Indonesia
Evaluation for action
Assessing animal disease surveillance capacities
August 2019
Indonesia

Evaluation for action

Assessing animal disease surveillance capacities

August 2019
Contents

Figures ................................................................................................................ iv
Tables .................................................................................................................. v
Acknowledgements ............................................................................................. vi
Abbreviations and acronyms ................................................................................ vii
Background .......................................................................................................... 1
  General context ................................................................................................... 1
  Development of the Surveillance Evaluation Tool .............................................. 1
  Context of the mission in Indonesia ................................................................... 2
  Objective of missions using the Surveillance Evaluation Tool ......................... 2
Evaluation methodology ....................................................................................... 3
  The toolkit and expected outputs ...................................................................... 3
  Phases of evaluation missions .......................................................................... 4
The evaluation mission in Indonesia .................................................................... 5
  Local situation and livestock production ........................................................... 5
  Composition of the evaluation team ................................................................. 8
  Mission summary .............................................................................................. 8
Evaluation results ................................................................................................ 11
  Description of surveillance system .................................................................... 11
  Surveillance Evaluation Tool outputs ............................................................... 23
  Core results ...................................................................................................... 23
  Performance attributes .................................................................................... 24
Recommendations .................................................................................................. 27
  Strength, weaknesses, opportunities, threats analysis ...................................... 27
    Strengths .......................................................................................................... 27
    Weaknesses .................................................................................................... 28
    Opportunities .................................................................................................. 29
    Threats ............................................................................................................ 29
  Recommendations and action plan .................................................................... 29
    Action plan ..................................................................................................... 32
References .............................................................................................................. 38
Appendix I – Summary of the evaluation .............................................................. 41
Figures

**Figure 1.** Cattle density in Indonesia. ................................................................. 5

**Figure 2.** Production of goats, cattle, sheep swine and buffaloes in Indonesia, 1961-2017 ............................................................. 6

**Figure 3.** Pig density in Indonesia ..................................................................... 6

**Figure 4.** Production of chicken (A) and ducks (B) in Indonesia, 1961-2017 ........................................................................ 7

**Figure 5.** Areas visited during SET evaluation mission in Indonesia, August 2019 ....................................................................... 9

**Figure 6.** Organogram of the Ministry of Agriculture and Veterinary Services in Indonesia, August 2019 .............................................. 11

**Figure 7.** Animal disease reporting system in Indonesia, August 2019 ............. 14

Figure 8. Comparative SET graphical outputs for Indonesia by category, August 2019. ............................................................................. 24

Figure 9. SET outputs for Indonesia by performance attribute of the system, August 2019. .......................................................................... 26

Figure 10. Feasibility/impact graph of proposed recommendations identified during the SET mission in Indonesia, August 2019......................... 30
Tables

Table 1. Categories and areas evaluated by SET .................................................. 3
Table 2. Members of the SET evaluation team in Indonesia, August 2019 .......................................................... 8
Table 3. Key legislation of animal disease surveillance in Indonesia, August 2019 .......................................................... 12
Table 4. Priority animal and zoonotic diseases in Indonesia, August 2019 .......................................................... 13
Table 5. Diseases reference tests conducted by disease investigation centres (DICs) in Indonesia, according to Ministry Decree No 89/Kpts/PD.620/1/2012 .................................................. 16
Table 6. SET outputs for Indonesia, August 2019 .................................................. 24
Table 7. Performance attributes evaluated by the SET ........................................... 25
Table 8. Prioritized recommendations from SET outputs, Indonesia, August 2019 .................................................. 31
Acknowledgements

This report is the result of a collaborative effort between Ihab El-Masry (Veterinary epidemiologist, FAO Rome), Syafrison Idris (Senior Veterinary Epidemiologist, DGLAHS Indonesia), Gaël Lamielle (Surveillance expert - zoonoses, FAO Rome), Dhony K. Nugroho (Veterinary Epidemiologist, DGLAHS Indonesia) and Farida Camallia Zenal (National technical Advisor for Surveillance-FAO ECTAD Indonesia).

The authors of the present evaluation report would like to thank all the stakeholders met, as well as all the people who contributed to the successful realization of this evaluation mission in Indonesia, including: Dr Ketut Diarmita (Director General of Livestock and Animal Health Services), Dr Fadjar Sumping Tjatur Rasa (Director of Animal Health-DGLAHS), Dr Nasirudin (Head of DIC Lampung), Dr I Wayan Masa Tenaya (Head of DIC Denpasar), Dr Bagoes Poermadjaja (Head of DIC Wates), Dr Sodirun (Head of DIC Subang). In addition, the authors would like to thank those who contributed to the development of SET and its methodology: Subhash Morzaria (FAO Senior Animal Health Adviser, Global Coordinator EPT-2/GHSA), Sophie von Dobschuetz (Veterinary Epidemiologist, FAO HQ), Sibylle Bernard-Stoecklin (Veterinary Epidemiologist FAO HQ), Magali Ruiz (Veterinary Epidemiologist, formerly of FAO HQ), Eran Raizman (Head of EMPRES-AH), Madhur Dhingra (Veterinary Epidemiologist, FAO HQ), Asma Saidouni (Regional Veterinary Epidemiologist, FAO Ghana), Béatrice Mouillé (EMPRES Lab Unit Deputy Coordinator, FAO HQ), Pascal Hendriks (Veterinary epidemiologist ANSES), Aurélie Courcoul (Veterinary epidemiologist ANSES), and Jean-Philippe Amat (Veterinary epidemiologist ANSES).
## Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSES</td>
<td>French Agency for Food, Environmental and Occupational Health &amp; Safety (Agence nationale de sécurité sanitaire de l’alimentation, de l’environnement et du travail)</td>
</tr>
<tr>
<td>ASF</td>
<td>African swine fever</td>
</tr>
<tr>
<td>BBALIVET</td>
<td>Indonesian Centre for Veterinary Sciences (Balai Besar Penelitian Veteriner)</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>DGLAHS</td>
<td>Directorate General of Livestock and Animal Health</td>
</tr>
<tr>
<td>DIC</td>
<td>Disease Investigation Centre</td>
</tr>
<tr>
<td>EID</td>
<td>Emerging infectious disease</td>
</tr>
<tr>
<td>EMT</td>
<td>Epidemiology Mapping Tool</td>
</tr>
<tr>
<td>EPT2</td>
<td>Emerging Pandemic Threats 2</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organisation of the United Nations</td>
</tr>
<tr>
<td>FAO-ECTAD</td>
<td>FAO Emergency Centre for Transboundary Animal Diseases</td>
</tr>
<tr>
<td>FAO-RAP</td>
<td>FAO Regional Office for Asia and the Pacific</td>
</tr>
<tr>
<td>FETPV</td>
<td>Field epidemiology training program for veterinarians</td>
</tr>
<tr>
<td>FMD</td>
<td>Foot and mouth disease</td>
</tr>
<tr>
<td>GHSA</td>
<td>Global Health Security Agenda</td>
</tr>
<tr>
<td>HPAI</td>
<td>Highly pathogenic avian influenza</td>
</tr>
<tr>
<td>HR</td>
<td>Human resources</td>
</tr>
<tr>
<td>IVM</td>
<td>Influenza Virus Monitoring</td>
</tr>
<tr>
<td>JEE</td>
<td>Joint External Evaluation</td>
</tr>
<tr>
<td>KPI</td>
<td>Key performance indexes</td>
</tr>
<tr>
<td>LIPI</td>
<td>Indonesian Institute of Sciences</td>
</tr>
<tr>
<td>LMT</td>
<td>Laboratory Mapping Tool</td>
</tr>
<tr>
<td>MoA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>MoEF</td>
<td>Ministry of Environment and Forestry</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NRCC</td>
<td>National reference coordination committee</td>
</tr>
<tr>
<td>OASIS</td>
<td>Tool for the Analysis of Surveillance Systems (Outil d’Analyse des Systèmes de Surveillance)</td>
</tr>
<tr>
<td>OHZDP</td>
<td>One Health Zoonotic Disease Prioritization</td>
</tr>
<tr>
<td>OIE</td>
<td>World Organisation for Animal Health</td>
</tr>
<tr>
<td>PCR</td>
<td>Polymerase chain reaction</td>
</tr>
<tr>
<td>PDSR</td>
<td>Participatory disease surveillance and response</td>
</tr>
</tbody>
</table>
PVS  Performance of Veterinary Services
SET  Surveillance Evaluation Tool
SIZE Information system for zoonoses and EIDs (Sistem Informasi Zoonosis and EIDs)
SOP  Standard operating procedure
SWOT Strengths weaknesses opportunities threats
ToRs Terms of reference
USAID United States Agency for International Development
VBD  Vector-borne disease
VPH  Veterinary public health
WHO  World Health Organisation
Background

**General context**

Outbreaks of animal disease can have a devastating impact on people’s livelihoods if not detected in time. In addition, over 70 percent of emerging infectious diseases are zoonotic in nature (WHO, 2020) and identifying them in animals can prevent their transmission to humans. Good-quality data is therefore essential to better prepare and respond to known and new threats to both livestock and people. Strong surveillance systems represent the cornerstone to provide decision-makers with adequate information to implement disease control programs.

Many assessments exist to help countries develop their animal health capacities, including the Joint External Evaluation (JEE) led by the World Health Organization (WHO) and the Performance of Veterinary Services (PVS) developed by the World Organisation for Animal Health (OIE). Although both JEE and PVS address some aspects of animal disease surveillance, these tools address general capacities related to One Health and veterinary services, respectively.

Member countries in Africa therefore requested a comprehensive evaluation methodology to guide specific activities aimed at enhancing national animal disease surveillance capacities.

