

Briefing note



Innovations for Safe Trade: Driving SPS Capacity, Inclusion and Market Access



Why Innovation Matters for Safe Trade

Sanitary and phytosanitary capacity is essential to protect human, animal and plant health and to facilitate trade. When countries can meet SPS requirements, they gain opportunities to access and compete in regional and global markets. Yet, when stakeholders are unable to comply, trade opportunities are restricted. Today, SPS systems operate in an increasingly complex environment, which increases the challenges. Food safety, animal and plant health risks are evolving, climate change is shifting pest and disease patterns, and trade processes are rapidly digitalizing. Many developing countries continue to face significant capacity gaps, making it harder to keep up with international standards and to fully benefit from safe trade.

Innovation plays a critical role in addressing these challenges. It strengthens SPS systems, improves efficiency and supports market access, while reinforcing the protection of health. Innovation is not limited to new technologies. It encompasses technological, social, institutional, regulatory, financial and behavioural approaches, and often involves adapting existing solutions to new contexts, users or capacities. Effective innovation is practical, evidence-based and grounded in local realities.

Inclusive innovation is particularly important to ensure that the benefits of strengthened SPS systems extend to smallholders, MSMEs, women, youth and persons with disabilities. Experience shows that innovations deliver the greatest impact when they are developed collaboratively, informed by local knowledge and supported by shared learning.

The STDF pilots SPS and safe trade innovations, alongside its role as a convenor, catalyst and learning platform. By enabling countries and partners to test solutions, generate evidence and share lessons, the STDF helps ensure that proven approaches can be adapted, scaled and sustained beyond individual interventions. The emphasis is on inclusive, cost-effective innovations that deliver tangible benefits for producers, MSMEs and public authorities.

“Innovation is not a buzzword—it’s a mindset. And it’s one we can shape together through shared knowledge and commitment.”

Vincent Martin, FAO

How Innovation Strengthens SPS Systems

- Responds to emerging risks through data-driven analysis, predictive tools and rapid diagnostics.
- Builds resilience through remote audits, virtual training and adaptive procedures.
- Improves efficiency through digital certification, automation and streamlined processes.
- Expands knowledge-sharing using interoperable platforms and open-access tools.
- Supports sustainability through climate-smart production and precision pest management

Innovation in Practice: What Has Been Shown to Work

Across SPS systems, innovation takes many forms. Experience from STDF-supported work demonstrates how practical innovations — when designed with users, informed by evidence and supported through partnerships — can deliver measurable improvements in SPS capacity and trade outcomes.

Global and regional dialogues, including the Vienna Food Safety Forum (June 2025) led by UNIDO with Australia, STDF and other partners and the STDF/IICA workshop on “Harnessing AI for Safe Trade in Latin America and the Caribbean” (November 2025), highlight the importance of knowledge exchange in advancing SPS innovation. These discussions bring together public and private actors to share practical experiences and build consensus on key priorities, including interoperable digital systems, secure data sharing, capacity development and the governance frameworks needed to support the effective use of digital and AI-driven solutions. In doing so, they help identify common challenges and practical pathways for scaling innovation across countries and regions.

 **Find out more:** Vienna Food Safety Forum [background paper](#) and [outcome report](#); and on [STDF/IICA Regional Workshop](#)



Innovations for Safe Trade: Practical Solutions and Outcomes

INNOVATIONS	EXAMPLES	OUTCOMES
Digital & Data Driven SPS Solutions	Digital pest surveillance eCertification systems Remote/hybrid audits	Faster risk detection Coordinated responses Streamlined trade
Production-Level & Agro-Technical	Biocontrols XRF testing	Safer products Improved compliance and market access
Inclusive & Social	Mobile advisory services Inclusive capacity building	Broader participation and more inclusive SPS systems
Smarter Regulations	Regulatory stock-taking and reform ePing for transparency	Coherent, evidence-informed rules Improved coordination Predictable market access
Climate-smart & Environmentally responsible	Precision pest management Climate-resilient SPS practices	Reduced environmental footprint Resilient systems Sustainable, adaptive value chains

