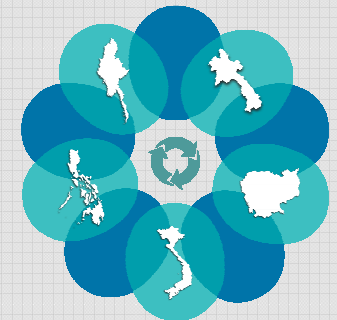


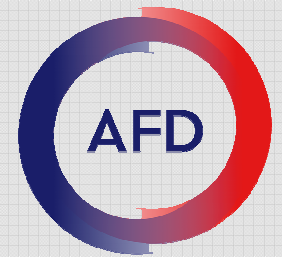
Steering Committee 23-24 January 2018 – Phnom Penh

The role of climatic factors and agricultural practices in incidence of Leptospirosis in Vietnam

National Institute of Hygiene and Epidemiology



ECOMORE II



WP VIETNAM

Process of initiation of the project

➤ Relevance at the National level

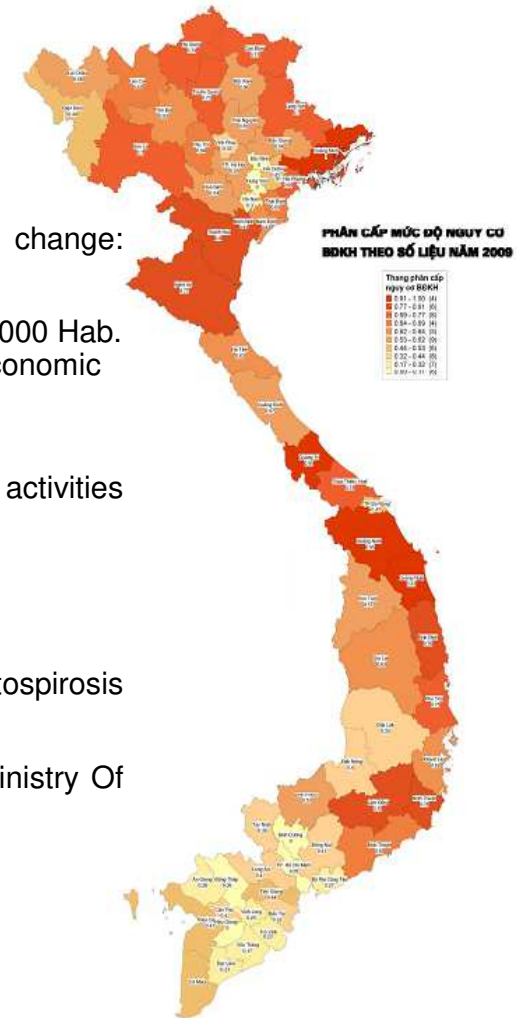
- Vietnam has been ranked among the five countries likely to be most affected by climate change: Average temperatures could rise 3°C and sea levels could rise nearly 1m by 2100.
- The Deltas are home for over 40% of the Vietnamese population with a density of more than 1,000 Hab. / km² and a region of intensive agriculture of which pig production is one of the main links of economic development. These livestock activities however lead to risks for water and soil pollution.
- The some region of Vietnam is regularly flooded due to the specific geography
- Impact on many aspects, including: general public health, infectious diseases and agricultural activities to health system

➤ Involvement of Authorities

- Agreement of local Health Departments and People Committees of 3 provinces
- Cooperation with the National Veterinary Research Institute to share data on Leptospirosis prevalence in animals
- Cooperation with the Department of Meteorology Hydrology and Climate Change of the Ministry Of Natural Resources and Environment (MONRE) to document environmental risk factors

➤ Experts who have participated in the design of the study

- Dr. Huynh Bich Tram – Pasteur Institute



Objectives of the project

➤ **Primary objective of the project**

- To assess the epidemiologic status of Leptospirosis and to identify the main risk factors of its transmission in various social and climatic environments

