Introduction and Overview
(For Discussion)

"Operationalizing a One Health Approach Building on the TDR-IDRC Research Initiative on Vector-Borne Diseases in the Context of Climate Change"

Bruce Wilcox and Carsten Richter

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo

Personala Conflict of Interest Statement
Africa's Environment and Health linkage in my personal and professional hIstory

In my element, Bwindi Forest, working on National Park design and establishment with my colleagues Batwa and Lukiga Tribesman tracking Mountain Gorillas. Ngawa Kamugasha, Uganda Sec of Environment, and Primatologist Tom Butinski 1985-86.

1985,
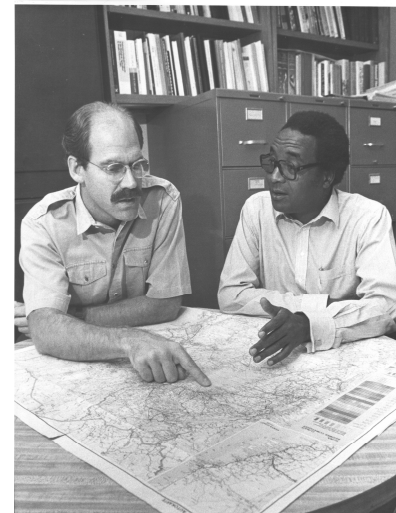
TDR-IDRC Research Initiative Outputs

Quantifiable and unquantifiable production
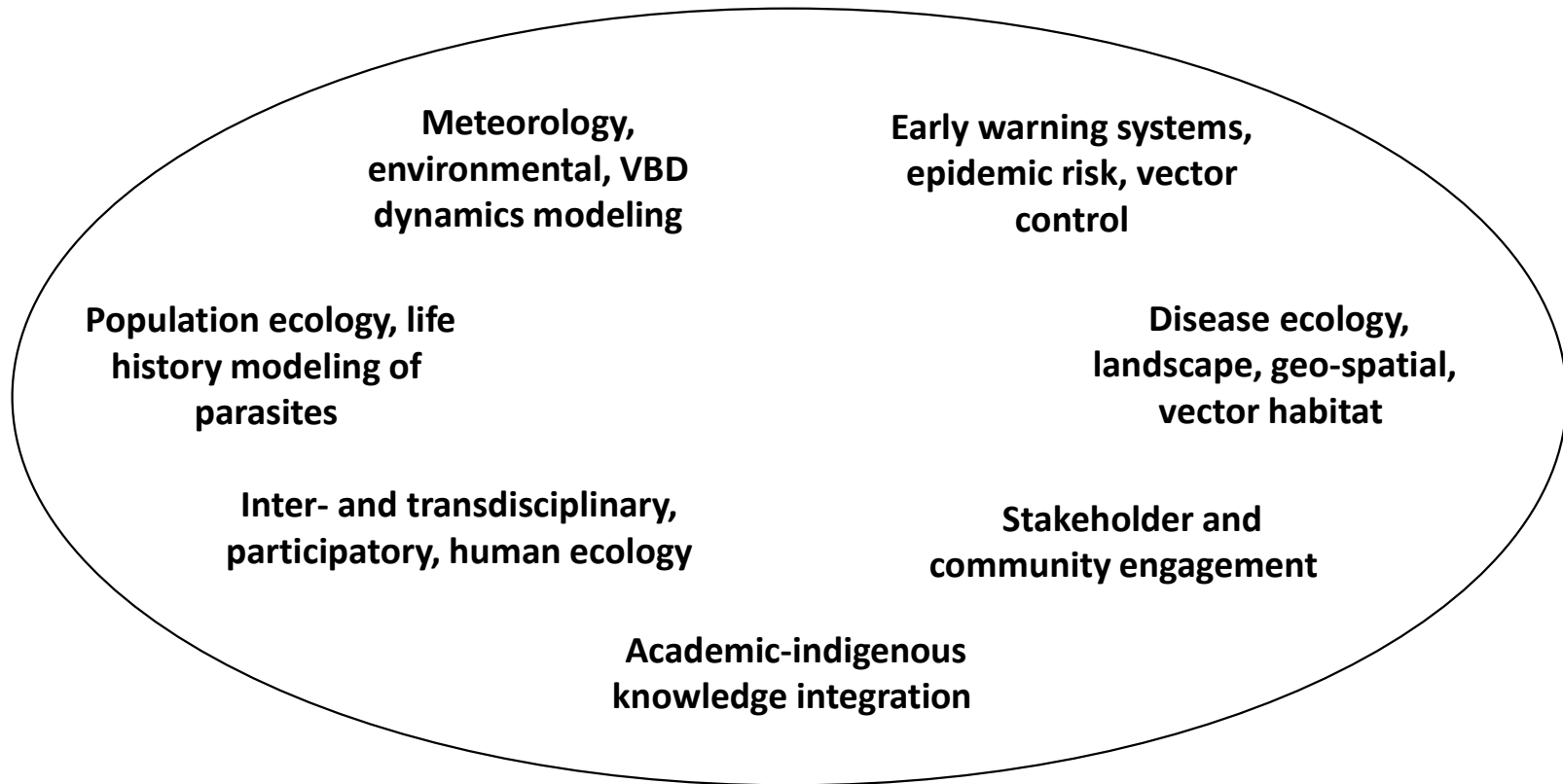
- 120+ peer view journal and technical publications directly from PI's