**Development of the Surveillance Evaluation Tool**

In response to the request of member countries, the Food and Agriculture Organization of the United Nations (FAO) developed the Surveillance Evaluation Tool (SET) to support prevention and control of animal disease threats, including zoonoses. The tool provides veterinary services and ministries with an objective, standardized, comprehensive and systematic evaluation of animal health surveillance systems. The initial development of SET was supported by the United States Agency for International Development (USAID) for use in African nations under the Global Health Security Agenda (GHSA) project (GHSA, 2018). Following the completion of the activity in project countries, SET was made available for use by FAO offices in other regions as well as governments interested in reinforcing their animal disease surveillance capacities under external funding.

The basis for SET was the surveillance network assessment tool “Tool for the Analysis of Surveillance Systems” (OASIS) developed by the French Agency for Food, Environmental and Occupational Health & Safety (ANSES) (Hendrikx, et al., 2011). Additional assessment criteria from FAO’s Epidemiology Mapping Tool (EMT) were also included for the following indicators: cross-sectoral collaborations, epidemiology workforce capacities, outbreak investigation, and risk assessment. Finally, the tool’s structure, scoring system (1 to 4) and graphical outputs were harmonized with FAO’s Laboratory Mapping Tool (LMT) and EMT.

In past SET missions, JEE indicators for “Real Time Surveillance”, “Workforce Development” (D.4.1 and D.4.3) and “Zoonotic Diseases” (WHO, 2016) were incorporated into SET and assessed in order to further characterise these indicators from the perspective of animal health. Following the publication of the new JEE indicators and guidelines in 2018 by WHO (WHO, 2018a), this aspect of the SET assessment was discontinued.
Two piloting sessions were conducted in the United Republic of Tanzania (12-21 June 2017) and Liberia (4-13 September 2017) to test SET in real-time situations in the East and West African contexts. Following these missions, outcomes were compiled in final reports that were distributed to key-decision makers of the surveillance system in both countries. The toolkit and evaluation methodology were also updated to reflect feedback and lessons learned during each of those piloting missions. Lastly, the final version of SET was distributed in English and French for implementation in the rest of project countries.

Following the successful implementation of SET in 14 countries in West, Central and East Africa, the tool was made available for use in other regions.

Context of the mission in Indonesia

This report details the first SET mission conducted in Southeast Asia, specifically in Indonesia between 21 August and 1 September 2019, and highlights outcomes and recommendations for the improvement of the local animal disease surveillance system. This mission was supported by the FAO component of the Emerging Pandemic Threat 2 (EPT2) project, financed by USAID (USAID, 2020).

In addition, this assessment was done jointly with a team from FAO Regional Office for Asia and the Pacific (FAO-RAP) conducting an in-depth evaluation of the veterinary service’s national epidemiology capacities using an updated version of the EMT tool. This was the opportunity to compare the two tools’ methodologies in real-time and link indicators between SET and EMT for better coordination in the future.

Objective of missions using the Surveillance Evaluation Tool

The main objective of this evaluation was to conduct an external assessment of the animal health surveillance system in Indonesia using SET, with specific focus on:

- institutional organization and legal framework at central, intermediary and field levels;
- timeliness and quality of laboratory analyses;
- surveillance activities and methodology;
- epidemiology workforce capacity and management, and epidemiological training;
- outbreak investigation mechanisms and resources;
- data management and analysis;
- communication and reporting of results to internal, local, multi-sectoral and international stakeholders; and
- sensitivity, specificity, representativeness, rapidity, simplicity, flexibility, acceptability, data quality, stability, and utility of the surveillance system.

Examining each of these areas in the Indonesian context allowed for the identification of strengths and areas of improvement for the surveillance system. Recommendations on tangible actions were then made in the form of an action plan to reach realistic goals for improvement.
Evaluation methodology

The toolkit and expected outputs

SET was developed to provide a comprehensive evaluation of the animal health surveillance system of a country, using a scoring grid composed of 90 indicators, grouped into 19 “categories” and seven “areas” (Table 1).

Using the information gathered during the evaluation mission, a score from 1 to 4 (or “N/A” if the indicator is not applicable) must be assigned to each one of these 90 indicators. Finally, after the scoring session, outputs are generated to identify the strengths and the gaps of the evaluation system, including:

- **Core-results** for the operation of the surveillance system, assigning a score for each category and area evaluated by SET.

- **Performance attributes** of the surveillance system (sensitivity, specificity, representativeness, rapidity, flexibility, reliability, stability, acceptability, simplicity and utility). These performance indicators are calculated using weighted coefficients assigned to the scores obtained for each indicator.

<table>
<thead>
<tr>
<th>Area</th>
<th>Category</th>
<th>Nº of indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional</td>
<td>Central institutional organisation</td>
<td>7</td>
</tr>
<tr>
<td>organization</td>
<td>Field institutional organisation</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Intersectoral collaborations</td>
<td>4</td>
</tr>
<tr>
<td>Laboratory</td>
<td>Operational aspects</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Technical aspects</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Analytical aspects</td>
<td>3</td>
</tr>
<tr>
<td>Surveillance</td>
<td>Objectives and context of surveillance</td>
<td>4</td>
</tr>
<tr>
<td>activities</td>
<td>Surveillance data collection</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Surveillance procedures</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Animal health investigations</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Risk assessment</td>
<td>2</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>Workforce management</td>
<td>5</td>
</tr>
<tr>
<td>workforce</td>
<td>Training</td>
<td>4</td>
</tr>
<tr>
<td>Data management</td>
<td>Information system</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Data processing and exploiting</td>
<td>5</td>
</tr>
<tr>
<td>Communications</td>
<td>Internal communication</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>External communication</td>
<td>3</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Internal evaluation</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>External evaluation</td>
<td>2</td>
</tr>
</tbody>
</table>
Phases of evaluation missions

SET evaluation missions consist of four main phases:

1. **Preparation and document review.** Preparation of the mission starts at the latest one month prior to the arrival of the team into the country. During this phase, team members finalise the mission’s program, stakeholders to interview and logistics in the field. The full SET packet is also shared with each assessor to familiarise themselves with the toolkit and its methodology. Documents relevant to the surveillance system are also requested using a questionnaire filled out by veterinary services to provide evaluators with important background information. These documents may include standard operating procedures (SOPs), surveillance plans, staff’s terms of references (ToRs), laws and more.

2. **Data collection during stakeholder interviews.** Detailed information on the country’s animal surveillance system is elicited through participatory interviews with various stakeholders at each level of the system (national, subnational and field) and in the field (livestock owners, traders, abattoirs, markets, public/private sector and more). A structured questionnaire is available to identify the information required for a complete evaluation. Nevertheless, a key element of the SET methodology is to embrace dialogue with stakeholders and therefore the questionnaire may only be utilized as a guideline during the interview process.

3. **Scoring session.** The evaluation team enters the information gathered during interviews into the SET scoring grid (Excel file), by assigning a score (1-4) to each of the 90 indicators evaluated, along with a justification.

4. **Development of country-specific recommendations.** Based on the scores entered into the SET scoring grid, graphs highlighting the system’s strengths and weaknesses are automatically generated. These outputs become the basis from which recommendations are identified. A final restitution meeting reports the evaluation’s conclusions and recommendations to key decision-makers.
The evaluation mission in Indonesia

Local situation and livestock production

Indonesia is an archipelago of more than 17,000 islands located in Southeast Asia along the equator, and is characterised by dense rainforest, mountain ranges and active volcanoes (Government of Indonesia, 2017).

The nation is divided into 33 provinces and 497 districts and in 1999, a process of decentralisation gave provinces a certain degree of autonomy to develop their own activities based on local needs. Some aspects of governance, however, such as regulating imports and export remain administrated from the central level in Jakarta, the capital.

The country is home to a population of 267,663,435 inhabitants (World Bank, 2019), 85.2 percent of which are Muslim, followed by Protestants (8.9 percent), Catholics (3.0 percent) and Hindus (1.8 percent) (Government of Indonesia, 2015), the latter of which are predominantly located on the island of Bali.

Agriculture represents a significant component of the national economy, with an estimated 14 percent of the gross domestic product invested into the sector, which also employs around 33 percent of the country’s labour force (FAO, 2018).

Beef and chicken are the main source of proteins (Agus, 2018). Extensive cattle raising practices done by small-medium scale farmers (5-50 heads depending on land available) represent the majority of cattle-producing activities and the remaining ten percent of consists of intensive farming around highly populated areas such as Jakarta (Agus, 2018). Cattle production predominates on Java Island and some areas of Sumatra (Figure 1).

Figure 1. Cattle density in Indonesia.

Source: FAO Empres-i, 2019
Aside from cattle, species of livestock most commonly raised include goats, sheep, pigs and buffaloes. Production of all but one have steadily increased over the last five decades, with goats being the most numerous as of 2017 (18,410,379 heads), followed by cattle (16,599,247 heads), sheep (16,462,274 heads) and swine (8,138,276 heads) (Figure 2) (FAOSTAT, 2019). Production of buffaloes has slowly decreased over the same period to an estimated 1,395,191 heads, half of its value since the 1960s (Figure 2) (FAOSTAT, 2019). It is worth noting that although Indonesia is predominantly Muslim and thus pork consumption is not widespread, concentrated areas of pig production exist in areas populated by non-Muslims, such as in Bali for example (Figure 3).

Figure 2. Production of goats, cattle, sheep, swine and buffaloes in Indonesia, 1961-2017.

Source: FAOSTAT, 2019

Figure 3. Pig density in Indonesia

Source: FAO Empres-i, 2019
In spite of increasing numbers, domestically produced cattle accounts for 45 percent of the beef consumed and the rest is imported predominantly from Australia (Agus, 2018).