➤ **Secondary objectives**

1. To estimate the incidence of Leptospirosis in human in selected areas Vietnam
2. To describe the main Leptospirosis serogroups circulating in humans and animals
3. To identify the main risks factors associated for Leptospirosis transmission
4. To improve capacity of NIHE lab and quality control for diagnosis of Leptospirosis
5. To improve clinical diagnosis and management of Leptospirosis at the hospital level and to develop capacity of detecting Leptospira of provincial preventive medicine center's laboratories.
6. To improve inter-sectoral collaboration between health, veterinary and environmental authorities/private sector

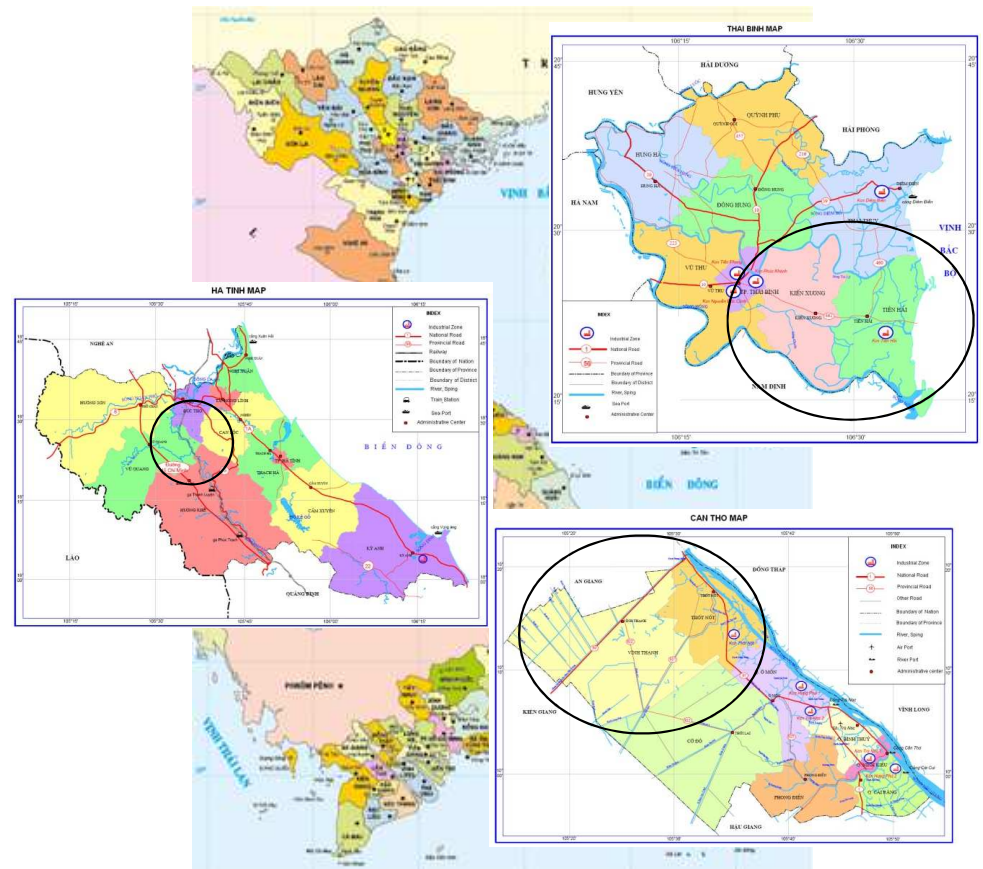
Specific Objective #1: To estimate the incidence of Leptospirosis in human in selected areas Vietnam

➤ Selection of areas

- Criteria: likely flooding, high density of population, intensive agriculture and different type of environment and willing of local health authorities to fully cooperate
- 3 provinces representing for 3 geographical areas in Vietnam: Ha Tinh, Thai Binh, Can Tho
- 2 districts for each province

