UTF/077/ZAM: Technical Assistance to the Zambia Aquaculture Enterprise Development Project (ZAEDP)

Session 2

What is **epidemiology**?
What is **surveillance**?

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Training Course on Development of an Active Surveillance for Epizootic ulcerative syndrome (EUS) and Tilapia lake virus (TiLV) using the FAO 12-point surveillance checklist (for non –specialist) and its implementation

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PREFECTS HAVE VITAL ROLE TO PLAY IN SCHOOLS
They act as a bridge between school authorities and pupils

Farmers com[...] against GBM[...]

But ex-Kasama member of Parliament denies chea[...]

PRESIDENT Lungu holding a tilapia just after he commissioned the over US$10 million privately-owned Yalelo Fish Farm in Siavonga yesterday. Looking on is Yalelo Limited director Fisho Mwale.
PICTURE: BRIAN MALAMA

'Increase fish farming'

JIMMY CHIBUYE
Siavonga

PRESIDENT Lungu yesterday launched a US$10 million privately-owned fish farm with a call to increase domestic fish production.

And President Lungu has urged financial institutions and the private sector to increase investment in fish production.

The President said the future of fisheries development in Zambia lies in partnerships between Government and the private sector.

He said the private sector has a responsibility to play in the development of a vibrant aquaculture industry.

Mr Lungu said this yesterday when he launched Yalelo Limited, a privately-owned fish farm located at Kamimbi village on the shores of Lake Kariba in Siavonga.

The fish farm, which grows tilapia fish, has sales of 6,000 kilogrammes per day.

"Increasing domestic fish production, especially aquaculture fish production will lead to increased job creation, improved access to protein as well as increased exports to neighbouring countries," Mr Lungu said.

The President said the production of domestic fish, especially aquaculture fish, would not only create jobs but also reverse the trend of importing fish.

He said despite the increase in Zambia's aquaculture fish production over the past five years, there is still more work to be done to further enhance the industry.

In 2010, aquaculture fish production was estimated at 9,535 metric tonnes and increased to over 19,000 metric tonnes in 2014.

Yalelo Limited produces five metric tonnes per day and the production is expected to [...] 15 metric tonnes daily in [...] three months.

President Lungu s[...] increase in production is [...] lead to job creation and r[...] importation of fish.

He said Governmen[...] the Ministry of Agric[...] Livestock, is support[...] initiatives aimed at [...] smallholder farmers [...] their productivity [...] access in areas [...] farming.

Continues on [...]

HENRY SINYA[...]
Kasama

P[...]

[M]inister has no authority to cancel te[...] [sa]ys witness in Masebo case

Story [...]

Scenario 1

- Country X would like to enable investment /to invest in aquaculture sector
- What can happen if disease situation is unkown or is case of presence of disease such as EUS/TilV?
- What authority needs to do before?

Scenario 2

- Country X would like to export life fish/products thereof to other countries/SADC/EU...
- Authority of importing countries is requesting Animal health certification in compliance with WTO/OIE or EU/OIE rules
- What does it means for exporting country?
- What must be done before certification?

Scenario 3

- Country X import live fish from country Y
- What importing country will request from CA of exporting country?
- What can happen if disease X (EUS) will enter into disease free zone or country)?

Scenario 4

- Country X has disease (EUS) confirmed in several outbreaks
- There is urgent need to start control program
- How?

Learning objectives

- Definition of epidemiology
- Epidemiological approach to disease
- Aquatic epidemiology
- Definition of surveillance

Definition of Epidemiology

- **Epidemiology offers insight of** knowledge necessary for finding the most effective ways to treat and prevent diseases
- **The term Epidemiology springs directly from epidemic, which originally referred to communicable disease outbreaks in a population and in turn is derived from the Greek roots “epi” (upon) and “demos” (population)**
- **The third component of epidemiology, the Greek root “logos”, mean study**

Definition of Epidemiology

- Epidemiology is the study of a disease patterns in populations in order to determine ***prevention and control strategies.***

Definition of Epidemiology

- Epidemiology is concerned with disease prevention and “succession of events which result in the exposure of specific types of individual to specific type of environment”
- To identify exposures and evaluate their associations with various outcomes of interests (health, welfare, production)
- Epidemiology is about association

Contributions of Epidemiology

- Investigate epidemics of diseases.
- Study the biological spectrum of a disease.
- Systematically record disease occurrence.
- Prioritize disease control strategies.
- Develop disease screening strategies.

