which are prerequisites for success. Special consideration will be given to understanding and addressing the needs of smallholders and public actors in charge of enforcing biosecurity.

FIGURE 1: *Steps of FAO-PMP-TAB*



Source: Author's own elaboration

5. **Sustainability** is essential and considered across three dimensions: economic, social (participatory), and environmental.

6. Whenever possible, the FAO-PMP-TAB will build on **existing international, regional and national standards and regulatory frameworks**. Information and best practices will be developed to reach and operationalize standards.

7. The approach is intended to **facilitate replicability and uptake** within a country and by different countries. There should be a peer learning component at community, national, regional and global level. For example, what has worked in farm or country X may also work elsewhere, and benefit from the lessons learned of others.

8. **Business or economic incentives** for the producers and value chain actors linked to reducing risks need to be identified at each step of the framework.

9. Progression at community level lies in **improved biosecurity outcomes** while at national level the focus is more on **process improvement** (not biosecurity specific). Examples include updated legislation, developed strategies, regional partnerships, and so on. In all cases, the improvements should be undertaken in clear, achievable and measurable steps.

10. Whenever possible, **multisectoral collaboration** will be encouraged in policy and regulatory approaches as well as the development and use of infrastructure in order to support efficient allocation of resources.

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Steps

FAO-PMP-TAB is a stepwise approach towards a better and sustainable biosecurity system, developed and implemented through public-private partnership and dialogue between different stakeholders, including producers, governments, industry and other value chain actors.

Four steps have been defined, as shown in Figure 1. A country may enter at any of the first three steps. Countries will enter at step 1 when considering new biosecurity initiatives and at steps 2 to 3 when seeking to expand existing biosecurity initiatives.

Because FAO-PMP-TAB is not disease- or sector-specific, a single country may be in different steps of FAO-PMP-TAB for different biosecurity challenges, production sectors or even different nodes within a value chain (for example, pig production, poultry production, dairy sector, slaughterhouses, farms and live animal markets). Clear outputs and indicators for each step will be defined as part of the FAO-PMP-TAB toolkit.

Step 1: Biosecurity practices, risks, interests and benefits are identified

At this step, biosecurity priorities and risks (as per data availability) are defined and characterized. Stakeholders are identified and mapped at each node of the relevant value chain(s) and their current biosecurity practices are documented to appreciate the risk they may pose to the health of livestock, wildlife, humans and the environment. Stakeholder priorities, interests and capacity are assessed to understand the challenges they face in adopting biosecurity practices as well as possible incentives for behaviour change. Through a consultative process and involving public-private partnership, an action plan to pilot biosecurity initiative(s) is developed, taking into consideration the four core components of FAO-PMP-TAB (see as follows).

Step 2: Biosecurity initiatives piloted

In this step, one or more initiatives to mitigate the priority biosecurity risks is piloted and the progress monitored. The pilot initiatives will trial options to mitigate risks which will include the adoption of different practices expected to strengthen one or more of aspects of prevention, preparedness, detection, response, recovery and disease management. The initiatives should be designed taking into consideration existing capacities and resources to facilitate their successful expansion in step 3. At the end of the pilot phase, there is an evaluation to determine the effectiveness of the biosecurity pilots, including public and private sector benefits, and draw lessons for refinement and scaling up.

Step 3: Biosecurity practices strengthened and expanded

Here, the pilot biosecurity initiatives are refined and more widely adopted through policy and market-based incentives. The expansion may be geographical (i.e. to other regions of the country) or sectoral (to other livestock production sectors). Expanding the pilot initiatives require an understanding of the existing policy and institutional framework, available resources, and incentives of both public and private sector actors to ensure the wide adoption of good biosecurity practices.

Step 4: Sustainable biosecurity supports health and resilience

In the last step, the country will have met the national or international standards and has proven improvements to health or market access. Stakeholders clearly demonstrate ongoing commitment to maintain and improve the biosecurity management system. The focus is now on ensuring sustainability to protect the achievements and to continue to monitor compliance and effectiveness.

Core components

Core components are the ingredients that must be considered to make sustainable improvements in biosecurity. Each of these should be considered at every step of FAO-PMP-TAB. As FAO-PMP-TAB is further developed, the core components will be reviewed and updated. The core components fit into four categories:

1. **knowledge and evidence**, which considers the extent of understanding of the current risk situation, required for evidence-based decisions by stakeholders;
2. the **enabling environment**, which describes the broader context within which individuals and organizations function and one that facilitates or hampers their existence and performance (United Nations Development Programme, 2008);
3. **infrastructure and capacity**, which refers to the physical structures and facilities as well as the private and public human resources and financial ability to implement biosecurity improvements;
4. **practices**, which includes the actual actions and activities performed that influence biological risks, as well as understanding the conditions that influence these practices.

