Better lives, better planet
through livestock

Strengthening One Health security through smarter biosurveillance

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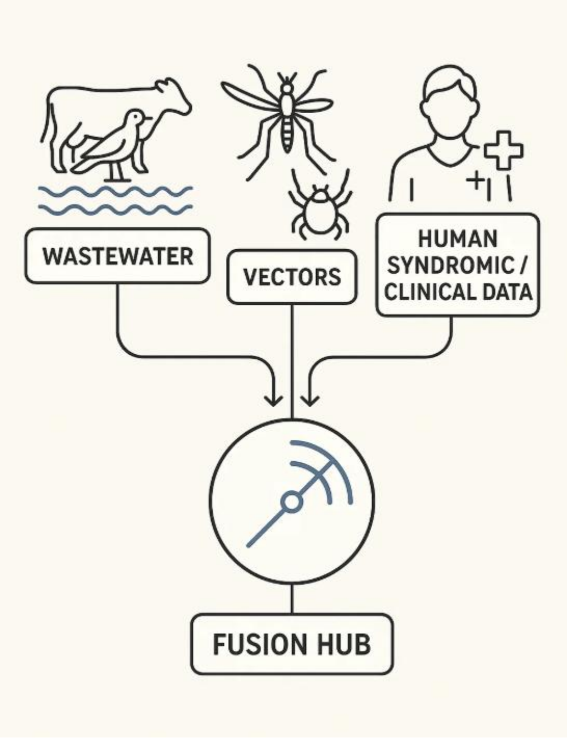
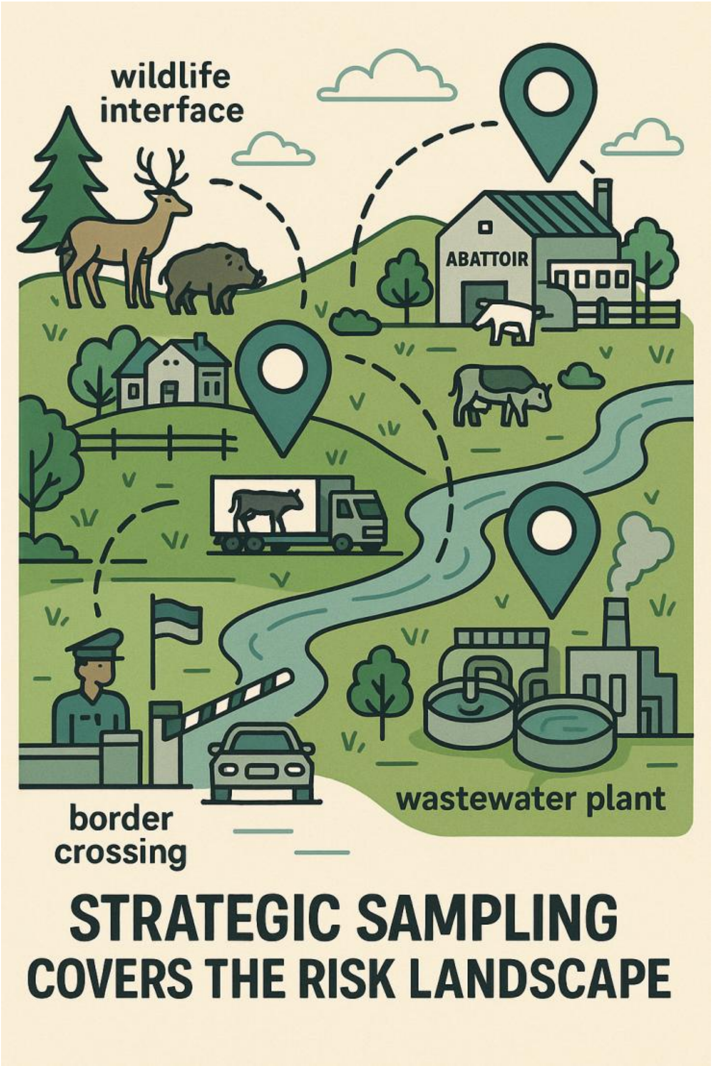
Sampling –the first line of biological defence