- Examples in the field of aquatic health?

The Epidemiological Approach

- Collection, analysis and interpretation of data to determine:
  - Distribution of diseases in time and space
  - Presence or absence of disease

- Tool for decision-making
  - Directed at the control and eradication of diseases

Increased demands

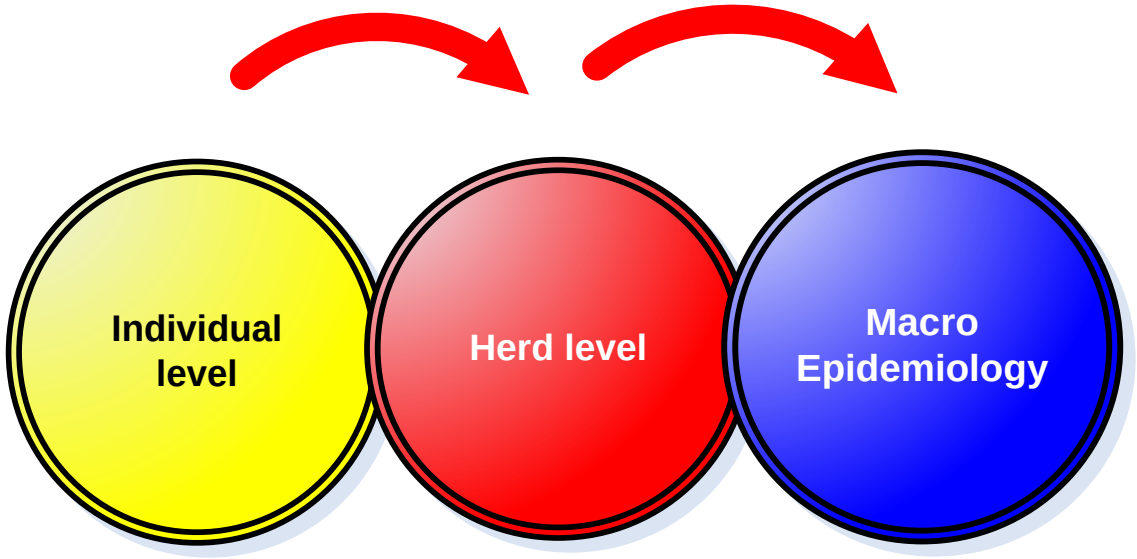
- Disease freedom
  - Initial declaration
  - Maintenance
- Zooning and compartmentalization
  - Surveillance
- Outbreak investigation and mitigation
- Large number of samples
  - Increased loads on surveillance systems and Dx laboratories

What is **aquatic epidemiology**?

- The study of disease in fish populations and of factors that determine its occurrence; the keyword being fish populations
- Additionally includes investigation and assessment of other health-related events, notably productivity
- All of these investigations involve observing fish populations and making inferences from the observations
- An integrating science with close links to clinical and laboratory medicine as well as biostatistics and health economics

Population based approaches

- Need to shift from individual clinical case emphasis to broader population-based thinking