➤ Methodology

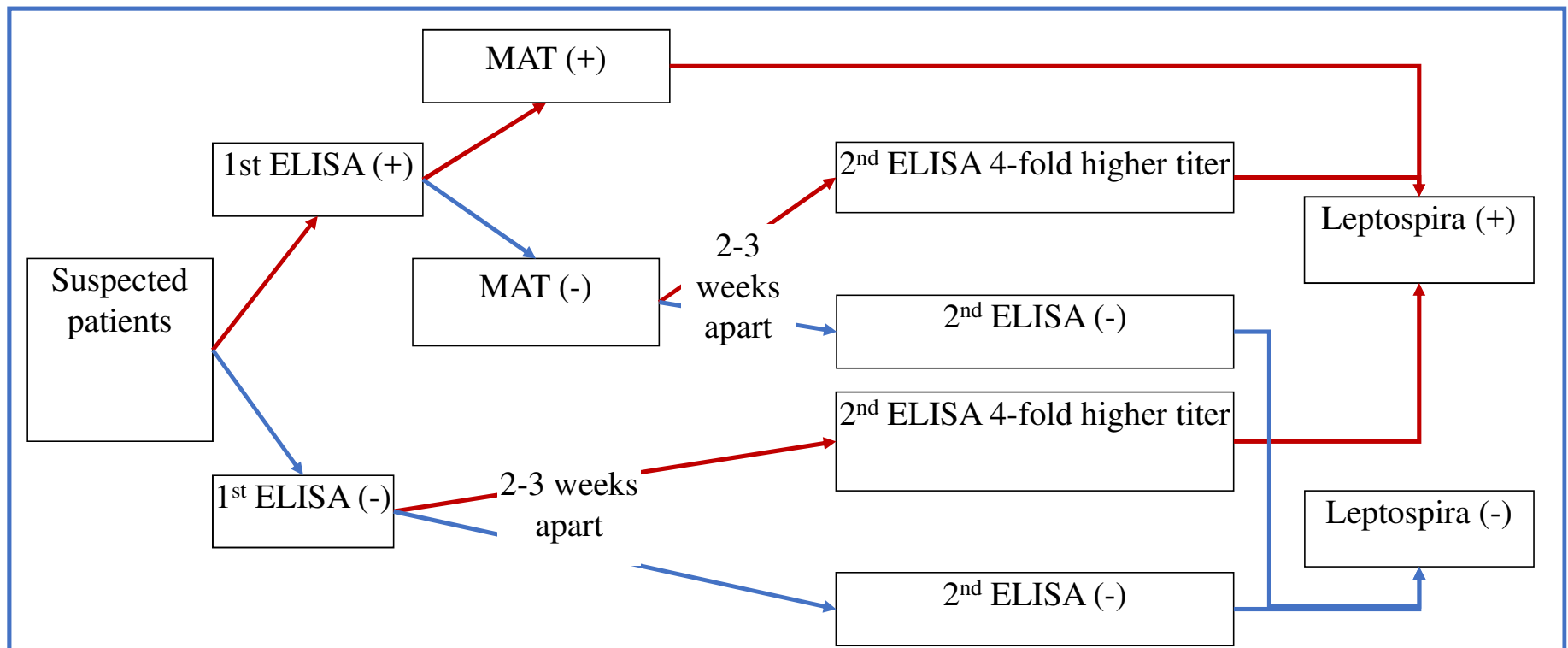
- Hospital-based surveillance for 1 year
- 12 hospitals including provincial and district hospitals will be selected in study



Activities correlated to the detailed protocol of objective #1

- **Study population:** All patients encountering to inpatient department of hospitals will be target subjects of the study.
 - **Suspected cases** : all cases meet the following criteria will be selected in the study:
 - Living in study area at least 6 months in prior reaserch study
 - Suddenly high fever ($>38.5^{\circ}$), chill for 5-7 days
 - Muscle aches
 - **Confirmed case** : All suspected cases with *Leptospira* (+) by ELISA and MAT at the first sample or second sample with titer 4 fold higher by ELISA as scheme below
- **Samples**
 - Estimated about 4000 suspected cases from 12 hospitals