- Sampling is not a technical detail – foundation of effective surveillance
- Early, targeted sample collection determines how quickly threats are detected and contained
- Strategic sampling connects field data to national, regional, and global security decisions
- Strengthening sampling systems – build resilient One Health security



Strategic sampling – anticipating threats

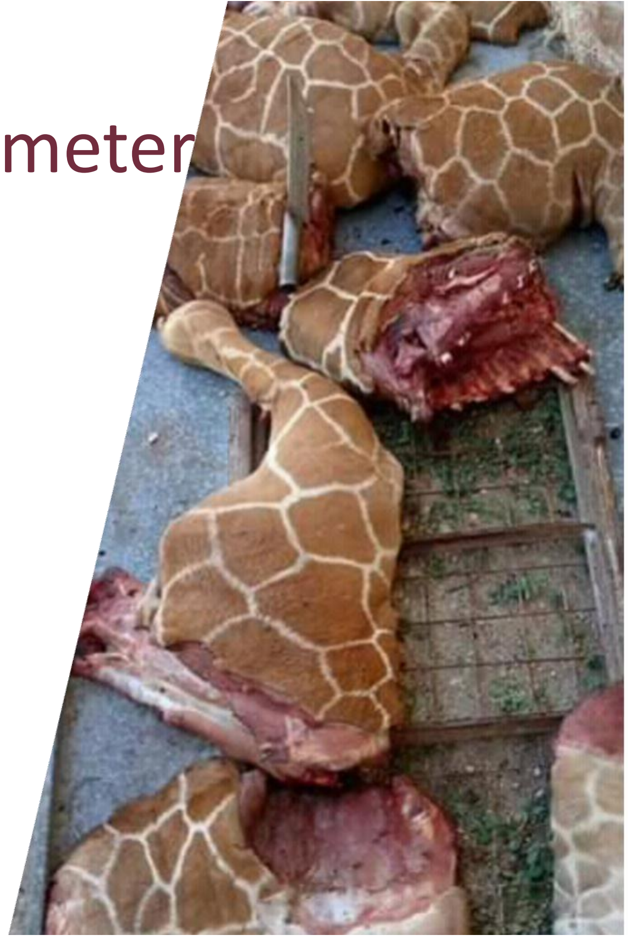
- Sampling design must be driven by risk landscapes – ecological, agricultural and human activity zones where threats are likely to emerge
- Targeted collection at high-risk interfaces enables early detection
- Sampling strategies should address all threat types – natural, accidental and deliberate misuse
- Integrated spatial, ecological and behavioural data helps predict where and when to sample before an outbreak
- First layer of defence – how surveillance systems see and respond to biological risks



Case study: Abattoir Waste surveillance

- Non-invasive and low-cost approach
- Pathogen detection signals weeks before clinical cases emerge
- Early warning has enabled targeted interventions – reducing outbreak risk
- Strategic sampling of agricultural by-products can yield high-value intelligence for both animal and public health security

Wildlife and Environmental Sampling – expanding the perimeter



- Sampling environmental matrices detects pathogen circulation long before clinical cases emerge
- Wildlife surveillance provides early warning of spillover risks – weeks/months before transmission into livestock or humans
- These interfaces act as a network of biological tripwires, extending surveillance beyond traditional detection systems