Diseases in fish populations

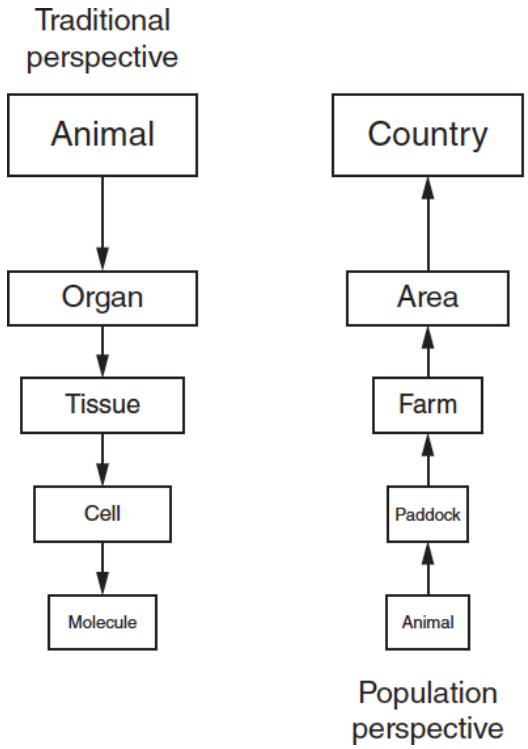
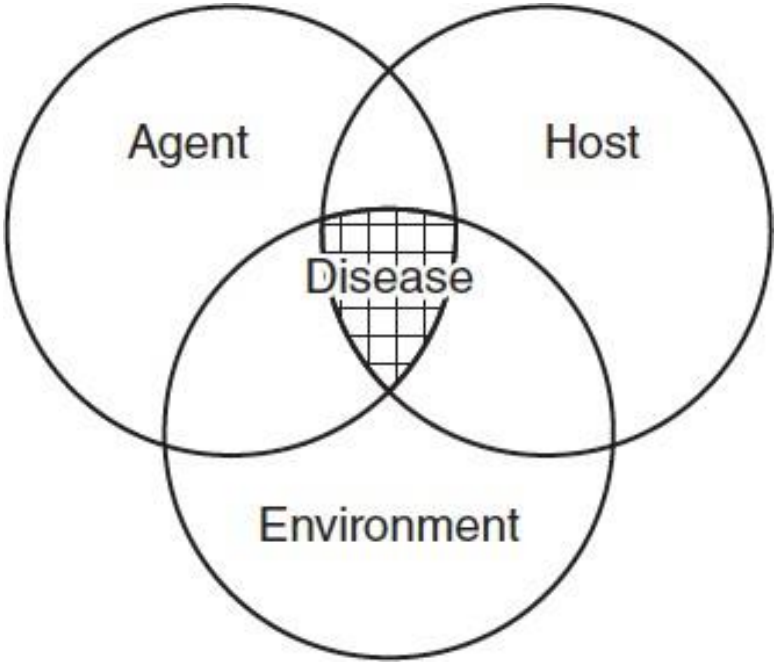


Fig. 1.1. Representation of the relationship between the traditional perspective of investigating disease and a population perspective.

Diseases in fish populations

- Most diseases do not occur at random in a fish population – they follow distinct patterns according to exposure of individuals in the population to various factors associated with the host, agent and environment