Activities correlated to the detailed protocol of objective #1



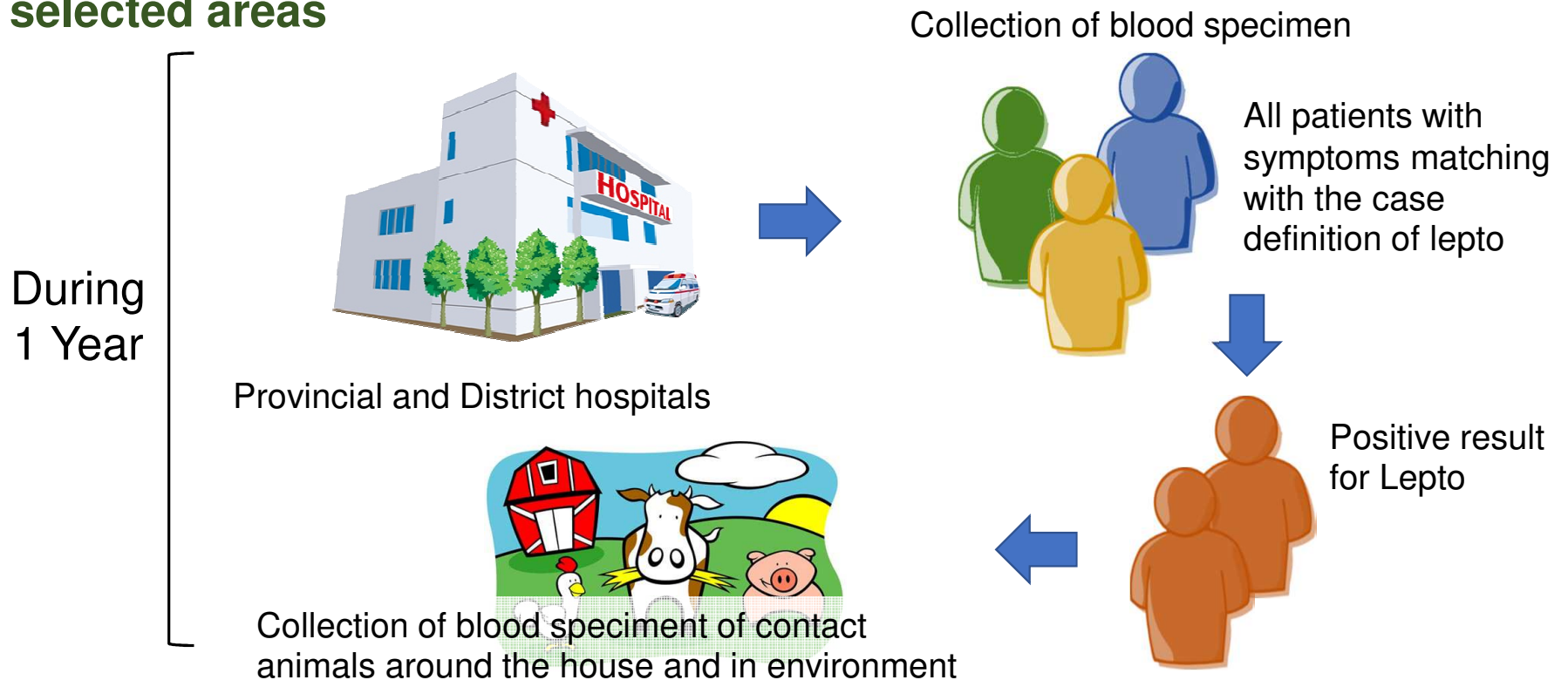
* Urine sample will be collected for patients showing up after 7 days

Activities correlated to the detailed protocol of objective #1

- Training in data collection, lab test..
- CRF filled in for all suspected cases
- Blood and/or urine sample collected for all suspected cases
- ELISA IgM will be performed at provincial centers
- Samples stored at provincial centers and transported to NIHE for MAT and PCR testing
- Data collection at hospitals will be monitored by NIHE team
- Data entering monthly

Results expected of the activities

- **Estimated incidence of Leptospirosis among hospitalizations in selected areas**



Monitoring of realization of objective #1

- Indicator
 - Number of suspected cases and confirmed cases per month
 - Number of samples collected and tested per month
- Means of verification
 - Dataset updated
 - Monthly report