“*Innovation must be inclusive and action-oriented...creating diverse, replicable solutions that empower communities and strengthen agri-food systems.*

Ravi Khetarpal, APAARI and STDF Developing Country Expert 2016-2017

Digital and Data-Driven SPS Solutions

Digitalization is reshaping how SPS risks are identified, compliance is managed and information is exchanged across borders. Effective digital SPS innovations increasingly function as shared public infrastructure, combining technology with institutional coordination, regulatory reform and learning systems that can be adapted, reused and scaled across institutions and countries. Interoperable digital systems and public goods increasingly support more streamlined procedures, strengthened border controls and coordinated action across borders, while enabling learning and compliance at scale.

Digital pest surveillance

Innovation: Mobile data collection using phones and tablets linked to central dashboards, enabling near real-time reporting, analysis and cross-border information exchange.

Why it matters: Faster detection of emerging pests and more coordinated regional responses, reducing risks to production and trade.

 [Find out more](#)

Electronic certification (ePhyto/eVet)

Innovation: Secure, paperless and internationally harmonized certificates exchanged electronically between national systems.

Why it matters: Reduced time and cost of trade, improved transparency and more predictable market access, particularly for MSMEs.

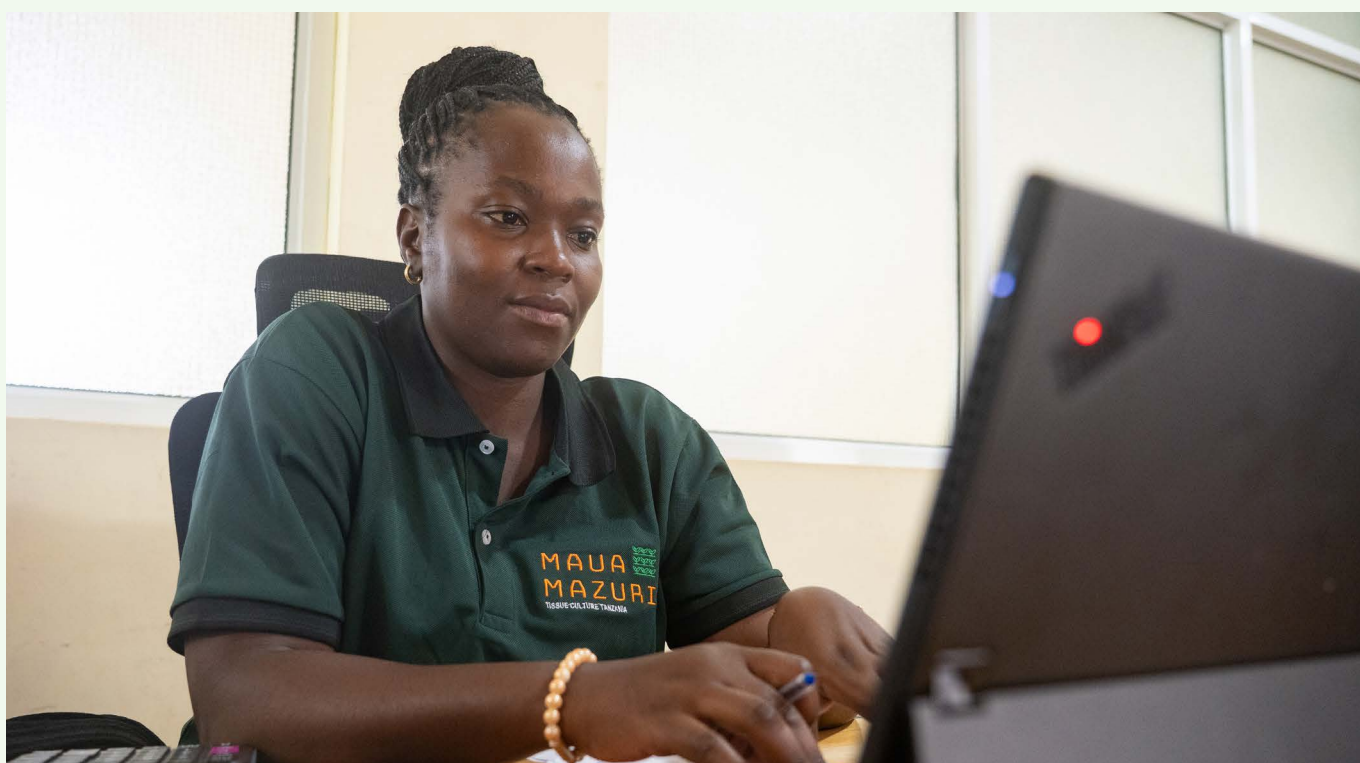
 [Find out more](#)