Other important species used for consumption include poultry and ducks, which have also shown a significant increase between 1961 and 2017 (Figure 4) (FAOSTAT, 2019).

Figure 4. Production of chicken (A) and ducks (B) in Indonesia, 1961-2017

Source: FAOSTAT, 2019
Rabies is endemic in Indonesia and is present in 24 out of the 33 provinces, affecting an estimated 150-300 people every year (Nugroho, 2013). Eradication programmes are implemented and several areas of the country are considered rabies-free, such as Papua, East Java and various smaller islands (Mutho, 2018). However challenges hinder these efforts, including limited surveillance data and the need to improve partnerships with affected communities (Dewi, 2018).

Other zoonotic diseases present in Indonesia include highly pathogenic avian influenza (HPAI), including HPAI H5N1 which caused regular outbreaks in both humans and animals since 2003 (WHO, 2019; ProMED, 2013). Henipaviruses have also been detected in fruit bats throughout the country, although no human cases have been reported to date.

Non-zoonotic diseases of importance in the region include Jembrana disease, foot and mouth disease (FMD) a viral disease affecting cattle. Although African swine fever (ASF) had not been reported in Indonesia at the time of this mission, its spread through neighbouring nations including Philippines and Timor-Leste was of concern to Indonesian authorities.1

Composition of the evaluation team

The evaluation team was composed of five members from the Indonesian Directorate General of Livestock and Animal Health (DGLAHS), FAO Emergency Centre for Transboundary Animal Diseases (FAO-ECTAD) office in Indonesia and FAO Headquarters in Rome (Table 2).

Table 2. Members of the SET evaluation team in Indonesia, August 2019

<table>
<thead>
<tr>
<th>Team member</th>
<th>Title and organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ihab El-Masry</td>
<td>Veterinary epidemiologist, FAO Rome</td>
</tr>
<tr>
<td>Syafison Idris</td>
<td>Senior veterinary officer, DGLAHS Indonesia</td>
</tr>
<tr>
<td>Gaël Lamielle</td>
<td>Surveillance expert (zoonoses), FAO Rome</td>
</tr>
<tr>
<td>Dhony K. Nugroho</td>
<td>Veterinary officer, DGLAHS Indonesia</td>
</tr>
<tr>
<td>Farida Zenal</td>
<td>Surveillance expert, FAO-ECTAD Indonesia</td>
</tr>
</tbody>
</table>

Mission summary

The external members of the assessment team arrived in Jakarta on 20 August 2019 and a general coordination meeting with the full evaluation teams for both EMT and SET was conducted on the following day to finalise the program and logistics of the mission. Because of the two tools’ similar methodologies and the overlap of stakeholders to be interviewed, it was decided to conduct joint interviews together with both SET and EMT assessors to gather information needed for their respective tool. To maximise the number of stakeholders met, the evaluation team divided into two groups (team 1 and team 2) for most of the interviews, each consisting of

---

1 An official notification of ASF in the country was made on 12 December 2020, three months following the SET mission (FAO, 2019).
external assessors for SET and EMT, national focal points from DGLAHS to support each tool, and staff from FAO-ECTAD.

A launching meeting was conducted on 22 August 2019 to present the mission to decision-makers at the Ministry of Agriculture (MoA), immediately followed by interviews of several units of the central level, including: DGLAHS epidemiology unit, Quarantine Administration, Ministry of Health (MoH), Ministry of Environment and Forestry (MoEF), the PREDICT project and more. Interviews at the central level continued on the following day, focusing on representatives from the private sector including veterinary and livestock associations. Both assessment teams left for the field portion of the mission thereafter.

The sheer size of Indonesia and the logistical constraints of the mission limited the geographic representation of the assessment. As an attempt to provide a balanced perspective of the realities of surveillance in the field, the national focal points chose to conduct field interviews in four areas of varying capacities for comparison purposes. Four sampling sites were chosen centred around Disease Investigation Centres (DICs) in Wates, Subang, Lamong and Denpasar. Team 1 travelled to Yogyakarta (near Wates) and Lampung, while team 2 conducted interviews in Subang and Denpasar (Figure 5).

**Figure 5.** Areas visited during SET evaluation mission in Indonesia, August 2019
(Blue = Team 1, Green = Team 2).

Source: UN, 2004
Interviews at the subnational level were primarily conducted during plenary sessions in a central location (usually the DIC) so that multiple local stakeholders can attend and provide information. This maximised the number of interviews although reduced the time for input by each person interviewed. Nevertheless, multiple plenary sessions with individuals from similar backgrounds were conducted to have the opportunity to continue gathering information or cross-reference the data received. Some interviews were also completed individually through field visits to stakeholders’ premises, as was the case for some district/sub-district veterinary officers, livestock owners, abattoir inspectors and more. At the subnational and field levels, feedback was received from a variety of sources, both in plenary and face-to-face settings. These included: quarantine staff, laboratory technicians, livestock associations and farmers, staff from National Parks and research institutes and more. In total, 237 individuals were available to provide feedback to assessors, both centrally and at the subnational level.

Following the data-gathering phase of the mission, the teams reconvened to Jakarta on 28 August 2019 to score the surveillance system using SET. A parallel scoring session was conducted for the national epidemiology capacity of DGLAHS using EMT. A debriefing meeting at the MoA was conducted on Friday 30 August 2019 to present preliminary findings from the mission to decision-makers. Scoring then continued through the morning of 31 August 2019. Using the outputs produced by the tool, a strength, weakness, opportunities, threats (SWOT) analysis was performed and a draft action plan for improvement of surveillance capacities in Indonesia was developed. The external members of the evaluation team departed on 1 September 2019.

The involvement of the national focal points from DGLAHS was essential throughout the entire mission to facilitate meetings with stakeholder in the field, provide external assessors with local context and develop an action plan that is adapted to the country.

The choice to conduct a joint SET/EMT mission originated from specific request by the Government of Indonesia. It was a very unique situation in which both tools were used together and provided the perfect opportunity to highlight synergies between the tools, harmonise their utilisation and improve their methodologies.

For example, SET benefited greatly from the structured request for information and document gathering process used for EMT. A similar approach will be added to SET to improve on its current request for documentation. Another outcome of this joint mission was the opportunity to map indicators between SET and EMT in order to facilitate information sharing between the two tools during future uses.
Evaluation results

Description of surveillance system

Institutional organization

Central level

Animal disease surveillance in Indonesia is the responsibility of the Surveillance and Epidemiology Unit, within the Animal Health Division of the DGLAHS (Figure 6). The priorities of the Division are to: 1) prevent international spread of transboundary diseases and 2) enhance national strategies and management of endemic diseases.

Several regulations formalise the roles of the different units in disease surveillance (Table 3).

Figure 6. Organogram of the Ministry of Agriculture and Veterinary Services in Indonesia, August 2019 (unit responsible for conducting animal disease surveillance highlighted in red).
### Table 3. Key legislation of animal disease surveillance in Indonesia, August 2019

<table>
<thead>
<tr>
<th>Topic</th>
<th>Legal text and topic addressed</th>
</tr>
</thead>
</table>
| Prevention, notification, control, eradication and response to animal diseases | - Law No. 18/ 2009 and No. 41/ 2014: Livestock Production and Animal Health  
- Presidential Instruction No.4/2019: Provincial capacity to detect and respond to zoonoses  
- Government Regulation No. 3/ 2017: Veterinary Authority  
- Government Regulation No. 47/ 2014: Animal Disease Control and Eradication  
- Ministry of Agriculture Regulation No. 61/ 2015: Animal Disease Eradication  
- Ministry of Agriculture Decree No. 4026/2013: List of Priority Animal Disease |
| Import and export quarantine, inspection and certification (for animals and animal products) | - Law No. 16/ 1992: Agricultural Quarantine  
- Government Regulation No. 82/ 2000: Animal Quarantine  
- Government Regulation No. 47/ 2014: Animal Disease Control and Eradication  
- Government Regulation No. 3/ 2017: Veterinary Authority  
- Ministry of Agriculture Decree No. 3238/2009: List of Disease of Animal Quarantine Concern  
- Ministry of Agriculture Decree No. 94/2011 and No. 44/2014: Entry and Exit Point of Animal Quarantine |
| Establishment and function of national and local veterinary service | - Law No. 18/ 2009 jo No. 41/ 2014: Livestock Production and Animal Health  
- Law No. 23/ 2014: Local Government  
- Government Regulation No. 18/ 2016: Organization and Structure of Local Government  
- Government Regulation No. 3/ 2017: Veterinary Authority  
- Local Government Regulations: Organization and structure of Local Government |

A national reference coordination committee (NRCC) meets annually to coordinate the overall DGHLAS work. Its role in designing, harmonising or reviewing general surveillance activities is not clearly described in the committee’s ToR. Surveillance objectives for the system are defined by ministerial decree. Several scientific/technical committees are present within the MoA to address specific subjects, these include: expert committees on animal health, veterinary public health (VPH) or quarantine activities. In addition, ad hoc committees may be formed to focus on disease control for specific diseases such as HPAI and rabies. Although these scientific committees bring together a wide range of stakeholders, none of them focus on designing, harmonising or reviewing general surveillance activities,
which is usually done by the Surveillance and Epidemiology Unit. The DGLAHS has prioritised 25 livestock diseases, some of which overlap with the 15 zoonoses identified jointly with the MoH in 2013 using the One Health Zoonotic Disease Prioritization (OHZDP) tool from the Centers for Disease Control and Prevention (CDC) (CDC, 2020) (Table 4).

