



Food and Agriculture
Organization of the
United Nations

SUSTAINABLE
DEVELOPMENT
GOALS



VIRTUAL COURSE

26 March to 15 April 2021

Design of an Active Surveillance for Tilapia Lake Virus (TILV) Disease and Its Implementation

TCP/INT/3707: Strengthening biosecurity (policy and farm level) governance to deal with Tilapia lake virus



Food and Agriculture
Organization of the
United Nations

SUSTAINABLE
DEVELOPMENT
GOALS



CHECKLIST 8

9 April 2021

Data collection and management

Nihad Fejzic

nihad.fejzic@vfs.unsa.ba

Fernando Mardones

fomardones@gmail.com

TCP/INT/3707: Strengthening biosecurity (policy and farm level) governance to deal with Tilapia lake virus



Learning objectives

- To understand the requirements and criteria for Checklist 8
- To design surveillance questionnaires and define appropriate data flow
- To determine the type of data to be collected and when, where and how data need to be obtained



Presentation topics

- Data type and forms
- Data source
- Standardization of data collection tools
- Surveillance questionnaires
- Other information sources
- Data, information and decision making



Quality of surveillance system is based on quality of data collected

Surveillance system, if working properly, will collect **a very large amount of data.**

It is possible to manage large amount of data using manual or paper system, however efficient data management will require computer and software for data analysis such as excel data sheet or more advanced applications for epidemiological/statistical analysis.



Reasons for collecting epidemiological data

Adapted from Cameron, 1999

- Identify if a disease is present in a country or region;
- Determine the prevalence and distribution of a disease;
- Determine the importance and impact of diseases;
- Identify risk factors for a disease;
- Identify and evaluate treatment or control options for a disease;
- Set priorities for the use of resources for disease control programs;



SUSTAINABLE
DEVELOPMENT
GOALS

Reasons for collecting epidemiological data

Adapted from Cameron, 1999

- Assist in planning, implementing and monitoring disease control or eradication programs;
- Respond to disease outbreaks;
- Meet both national and international reporting responsibilities;
- Demonstrate disease status to trading partners;
- Monitor productivity and performance of livestock or aquatic animals;
- Evaluate diagnostic tests and screening procedures for disease; and
- Many others.



Variables, Data and Information

What is a variable?

- A property or characteristic that can vary, either between animals, between groups or over time.
- In an epidemiological study, variables are the things that we measure or record about animals, groups and their environment.

Examples:

- Animal characteristics, such as disease status, breed, species, sex
- Things we can measure, such as weight, antibody titer, length, height
- Group characteristics, such as group size, location, group treatment
- Environmental characteristics, such as soil type, water pH, rainfall.



What is data?

- Data is a collection of facts about the animal or animals being studied.
- Where variables are the characteristics being measured or recorded, data are the actual values that are recorded – the values that variables take when measured in individuals or groups.

For example, if a variable called disease is measured in a group of five ponds of tilapias the resulting data will be a series of five values, one for each tilapia pond, with each value being either diseased or not diseased.



What is information?

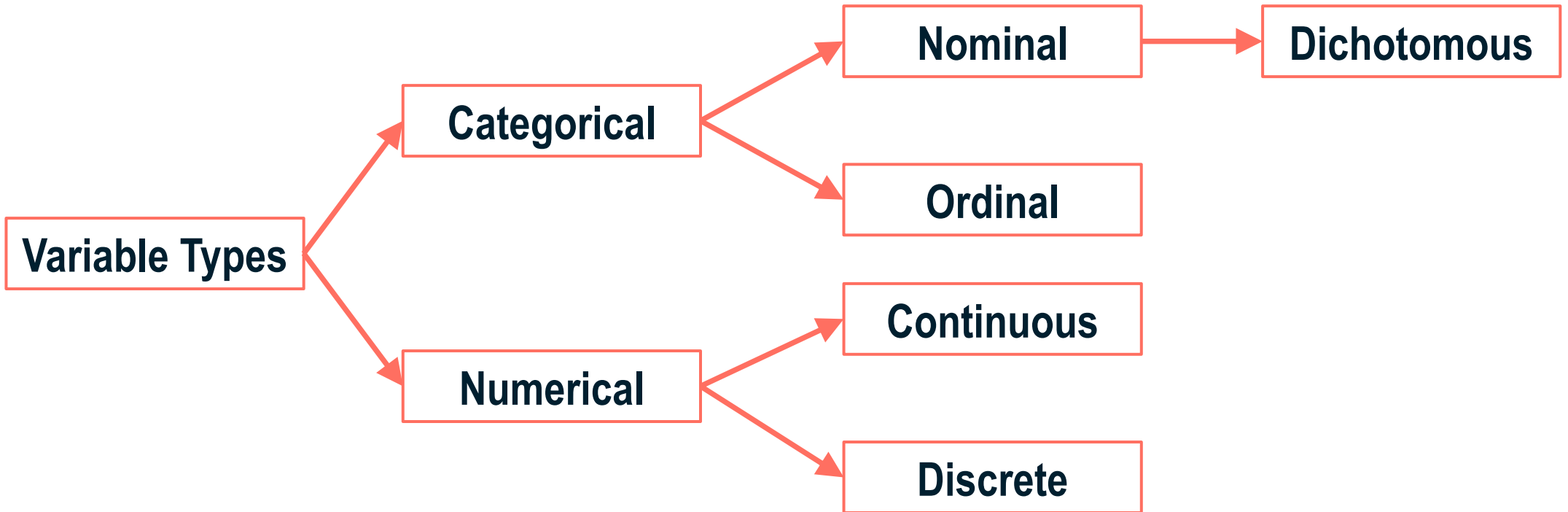
- Data can be processed and analyzed to generate information.
- Information is therefore not just the sum of the data available.
- Information can only be extracted from data if it is organized and analyzed to provide meaning and allow interpretation.