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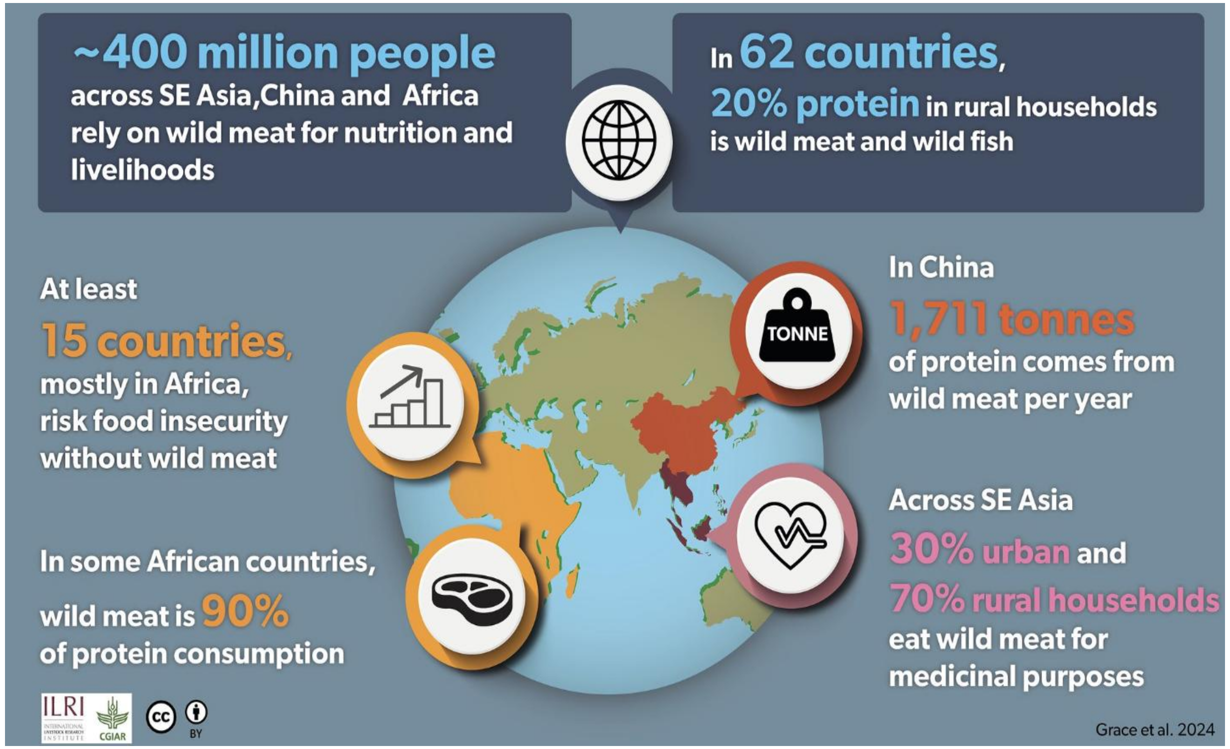
Hidden signals –behaviour as a biosecurity indicator