Remote and hybrid audits

Innovation: Virtual inspections combining video, digital records and targeted on-site verification, reducing the need for physical travel.

Why it matters: Expanded inspection coverage, cost savings and more efficient use of public and private sector resources.

 [Find out more](#)



Mobile laboratory services

Innovation: Mobile and digitally connected laboratory units, following standard protocols, to provide SPS testing and diagnostics in remote and underserved areas.

Why it matters: Improves the timeliness and reliability of testing, strengthens surveillance and compliance, and reduces delays and costs associated with transporting samples to central laboratories.

 [Find out more](#)

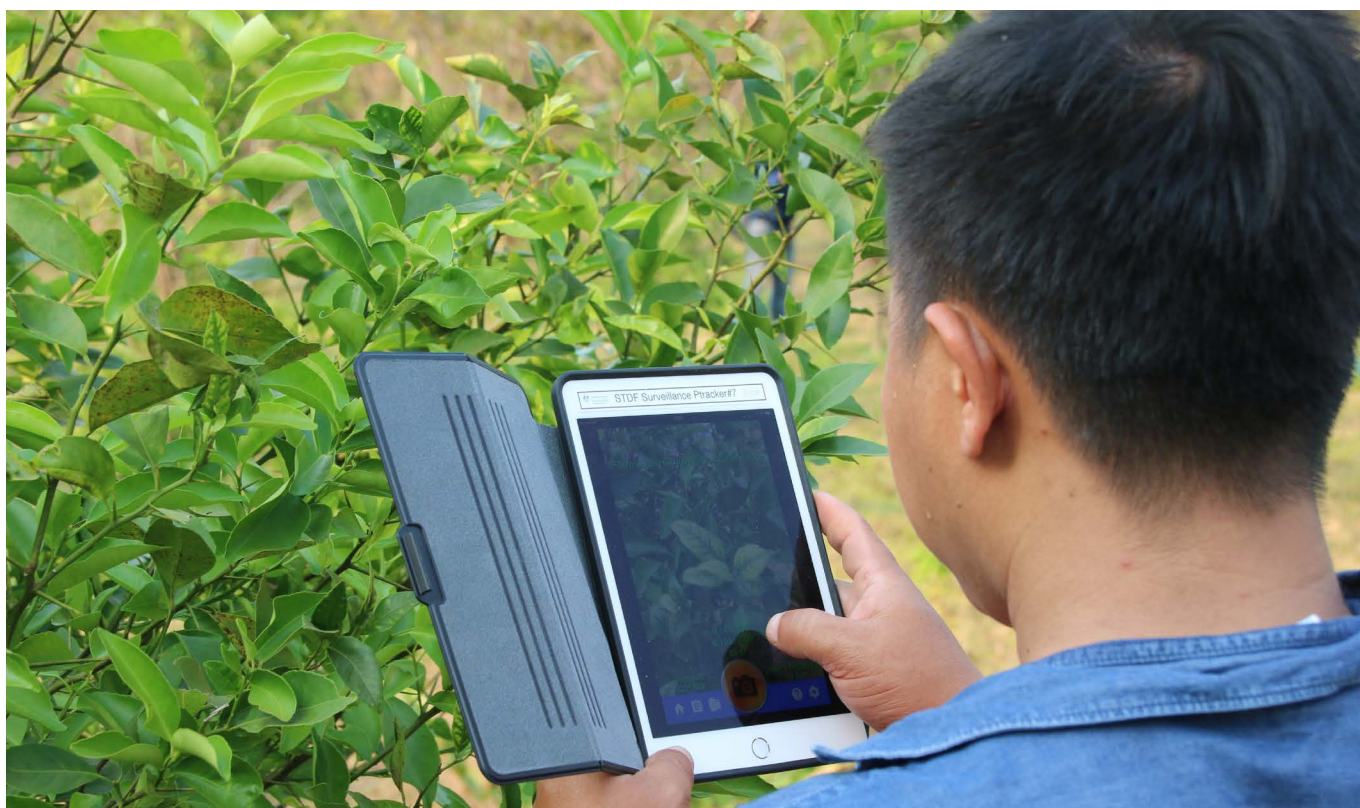
“**Innovation in SPS digital systems is most effective when designed as shared, interoperable solutions—leveraging data and AI to support learning, reuse and scaling across institutions and borders.**