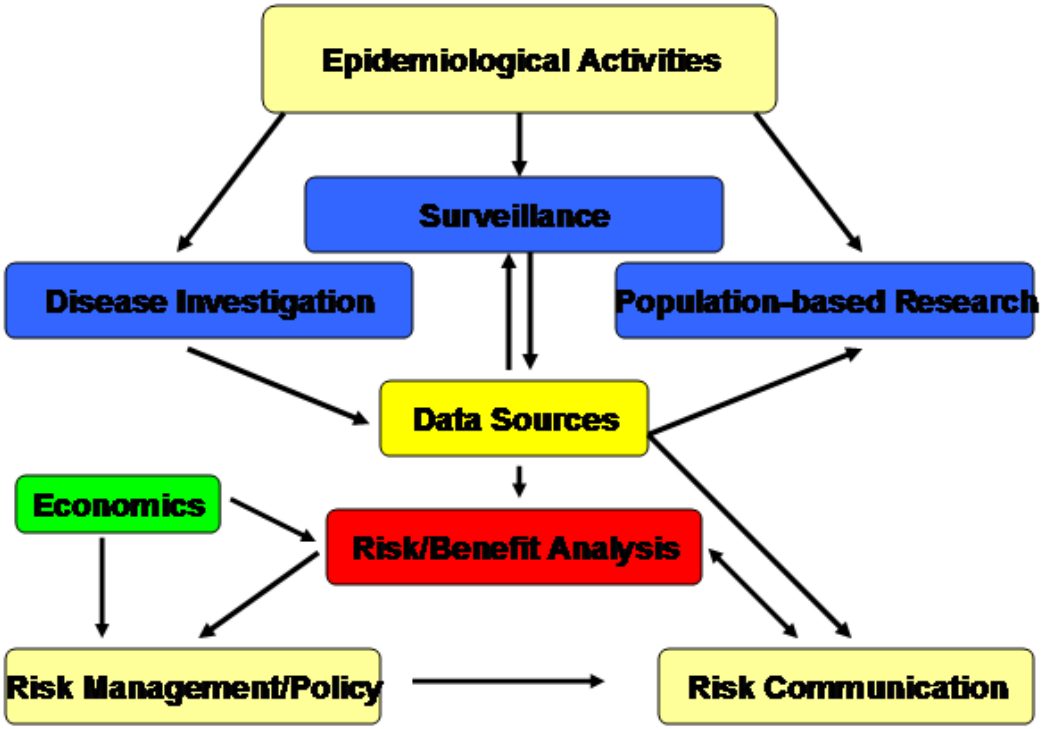


The key component of epidemiological approach

- Focuses on populations
- Defines disease broadly
- Applies knowledge of interrelationships among host, agent, environment
- Describes disease patterns
- Determines the role of chance in observed disease frequencies
- Provides observational and experimental approaches to study disease
- Incorporates systematic and critical evaluation of the scientific literature

	CLINICAL	LABORATORY	EPIDEMIOLOGY
Scope of interest	diseased animal	dead animal or sample	Population (dead, moribund, diseased, healthy)
Location	Field or clinic	Laboratory	Field and office
Aim/objective	treatment	treatment and prevention	Disease mitigation (control and prevention)
Diagnosis	Simptoms/laboratory findings	Identification of agent	Measurment of frequency and association
Questions	What is that? How to treat?	What is disease mechanism? How that couse disease?	What, Who, When, Why...