Toolkit

1. The FAO-PMP-TAB toolkit will contain tools and mechanisms to identify and mitigate biosecurity risks and to support implementation of biosecurity improvement including governance and regulatory mechanisms to monitor, measure and sustain progress. This includes the stocktaking of existing information and procedures in place to prevent and manage animal diseases and emerging zoonoses. It will include practical tools to:
   - facilitate stakeholder mapping and consultation;
   - assess the current biosecurity environment;
   - conduct value chain analysis and risk assessment;
   - review the legislative and policy framework;
   - perform knowledge attitude and practice studies;
   - perform socioeconomic assessments including consideration of incentives, costs and cost-benefit analysis of biosecurity interventions along the value chain.

2. FAO-PMP-TAB will bring together existing tools and initiatives under a single umbrella, with the creation of new tools as required. The toolkit will remain open to continued development and improvement based on lessons learned and experiences gained.
   - Existing tools created by FAO (e.g. SET, LMT, EVC, ASL2050)[2] and pathogen-specific programmes and pathways are relevant and will be integrated into FAO-PMP-TAB.
   - Non-FAO tools developed by other organizations (for example on-farm biosecurity assessments) or by the countries applying FAO-PMP-TAB will be validated for use and integrated as appropriate.
   - Among other tools, FAO will develop:
     - a template for a stepwise biosecurity improvement tool (e.g. small steps which are clear, achievable and measurable);
     - a tool to guide and monitor progress along FAO-PMP-TAB.

3. The toolkit will be housed on a virtual platform for FAO-PMP-TAB. This will also act as a hub for knowledge and evidence, training, and sharing experiences and best practices for experts and stakeholders, including:
   - a web-based system for undertaking biosecurity assessments and potential solutions across core components;
   - a community of practice

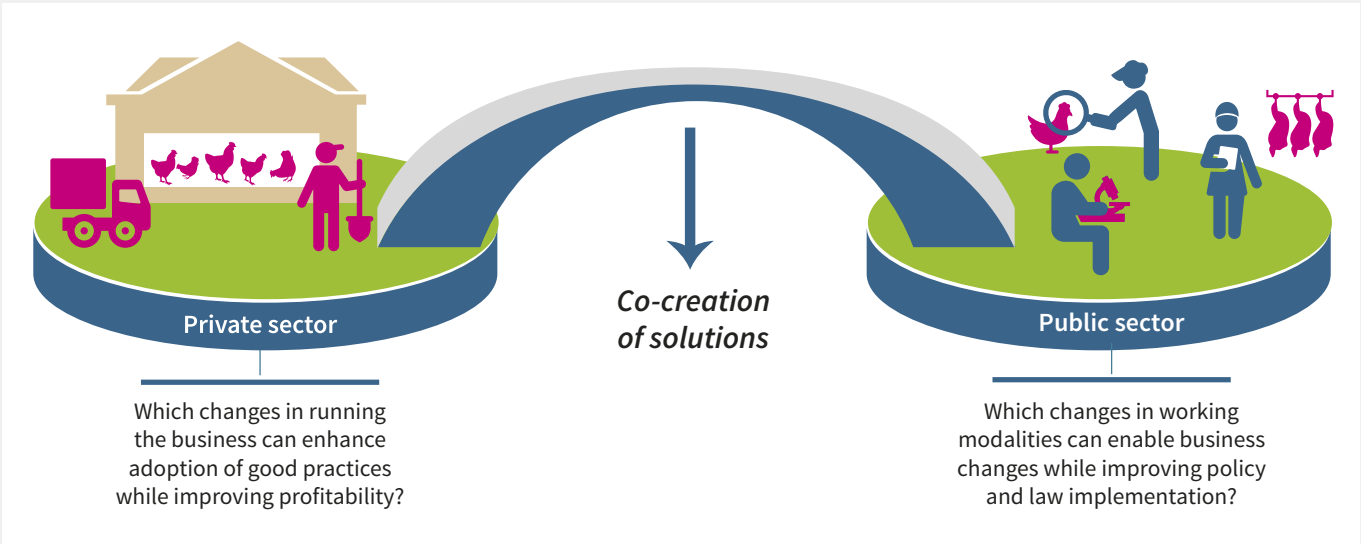
4. To ensure the guidance is useful and comprehensive, specific content will be proposed for different stakeholders such as policy or strategic leaders, executive leaders, and implementation leaders.