- 150+ Initiative publications in total

- 50+ graduate degrees

- 7 country, Africa continent-wide research network

- Worldwide community of practice associated with the Initiative

- Incalculable value of increased human resource assets—knowledge, skills, and working relationships.

TDR-IDRC Research Initiative Outputs

Seven categories of research emphasis—each an integrative research endeavor

Meteorology, environmental, VBD dynamics modeling

Early warning systems, epidemic risk, vector control

Population ecology, life history modeling of parasites

Disease ecology, landscape, geo-spatial, vector habitat

Inter- and transdisciplinary, participatory, human ecology

Stakeholder and community engagement

Academic-indigenous knowledge integration

TDR-IDRC Research Initiative Outputs

In addition to the high level of production a foundation for further work

- enhancing approaches to stakeholder participation, including community engagement, inter-and transdisciplinary project management, and supporting policies

- understanding of problems, processes, mechanisms, or causal relationships linking VBDs in the context of social and ecological processes

- individuals or organized groups who are knowledgeable, skilled, or otherwise can conduct research aimed at improving this understanding

- research undertaken on VBD risk in the context of environmental change, particularly climate change, as a basis for the formulation of evidence-based health policy

TDR-IDRC Research Initiative as an Integrative Research Achievement
The integrative research that took place is perhaps the initiative's highest acheivement

Integrative modes of research (inter-and transdisciplinary) research are extremely challenging in science, and especially medicine—that Ecohealth and One Health have helped provoke.

Not measurable in the quantity of papers or students, and certainly not impact factors of the journals.

Could we define criteria and measure whether we're doing this?

The substantial progress made in this direction that can now propel us forward toward closing critical gaps in this regard.

Alignment with the Strategic Action Plan to scale up H. and E. Interventions in Africa
TDR-IDRC Research Initiative aligns with HESA & SAP

Addressing the health-environment challenge by providing:

- Novel experimental, methodological, interdisciplinary research advances for critical health & environment challenge.

- A model for building capacity for multisectoral, participatory action interventions, including for community self-mobilization generally applicable to linked health & environment challenges.

- A foundation for developing, testing and refining an operational (organizational and management) system approach for monitoring & evaluation of progress.

- Insights into the mechanisms that underly health and environment interdependency in relation to ecosystem integrity and its preservation.

- A sustainability science, evidence-based framework broadly applicable to SDGs for operationalizing the Libreville Declaration to contribute to attainment of SDGs.