Components of Veterinary Epidemiology

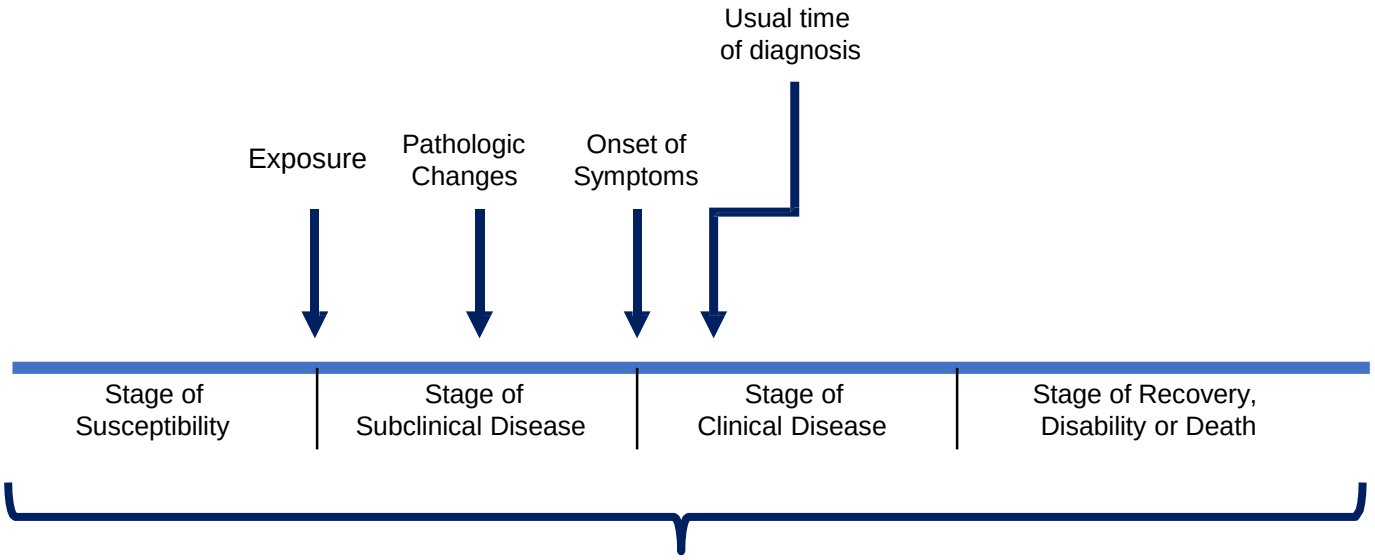


Epidemiological approach in practice

- Monitoring
- Surveillance
- Survey
- Disese control program (DCP)
- Disease eradication program (DEP)
- Disease notification and reporting

Natural history of TiLV

(do we have drawn this?)



May vary from fish to fish and are influenced by preventive and therapeutic measures

Definition of animal disease surveillance

Surveillance is:

All regular activities aimed at ascertaining the health status of a given population with the aim of early detection and control of animal diseases of importance to national economies, food security and trade

FAO Manual of livestock disease surveillance and information system

http://www.fao.org/docrep/004/x3331e/X3331E00.htm

Definition of animal disease monitoring

Monitoring is:

All activities aimed at detecting changes in the epidemiological parameters of a specified disease

FAO Manual of livestock disease surveillance and information system

http://www.fao.org/docrep/004/x3331e/X3331E00.htm

Definitions

Textbook	Monitoring	Surveillance
Martin et al.1986	Animal disease monitoring describes the ongoing efforts directed to assesing the health and disease status of a given population	The term”disease surveillance” is used to describe a more active system and implies that some form of directed action will be taken if the data indicate a disease level above a certain threshold.
Thrusfiled, 1995	Monitoring is the making of routine observations on health, productivity, and environmental factors and the recording and transmission of those observations.	Surveillance is a more intensiv form of data recording than monitoring
Thrusfiled, 1995	The routine collection of information on disease, productivity, and other characteristics possibly related to them in population	An intensive form of monitoring. Designed so that action can be taken to improve the health status of a population; therefore, it is frequently used in disease control campaigns.
Noordhuizen et al. 1997	Monitoring refers to a continuous, dynamic process of collecting data about health and disease and their determinants in a given population over a defined time period (descriptive epidemiology)	Surveillance refers to a specific extension of monitoring where obtained information is used and measures are taken if certain threshold values related to disease status have been passed. It, therefore, is part of disease control progams.

Surveillance versus monitoring

- Surveillance means the continuous investigation of a given population **to detect occurrence of disease for control purposes**, which my invole testing of a part of population
- Monitoring constitutes on-going programmes directed at **detection of changes in the prevalence** of disease in a given population and its environment

Surveillance and surveys

- **Passive** surveillance is a system in which CA make no active efforts to collect disease information; they just wait for disease report to come to them. Statutory case reporting is the most broadly used passive surveillance.
- **Active** surveillance uses structured disease **surveys** to collect high quality disease information quickly and inexpensively. CA make active efforts to collect the information needed.
- Surveillance system typically involves a number of data collection approaches, and also incorporates data management, analysis and reporting system.
- Structured survey may be one component of a surveillance system.