Example: a database containing the results of a survey of villages for TiLV is just a collection of data. The information generated from these data might be that 20% of Tilapia farms have had an outbreak in the last 12 months, but that farms in Region A are at three times the risk of an outbreak as farms in Region B.



Variable Types

There are two main types of variables, categorical variables and numerical variables, and several sub-types.



Epidemiological variable types (adapted from Thrushfield, 2005).

Principles of data management and analysis

- **Categorical data** (qualitative information):
 - Nominal or named data i.e. (1-catfish; 2 - tilapia; 3-shrimp)
 - Ordinal or ordered data (small, medium, large)
 - Dichotomous data (only two values possible: yes/no)
- **Numerical data** (quantitative): measure value i.e. age, weight, temp, pH...

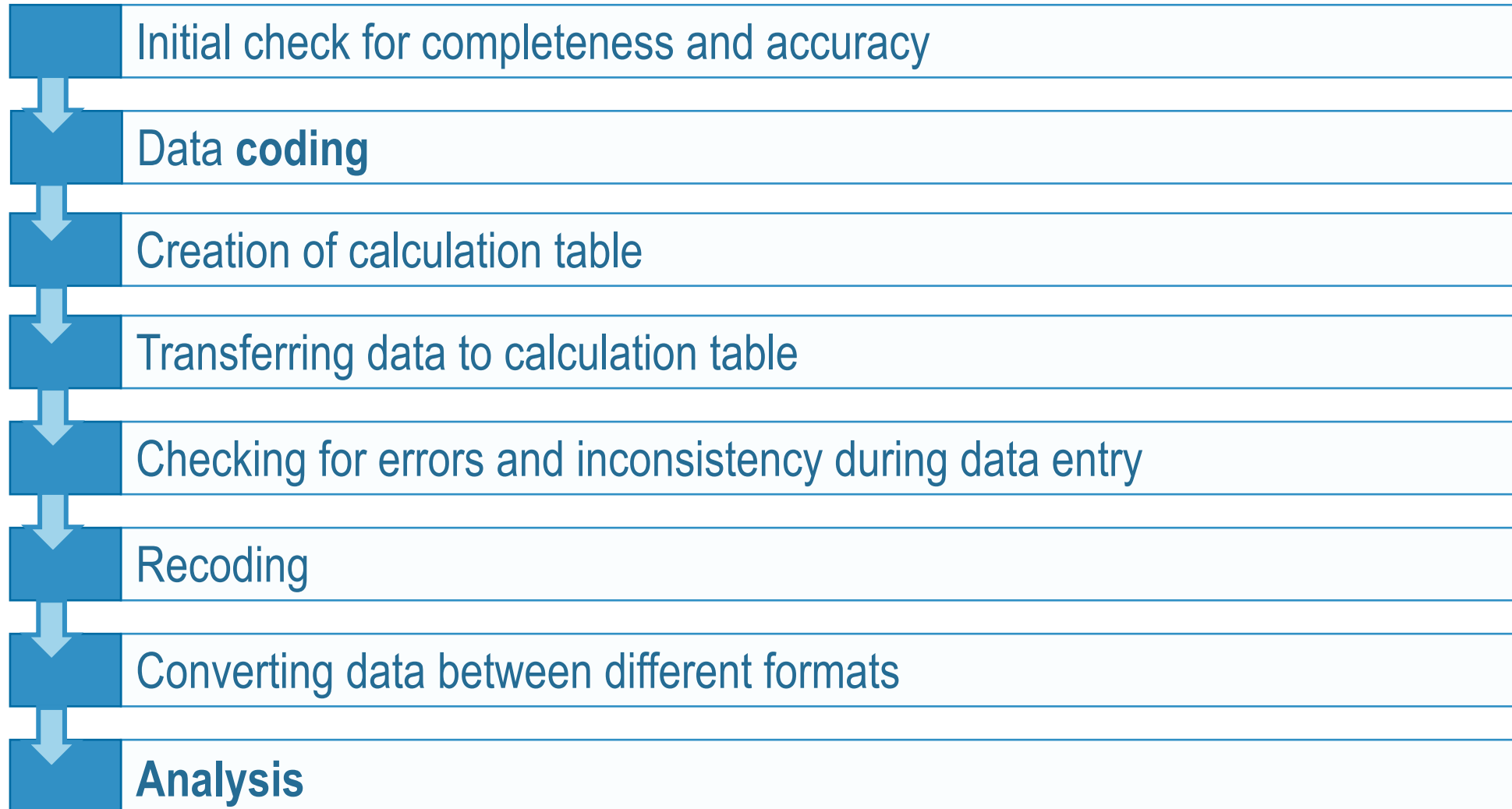


Questionnaires

- Epidemiological/laboratory/socioeconomics
- Used during survey: Inspection and field visits
- Piloting
- Paper or electronical forms
- Data dictionary



Data processing procedures





Data processing procedures

- Initial **check for completeness and accuracy** (missing data, mistakes....
In the early phase)
- **Data coding**
 - Process of converting complex data into a simpler form that is easier to manipulate.
 - Use number as codes
- **Creation of calculation table:**

Pond ID	Number
Farm ID	Number
Date of Visit	Date
Outbreak	Yes/No



Data processing procedures

- Transferring data to calculation table
 - Avoid data entry errors
- Checking for errors and inconsistency during data entry
- Recoding
 - this is process of changing data from one form to another, to make it easier to analyse - i.e. number of days between two dates
- Converting data between different formats
- Analysis



SUSTAINABLE
DEVELOPMENT
GOALS

Sheet number 1 is named “**Data**” followed by sheet number 2 named “**Data Dictionary**”. Data dictionary describe the variable, variable name and a short description for each variable at the “**Data**” sheet. The “**Data**” sheet is required for EACH farm or your defined epidemiological unit at each country. The information required is based on the epidemiological questionnaire that was prepared for all countries at previous workshops. Please, assign one or two team leaders to revise the information to get familiar and fill out the forms.

Sheet number 3 is named as “**Field sampling**” followed by sheet number 4 named “**Field Sampling Dictionary**”. Again, the dictionary is solely aimed to describe each variable in the form (not need to fill out). Note that the “Field sampling” records INDIVIDUAL fish that was sampled at each farm. For example, if a country sampled 30 farms, and took 30 fish per farm, the total number of records of fish after the first row (which contains the variables) will be 900 records for individual fish.

On the other side, the “**Data**” sheet would contain the total number of farms sampled at each country. If a country visited 50 farms, then the “**Data**” sheet will contain 50 rows of data (excluding the heading row).

Note that the connecting variable between the “**Data**” and “**Field Sampling**” sheets is the variable “*dataID*”, *i.e.*, a unique identification code (ID) for the survey (for each farm) that should be assigned by your team.”

Example of data dictionary (field)