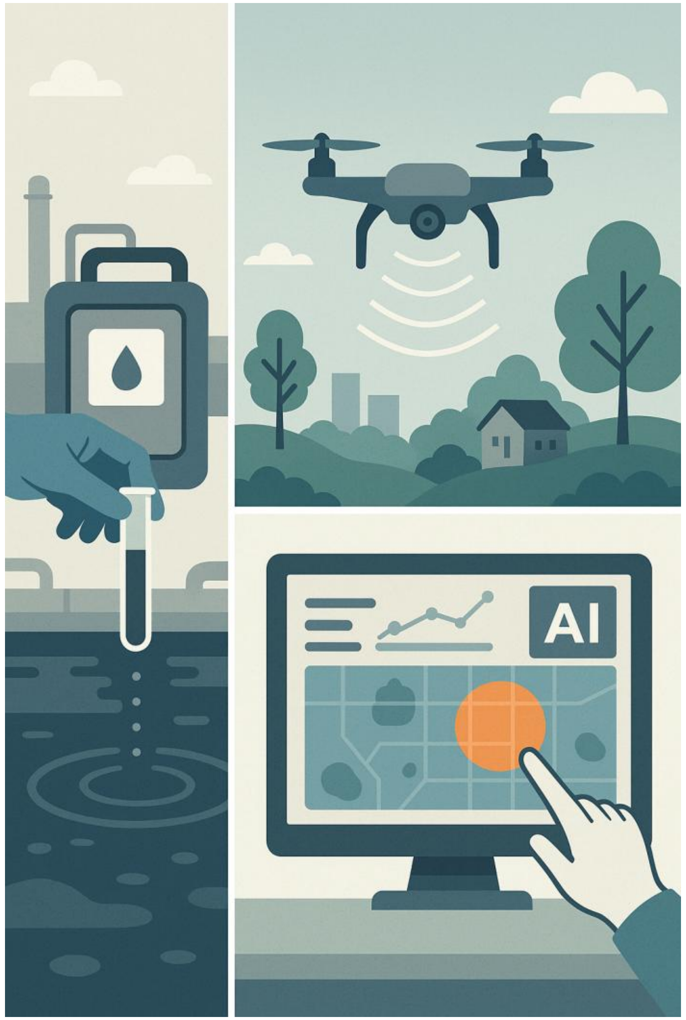

Photo credit: Axel Fassio/CIFOR



Behaviour leaves biological fingerprints; ignoring them leaves us blind to where the next outbreak, accident or attack could begin.

Innovative tool and technologies

- Portable field tools – enabling rapid, on-site detection
- Autonomous and remote systems – drones, robotic samples, biosensors to continuously collect air, water, or vector samples in high-risk areas
- AI-guided sampling networks – use of climate, livestock trade routes, known hotspots



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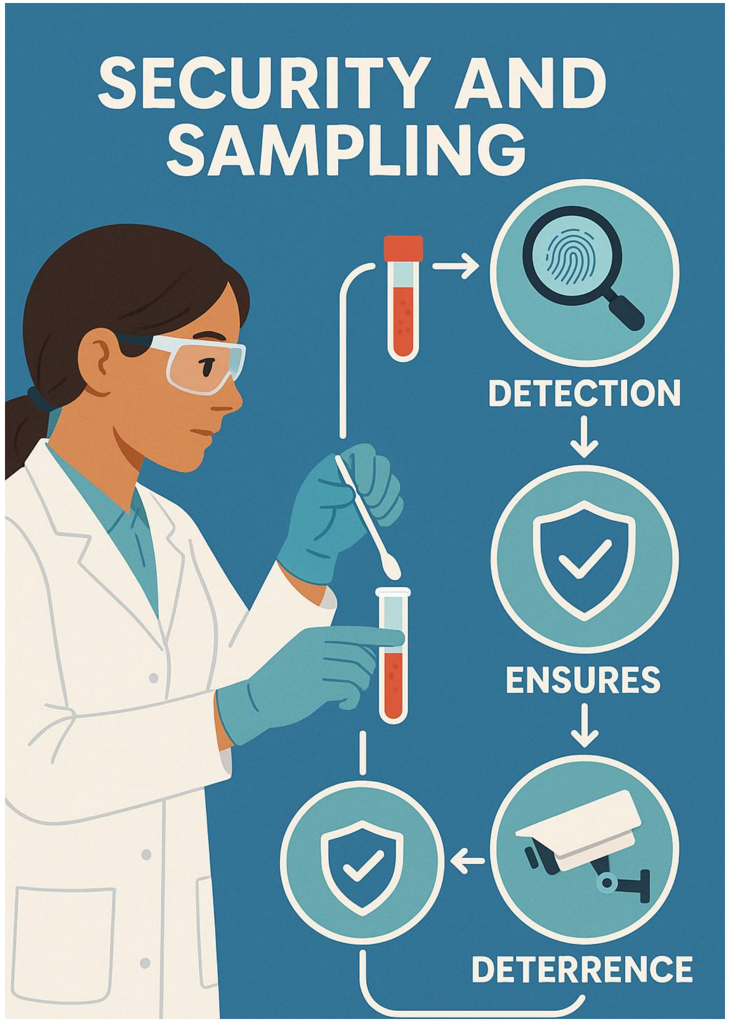
Metadata and Chain of Evidence

- Accurate metadata – time, location, collector identity –transforms biological sample into actionable intelligence
- Chain of custody protocols – sample integrity
- Digital field data capture reduces error, speeds up information flow
- Secure transport and storage protocols
- Strong documentation practices builds trust and credibility across public health, veterinary and security agencies.