[2] Surveillance Evaluation Tool (SET); Laboratory Mapping Tool (LMT); epidemiology value chain (EVC); Africa Sustainable Livestock 2050 (ASL2050).

Box 1: Insights from Africa Sustainable Livestock 2050 on progressive biosecurity control at local level

Communities build the foundation of sustainable biosecurity systems: their engagement, acceptance, and application of good practices on a daily basis are prerequisites for the success of any biosecurity or other public health initiative. However, there is a blatant gap between many policies and actual compliance on the ground, which poses formidable challenges to veterinary services in many developing countries (Heath, 2006). FAO, through the ASL2050 project (FAO, 2023), has developed an approach to engage public and private sector actors at community level to identify biosecurity challenges and jointly develop solutions to address them. This approach includes legislative reviews, co-creation workshops, business analyses, consultations with local extension officers, and locally adapted prerequisite programmes on biosecurity.

Pilots in the poultry sector in Kenya and Uganda have shown that stakeholders are willing to invest in biosecurity, but also point out that "change can't happen overnight". The programmes thus naturally focused on developing workable control measures with clear examples of compliance that allow for gradual improvements over time. For a common biosecurity practice, such as access control, stakeholders identified different measures of compliance, starting, for instance, with simple signposts and gradually expanding to keeping visitors' logs or building farm gates and fences. Depending on the specific level of compliance, the public sector incentivized stepwise compliance through different mechanisms such as a staged certification system, where the basic level would allow producers to officially supply livestock products at municipal level, while higher levels would allow them to also supply neighbouring districts. A key feature of the entire approach is the role of public veterinarians, who are not mere enforcers of legislation, but engage private actors in the progressive achievement of solutions that are in line with biosecurity and business priorities. Read more about this approach with an example from the poultry value chain in Uganda here.



Notes :

a) **Heath,** S.E. 2006. Challenges and options for animal and public health services in the next two decades. *OIE Revue Scientifique et Technique,* 25(1): 403–419. https://pubag.nal.usda.gov/download/36345/pdf

b) **FAO.** 2023. Africa Sustainable Livestock 2050. In: *Food and Agriculture Organization of the United Nations.* Rome. Cited 29 March 2023. www.fao.org/in-action/asl2050/en/

Box 2: Improving biosecurity in the poultry production chain

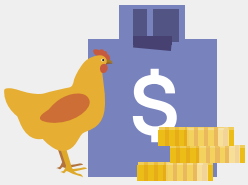
Bắc Giang is one of the provinces with the highest poultry population in Viet Nam. However, the biosecurity conditions of hatchery and poultry households are still very poor, contributing to low production efficiency and increasing risk of animal and zoonotic diseases. Although the legislation regarding auditing on veterinary hygiene conditions is available, it is not suitable for small-scale production, which is very common in Viet Nam.

In this context, the Department of Livestock Production of Viet Nam, in collaboration with FAO, implemented the project "Evidence-Based Risk Management along the Livestock Production and Market Chain". The project was supported by the United States Agency for International Development and the Department of Foreign Affairs and Trade of Australia.

Activities were carried out at two levels (the producer and the local authority):

1. Producers were trained on good hatchery and farm management practices and biosecurity. Action plans for improvement were prepared and assessments performed before and after.
2. The local authorities were trained on good hatchery management practices and biosecurity, as well as hatchery and farm auditing and certification. A hatchery biosecurity auditing checklist was developed.

As a result of these activities, 188 farmers were trained on good biosecurity and husbandry practices. A total of 70 hatcheries had a pre-intervention assessment, 50 hatcheries were audited and 45 were certified. A cost-benefit analysis provided evidence on the impact of interventions and certification. The Ministry of Agriculture and Rural Development of Viet Nam now plans to expand this pilot to other provinces with high poultry density. Furthermore, the biosecurity auditing checklist is now a part of legislation to support food safety conditions for poultry products in the country.



Hatcheries and poultry farms have become staggeringly profitable in Bắc Giang. A woman hatcher, after receiving training from the project, now raises 3 000 hens in her backyard and makes a handsome profit of more than USD 100 000 from selling day-old chicks each cycle of 14 months.

Source: **FAO.** 2019. Evidence-based risk management along the livestock production and market chain: Viet Nam. Bangkok.

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