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo

Framing and Operational Elements Chart Conceived at 2016 Manila Expert Panel Meeting

INSTITUTIONAL/POLICY FRAMEWORKS

UN SDGs (2015-30)	Libreville Conference on Health and Environment in Africa	Health and Environment in Africa Strategic Alliance	Universal Health Coverage

Source: TDR Expert Panel Consultation Meeting on Health and Environment, Manila, 5-6 April 2016

Operationalizing the One Health Approach

Risk Mitigation of VBDs in a Climate Change Context → Health and Environment *sensu lato Risk Mitigation*

OPERATIONAL PRINCIPLES/ELEMENTS

TRANSDISCIPLINARITY
- Enables merging of knowledge, information flow and uses across relevant academic disciplines, sectors and stakeholders
- Enables networking

SYSTEMS THINKING
- Identifies non-linearities
- Reveals system structures and dynamics
- Informs knowledge needs and composition of transdisciplinary team

MULTISECTORAL PARTNERSHIP AND COLLABORATION
- Helps identify multiple drivers
- Builds on existing relationships
- Deep, context-driven engagement with communities
- Informs public health and environment services needs
- Monitoring and evaluation processes in place

EPISTEMOLOGICAL PLURALISM
- Multiple ways of knowing, including traditional and local knowledge
- Problem-driven team composition

TRANSLATIONAL
- Impact on best practices and policies
- Communications and advocacy
- Knowledge sharing

CAPACITY BUILDING
- Research capacity
- Learning posture through collaboration

COMMITMENT TO VALUES
- Equity and equality; gender transformative
- Cultural sensitivity

OUTCOMES

- **Innovative solutions (incl. social innovation for health)**
- **Sustainable and integrated preventive public health approaches**
- **Multisectoral linkage through effective communications and joint action**

- **Strong community participation for adaptive capacity and resilience**
- **Research uptake/translation: scaling up best practices and influencing policy**

IMPACT **Increased Capacity for VBD/Climate Change Risk Management**

Transdisciplinarity and the Combining Ways of Knowing and Learning
Combining world views and ways of knowing is fundamental to real world problem solving

Epistemological pluralism is the acceptance of there being different ways of knowing things, i.e., of more than one scientifically legitimate world view—outside the laboratory or controlled experimentation.

It arose from the finding of natural phenomena—particularly that qualify as 'complex adaptive systems'—that cannot be fully explained by a single theory or fully investigated using a single approach.

We can add: cannot be managed, including from the standpoint of health and environmental risk mitigation, sustainability, etc. (Nor the SDGs achieved).

…we are only now beginning to acquire reliable material for welding together the sum total of all that is known into the whole; but, on the other hand, it has become next to impossible for a single mind fully to command more than a small specialized portion of it…Now, there is a great plurality…of consciousnesses and minds.
 Irwin Schrodinger. *What is Life?* Cambridge University Press. 1944.

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo

Transdisciplinarity as the Key Element Critical to Adaptive Capacity
The Initiative and parallel efforts including methodological breakthroughs support this finding
See section on transdisciplinary process for building adaptive capacity

- The Initiative's findings helped fill gaps and lend further support to the social-ecological systems framework (SESR)—i.e., the "ecosystem approach 2.0"—as an effective tool for mitigating VBD risk in the context of climate change employing SESR's resilience-based conception of adaptive capacity.

- This framework views **people, their landscapes, their livelihoods, the associated vectors, and non-human host reservoir species as one system**—despite being dealt with in science as different disciplinary domains.

- This includes humans and the populations of other animal species, vectors, and pathogen populations interacting in self-regulating systems that are often dysregulated as a result of human activity including unplanned development and consequential loss of ecosystem integrity.

- Operational criteria drawing on SESR and building on those previously suggested for the ecosystem approach centered on 'adaptive management' are shown to be similarly applicable to One Health.

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo

Implementation Research also is Critical to Adaptive Capacity

A critical need and opportunity toward achieving sustainable VBD control in a climate change context

- The purpose of implementation research is to better understand how and why some interventions work and other do not (including those described as Ecohealth or One Health) work.