Sampling for Security – detection to deterrence

- Reduce detection time
- Integration of sampling data into intelligence and law enforcement workflows to enhance situational awareness
- Strengthen national response capability
- Consider joint simulation exercises with vets/security agencies in response to biothreat scenarios



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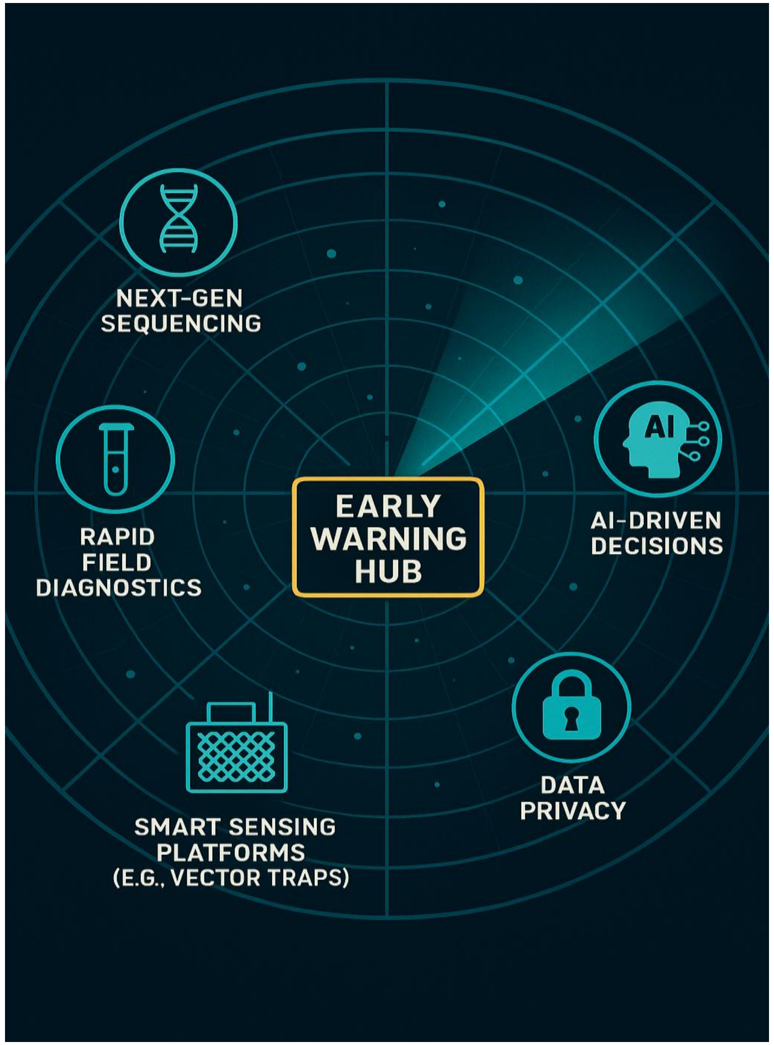
Sampling for security continuum

- Sampling (and detection) is not a lab-isolated function; it needs to be part of a continuous security loop
- Triggers situational awareness
- Informs intelligence assessments, data sharing and rapid action
- The more seamless it becomes the faster and smarter we can respond and stronger our deterrence posture grows
- Data sharing



Key take home messages

- Sampling is the first act of biological defence
- Strategic sampling turns biosurveillance into bio-intelligence
- Behaviour is a biosecurity indicator
- Metadata builds credibility
- Improved detection is deterrence – let's do more and share
- Preparedness is a joint enterprise – let's get more investments
- Build the global capacity for shared defence

Thank you

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