Table 4. Priority animal and zoonotic diseases in Indonesia, August 2019

<table>
<thead>
<tr>
<th>Priority animal diseases identified by the DGLAHS</th>
<th>Priority zoonoses identified using the CDC One Health Zoonotic Disease Prioritization tool (2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. avian influenza</td>
<td>9. Schistosomiasis</td>
</tr>
<tr>
<td>2. rabies</td>
<td>10. Q-fever</td>
</tr>
<tr>
<td>3. anthrax</td>
<td>11. campylobacteriosis</td>
</tr>
<tr>
<td>4. brucellosis</td>
<td>12. trichinellosis</td>
</tr>
<tr>
<td>5. leptospirosis</td>
<td>13. paratuberculosis</td>
</tr>
<tr>
<td>7. bovine tuberculosis</td>
<td>15. cysticercosis/taeniasis</td>
</tr>
<tr>
<td>8. salmonellosis</td>
<td>* Foreign animal diseases</td>
</tr>
</tbody>
</table>

Intermediate and field levels

Surveillance is a decentralised function in Indonesia and provinces are free to identify their own priorities related to animal health and production independently of the DGLAHS. The central level therefore does not directly oversee disease reporting activities conducted by provinces and districts (Figure 7). DGLAHS is nevertheless represented at the subnational level through nine Disease Investigation Centres (DICs) covering the whole country and located in: Banjarbaru, Bukittinggi, Denpasar, Lampung, Maros, Medan, Subang, Wates and Papua. The DICs consist of laboratory and epidemiology units that support surveillance activities in the field. In practice, the relationship between the DICs and data collectors in the sub-districts may be limited providing sampling and/or diagnostic services, although some DICs may have regular coordination meetings with, and field officers can also seek advice from DIC epidemiologists on occasions. DICs also design active surveillance projects in the field depending on priorities from DGLAHS.
Intersectoral collaboration

At the time of the evaluation, specific partnerships between MoA and MoH for animal disease surveillance were only formalised for HPAI following a Four-way linking workshop conducted in 2013 (The Tripartite, 2013). It was noted that informal communication between DGLAHS and public health at the central level function well and a veterinarian is present within the MoH’s Zoonotic Disease Unit to facilitate this. A Ministry of Coordination supports collaboration between national and provincial governments and between various ministries, and formal mechanisms are in place for that effect. Although these structures exist, they are general
guidelines and not specific to surveillance activities, or they may be implemented only during outbreaks in an *ad hoc* manner. The DGLAHS has identified focal points for OIE, MoH, WHO and MoEF to support surveillance and response to zoonoses. It is also worth noting that although the OHZDP tool was used in Indonesia in 2013, discussions with staff showed that MoH uses a different list for priority zoonotic diseases. At DIC, province and district levels, informal exchange of information with the counterpart public health offices occurs using SMS or WhatsApp messages, mainly for rabies and avian influenza.

Some coordination between DGLAHS and the private sector exists (mainly poultry industry for HPAI-related issues) but it is not formalized in clear protocols. The DGLAHS and the private poultry sector may meet between eight and ten times per year to discuss vaccination-related issues. Commercial poultry farms under the compartmentalization program are monitored by DGLAHS, DIC, provincial/district veterinary services. The private poultry and vaccine companies implement their own surveillance programs, and may report to DIC to test samples in case a new virus/clade is detected. The private poultry industry has access to the Influenza Virus Monitoring system (IVM) but not iSIKHNAS.

At the national level, most (70 percent according to interviews) of the funding for surveillance activities is directed towards the maintenance of the real-time reporting platform iSIKHNAS, with 20 percent supporting DICs and the remainder used for various other purposes. It was noted that these figures may shift depending on priorities highlighted by upper management.

Monthly coordination meetings occur where DIC heads travel to the MoA’s headquarter in Jakarta – a wide range of topics may be discussed during those meetings, including surveillance. Likewise, a representative from the central level may conduct supervisory visits to DICs during the year to review how data entry is conducted, provide training and more – although these visits are regular, not all DICs may be visited in one year due to the size of the country.

**Laboratory**

*Operational aspects*

Several laboratory networks exist within the country, which makes an overall assessment of the national capacity complex. There is no true central veterinary laboratory and the DICs are the main laboratories used by the veterinary services for surveillance of animal diseases. Several parallel systems exist, managed by different institutions. For example, the Quarantine Administration possesses a network of 44 laboratories throughout the country to conduct tests on imported animals. The Indonesian Research Centre for Veterinary Science (BBALIVET) is located in Bogor and also provides diagnostic services for farmers in their area. There is little coordination between these institutions at the field level and any formal information-sharing usually goes through the General Secretariat of the MoA. Laboratory capacities at the field level may vary greatly between provinces depending on local animal health priorities. Most provinces (28) possess laboratory facilities, while only 17 percent (85) of districts have them.

Although only the DICs are the only laboratories officially part of the veterinary services under the DGLAHS, all other facilities mentioned above play a role in detecting animal diseases in the country. The presence of multiple diagnostic networks has an impact on standardisation of diagnostic procedures at a country-
level. For example, all DICs use the IV-Lab software for information management, which links directly into the iSIKHNAS database. Laboratories under the Quarantine Administration use SIM-Lab, which does not interact with iSIKHNAS, and provinces/districts most often use Microsoft Excel or Publisher for their data management. All laboratories within Indonesia benefit from the same accreditation process (ISO17025). In addition DICs Subang and Denpasar are accredited for ISO 9001:2008 for quality management systems. An OIE Gap Analysis conducted in 2011 highlighted the need for coordination of the different laboratory networks within the country and Ministerial Decree 51/2006 aims to support this effort, however at the time of this mission, no progress was done on this aspect.

**Technical aspects**

Each DIC, besides newly established DIC Papua, is a reference centre for specific priority diseases (Table 5), setting the standard diagnostic protocols to be used by other DICs. All DICs visited used formalised SOPs for their diagnostic work and timelines for conducting tests and delivering results are defined. Interviews noted some issues related to access to consumables (e.g. reagents) or reduced staff that can cause delays on occasions. One area where standardisation is lacking between DICs is through the production of laboratory reports – although all use the same information system (IVLab), some dissimilarities can be noted between the reports from different centres.

Table 5. Diseases reference tests conducted by disease investigation centres (DICs) in Indonesia, according to Ministry Decree No 89/Kpts/PD.620/1/2012

<table>
<thead>
<tr>
<th>DIC</th>
<th>Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banjarbaru</td>
<td>Surra, infectious bovine rhinotracheitis</td>
</tr>
<tr>
<td>Bukittinggi</td>
<td>Rabies</td>
</tr>
<tr>
<td>Denpasar</td>
<td>Jembrana, epizootic septicaemia</td>
</tr>
<tr>
<td>Lampung</td>
<td>Newcastle disease, infectious bursal disease</td>
</tr>
<tr>
<td>Maros</td>
<td>Bovine viral diarrhoea, brucellosis</td>
</tr>
<tr>
<td>Medan</td>
<td>Hog cholera, porcine reproductive and respiratory syndrome</td>
</tr>
<tr>
<td>Subang</td>
<td>Avian influenza</td>
</tr>
<tr>
<td>Wates</td>
<td>Anthrax, avian influenza, bovine spongiform encephalopathy, <em>Salmonella</em></td>
</tr>
</tbody>
</table>
Analytical aspects

All visited DIC laboratories have capacities to conduct basic serological and molecular detection assays, including polymerase chain reaction (PCR) tests. Virus isolation and gene sequencing are conducted in the reference centres. The available diagnostic services in each DIC laboratory are covering a wide range of viral, bacterial and parasitic diseases of various animal species, such capacity is much lower in the provincial and district laboratories (if any) where it's limited to few parasitic and bacterial diseases. Interviews observed that each DIC laboratory has its own design for reporting laboratory results.

Surveillance activities

Objectives of surveillance

At the central level, general objectives where developed with input from various stakeholders, including heads of DICs, representatives from provinces/districts, epidemiology groups, the private sector and more. In addition, national disease-specific surveillance objectives can exist related to specific requirements, such as proof of freedom of FMD and HPAI.

Each DIC also develops their own specific objectives which are formalised in their strategic plans, and reflecting their local disease situation and activities, although they tend to be drafted with limited input from local stakeholders and without risk assessment for the concurrent epidemiological situation either locally, nationally or globally.

Surveillance data collection

iSIKHNAS is the reference system used to notify diseases to the central level. While it initially developed as an animal disease reporting tool, it quickly became used for a wide variety of livestock-related activities such as: animal movements, slaughterhouse data, vaccination programmes, artificial inseminations and much more. An abundance of data related to artificial insemination or vaccinations is captured into iSIKHNAS as compared to disease surveillance because these are fee-generating activities. Data related to disease investigation activities are not captured in the database and written reports are usually generated.

The use of the tool by field officers is variable however, with 52 percent of districts not using it to report diseases. The SMS coding system to used enter information into iSIKHNAS may be a barrier to reporting, as some officers reported the system to be complicated and they need to refer to a manual to ensure proper codes are entered. An Android version of the tool is under development to make this process more user-friendly. Because of this, data from the field is seldom entered into iSIKHNAS and is usually captured when DICs are involved, such as when a specimen is submitted for testing or during active surveillance projects. To remedy this, the DGLAHS requests all provinces to fill out an Excel form with their animal disease data every six months, prior to mandatory reporting to OIE. Provinces may also develop their own data collection methodologies and, which further reduces harmonisation of data collection in the field.

An iSIKHNAS Wiki webpage provides users with all the information needed to use the system, including guidance on case definitions (iSIKHNAS, 2014). These case definitions are based on general syndromes to report and disease-specific case definitions are usually developed on an ad hoc basis.
In the districts and sub-districts visited, no/few standardised reporting form were noted and notification to the superior level was mostly through phone communications, in addition to monthly reports with disease summaries which are then archived in provincial offices. In some instances, iSIKHNAS is used by field officers who feel comfortable with the tool and also in abattoirs. Although some districts possess basic diagnostic capacities such as microscopy, sampling for diagnostic testing is often conducted by personnel from the nearest DICs, upon request from private practitioners, districts or livestock owners.