- It's effectively translational research in real world settings employing evidence-based findings, including those of the influences of the social, cultural, economic, political, legal, and physical environment on expected outcomes.

- It also considers the institutional contexts and the stakeholders and their interactions, includinig health systems, the roles played by governments, non-governmental organizations, other organizations across the relevant sectors.

- FInally, implementation research is particularly applicable to problem solving challenges involving complex adaptive systems—health, environment, including but not limited to VBD transmission and climate systems.
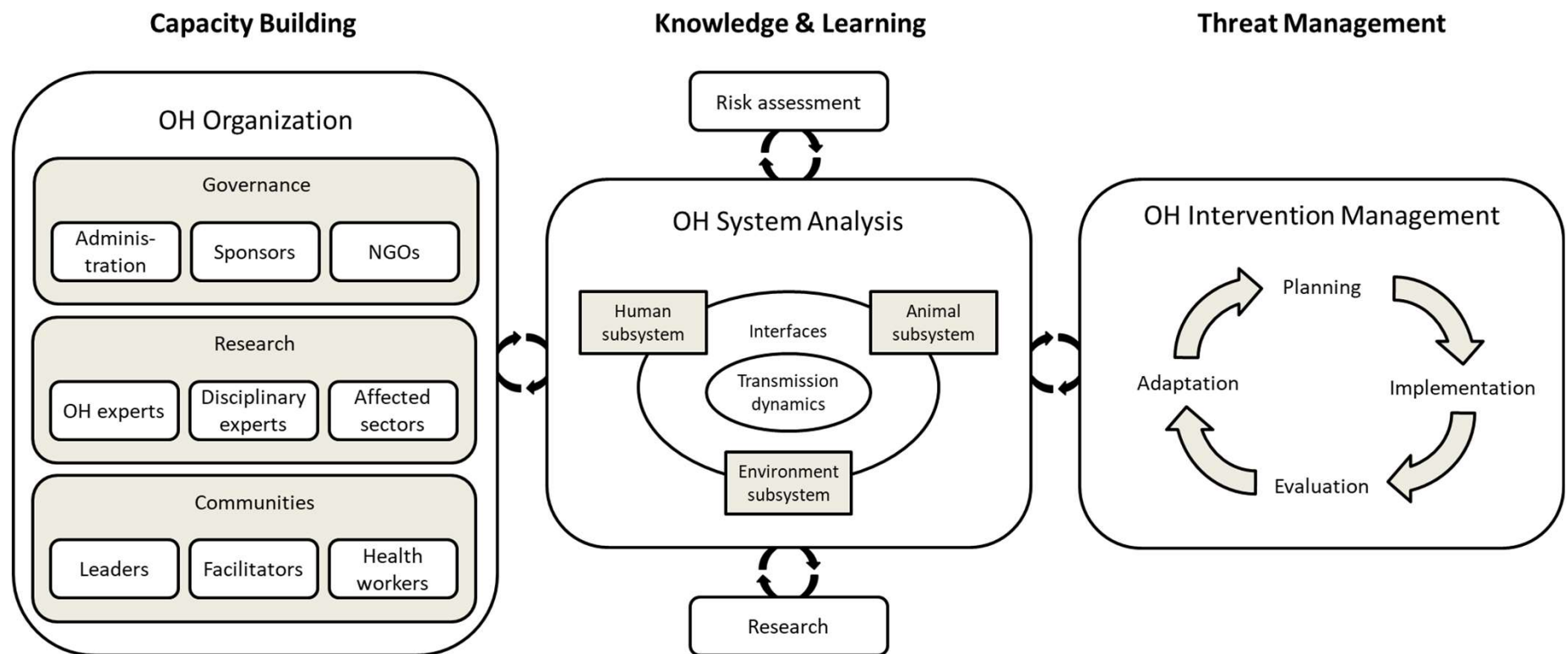
One Health Scorecard and Metrics as Essential Tools
Providing the basis for effective and efficient programme management this sustainability

- Provides a pragmatic answer to the challenge of evaluating, managing, and benchmarking not only quantitative but also multi-dimensional and interdependent qualitative objectives fundamental to an organization's sustainable success.