Janelle Yarde-Blackman, Caribbean Agricultural Health and Food Safety Agency (TBC)

Digitalizing pest surveillance across Asia-Pacific

National plant protection organizations and research partners co-developed mobile-based surveillance tools to digitalize field data collection, improve geo-tagging and harmonize reporting formats across borders. The system strengthened early warning and enabled faster, more coordinated responses to emerging pest threats, while providing a scalable regional model that countries can adapt to their own SPS systems.

 [Find out more:](#) [STDF project on digital pest surveillance in Asia-Pacific](#)



Production-Level and Agro-Technical Innovations

Many SPS risks originate at farm and processing levels. Innovation in practices, tools and skills can help producers comply with international requirements while reducing risks and costs. Experience shows that the most effective and trade-facilitating solutions emerge when producers, regulators and researchers jointly test and adapt approaches under real production conditions.

Biocontrols to reduce pesticide residues

Innovation: Field-tested residue mitigation approaches combining conventional pesticides early in the production cycle with targeted use of biocontrol products closer to harvest, supported by farmer training and adaptive production guidance.

“*Intentional and well-aligned partnerships, linking the public and private sector and other key actors, are essential to scale innovation and turn shared goals into lasting impact.*

Loraine Ronchi, World Bank

Why it matters: Maintains effective pest control while allowing residues to fall below importing market limits, reducing rejection risks and strengthening confidence in export compliance.

🌐 Find out more: [Asia-Pacific](#), [Southern Africa](#), [Latin America & Caribbean](#)

Reducing cadmium in cocoa

Innovation: Rapid, on-site X-ray fluorescence testing (a portable method for analysing mineral content and contaminants), combined with hotspot mapping and codes of practice, enabling early detection of contamination, identification of high-risk areas, and proactive mitigation.

Why it matters: Safer exports, improved compliance and more sustainable market access for smallholders.

🌐 Find out more: [Latin America & Caribbean](#)



Inclusive and Social Innovations

Innovation is about people and institutions. Inclusive approaches ensure SPS systems deliver benefits for smallholders, MSMEs, women, youth and persons with disabilities and other vulnerable groups.

Mobile advisory services

Innovation: Simple, low-bandwidth digital guidance on SPS requirements delivered on demand, designed for producers with different levels of literacy, connectivity and physical access constraints.

Why it matters: Improves compliance and reduces barriers for producers with limited access to

extension services, including women, youth and other underserved groups.

 [Find out more](#)

Inclusive capacity building

Innovation: Training and institutional approaches that address gender-specific, accessibility and other barriers to participation, strengthening engagement in SPS decision-making.

Why it matters: More equitable value chains and stronger SPS outcomes.