**Surveillance procedures**

Passive surveillance is mostly conducted by the provincial government in response to diseases reported by farmers and is not harmonised across the country due to individual provinces’ own priorities and methodologies, as previously discussed. Recently, a new presidential directive (Presidential Instruction No.4) mandates every province to develop capacity to detect zoonotic diseases, including in animals. The DGLAHS is using this as an opportunity to standardise surveillance at the subnational level and is developing guidance on the requirements provinces should implement to comply with the Presidential directive. It may not always be possible for the DGLAHS to conduct outreach to data collectors to improve passive reporting because of the decentralised nature of animal disease surveillance, however intensive awareness programs to field officers were implemented in 2014-2015 to sensitise them on uses of iSIKHNAS.

Active surveillance projects are regularly undertaken by DICs based on their yearly budget. Each centre organises these activities for about five local priority diseases depending on their objectives. Protocols are developed at the beginning of each project and include sample size calculations, sampling SOPs and more. Once planned by the DICs, these active surveillance projects are typically completed, and if budget cuts arise, the number of samples collected is usually reduced. Other limitations identified during interviews included the geographic representation of sampling for active surveillance, due to the large area covered by some DICs.

Subnational governments may conduct their own active surveillance projects and share findings with the DICs, however the centres are seldom involved in developing joint methodologies for active surveillance with provinces and districts. In the city of Yogyakarta, a participatory disease surveillance and response (PDSR) project that was initiated with the support of external donors has now been taken on by the local government and PDSR officers continue to actively search for HPAI and conduct outreach to stakeholders.

Coordination between the DICs and subnational governments vary between locations and on some occasions, regular meetings occur between both levels to share disease summaries. Provinces and districts may also contact DICs on a case-by-case basis for expertise on emerging diseases.

Surveillance in wildlife species limited and there are a total of seven veterinarians within the MoEF, none of whom have received formal training in epidemiology. Activities in this sector are project-driven and focus on specific diseases of local importance. These projects include sampling of wild birds for avian influenza or surveillance at the interface between rhinos and livestock in Sumatra, sampling of wild buffaloes in national parks for brucellosis and surra. The PREDICT project is also active in Indonesia and, in some cases, DICs are able to continue the research with their own budgets (e.g. DIC Maros). It is worth noting that sampling of wildlife within National Parks is the responsibility of the MoEF and discussions with stakeholders
highlighted that the administrative process to provide DGLAHS with sampling permit is quite cumbersome, which puts a strain on these activities.

Surveillance in vectors once again reflect priorities identified by each DIC. For example, interviewees noted that DIC Banjarbaru conducts ongoing surveillance in mice since 2010 for Surra. A National Research Centre for vector-borne diseases (VBDs) also collaborates with many DICs on vector surveillance, as in the case with DIC Denpasar for Japanese encephalitis, DIC Wates for leptospirosis, and DIC Maros for schistosomiasis. Surveillance in mosquitoes and flies was scaled up in 2018, prior to the Asian Games held in Jakarta, specifically to monitor the risk of VBDs to horses participating in equestrian events.

Although the Quarantine Administration is not part of the DGLAHS, assessors were particularly interested in their preparation measures in light of the outbreak of ASF spreading through China and southeast Asia. At the time of the mission, no ASF cases were detected in Indonesia, however the threat of introduction of the disease in the country was a major concern of the MoA. Representatives from the Quarantine Administration interviewed during the mission mentioned that new/emerging diseases of concern to the country trigger the circulation of a notification from headquarters to all quarantine officers with a description of the issue and protocols to implement.

Although DIC, province and district officers possess basic knowledge on surveillance procedures, guidelines for the different surveillance methodologies (general or for a given disease/threat) are not always formally developed or communicated in written protocols or SOPs.

At the national level, not all priority zoonotic diseases have formal surveillance plans or minor aspects of surveillance may be included in disease control plans (e.g. Jembrana, anthrax). Guidelines on general surveillance techniques however have been developed by the DGLAHS and are available for different levels for the development of their surveillance activities known as Technical Guideline for infectious animal diseases surveillance (2014). These guidelines cover general principles of surveillance and are not disease-specific protocols.

**Animal health investigations**

Initial response to disease events falls under the provincial jurisdiction and, depending on their capacities, they may request additional support from their nearest DIC. The role of the DICs in disease investigations and response is supported by Governmental Decree No.53 and is included in all DIC staff’s ToRs. It was noted during interviews that, once a request is made, the DICs are always able to initiate an investigation within two days, however the composition of the DIC response team is not usually formalised prior to an event, and formal protocols may not always exist to support these activities. In addition, investigations may be limited to laboratory activities (e.g. sample collection and identifying the aetiology), as opposed to epidemiological aspects of describing the extent of an outbreak, risk factors, possible sources of infection, modes of transmission, etc. Formal protocols may not always exist to support these activities.

**Risk assessments**

Disease-specific risk assessments are usually conducted in an ad hoc manner, following a national or international event, as was done for H5N6 HPAI and Nipah virus. On occasions, rapid risk assessments may also be conducted although the protocols may not always be based on international guidelines. Other institutions
within the MoA may also conduct their own risk assessments, such as the Biosecurity Division for the importation of animal products.

Lastly, assessors noted that the results of these assessments do not always inform decision-makers when identifying/updating objectives or priority diseases at the national and/or DIC level.

**Epidemiology workforce**

*Human resources management*

The Surveillance and Epidemiology Unit at the central level is staffed by seven veterinarians, four of whom also have received a Masters’ level of education. Staff conducting diagnostic and epidemiology analyses at the DICs are also required to be veterinarians and about half of their technical workforce either have a Masters or participated in the national in-service epidemiology program. The number of staff conducting epidemiology analyses at the provincial and district levels is difficult to assess without visiting each jurisdiction and may depend on the province priorities.

At minimum, core activities of the surveillance and epidemiology workforce consist of conducting descriptive data analysis (table summaries, mapping of cases) and developing reports. DIC personnel’s duties overlap between the laboratory and epidemiology functions of the centres and there are no clear units whose responsibilities are dedicated to epidemiology.

ToRs for most staff in the government system exist, based on their job classification and are included in legal documents. These are general across positions at the same levels throughout the MoA and do not list the specific technical tasks related to surveillance activities.

There is an informal understanding of the number of agents needed within the surveillance network (known as “the pyramid”) but the central level has little authority to promote these numbers at provincial levels. Ministerial Decree No.54 stipulates that DICs should be allocated the necessary funds for general human resource (HR) capacities at their levels. Lastly, the Cinagara centre, responsible for implementing the national field epidemiology training programme, is developing a strategic plan to guide the implementation of the training in the country. These resources provide some guidance for the development workforce capacities for the veterinary services, however there is no unifying strategy for the development of HR specific to surveillance.

The EMT component of this mission will provide more details on the epidemiology capacities of the DGLAHS and outcomes of this assessment will be presented in a parallel report.

*Training opportunities*

Initial trainings for staff starting their duties within the surveillance system may vary between the different levels. Staff at the central level receive a training that focuses on their general duties rather than surveillance specifically. Some DICs may implement extensive training programs for existing and new staff, as in the case of DIC Subang which trains around 70 percent of the existing staff every year, in addition to providing a 14 days course for the newcomers on relevant policies and response to diseases in various species, while other DICs may provide new employees with a presentation.
A large portion of the Surveillance and Epidemiology Unit’s budget is allocated to the maintenance of the iSIKHNAS system. When opportunities arise, the unit may conduct workshops to refresh/update iSIKHNAS users on how to use the tool. Veterinarians and paraveterinary professional also benefit from active veterinary associations which can offer trainings in exchange for continuing education credits that are required to maintain professional licenses.

In 2017, the Cinagara Animal Health Training Centre developed the national field epidemiology training program for veterinarians (FETPV) called PELVI (Bahasa acronym for FETPV), in collaboration with the Faculty of Veterinary Medicine at Gadjah Mada and Bogor Agricultural University. The curriculum consists of 30 percent of classwork and 70 percent of field work and covers several topics relevant to surveillance such as: 1) Introduction to Epidemiology, 2) Surveillance and Animal Health Data Analysis, 3) Outbreak Investigation and 4) Epidemiological studies. At the time of the mission, 24 participants had undergone this training (19 non-degree holders and 5 degree holders).

Additional epidemiology training opportunities may be provided by regional and/or international organization, for instance FAO provided trainings on risk assessment to staff from DGLAHS and DICs.

**Data management**

iSIKHNAS functions both as a real-time reporting system and relational database for the central level. A total of 10,726 iSIKHNAS users are registered throughout Indonesia, although it is difficult to ascertain how many of the reports submitted concern animal diseases specifically because the system is used for a wide variety of animal health and production data. In many provinces, livestock officers primarily use Microsoft Excel to maintain their disease data and report to their superiors.

Incomplete or erroneous data are not accepted by iSIKHNAS and it is possible to trace back the person entering data if more information is needed based on their phone number. The system also produces descriptive analyses including spatiotemporal summaries and common risk factors for diseases (e.g. species, origin, age of animals affected).

iSIKHNAS focal points are identified in DICs, as well as in provinces and/or districts. Their role is to train and support users in operating the tool. Although it is aimed to be used for real-time reporting, it is not always so at the field level due to requirements by some provinces to report high impact diseases to the local government prior to submitting to the national level.

iSIKHNAS is a powerful tool for disease reporting and data management. Users can send notifications directly using SMS or a using soon-to-be launched Android application. A web portal also allows them to review the national animal disease situation, or focus on their jurisdiction. Interviews in the field have found that the utility of iSIKHNAS can be improved however, as officers are not always aware of many features the tool can provide them, especially regarding feedback of diseases analyses and summaries. Reasons behind this slow uptake of the tool include the complicated nature of the SMS coding system, as well as the low number of field data collectors leading to a large workload, and implying that they have little time to explore the system’s features. Finalisation of the Android version of iSIKHNAS and implementing national training campaigns can increase the utility of the system. In addition, the Influenza Virus IVM platform, launched in 2014, is used to collect data
specific to HPAI and support control efforts (FAO, 2017). IVM is directly linked with iSIKHNAS at the central level.