Specific Objective #2: To describe the main Leptospirosis serogroups circulating in humans and animals

- All cases positive with 1st ELISA or 4-fold higher titer at 2nd ELISA will be performed Micro-Agglutination-Technique (MAT) to detect serogroup and serovar
- MAT test will be done at NIHE
- Animal samples i.e dogs, pigs, cattle from households of all positive cases, if any, will be tested



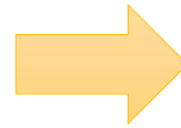
Activities and Results

Activities

MAT test for all ELISA (+) cases

ELISA and/or MAT for all blood samples collected from contact animals

PCR performed for urine samples of ELISA (+) cases



Results

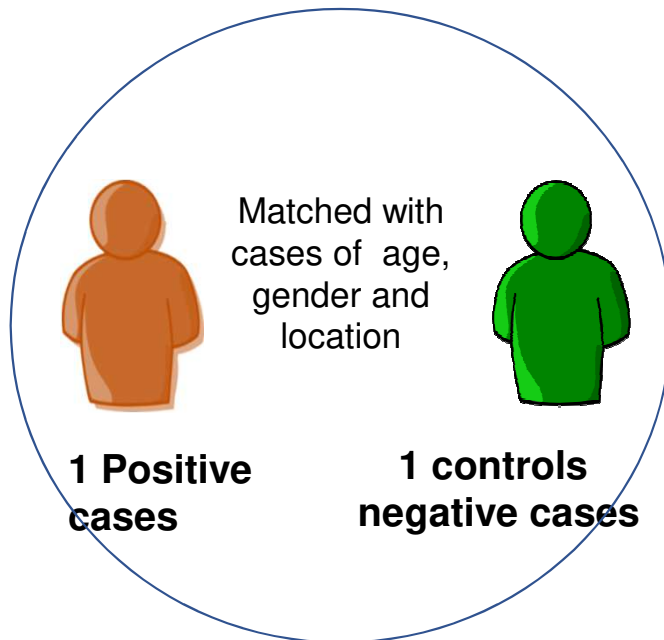
Leptospirosis serogroup, serovar and strains (maybe) in 3 selected provinces identified

Monitoring of realization of objective #2

- **Indicator**
 - Number of MAT and ELISA tests for human performed
 - Number of ELISA tests for animals performed
- **Means of verification**
 - Dataset updated
 - Monthly report

Specific Objective #3: To identify the main risks factors associated for Leptospirosis transmission

Case-control study



- **The cases:** Positive subjects confirmed by ELISA and MAT among suspected subjects admitted in studied hospitals.
- **The controls:** match with cases of the same village, age, gender and negative with *Leptospira* by ELISA
- **Sample:** 200 cases per province x 3

Activities correlated to the detailed protocol of objective #3

- Characterize all confirmed cases i.e villages, age, gender
- Select potential controls and collect blood samples for ELISA testing
- Conduct structured interview for some risk factors: occupation, risk behaviours and practices, environments...
- Collect animal samples from the control households, if any
- Collect climatic data

Results expected of the activities

The main risk factors of Leptospirosis are identified

Personal factors

- **Age/ Gender/ Education level/ Income/ Occupation/ Living area**
- **Personal perception of Lepto and risk factors**
- **Working risk behaviors in**
 - Barefoot in working
 - Contact animal waste in livestock
 - Swimming and wading in fishery
 - Sewage cleaning
 - Working in slaughter-house
 - Not wearing personal protection
 - Not washing after work
- **Daily risk behaviors**
 - Taking a bath in surface water
 - Washing in surface water
 - Walking barefoot
 - Water – related entertaining activities (swimming, kayaking...)