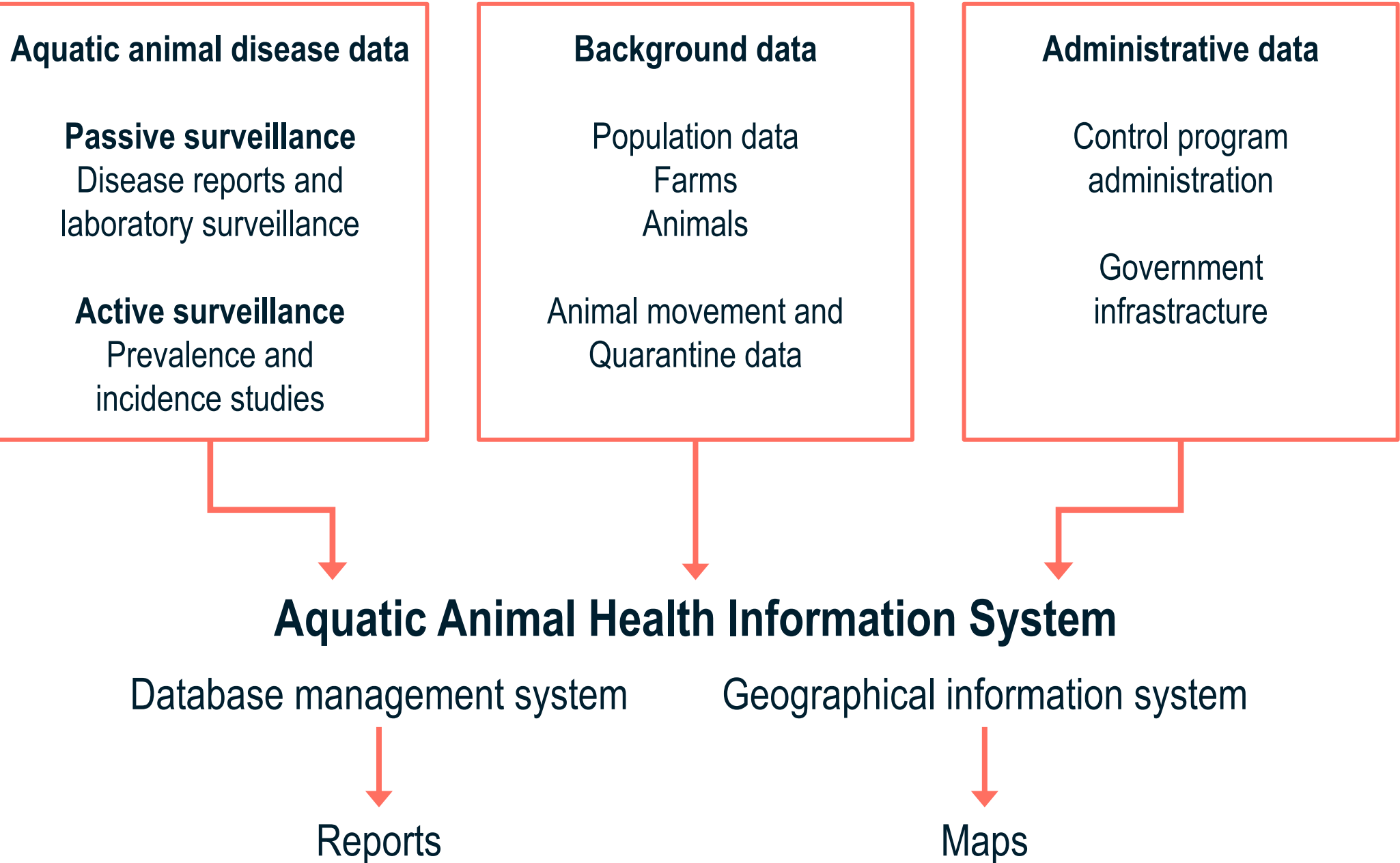
Variable	Variable name	Description
dataID	Data ID	A unique identification code (ID) for the survey (for each farm)
date	Date/time interview	Date of the interview of the questionnaire
date2	Date/time sampling	Date of the field sampling
interviewer	Name of the interviewer	Name of the interviewer (i.e., the lead person at the farm visit)
country	Country	Country where the survey was carried out
adm1	Province/State	Province or State of the location of the dataID
adm2	District	District of the location of the dataID
adm3	Subdistrict	Subdistrict of the location of the dataID
adm4	Village	Village of the location of the dataID
farmID	Farm registration number	A unique identification code (ID) for the sampled and/or visited farm
owner	Farm owner	A unique identification code (ID) for the owner of the farm (or company)
gender	Gender	Gender of the owner
farm_age	Existence of farm (years)	The years (or months) of existence of the farm (actively farming fish); specify time
farm_phone	Farm contact phone number	Farm contact phone number including country and area code
farm_email	Farm contact email	Farm contact email
latitude	Latitude of the location of the farm and/or ponds (decimal degrees)	Latitude on decimal degree obtained from GPS coordinates (using datum WGS-84). Provide separate locations if all ponds are not at the same location
longitude	Longitude of the location of the farm and/or ponds (decimal degrees)	Longitude on decimal degree obtained from GPS coordinates (using datum WGS-84). Provide separate locations if all ponds are not at the same location
farm_type	Type of production	Specify type(s) of fish production