Lastly, there are plans to link iSIKHNAS with the Information System for Zoonoses and Emerging Infectious Diseases (SIZE from acronym in Bahasa) used by the MoH, and with SIM-Lab used by the Quarantine Administration.

DICs develop and publish annual activity reports, available online and in hard copies, where surveillance data are summarized in percentages and visualised on charts and maps. It is important to note that the maps produced by the DICs represent geographic locations of positive tests from samples submitted to the centres for testing, as DICs do not conduct passive surveillance in the field. The assessors noticed the importance to invest in improving the skills in analytical epidemiology and biostatistics to optimise the use of the exiting data.

Communications

Internal communications

Horizontal communication systems (between districts, provinces or DICs) does not generally occur in a formal manner and suspected/confirmed disease events are not always communicated by the affected DIC to other at-risk districts or other DICs. However, many WhatsApp groups exist for informal data sharing at all levels of the surveillance system.

Lastly, it is worth noting that iSIKHNAS is able to send emergency alerts via SMS to a predetermined list of officials if high impact diseases are detected through the system.

External communications

Yearly reports of disease data produced by the DGLAHS and each DIC are posted online and shared with provincial governments. The DGLAHS also distributes them to focal points at the MoH.

The DGLAHS and DICs all maintain their own webpages where reports and other relevant information can be posted. In addition, each DICs developed smartphone applications to inform their clients on the services provided, report test results and get general information on animal diseases (e.g. Silacak application in DIC Wates). Although DICs developed different applications, their purpose remains similar across the board.

Evaluation

Internal evaluation

Indicators in the form of key performance indexes (KPI) exist for MoA activities in high-level documents in the form of annual or medium-term objectives. These indicators tend to be general although some of them directly relate to surveillance activities, such as the number of samples submitted for testing. Internal evaluations using those KPI are done on a yearly basis and the Surveillance and Epidemiology Unit recommends corrective measures to DICs.

External evaluation

Several external evaluations have been conducted in Indonesia, such as the PVS in 2007, the PVS Gap Analysis in 2011, an assessment of information systems by
Australia AID in 2012 and the JEE in 2018 (WHO, 2018b). In addition, FAO supported the implementation of LMT assessments in 2019 and a pilot EMT mission in 2014 using an older version of the tool. These evaluations have led to some improvement for the surveillance system in Indonesia, such as the development of iSIKHNAS and the increase in veterinary universities in the country from five to ten.

Interviewees nevertheless felt that the national animal disease surveillance system has not benefitted from a complete and thorough assessment as all of the evaluation methodologies mentioned above only cover aspects of surveillance.

**Surveillance Evaluation Tool outputs**

Two different types of outputs are provided by the evaluation:

1. core results (Table 3, Figure 4)
2. performance attributes (Table 4, Figure 5)

**Core results**

The core results describe the operation and general status of the surveillance system, assigning a score to subcategories within each area evaluated by the SET (Table 1). All scores are expressed as percentages, based on an ideal situation where scores of 4 are given to all indicators (100 percent).

The categories that scored the highest included “Information system” and “data processing and exploitation” (66.7 percent each), no doubt from the positive impact provided by the iSIKHNAS system. “Internal evaluations” also scored a 66.7 percent due to the presence of internal indicators (KPIs) that are evaluated yearly (Table 6, Figure 8).

Although some guidelines for collaboration between the public health sector and the DGLAHS exist, the absence of such formalised mechanisms with MoEF or the private sector brought the score of “Intersectoral collaborations” to 25.0 percent. The DICs provide a strong laboratory network, however the overall “Operational aspects of the laboratories” scored 33.3 percent because of the presence of other networks in the countries (Quarantine, Provinces/districts) that are not integrated into surveillance at a national level. Lastly, the lack of standardisation of “Surveillance procedures” due to the different methodologies used at the field level have an impact on the score received for that category (37.0 percent) (Table 6, Figure 8).
Figure 8. Comparative SET graphical outputs for Indonesia by category, August 2019.

Table 6. SET outputs for Indonesia, August 2019.

<table>
<thead>
<tr>
<th>Area</th>
<th>Score by area (%)</th>
<th>Category</th>
<th>Score by category (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional</td>
<td>36.8</td>
<td>Central institutional organization</td>
<td>52.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Field institutional organization</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intersectoral collaborations</td>
<td>25.0</td>
</tr>
<tr>
<td>Laboratory</td>
<td>41</td>
<td>Lab - Operational aspects</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab - Technical aspects</td>
<td>38.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab - Analytical aspects</td>
<td>55.6</td>
</tr>
<tr>
<td>Surveillance activities</td>
<td>48.4</td>
<td>Objectives and context of surveillance</td>
<td>41.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surveillance data collection</td>
<td>42.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surveillance procedures</td>
<td>37.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Animal health investigation</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk assessment</td>
<td>50.0</td>
</tr>
<tr>
<td>Epidemiology workforce</td>
<td>44.4</td>
<td>Workforce management</td>
<td>46.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training</td>
<td>41.7</td>
</tr>
<tr>
<td>Data management</td>
<td>52.4</td>
<td>Information system</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data processing and exploitation</td>
<td>66.7</td>
</tr>
<tr>
<td>Communications</td>
<td>38.1</td>
<td>Internal communication</td>
<td>58.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>External communication and resources</td>
<td>44.4</td>
</tr>
<tr>
<td>Evaluation</td>
<td>50</td>
<td>Internal evaluation</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>External evaluation</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Performance attributes

Qualitative attributes have been identified and used by several international organisation to evaluate the general performance of a surveillance system (Table 7) (CDC, 2001; CDC, 2004; Health Canada, 2004; WHO 1997). The SET Excel spreadsheet calculates the progress of the surveillance system relative to these performance attributes and generates visual outputs in the form of a spider graph (Figure 9). Scores for indicators are weighed according to their importance to a
specific attribute and outputs are generated as percentages of an ideal situation (scores of 4 on all indicators). An exhaustive list of the relationship between indicators and attributes is available upon request.

Table 7. Performance attributes evaluated by the SET (CDC, 2001; CDC, 2004; Health Canada, 2004; WHO 1997)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>The ability of a surveillance system to detect true health events i.e. the ratio of the total number of health events detected by the system over the total number of true health events as determined by an independent and more complete means of ascertainment.</td>
</tr>
<tr>
<td>Specificity</td>
<td>A measure of how infrequently a system detects false positive health events i.e. the number of individuals identified by the system as not being diseased or not having a risk factor, divided by the total number of all persons who do not have the disease or risk factor of interest. Because of the difficulties in ascertaining the total population at risk in surveillance, determination of the number of misclassified cases (false positives) can be used as a measure of the failure of the system to correctly classify health events.</td>
</tr>
<tr>
<td>Representativeness</td>
<td>A surveillance system that is representative accurately observes both the occurrence of a health event over time and the distribution by person / animal and place of that event in the population at any point in time.</td>
</tr>
<tr>
<td>Rapidity/Timeliness</td>
<td>The interval between the occurrence of an adverse health event and (i) the report of the event to the appropriate public health agency, (ii) the identification by that agency of trends or outbreaks, or (iii) the implementation of control measures.</td>
</tr>
<tr>
<td>Flexibility</td>
<td>The ability of the surveillance system to be easily adapted to new reporting needs in response to changes in the nature or the importance of the health event, the population monitored, or the resources available.</td>
</tr>
<tr>
<td>Data quality (reliability)</td>
<td>Reflection of the completeness and validity of the data recorded in the public health surveillance system.</td>
</tr>
<tr>
<td>Stability</td>
<td>The surveillance system’s ability to collect, manage, and provide data properly, and its availability (the ability to be operational when it is needed).</td>
</tr>
<tr>
<td>Acceptability</td>
<td>Assessed by the willingness of persons conducting surveillance and those providing data to generate accurate, consistent and timely data.</td>
</tr>
<tr>
<td>Simplicity</td>
<td>Refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives.</td>
</tr>
<tr>
<td>Utility/usefulness</td>
<td>The usefulness of a surveillance system is assessed by whether it leads to prevention or control or a better understanding of health events.</td>
</tr>
</tbody>
</table>
Performance attributes for the overall surveillance capacity in Indonesia reveal a system with moderately high “Flexibility” (68 percent). This is partly explained by the presence of the DICs as an intermediate level that can provide support to field activities, as well as the regular trainings that can be provided by veterinary associations and/or the PELVI programme.

The “Specificity” of the system received a low score (22 percent) from the lack of standardisation of surveillance at the field level and limited surveillance activities in vectors and wildlife.

**Figure 9.** SET outputs for Indonesia by performance attribute of the system, August 2019.
Recommendations

Strength, weaknesses, opportunities, threats analysis

A strengths-weaknesses-opportunities-threat (SWOT) analysis was conducted to gain a better understanding of the animal disease surveillance system in place in Indonesia.

Strengths

Institutional

- Central unit responsible for surveillance are supported by several laws and regulations.
- DICs provide provincial governments with support for surveillance.