 [Find out more: Nepal, Uganda, Bangladesh](#)

Strengthening women's participation in Senegal's horticulture exports

Targeted capacity building and producer-group models enabled women producers to engage more fully in inspection, certification and quality assurance processes within Senegal's horticulture export sector. The approach improved compliance outcomes, raised product quality and demonstrated how inclusive institutional arrangements can strengthen SPS performance and competitiveness.

 [Find out more: STDF project on inclusive SPS capacity building in Senegal and Opening the Door to Safe Trade: How More Inclusive SPS Systems Expand Market Opportunities for All](#)



Regulatory and Institutional Innovations

Effective SPS systems depend not only on technical capacity, but also on strong regulatory and institutional frameworks that are transparent, inclusive and evidence-based. Regulatory and institutional innovations help ensure SPS measures are fit for purpose, grounded in science and informed by the practical experience of both public and private stakeholders. By strengthening regulatory quality, improving risk-based oversight and supporting smarter prioritization of investments, these approaches make SPS systems more efficient, credible and responsive, ultimately improving health outcomes, facilitating safe trade and supporting sustainable development.

Strengthening regulatory quality and transparency

Innovation: Applying Good Regulatory Practices (GRPs) — including regulatory stock-taking, impact assessment, stakeholder consultation and inter-agency coordination — improves the design and implementation of SPS measures, ensuring they are fit for purpose. Digital tools such as ePing support these practices by enhancing transparency, trust and coordination, enabling regulators to track and comment on draft SPS measures, and ensuring that the private sector is fully aware of regulatory changes affecting their market access.

Why it matters: Clearer, more coherent and transparent regulations support better health protection, while reducing unnecessary regulatory burdens for the private sector and government. GRPs help ensure SPS measures are better aligned with national priorities and international obligations, leading to improved compliance and more effective use of resources.

 Find out more: [STDF project on the use of the ePing SPS and TBT Platform](#), [STDF GRP Guide](#)

Voluntary third-party assurance

Innovation: Voluntary Third-Party Assurance (vTPA) programmes use public–private partnerships and data-sharing to complement and strengthen official controls through a risk-based approach. Under regulatory oversight, accredited third parties can support compliance verification, helping competent authorities to focus public controls where risks are highest.

Why it matters: Strengthens oversight efficiency, improves risk targeting and builds trust across value chains, while making more effective use of limited public resources.

 Find out more: [Africa](#), [East Africa](#), [Central America](#), [vTPA Programme Assessment Tool](#), [Lessons from STDF Projects in Africa and Central America](#)



Prioritizing SPS Investments

Innovation: The Prioritizing SPS Investments for Market Access (P-IMA) framework provides an evidence-based approach to identifying and prioritizing SPS investments by linking SPS capacity gaps to trade, market access and policy objectives. It brings together public and private stakeholders to assess options and identify where SPS investments can deliver the greatest impact.

Why it matters: Helps governments and partners allocate scarce resources more effectively, build the business case for SPS investments and integrate SPS priorities into national and regional planning and financing.

 [Find out more](#)

“**P-IMA shows how innovation in SPS capacity can support trade, inform policy and enable evidence-based investment decisions.**

MaryLucy Oronje, CABI and STDF Developing Country Expert 2024-2026

Evidence-based investment planning to unlock market access in The Gambia

Through a consultative public-private process, The Gambia applied the STDF P-IMA Framework to prioritize SPS capacity-building investments across key export sectors. The analysis ranked six investment options, led by SPS challenges affecting cashew, followed by chilli, mango, groundnuts, smoked fish, and hides and skins. It showed that investments of US\$3.5 million could generate US\$52 million in returns. The results informed the design of a EUR 19 million EU-funded programme and an STDF project to improve the safe trade of cashew, demonstrating how robust evidence can guide smarter SPS investment decisions and make the business case for financing.

 [Find out more: STDF P-IMA work in The Gambia](#)



Climate-Smart & Environmentally Responsible SPS Innovations

Climate change is intensifying pest pressures, altering disease pathways and increasing variability in SPS risks. SPS innovation that is grounded in science, risk management and field evidence can help countries respond more effectively to these challenges, while also enhancing resilience to climate change and delivering environmental co-benefits. In this context, climate-smart and environmentally responsible approaches are not separate objectives, but win-win outcomes of more resilient and sustainable SPS systems.