farm_size	Area under culture farm/ponds/tanks/cages	Total area or surface of the farm (in hectare)
farm_cages	Cages in the farm (units)	Total number of cages in the farm (units)
farm_ponds	Ponds in the farm (units)	Total number of ponds in the farm (units)
farm_tanks	Tanks in the farm (units)	Total number of tanks in the farm (units)
farm_fry	Fish at the fry stage	Total number of fish at the fry stage
farm_finger	Fish at the fingerling stage	Total number of fish at the fingerling stage
farm_gout	Fish at the grow-out stage	Total number of fish at the grow-out stage
farm_brood	Fish at the breeder stage	Total number of fish at the breeder stage
water_source	Predominant water source (s)	Specify predominant water sources used in ponds and/or cages at the farm (if two or more, please describe)
wt_mgmt	Water management	Specify predominant water management type used in ponds and/or cages at the farm (if two or more, please describe)
wt_temp	Water temperature	Specify average water temperature (in Celsius degrees) at the farm
farm_substrate	Pond/tank substrate	Specify predominant water substrate used in ponds and/or tanks at the farm (if two or more, please describe)
aerator	Use of aerators in ponds	Do you use aerators in the pond? (Use 0 = no; 1 = yes)
farm_nearby	Nearby farms (or any production units)	Are any of ponds/cages adjacent to or intermingled with ponds of other farms? (Use 0 = no; 1 = yes)
farm_nearby2	Nearby farms using the same water source	Are there other nearby farms using the same water source? (Use 0 = no; 1 = yes)
farm_species	Fish species cultured	Specify each fish species raised at the farm