- Draws on the widely adopted Balanced Scorecard used by corporations, government agencies, NGOs to address the limitations of depending on outcome indicators alone vs outcome (e.g., disease incidence) plus process indicators.

- Accounts for how improvements intangible assets affect tangible outcomes through chains of cause-and-effect relationships, which unlike tangible assets, involve value creation processes that are multiplicative, not additive or linear in affect such as collaborative problem-solving.

- Implementing, managing and benchmarking the complex strategies of One Health approaches, requires an equally complex, yet manageable performance evaluation system.

Components of an adaptive One Health Approach

Continuous capacity building for generative learning and sustainable threat management

Capacity Building

OH Organization

Governance

| Adminis-tration | Sponsors | NGOs |

Research

| OH experts | Disciplinary experts | Affected sectors |

Communities

| Leaders | Facilitators | Health workers |

Knowledge & Learning

Risk assessment

OH System Analysis

Human subsystem — Interfaces — Animal subsystem

Transmission dynamics

Environment subsystem

Research

Threat Management

OH Intervention Management

Planning — Implementation — Evaluation — Adaptation

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo

Operationalizing the One Health Approach
A 'logic model' for building capacities, developing capabilities, achieving competencies

Risk	Capacity building		Organizational development		Operations	Outcomes

Recognition of a disease threat

IF

Resources
- Sponsors
- Administrative Staff
- One Health Experts
- Affected Sectors
- Relevant Disciplins
- Community leaders
- Community facilitators
- Health workers
- NGOs
- Funds
- Supplies and Equipment

THEN

IF

Capabilities
- Governance
- Administration
- Training
- Skill development
- Communication
- Knowledge Management
- Stakeholder Management
- Cultural Management

THEN

IF

Strategy
- Vision
- Mission Statement
- Common Language
- Action plan

Organizational Culture
- Shared Values
- Leadership
- Behaviors
- Inclusion
- Practices
- Reflection

Management
- Standards
- Policies
- Processes
- Tools
- Technologies

THEN

IF

Competencies
- Systems Thinking
- Generative Learning
- Transdisciplinarity
- Adaptiveness

THEN

IF

Activities
- Operations Management
- Systems Analysis
- Adaptive Management
- Implementation Research

THEN

Long term
- Wellbeing
- Productivity
- Low Risk
- Resource Efficiency
- New Knowledge
- Community Development

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo

Quick Introduction to Scorecards

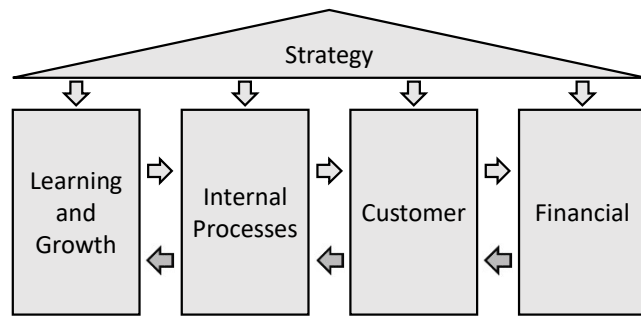Management tool for building and sustaining core competencies

Rational:

- **Success:** Every organization that is successful offers specific resources, products, or services that are either cheaper or of a higher quality than those of its competitors or unique.

  → **effectiveness** and **efficiency**

- **Success factors:** Organizations develop internal core competencies that are key to their current success. Building, securing and strengthening them is the foundation of any successful strategy.

  → **core competencies** and **sustainability**

- **Managing success factors:** Core competencies are made of a multitude of key capacities and capabilities, enabled by organizational and managerial frameworks, processes and tools. Therefore, evaluating success requires evaluating the performance of essential success components from several perspectives.