Environmentally responsible pest management

Innovation: SPS-compliant pest management approaches based on the IPPC's standard for Wood Packaging Material (ISPM 15) help to safeguard trade. Strengthened dialogue between the public and private sector, combined with new Standard Operating Procedures (SOPs) for heat treatment,

has facilitated the uptake of a sustainable alternative to the harmful use of methyl bromide, which damages the ozone layer and biodiversity.

Why it matters: Transitioning to eco-friendly solutions like heat treatment reduces environmental impact while ensuring safe trade. It also provides opportunities to promote private sector development linked to new treatment options on the market.

 [Find out more](#)

Climate-resilient SPS practices

Innovation: Adapted surveillance, sampling and risk-management protocols designed to function under changing climatic conditions and evolving pest pressures.

Why it matters: Helps maintain effective SPS controls and market access in climate-stressed environments, reducing disruption to trade and livelihoods.

 [Find out more : Environment & Climate Change](#)

“SPS innovations that integrate climate and environmental considerations enhance resilience, sustainability and reliability of trade systems.

Sidney Suma, STDF Developing Country Expert 2012-2013





Lessons and Recommendations

Experience across innovations piloted through STDF projects highlights that progress depends as much on mindset, learning and collaboration, as on access to technology and resources. Many effective solutions are co-developed and adapted by SPS regulators and other authorities, researchers, producers, MSMEs, women and youth entrepreneurs in developing countries, often under challenging conditions, and continue to evolve long after project support ends.

Innovation for the STDF also includes how programs are designed and delivered: strengthening monitoring, evaluation and learning; embedding safeguarding practices; widening the definition of inclusion, including accessibility for persons with disabilities; and placing greater emphasis on scaling proven approaches through partnerships and shared learning.

KEY LESSONS

1. Innovation in SPS systems spans people, processes and policy, not only technology.
2. An innovation mindset enables SPS authorities to test, learn and adapt, supporting continuous improvement over time.
3. Innovative use of field-level evidence strengthens regulatory decision-making, helping ensure rules remain effective, proportionate and fit for purpose.
4. Digital innovation can improve efficiency, transparency and resilience in SPS compliance when embedded in institutions and regulatory frameworks.
5. Locally adapted innovation improves uptake, equity and sustainability, particularly for smallholders, MSMEs and underserved groups.
6. Collaborative innovation through South-South, North-South and public-private cooperation accelerates learning and scale, while making better use of limited resources.
7. Regulatory innovation, including good regulatory practices and evidence-based prioritization, improves compliance and supports safer, more predictable trade.

RECOMMENDATIONS

1. **Policy makers and regulators:** Embed innovation thinking in national SPS strategies, modernize regulatory frameworks and use evidence and learning to adapt rules over time.
2. **SPS authorities:** Prioritize innovative, context-appropriate solutions, roll out proven innovations to save time and resources, and invest in systems that support learning, monitoring and continuous improvement.
3. **Private sector:** Engage in responsible SPS innovation with public authorities and producers, including data-sharing and co-development of solutions that strengthen compliance across value chains.
4. **Development partners and donors:** Support the scaling of proven SPS innovations, with attention to inclusion, safeguarding, climate-related SPS risks and shared learning across regions.



The STDF is a global partnership to facilitate safe trade. It was established by the Food and Agriculture Organization (FAO) of the United Nations, the World Bank Group, the World Health Organization (WHO), the World Organisation for Animal Health (WOAH) and the World Trade Organization (WTO).

The STDF strengthens the sanitary and phytosanitary capacity of public and private sector stakeholders in developing countries, driving safe and inclusive trade that contributes to sustainable economic growth, poverty reduction, food security and climate resilience, in support of the UN Global Goals.

With thanks to STDF donors



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September 2026

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