Laboratory

- DICs are reference laboratories for several priority diseases, developing protocols for other facilities in their network.
- DICs have advanced diagnostic capacities.
- Accreditation of the DIC laboratories.
- Information systems are used in laboratories (DICs and Quarantine).
- DICs develop their own smartphone applications for communications with their clients.

Surveillance activities

- General guidelines for surveillance exist.
- iSIKHNAS provides a standardize system for disease reporting.
- Active surveillance projects conducted in all DICs as well as in some districts.
- Focal points for inter-sectoral collaboration are identified (at MoH, MoEF and international organisations).

Workforce

- Continuing education opportunities exist through different professional associations.
- Most epidemiologists at the DIC and central levels have advanced degrees.
- The PELVI program by the MoA supports in-service epidemiology training.

Data management

- iSIKHNAS provides the system with a real-time reporting tool and relational database.
- Real-time basic epidemiology analyses can be performed by registered users on iSIKHNAS.
- iSIKHNAS focal points are identified in provinces to support the use of the tool.

Communications

- Informal communication networks exist to transmit critical information when needed.
- Webpages exist for the DGLAHS at the central and DIC levels.
- Maps and disease situation reports are published regularly online.

Evaluations

- Several external evaluations have led to improvements in the surveillance system.
- Performance indicators for internal evaluation exist and are reviewed regularly.
Weaknesses

Institutional

- A large number of priority diseases have been identified without thorough risk assessment for their selection.
- Decentralisation leads to different livestock priorities at the provincial/district levels in terms of animal disease surveillance.
- Absence of steering committee to identify and review surveillance objective at the national level.
- No clear reporting line from the field to the central level – and complicated by the different jurisdictions’ variable procedures for disease surveillance.

Laboratory

- Different laboratory networks exist in the country (e.g. DICs, Quarantine, provinces/districts) with variable capacities do not work in unison.
- No standard laboratory reporting format between DICs.

Surveillance activities

- The role of the DICs in term of epidemiology is not clear – there is overlap between epidemiology and laboratory functions at the DICs.
- There is over-reliance on the DICs for sampling at the field level.
- Case definitions are syndromic and not disease-specific.
- Not all surveillance activities are covered by SOPs or protocols.
- Poor uptake of iSIKHNAS at the field level (52 percent of districts report using the platform).
- Active surveillance projects in DICs are not always based on risk assessments and may not be representative.
- Passive surveillance at the field level is focused on diseases of interests (e.g. rabies in Bali) rather than the national priority disease list.

Workforce

- Individual ToRs for epidemiologists are not in place.
- Available workforce for emergency events is limited.
- No unifying workforce development strategy for epidemiology and surveillance activities is in place.
- Initial trainings for new staff entering the surveillance system are not uniform across the country.

Data management

- No interoperability between iSIKHNAS and the Quarantine Administration’s management system.
- Different data management systems used at the provincial/district levels (e.g. Excel) do not directly connect to iSIKHNAS and may only be captured if the DICs are involved.

Communications

- No formal horizontal communication strategy between at the field level, between the districts/provinces to share alerts.
- No formal intersectoral communication/data sharing mechanisms.
Opportunities

- Presidential Order No. 4 can enforce standard disease reporting capacities at the field level.
- Partnerships with external partners support surveillance activities.
- Intersectoral surveillance platforms under development developed linking SIZE and iSIKHNAS.

Threats

- Risk of imported diseases (e.g. ASF) may drain resources allocated to surveillance.
- Different national priorities for animal and livestock (e.g. production focus for export) affect resource allocation.
- Sustainability of project-based activities.

Recommendations and action plan

The final product of a SET evaluation is a series of strategies for the improvement of the local animal disease surveillance system. These are presented in the form of an action plan with realistic, measurable, and time-bound recommendations. To design this action plan, the evaluation team discussed and identified major recommendations using the information gathered during interviews.

Each proposed recommendation was then plotted qualitatively on a feasibility/impact chart to help prioritize their implementation within the local context (Figure 10), where cost includes budgetary constraints as well as logistical ones (e.g. workload). Recommendations that were kept in the final action plan were those that were considered to provide a significant impact for the improvement of the surveillance system, with the ideal situation being high impact/high feasibility strategies (upper right quadrant in Figure 10).
Figure 10. Feasibility/impact graph of proposed recommendations identified during the SET mission in Indonesia, August 2019.

1. Establish steering and technical committees to review surveillance objectives and activities nationally.

2. Develop minimum requirements for surveillance at provincial and district levels under Presidential Decree No.4 & 101.

3. Review and update formal documents framing national surveillance activities.

4. Implement an incentive program to improve uses of iSIKHNAS in the field for disease reporting.

5. Develop a joint approach to field investigations to promote rapid and coordinated response to disease events.

6. Improve effectiveness of iSIKHNAS alert notifications to decision-makers at province/district levels and other relevant sectors.

7. Establish a network of laboratories network to coordinate roles and responsibilities of different laboratory systems.

8. Develop a coordinated surveillance system at the interface between livestock and wildlife.

9. Develop a coordinated training program for surveillance agents across levels.

Source: FAO, 2019

Recommendations were then prioritized into short-term (1-2 years), mid-term (3 years) and long-term (4 years) based on their impact and feasibility (Table 8).
### Table 8. Prioritized recommendations from SET outputs, Indonesia, August 2019.

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Short-term 1-2 years</th>
<th>Mid-term 3 years</th>
<th>Long-term 4 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Priority 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1.</strong> Establish steering and technical committees to review surveillance objectives and activities nationally.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2.</strong> Develop minimum requirements for surveillance at provincial and district levels under Presidential Decree No.4 &amp; 101.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3.</strong> Review and update formal documents framing national surveillance activities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Priority 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4.</strong> Implement an incentive program to improve uses of iSIKHNAS in the field for disease reporting.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5.</strong> Develop a joint approach to field investigations to promote rapid and coordinated response to disease events.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6.</strong> Improve effectiveness of iSIKHNAS alert notifications to decision-makers at province/district levels and other relevant sectors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7.</strong> Establish a network of laboratories network to coordinate roles and responsibilities of different laboratory systems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8.</strong> Develop a coordinated surveillance system at the interface between livestock and wildlife.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Priority 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>9.</strong> Develop a coordinated training program for surveillance agents across levels.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Action plan

(A summarized version of this action plan is available as a standalone document in Appendix)

1 Establish steering and technical committees to review surveillance objectives and activities nationally

Strategy:

- Identify relevant stakeholders to include in each committee, including representatives from:
  - **Steering committee**: DGLAHS, centre animal quarantine, DICs, Representative provinces, districts representative, MoH, MoEF, Veterinary professional associations, private sector, Universities/ Veterinary School Association/AFKHI, IVMA and relevant NTOs, research institutions.
  - **Technical committee**: DAH, MoA expert committee for animal health, VPH and animal quarantine, DVPH, DICs, Academia.

- Formalise roles of each committee:
  - **Steering committee**: defines the orientations and objectives of the surveillance system and makes the strategic decisions. The main decision-makers involved in surveillance are part of this committee. Specific activities of the steering committee may include prioritisation of diseases/threats, review/update of surveillance objectives, developing partnerships with different stakeholders (Dufour, 2009).
  - **Technical committee**: involves all the scientists and technicians able to define, develop and evaluate surveillance protocols to reach the objectives of the surveillance system. Depending on the size of the system, the technical committee may be merged with the central unit or steering committee (for small systems) or have disease-specific sub-committees (for large systems) (Dufour, 2009). Specific activities of this committee include development of minimum standards and SOPs for active, risk-based and value chain-based surveillance plans for priority diseases/threats.

- Develop members’ terms of references (ToRs) and work plan for each committee through Ministerial decree.

- Convene launching meeting for each committee.

Roles and responsibilities:

- Lead: MoA’s Director General (DG) to appoint members of committees, director & sub-director to validate selection.
- Partner: MoA’s general secretariat (Legal Bureau).

Deliverables:

- Members of committees identified and terms of reference formalised.
- First meetings of steering and technical committees.

Timeline for completion:

- Within 1 year of evaluation.
2 Develop minimum requirements for surveillance at provincial and district levels under Presidential Decree No.4 & 101

Strategy:

- Develop technical guidelines to standardise requirements for surveillance of animal/zoonotic diseases at the provincial and district levels, including outbreak investigation and risk assessment. Topics covered by guidelines should include:
  - data collection requirements (information to be collected, frequency, format);
  - data validation and analysis steps;
  - information sharing mechanisms (vertical and horizontal);
  - annual/monthly work plans including time frame, sites and operational budget;
  - training requirements for staff conducting surveillance at all levels (including initial and refresher trainings);
  - laboratory testing procedures; and
  - coordination with DICs and central level.

Roles and responsibilities:

- Lead: DGLAHS Epidemiology Unit and resources and animal health Institutional unit.
- Partner: DGLAHS Legal unit and MoA legal Bureau division, Ministry of internal affair.

Deliverables:

- Minimum requirements for surveillance including outbreak investigation and risk assessment at the subnational level are formalised and distributed to provinces and districts.

Timeline for completion:

- Within 1 year of evaluation.

3 Review and update formal documents framing national surveillance activities

Strategy:

- Convene steering committee to update objectives of surveillance system.
- Review and update list of notifiable and priority diseases using a risk-based methodology:
  - based on realistic risk to livestock industry, public health and import;
  - including priority levels (e.g. immediate vs. routine reporting); and
  - formalising case definitions for each disease
- Develop surveillance plans and protocols for all notifiable diseases, including active and passive surveillance activities:
  - Surveillance plans may be disease-specific and/or more general to cover more than one disease depending on the diseases’ importance.
  - Adapt the plans to the available financial and human resources to ensure sustainability of high quality data.
- Update ToR for DICs and develop specific ToRs for epidemiology unit within DICs regarding risk assessments, active surveillance design, data analysis, event investigation and reporting of surveillance activities at their levels.
• Review and update performance indicators for internal evaluation of surveillance activities.
• Disseminate new plans/protocols to relevant staff at central, regional/intermediate and local levels.

