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

Session 3

Checklist 8
Data flow and management

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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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8	Data flow and management	Data forms included Data base (design and management) 8.a. Compatibility of data throughout the collection/analysis process and transparency 8.b. Consistency, quality and precision of data

Surveillance data management

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 statistical analysis.

Importance of appropriate data

- What type of data would be collected using a "macro" approach? (country level)
- What type of data would be collected using a "micro" approach? (farm or herd level)

Principles of data management and analysis

- **Continuous data** (quantitative): measure value i.e. age, weight, temp, pH…
- **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)

Data processing procedures

- Initial check for completeness and accuracy
- Data **coding**
- Creation of calculation table
- Transferring data to calculation table
- Checking for errors and inconsistency during data entry
- Recoding
- Converting data between different formats
- **Analysis**

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

Reporting

- Objective of survey is not to collect data or generate some result, but to answer a question
- The answer is used to take some sort of action
- Treat data analysis and preparation of report as priority
- **Survey will result with one number, and this is the most important information**
- The information should be easy and quick to understood
- Distribute information, including international
- If possible, result should also be published in scientific journals

Data analysis checklist

- **Data analysis team appointed** (by person, by position, by department/institution). Data analysis team might be within government, within institutes/universities, outsourcing (private companies/consultants). Appointment might be on permanent basis or by specific appointment
- **Division of analytical tasks within data analysis team** (it is recommended to involve trained epidemiologist or statistic specialist)
- **Timelines for filed data delivery developed** (data base entry/data analysis/analysis outputs reporting)
- **Reporting lines and forms** (defined and described)
- **Analysis methodology defined and clear** (prescribed by surveillance program or determined as per specific demand. Measures for bias control incorporated (either in sampling protocols –stratified sampling etc, or in analysis methodology – blinding, stratified analysis)

Data flow

- All data on EUS/TiLV should flow to one central location. **Active surveillance** by definition means that main users of the information make active efforts to collect the information needed.
- As the collection of EUS/TiLV information is controlled by the users, it is possible to make sure that the information will be of appropriate quality.
- Local aquaculture officers are often not disease experts. To overcome this problem, it is very important that all people responsible for making disease reports, collect surveillance data, filling questionnaires, and entering data into datasheet **are instructed** how to do that before surveillance program.
- Training and or SOP developed for data entry/ cross checks is highly recommended.

Software

- The advantages of using a computer and epidemiological software are that process of routine data analysis and reporting can be completely automated.
- There is number of **free applications available** (WinEpisope, Epi Info, Epi Calc, etc.), however commercial software and software developed for specific surveillance program can be used as well.
- It is recommend to provide training for use of the data analysis software applied (data analysis teams).
- Epi software has ability to create mapping system to create maps showing the distribution of disease report. Understanding where disease is occurring, and the patterns of disease in time and space, can provide new clues about causes of the disease, the way it is spread, and possible control mechanisms. As with other type of reports, it is possible to automate the process of generating maps, so that the software does all the work.

Questionnaire for collection of TiLV-surveillance data from aquaculture establishments

The purpose of this survey questionnaire is to collect specific data on farmed fish populations relevant to the diagnosis of TiLV disease affecting susceptible fish. The results of laboratory analysis of field samples together with analysis of complementary data collected by this questionnaire, will allow a science-based evaluation of the available data and information through a corresponding epidemiological study format (cross sectional). This will provide comprehensive information on absence/presence of TiLV, frequency and distribution as well as a good understanding of potential risk factors and their degree of association. Epidemiological data from this study will support the formulation of appropriate risk-management measures to prevent and control spread of infection and to mitigate the impact of this disease.

Data ID		**Date Time**		**Name of the interviewer**	
Province/ State		**District**			
Sub district		**Village**			

Farm Registration No.		**Farm owner**		**Gender**	○ M ○ F	**Existence of farm (years)**	
Farm Contact Info							

Location of farm/pond (GPS coordinates or narrow geographical location WGS-84) Provide separate locations if all ponds are not at the same location	Latitude: Longitude:
Type of production	○ Hatchery
	○ Pond grow-out
	○ Cage grow-out
Total area under culture farm/ponds/tanks/cages (ha)	
Number of production units	○ Cages ○ Ponds ○ Tanks
Total number of fish on farm	○ Fry ○ Fingerling ○ Grow-out ○ Brood fish
What is the source of water used for the ponds/cages?	○ Pumped well/borehole water ○ River ○ Lake/reservoir ○ Surface water not connected to river or lake ○ Other (Specify)