Example of data dictionary (laboratory)

Variable	Variable name	Description
dataID	Data ID	A unique identification code (ID) for the survey (for each farm)
case_number	Fish number (eg., P1 to P30)	Indicate each fish by a unique number (P1, P2, ..., P30)
species	Fish species	indicate fish species
breed	Fish breed (strain)	Indicate fish breed or strain
life_stage	Development stage	Indicate each fish by fry, fingerling, grow-out, brood.
weight	Fish weight	Indicate for each fish the weight (grams)
length	Fish length	Indicate for each fish the length (centimeters)
gender	Fish gender	Indicate for each fish the gender
sample_type	Fish sampling type	Indicate if fish was collected randomly, moribund, corner, etc.
sample_condition	Fish sampling condition	Indicate if fish was fresh mortality (< 1 hours), mortality was already collected prior to visit (<24 hours), etc.
clinical	Fish necropsy	Indicate relevant features at the necropsy
test_request	Diagnostic test requested	Indicate if diagnostic test was requested (0= no, 1 = yes)
pool	Fish pool	Indicate the pool number if followed to PCR test
PCR	PCR result	Indicate if PCR resulted positive/negative
behavior	Fish behavior	Describe fish behavior at sampling
eating	Fish eating pattern	Describe fish feeding pattern at sampling
lethargy	Fish lethargy observed	indicate if lethargy was observed at the time of sampling (use 0 = no, 1 = yes)
obs	Observations	Describe any observation at the sampling for all fish
Test I	Test Result Level I	Clinical signs according to case definition
Test II	Test Result Level II	Histopatology
Test III	Test Result level III	PCR positive



SUSTAINABLE
DEVELOPMENT
GOALS





Practical tips

- Village, farm, fisher codes
- Write information as soon as it is collected
- Delegate responsibly to each member of surveillance team
- Write the information clearly and carefully
- Design sheets to minimize the amount of writing required
- Keep the sheets safe and dry
- When collecting samples label each tube carefully with permanent waterproof marker



Summary: data collection and management

- Data forms (field and laboratory)
- Database (design, entry and management)
- Other information technology (mapping, GPS, photos...)



Food and Agriculture
Organization of the
United Nations

SUSTAINABLE
DEVELOPMENT
GOALS

Thank you for your attention!

Nihad Fejzic

nihad.fejzic@vfs.unsa.ba

Fernando Mardones

fomardones@gmail.com

TCP/INT/3707:

**Strengthening biosecurity
(policy and farm level) governance
to deal with Tilapia lake virus**

This was also made possible with the support of the Norwegian Agency for Development Cooperation under the project GCP/GLO/979/NOR Improving Biosecurity Governance and Legal Framework for Efficient and Sustainable Aquaculture Production.



Norad