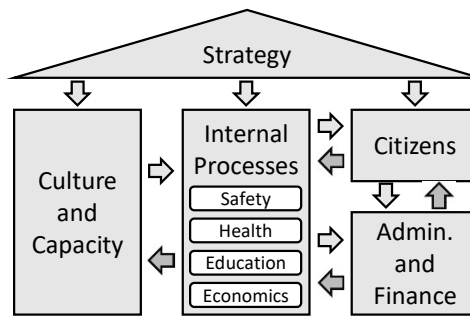 → **perspectives** and **Key Performance Indicators**

Examples of Scorecards
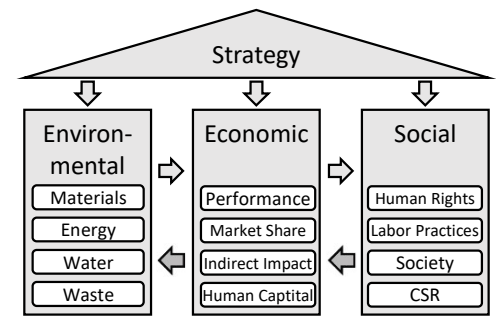
Evaluation of core competencies from different perspectives

Classic corporate:


```
                    Strategy
Learning    Internal    Customer    Financial
and         Processes
Growth
```

Public administration:


```
                    Strategy
Culture     Internal    Citizens
and         Processes
Capacity    Safety      Admin.
            Health      and
            Education   Finance
            Economics
```

Corporate sustainability:


```
                    Strategy
Environ-    Economic    Social
mental
Materials   Performance   Human Rights
Energy      Market Share  Labor Practices
Water       Indirect Impact  Society
Waste       Human Captital   CSR
```

Core competencies of an adaptive One Health Approach:

- Systems thinking
- Generative learning
- Transdisciplinarity
- Adaptiveness

Capacity → **Intervention Science** → **Risk Management** → **Low Impact and Risk**

Structure and Interrelations of a One Health Scorecard

Management tool for evaluating organizational development, capabilities and systemic risk

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo
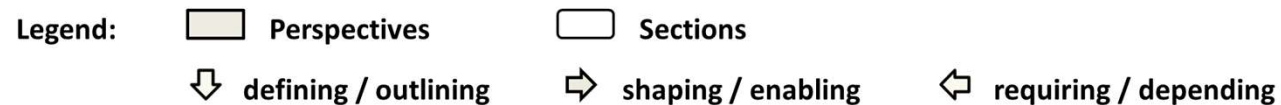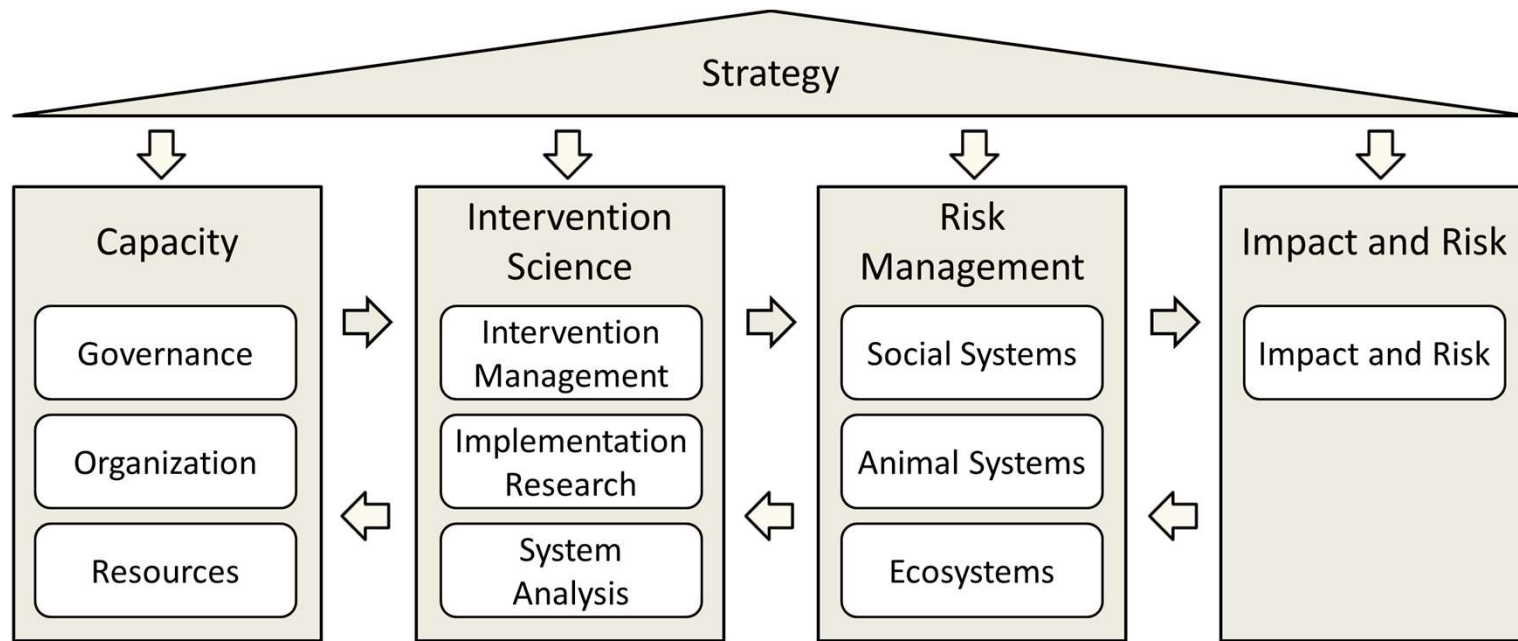
Example of a Key Performance Indicator of a One Health Scorecard
Capacity / Organization / Knowledge