What type of water management is used?	○ Open (frequent change of water during the culture period) ○ Semi closed (water changed few times during the culture period) ○ Closed (no change of water during the culture period) ○ Recycled (Water changed using recycled water)	
Water temperature	°C	○ <28 °C ○ 28-30 °C ○ >30 °C
Pond/tank substrate	○ Clayish ○ Muddy ○ Sandy ○ Concrete ○ Synthetic lining ○ Other (Specify)	
Do you use aerators in the pond?	○ Yes ○ No	
Are any of ponds/cages adjacent to or intermingled with ponds of other farms?		○ Yes ○ No
Are there other nearby farms using the same water source?		○ Yes ○ No

Type of culture	○ Small scale <10 tons/annum ○ Medium scale 10-50 tons/annum ○ Large scale >50 tons/annum	○ Extensive (fertilized ponds/natural food only) ○ Semi-intensive (fertilized/ natural food supplemented with commercial feed) ○ Intensive (commercial feed only)
Fish species cultured	○ *Oreochromis niloticus* ○ *Oreochromis mossambicus* ○ *Oreochromis andersonii* ○ *Oreochromis aureus* ○ *Coptodon zillii* ○ Other	
What type of feed is used in the farm?	○ Commercial feed ○ Self-made feed ○ Fertilized ponds/natural food ○ Feed storage ○ Good ○ Poor	

Source(s) of fish for stocking (during previous year)	○ Purchased from outside hatchery ○ Own hatchery ○ Wild-caught
Control of health of restocking - tested/certified by supplier to be free from diseases	○ Yes ○ No
Treatment of ponds before restocking	○ Pond is left dry for more than one week before restocking ○ Pond is left dry for less than one week before restocking ○ Top soil is scraped out of pond when dry ○ Lime is applied: O Dolomite O Hydrated lime O Agricultural lime ○ Fertilizer is applied: O Chicken/cattle manure O Chemical fertilizer
Aplied biosecurity measures	○ Pond/farm has fencing ○ Farm uses sun-drying to disinfect nets ○ Farm uses chemicals to disinfect nets ○ Are ponds/cages fallowed after harvesting ○ Pond/farm has disinfectant foot bath ○ Other
Mortality management	○ Left to decompose in pond/cage ○ Removed from pond/cage ○ Incinerated/burnt ○ Buried ○ Thrown back into the river/lake ○ Consumed ○ Other
Suspicious symptoms seen on site (at time of sampling)	○ Yes ○ No
Other disease seen on site (if yes, describe)	
Number of fish sampled on site?	
Age of fish sampled	○ Fry ○ Fingerlings ○ Grow out
Sex of sampled fish	○ Mixed sex ○ All-male
Other observations in case of an outbreak	○ 1-2 % increase in daily mortaility lasting for 2-3 days or longer ○ Peak mortality within 7 days ○ Overall mortality of 20-90% ○ Mortality stopped after peak mortality ○ Recent fish introductions/movement

Draft questionnaire for collection of data from aquaculture establishments providing samples for the surveillance purposes for EUS

The purpose of this survey questionnaire is to collect relevant farm and field data that will serve as background information to support the diagnosis of EUS disease affecting fish farms at national level. The results of laboratory analysis of field samples together with analysis of complement data collected by this questionnaire, alongside scientific based evaluation of available data and information through correspondent epidemiological study format (cross sectional or case-control) will lead to a comprehensive information on absence/presence of EUS, frequency and distribution as well as good understanding of potential risk factors and their degree of association so that risk management measures can be drawn to prevent, control and manage these diseases.

Name of the interviewer		**Date**		**Data ID**			
Province		**District**					
Sub district		**Village**					
Farm ID		**Farm owner**		**Gender**	○ M ○ F	**Age Yrs**	
Farm Contact Info							

What is the total area of cultured farm/ponds (ha)?			
What is the source of water used in ponds?	○ Fresh water ○ Sea water ○ Brackish water ○ Other (Specify)		
What type of water management is used?	○ Open (frequent change of water during the culture period) ○ Semi closed (water changed few times during the culture period) ○ Closed (no change of water during the culture period) ○ Recycled (Water changed using recycled water)		
Describe water supply and drainage:	○ Same river system ○ Separate inlet and outlet for each pond ○ Other (Specify)		
Awerage water temperature			
Pond soil type	○ Clayish ○ Muddy ○ Sandy ○ Concreat ○ Lining ○ Other (Specify)		
Do you use aerators in the pond?	○ Yes	**If Yes what type**	