Roles and responsibilities:
• Lead: steering and technical committees of surveillance system, DGLAHS.
• Partner: representatives from DICs.

Deliverables:
• National list of reportable diseases reflect risks to country and objectives of surveillance system.
• Each disease in the priority list is covered by specific surveillance plan procedures.
• Roles and responsibilities of DICs in terms of epidemiology and surveillance activities is formalised.
• Performance indicators for surveillance activities are updated.

Timeline for completion:
• Within 2 year of evaluation.

---

4 Implement an incentive program to improve uses of iSIKHNAS in the field for disease reporting

Strategy:
• Review iSIKHNAS province reporting data.
• Calculate budget allocation from central level for animal disease activities based on iSIKHNAS reports data and DICs surveillance report.
• Assess the relevance/possibility of using number of disease events reported through iSIKHNAS as a performance indicator for staff evaluation at district levels.

Roles and responsibilities:
• Lead: DGLAHS.
• Partner: iSIKHNAS focal points in provinces.

Deliverables:
• Over 70 percent of provinces regularly report using iSIKHNAS.

Timeline for completion:
• Within 2 years of evaluation.

---

5 Develop a joint approach to field investigations to promote rapid and coordinated response to disease events

Strategy:
• Develop protocols for field investigations highlighting roles and responsibilities of each government level (e.g. national, DICs, provinces/districts), including individual staff within each level.
• Develop specific forms for field investigation including the key epidemiological information and link it to iSIKHNAS.
• Train multi-level teams in utilisation of protocols:
  o Include staff previously trained in outbreak investigations from previous projects, such as Participatory Disease Surveillance and Response (PDSR) and One Health teams.
• Validate protocols by conducting simulation exercises.

Roles and responsibilities:
• Lead: DGLAHS Epidemiology Unit and DICs.
• Partner: Provinces/districts.

Deliverables:
• Roles and responsibilities for field investigations are formalised and distributed at all levels.
• Multi-level teams are trained in event investigations.
• A multi-level simulation exercise is conducted in each DIC.

Timeline for completion:
• Within 3 years of evaluation.

6 Improve effectiveness of iSIKHNAS alert notifications to decision-makers at province/district levels and other relevant sectors

Strategy:
• Review and update current list of recipient on the SMS notification system:
  o Identify missing sectors that would benefit from early warning (E.g. Quarantine Sub-directorate staff, MoH, MoEF, Ministry of Internal Affairs, Disaster Agency).
• Conduct outreach with provinces/districts to add relevant stakeholders and their input on the content of the notifications.
• Update template of notifications based on feedback received:
  o E.g. Include level of certainty of events (suspect vs. probable vs. confirmed).
• Develop iSIKHNAS module to include link to resources in messages sent to direct recipients to important information related to the event notified:
  o E.g. Disease-specific factsheets for prevention and control.

Roles and responsibilities:
• Lead: DGLAHS.
• Partner: iSIKHNAS focal points, DICs, provinces/districts.

Deliverables:
• The list of recipients receiving iSIKHNAS alert messages is updated.
• Templates alerts are adapted to recipient and type of event.
• Alerts are able to link to specific recommendations approved by all partners to promote rapid response.
Timeline for completion:

- Within 3 years of evaluation.

### Establish a network of laboratories network to coordinate roles and responsibilities of different laboratory systems

#### Strategy:

- Develop ministerial decree on veterinary laboratory network.
- Develop information sharing/interoperability mechanisms on priority diseases diagnostics between laboratory systems, including:
  - DIC laboratories;
  - provincial and district laboratories;
  - quarantine laboratories;
  - research institutions (e.g. BBALIVET);
  - private sectors laboratory; and
  - universities laboratory.
- Expand IVLab system to the provincial levels and link with iSIKHNAS.
- Identify a reference laboratory for emerging infectious diseases (EIDs).
- Standardise the laboratory report templates to link results with disease epidemiology.

#### Roles and responsibilities:

- Lead: DGLAHS – epidemiology unit.
- Partner: DICs, MoA legal bureau, DGLAHS legal unit, Quarantine, Provinces/districts, research institutions.

#### Deliverables:

- Ministerial decree on veterinary laboratory network is developed.
- A system for information sharing is developed between all laboratory networks present in the country.
- All laboratories at provincial level use IVLab linked with iSIKHNAS.

Timeline for completion:

- Within 4 years of evaluation.

### Develop a coordinated surveillance system at the interface between livestock and wildlife

#### Strategy:

- Develop joint priorities for wildlife surveillance based on risks to livestock, public health and conservation.
- Develop MoU with MoEF/MoA/Indonesian Institute of Sciences (LIPI) to support sampling and diagnostics within protected areas (parks, corridors).
- Train MoEF veterinarians in PELVI (central and front-liner) and other relevant training program to build epidemiology capacity.
- Identify areas of interoperability between iSIKHNAS and MoEF databases including non zoonotic diseases.
Roles and responsibilities

- Lead: DGLAHS-MoA, DG Nature Resources and Ecosystem Conservation-MoEF.
- Partner: DICs, LIPI, provinces and districts at interface.

Deliverables:

- Joint priorities for surveillance at the interface are formalised.
- MoUs to facilitate support from MoA staff in wildlife sampling are signed.
- All MoEF veterinarians are trained in PELVI and other relevant training programs (central and front-liner).

Timeline for completion:

- Within 4 years of evaluation.

| 9 | Develop a coordinated training program for surveillance agents across levels |

Strategy:

- Develop an MoU with the Indonesian Veterinary Medical Association (IVMA) and Indonesia Veterinary Faculty Association to include aspects of disease reporting in continuing education re-certification:
  - Government veterinarians should have special requirements relevant to their work functions.
- Assess the training needs for the staff at central and local levels to implement epidemiology and surveillance duties.
- Expand on existing PELVI program to include in-service training on:
  - conducting specific analytical analyses (for targeted staff);
  - designing active surveillance projects (frequency, sample size, risk-based approaches, analysis/expected outputs);
  - designing and implementing risk assessment studies for central and DIC epidemiologists; and
  - animal health investigations (see recommendation 5)

Roles and responsibilities:

- Lead: DGLAHS.
- Partner: Indonesia Veterinary Medical Association and Indonesia Veterinary Faculty Association.

Deliverables:

- CE certifications for veterinarians and para-professionals include aspects of disease reporting.
- Government veterinary staff receives in-service trainings on data analyses, active surveillance design and other relevant topics identified.

Timeline for completion:

- Within 4 years of evaluation.
References


https://data.worldbank.org/indicator/SP.POP.TOTL?locations=ID
### Appendix I – Summary of the evaluation

#### MISSION INFORMATION

**Country:** Indonesia  
**Dates of mission:** 5 assessors divided into 2 teams  
**Evaluation team:**  
- Senior veterinary officer and veterinary officer from DGLAHS, one epidemiologist from FAO-ECTAD Indonesia, two epidemiologists from FAO Rome  
**Number of stakeholders met for interviews:** 237

### EVALUATION RESULTS

#### AREAS VISITED

![Map of Indonesia](https://example.com/indonesia_map)

Source: UN, 2004

### MAJOR STRENGTHS

- Central unit responsible for surveillance supported by several laws and regulations and DICs provide provincial governments with support for surveillance.  
- DICs have advanced capacities and are reference laboratories for several priority diseases, developing protocols for other facilities in their network.  
- iSIKHNAS provides a standardize system for disease reporting.  
- Focal points for inter-sectoral collaboration identified (at MoH, MoEF and international organisations).  
- Active surveillance projects conducted in all DICs as well as in some districts.  
- Continuing education opportunities exist through different professional associations.  
- The PELVI program by the MoA supports in-service epidemiology training.  
- iSIKHNAS provides the system with a real-time reporting tool and relational database.  
- Real-time basic epidemiology analyses can be performed by registered users on iSIKHNAS.  
- Maps and disease situation reports are published regularly online.

### TARGETED AREAS OF IMPROVEMENT

- A large number of priority diseases identified without thorough risk assessment for their selection.  
- Decentralisation leads to different livestock priorities at the provincial/district levels in terms of animal disease surveillance.  
- No clear reporting line from the field to the central level – complicated by the different jurisdictions’ variable procedures for disease surveillance.  
- The role of the DICs in term of epidemiology is not clear – there is overlap between epidemiology and laboratory functions at the DICs.  
- Not all surveillance activities covered by protocols.  
- Passive surveillance at the field level is focused on diseases of interests (e.g. rabies in Bali) rather than the national priority disease list.  
- No formal horizontal communication strategy between at the field level, between the districts/provinces to share alerts.
## SET ACTION PLAN

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Short-term 1-2 years</th>
<th>Mid-term 3 years</th>
<th>Long-term 4 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Priority 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Establish steering and technical committees to review surveillance objectives and activities nationally.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Develop minimum requirements for surveillance at provincial and district levels under Presidential Decree No. 4 &amp; 101.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Review and update formal documents framing national surveillance activities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Priority 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Implement an incentive program to improve uses of iSIKHNAS in the field for disease reporting.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Develop a joint approach to field investigations to promote rapid and coordinated response to disease events.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Improve effectiveness of iSIKHNAS alert notifications to decision-makers at province/district levels and other relevant sectors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Establish a network of laboratories network to coordinate roles and responsibilities of different laboratory systems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Develop a coordinated surveillance system at the interface between livestock and wildlife.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Priority 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Develop a coordinated training program for surveillance agents across levels.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>