Environmental – related factors

- **Polluted soil and surface water**
- **Climate zones**
- **Climate changes: rainfall, flooding...**
- **Seasonal factor: rainy season..**

Household-related factors

- **Living condition:**
 - Dampness
 - Poor house sanitation
 - Poor sewer condition
 - Existence/Owned domestic animals
- **Household income**
- **Perception of lepto and risk factors**
- **Risk behaviors:**
 - Using surface water for daily activities
 - Frequency of house cleaning
 - Contact domestic animals

Monitoring of realization of objective #3

- Indicators
 - Number of cases and controls collected, tested and interviewed
- Means of verification
 - Dataset updated
 - Monthly report

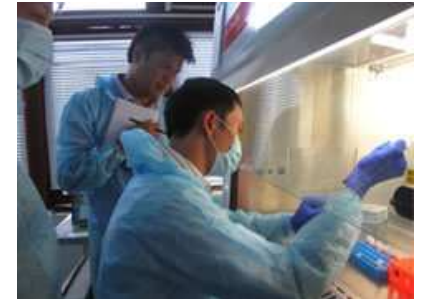
Specific Objective #4: To improve capacity of NIHE lab and quality control for diagnosis of Leptospirosis

- Participate in transversal training on Leptospirosis,
 - i) detection of *Leptospira* in the environment to identify its role in the scheme of transmission between humans and animals,
 - ii) genomic sequencing by MRST technique to capacitate the Microbacteria Dept. of the NIHE
- Establish an external quality control.



Results expected of the activities

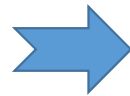
- **The capacity of NIHE to perform a proper algorithm of analysis is strengthened.**
- **The quality control is validated.**



Monitoring of realization of objective #4

- Indicators
 - Improvement of laboratory capacity of NIHE to Leptospira testing
 - Capable to provide training
- Means of verification
 - Number of analysis performed.
 - Results of external quality control

**Specific Objective #5:
To improve clinical diagnosis
and management of
Leptospirosis at the hospital
level and to develop capacity
of detecting Leptospira of
provincial preventive
medicine center's
laboratories**



- Retrospective review by MDs of key signs of Leptospirosis to issue a clinical scoring.
- Disseminate the guidelines to all MDs in the province

Activities correlated to the detailed protocol of objective #5

- Improvement of clinical diagnosis of leptospirosis
 - Development of guidelines to improve clinical diagnosis; symptoms of leptospirosis as reported in the literature are highly polymorphic, depend on strains and may be similar to symptoms observed for dengue, Japanese encephalitis ...
 - Disseminate the guidelines to all MDs in the province by trainings or workshop.
- Transfer of skill to the provincial centers of preventive medicine
 - Training staff at provincial centers of preventive medicine
 - Trained staff involved in testing sample of studied subjects

Results expected of the activities



- MDs are better aware of clinical signs and risk factors of Leptospirosis. A scoring table is issued by the WGs.
- Provincial Preventive Medicine Center (PPMC) is capable doing Leptospira testing

Monitoring of realization of objective #5

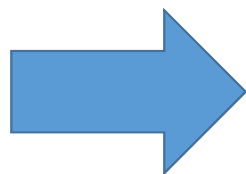
- Indicators

- Improvement of awareness and clinical diagnosis of Leptospirosis in hospitals
- Number of tests done by PPMC

- Means of verification

- Hospital report
- PPMC report

Specific Objective #6: To improve inter-sectoral collaboration between health, veterinary and environmental authorities/private sector



Establish a cooperation with the animal health and environmental sector to share data on Leptospirosis prevalence in animals and document environmental risk factors

Activities correlated to the detailed protocol of objective #6

- Involve veterinarians in the detection of Leptospirosis in animals
- Group Work meetings and Workshops to share relevant topics

Monitoring of realization of objective #6

- Indicators

- Number of GW meetings and workshop with relevant topics to share documented

- Means of verification

- Report issued on the organization of WGs, National Stakeholder Meetings and other sharing of experience

Timelines

Ground work:

- Ethical approval
- MOH approval

4/2018



5/2019



Wrap-up

- Analysis of data
- Recommendations
- Clinical guideline for hospitals

Field work:

- Kick-off meeting
- Training
- Data collection and entry
- Testing sample
- Monitoring



Thank you for your attention