	○ No		
Observed changes in the pond environment (during last XX months)	○ Foam on surface ○ Acid soils ○ pH drop ○ plankton blooms (color) ○ Black pond bottom ○ Dead algae on pond bottom		
Number of ponds/cages (overall)			
Location of ponds (GPS coordinates or narrow geographical location) Provide separate locations if all ponds are not at the same place			
Number of reservoir ponds (if 0 go to next question)		**How water in reservoir ponds is treated before use?**	○ Holding water for ____ days ○ Chlorination ○ No treatment ○ Other (specify)
Are any of ponds adjacent or intermingled with ponds of other farms?	○ Yes ○ No		
Are there other nearby farms (within ?? km radius) using the same water source?	○ Yes ○ No		
Fish health issues over last year on adjecent farms and farms using same water source?	○ None ○ Above expected mortality (unknown cause) ○ Above expected morbidity (unknown cause) ○ Confirmed occurrence of (Specify disease)		

Type of culture	○ Traditional grow out ○ Traditional polyculture ○ Semi intensive grow out ○ Intensive grow out
Fish species	
What type of feed management is employed in the farm?	○ Hand-broadcast ○ Mechanical automatic feeder ○ Feeding trays
What type of feed is used in the farm?	○ Commercial feed (brand) ○ Self-made feed (farm-made feed) ○ Others (e.g. fresh fish, mollusc)
In what conditions were feed stored?	○ Cool shaded storage ○ On shelf (not on land)
How long were the feeds stored in the farm until use?	

Source(s) of fish restocking (during previous year)					
Control of health of restocking - tested/certified by supplier to be free from EUS	• Yes • No				
Frequency of restocking		**Date of last restocking**			
If species other than shrimp are cultured source of restocking		**Frequency of restocking**		**Date of last restocking**	
Treatment of ponds before restocking	O Pond is dried before stock more than one week O Pond is dried before stock less than one week O Remove top soil O Apply lime: O Dolomite O Agriculture lime O Hydrated lime O Apply fertilizer: O chicken manure O Chemical fertilizer (specify) O Apply probiotic (specify) dose O Use water treatment O Calcium hypo chloride application dose O Dichlorvos (Bestacin) application dose O Other chemicals(specify)dose O Use paddle wheel O Three per hectare O Six per hectare O Other(specify)				
Aplied biosecurity measures	O pond has reservoir O each pond has fencing O pond has foot bath				
Are there wild fish found in the ponds?	O Yes O No	**If yes what species**	O Crab O Fish O Other(specify)		
How do you eliminate or control potential carriers of disease agents in the water?	O Use of filter in intake O Water has stand in reservoir (days) O Water Chlorination O Use insecticides O Use tea seed cake (Saponin) O Use probiotoics (type and amount) O Others (specify)				
Do you keep farm records? If so what information or data are being collected and/or monitored?	O				
Behavior/health disorders observed on the farm during last XX months	O Abnormal swimming movements O Unusual aggregations O Congregation of pray birds O Unusual activity during daytime				

Heading 2

	○ Swimming at or near pond surface
	○ Increased feed consumption
	  ○ Followed by going off-feed
	  ○ Reduction or cessation of feeding
	  ○ Abnormal feed conversion ratios
	○ Higher than ussualy mortality
	  ○ Random
	  ○ Same in every pond
	  ○ Only in some ponds
	  ○ More ponds affected over time
	○ Presence of parasites/commensals
	○ Erosion
	○ Abnormal colouration

Do you have easy access to a fish health laboratory or fish disease expert or extension officer in case of a disease emergency?	○ Yes ○ No
Are any of observed changes investigated for determining the cause (if no go to question??)	○ Yes ○ No

By who?		**By what means?**	
What cause/disease is established?			
Time when the outbreak occurred			
Number of affected ponds		**Pond size (ha)**	
Species affected			
Prevention measurement for preventing spread to other ponds	○ stop water pumping from channal ○ apply vitamin ○ apply immunostimulan ○ Other (specify)		
Water depth		**Pond bottom**	○ Clayish ○ Muddy ○ Sandy ○ Concreat ○ Lining ○ Other (Specify)
Specify source of restocking for affected ponds		**Stocking density**	
Did you treat waste water after disease outbreak?		○ Yes ○ No	
How are ponds prepared for the next culture period?	○ Flushing of sediments ○ Soil removal ○ Drying (duration) ○ Ploughing ○ Liming		

	O Use of Fertilizers (Type)			
Enviromental variables taken on site:	O Water temperature O pH O salinity O Transparency O Disolved oxigen O Water level O Amonia? NO2 H2S O Pond soli condition/colour?			
Pond health observations	O Lethargy O Swim near surface O Shrimp on the edge O Dead fish O Observed higher than normal mortality O Size variation O Proportion small more than 60% O Abnormal behavior (describe) O Birds congregating around the pond			
Other remarks:				
Overall number of fish sampled		**Number of sampled ponds/cages**		
		Dead	**Mordibun/sick**	**Normal**
Number of fish sampled per each pond	Pond 1 Pond 2 Pond 3 Pond...			
Overall				

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Thank you for your attention