Score	Stage	Description
5	Innovation	New perspectives and insights through innovations in theories, models and paradigms and modifications of underlying norms, policies and objectives.
4	Generation	Generation of new knowledge through equitable integration of individual and social learning in an adaptive, transdisciplinary process.
3	Provisioning	Provisioning and enhancement of role-specific knowledge and skills and facilitation of knowledge sharing across sectors, disciplines and stakeholders.
2	Compilation	Establishment of a knowledge management, training and skill development system to build and sustain essential knowledge capacity.
1	Analysis	Analysis of essential knowledge and skills relevant to developing a sustainable One Health approach to a specific disease threat and analysis of current gaps.

Example of a One Health Scorecard for VBDs in the Context of Climate Change
Collectively developing a standard that incorporates variances of specific settings for a harmonized evaluation

P1 Capacity	3

P2 Intervention Science	2

P3 Risk Management	2

P4 Impact and Risk	4

S1 Governance	3
K1 Sectors	4
K2 Disciplines	3
K3 Communities	3

S4 Intervention Management	2
K10 Planning	3
K11 Implementation	3
K12 Adaptation	2

S7 Social Systems	3
K19 Resilience	4
K20 Risk Mitigation	3
K21 Risk Control	3

S10 Impact and Risk	4
K28 Severity	3
K29 Frequency	2
K30 Risk Potential	4

S2 Organization	3
K4 Culture	3
K5 Knowledge	4
K6 Management	3

S5 Implementation Research	2
K13 Effectiveness	3
K14 Efficiency	3
K15 Sustainability	2

S8 Animal Sytems	2
K22 Resilience	2
K23 Risk Mitigation	3
K24 Risk Control	2

S3 Resources	3
K7 Human Resources	4
K8 Supplies & Equipment	3
K9 Financial Resources	3

S6 System Analysis	3
K16 Social Systems	4
K17 Animal Systems	4
K18 Ecosystems	3

S9 Ecosystems	2
K25 Resilience	2
K26 Integrity	3
K27 Vector Control	2

Consultation Meeting for Operationalizing a One Health Approach for Vector-Borne Diseases in the Context of Climate Change, 17-18 December 2019, Brazzaville, Republic of the Congo