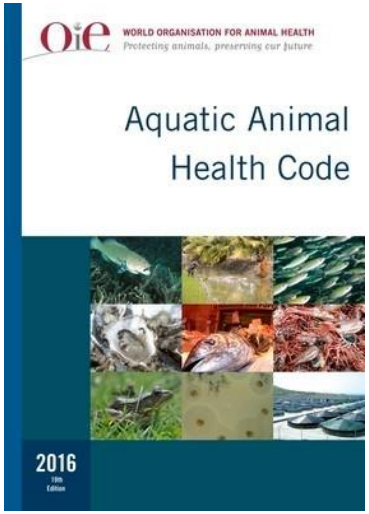
Risk based surveillance

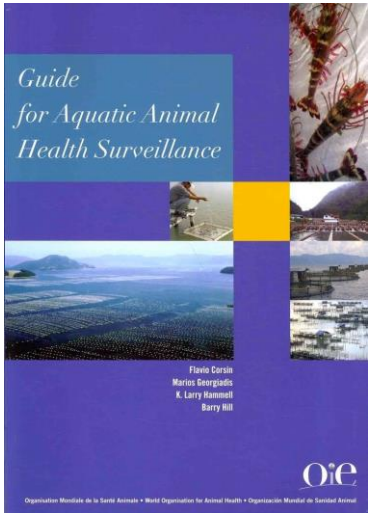
- **Risk based** surveillance: A surveillance programme in the design of which exposure and risk assessment methods have been applied together with traditional design approaches in order to assure appropriate and cost effective data collection
- RBS similiar with **targeted** surveillance (OIE: selected sections of the population in which disease is more likely to be introduced or found)

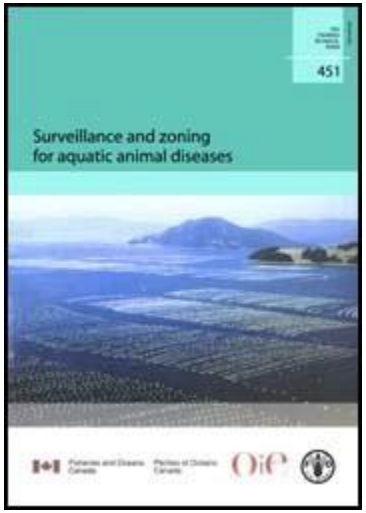
Surveillance in our case

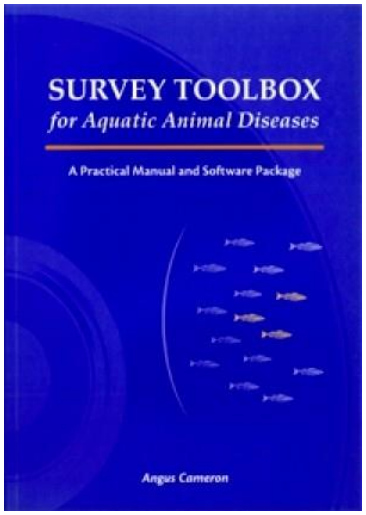
The systematic, continuos or repeated, **measurment**, **collection**, **analysis**, **interpretation** and **timely dissemination** of animal health and welfare related data from defined populations. These data are then used to describe health hazard occurence and to contribute to the planning, implementation and evaluation of risk mitigation action. (Hoinville et al, 2013)

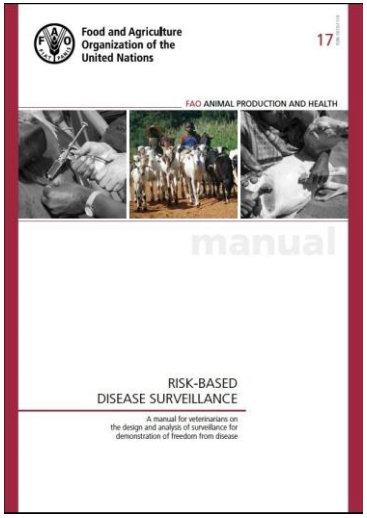
Available resources & useful references











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Thank you for your attention