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Tajikistan
Evaluation for action

Assessing animal disease
surveillance capacities

April 2021

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Abbreviations and acronyms

ANSES	Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail
CFS	Committee of Food Security
CDC	Center for Disease Control and Prevention
ELISA	enzyme-linked immunosorbent assay
EMT	Epidemiology Mapping Tool
FAO	Food and Agriculture Organization of the United Nations
FMD	foot-and-mouth disease
GHSA	Global Health Security Agenda
GIS	geographic information system
HPAI	highly pathogenic avian influenza
IFAD	International Fund for Agricultural Development
IHR	International Health Regulations
JEE	Joint External Evaluation
LIMS	Laboratory Information Management System
LMT	Laboratory Mapping Tool
MoA	Ministry of Agriculture of Tajikistan
MoE	Ministry of Ecology of Tajikistan
MoEP	Ministry of Environmental Protection
MoH	Ministry of Health of Tajikistan
MoIA	Ministry of Internal Affairs of Tajikistan
NDC	National Diagnostic Center of the Committee of Food Security
OASIS	Outil d'Analyse des Systèmes de Surveillance
OIE	World Organization for Animal Health
PCR	polymerase chain reaction
PPR	peste des petits ruminants
PTS	Proficiency Testing Scheme
PVS	Performance of Veterinary Services
RAC	Republican Antiepizootic Centre
REU	FAO Regional Office for Europe and Central Asia
SET	Surveillance Evaluation Tool
SOP	standard operating procedures
SWOT	strengths, weaknesses, opportunities, threats
TCP	Technical Cooperation Programme

TORs	terms of reference
USAID	United States Agency for International Development
VS	Veterinary Service
WHO	World Health Organization

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 and their early detection in animals can prevent their transmission to humans. Good-quality data is therefore essential to better prepare and rapidly respond to known and new threats to both livestock and people. Strong surveillance systems represent the cornerstone to providing decision-makers with adequate information to implement disease control programmes.

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.

Hence, there is a need for a comprehensive evaluation methodology to guide authorities in enhancing national animal disease surveillance capacities.

Development of the Surveillance Evaluation Tool

The Food and Agriculture Organization of the United Nations (FAO) developed the Surveillance Evaluation Tool (SET) to support the prevention and control of animal disease threats, including zoonoses. The tool provides veterinary authorities 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. Following the completion of the activity in project countries, SET was made available for use by FAO offices in other regions and by governments interested in reinforcing their animal disease surveillance capacities under external funding.

The basis for SET was the surveillance network assessment tool *Outil d'Analyse des Systèmes de Surveillance* (OASIS), which translates as Surveillance Systems Analysis Tool, developed by the French *Agence Nationale de Sécurité Sanitaire de l'alimentation, de l'environnement et du travail* (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 (one to four), and graphical outputs were harmonized with FAO's Laboratory Mapping Tool (LMT) and EMT.

In previous 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 to further characterize these indicators from an animal health perspective. Following the publication of the new JEE indicators and guidelines in 2018 by WHO (WHO, 2018), this aspect of the SET assessment was discontinued.

Context of the SET mission to Tajikistan

The SET mission was requested by the FAO Regional Office for Europe and Central Asia under the Technical Cooperation Programme (TCP) "Establishing a Network on Priority Livestock Diseases in Central Asia" (TCP/SEC/3702).

FAO, through its Regional Office for Europe and Central Asia, is the initial driver of the network that includes Tajikistan, Uzbekistan, Kazakhstan, Kyrgyzstan, and Turkmenistan. The project aimed to establish the Central Asia Animal Health Network (CAAHN), which was launched in November 2019, as well as to gather baseline data in all countries on the surveillance capacities (through SET) and laboratory diagnostics capacity (LMT) of the veterinary sector.

Animal health networks offer a framework for building strong technical capacity, competency, leadership, and a critical mass of regionally networked specialists in veterinary medicine, epidemiology, surveillance, and diagnosis – all of which are essential to coordinate actions to manage the risks of transboundary animal diseases and zoonoses.

Regional animal health networks join forces to 1) exchange information and experience; 2) standardize laboratory, field prevention/control, operating, communication, and other procedures; 3) identify gaps, weaknesses, and priorities; and 4) fulfil these gaps, for example by providing training and capacity building. This can be done using specific meetings, exchange of people, training and capacity building, organization of ring trials, joint work plans, etc.

This report details the SET mission conducted in Tajikistan in April 2021 under the aforementioned TCP and highlights outcomes and recommendations for the improvement of the local animal disease surveillance system. This is the first mission conducted since the start of the COVID-19 pandemic. All precautions and safety measures prescribed by both FAO and the Republic of Tajikistan were carefully followed.

SET mission objectives

The main objective of the mission was to conduct an external evaluation of the animal health surveillance system in Tajikistan using SET focusing specifically 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 Tajikistan context allowed for the identification of the strengths and weaknesses of 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 SET 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 or "subcategories". These indicators are grouped into 19 "categories", which constitute seven "areas" (Table 1).

Table 1: Categories and areas evaluated by SET

Area	Category	Nº of indicators
Institutional organization	Central institutional organization	7
	Field institutional organization	8
	Intersectoral collaborations	4
Laboratory	Operational aspects	2
	Technical aspects	8
	Analytical aspects	3
Surveillance activities	Objectives and context of surveillance	4
	Surveillance data collection	14
	Surveillance procedures	9
	Animal health investigations	2
	Risk assessment	2
Epidemiology workforce	Workforce management	5
	Training	4
Data management	Information system	2
	Data processing and exploitation	5
Communications	Internal communication	4
	External communication	3
Evaluation	Internal evaluation	2
	External evaluation	2

Source: Author's own elaboration.

Using the information gathered during the evaluation mission, a score from one to four (or N/A if the indicator is not applicable) must be assigned to each of these 90 indicators. Finally, after the scoring session, outputs are generated to identify the strengths and weaknesses 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 subcategory.

Phases of SET missions

SET evaluation missions consist of four main phases:

- **Preparation and document review.** Preparation of the mission starts at the latest one month before the arrival of the team into the country. During this phase, team members finalize the mission's programme, identify stakeholders to interview, and arrange logistics in the field. The full SET package is also shared with each evaluator so that they can

familiarize themselves with the toolkit and its methodology. Several documents to support the information provided during the interviews must be shared by the national focal points before the mission – these include standard operating procedures (SOPs), protocols, and other written documents describing how the surveillance system functions.

- **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 is only used as a guideline during the interview process.

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

- **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 for discussion and potential amendments.

The SET mission in Tajikistan

Local situation and livestock production

Tajikistan is a landlocked country bordering Kyrgyzstan, Uzbekistan, China, and Afghanistan. More than 90 percent of the country is mountainous (the Alay and Pamir mountain ranges). Administratively, the country is divided into four provinces (oblasts): Badakhshan, Khatlon, Sughd, and Regions (Rayons) of Republican Subordination (FAO, 2012). Agriculture plays a significant role in the livelihoods of the country's rural population comprising two main farming systems: upland areas (characterized by wheat, potatoes, and horticulture along with rainfed pasture), and lowlands (focused on cotton and wheat production). Livestock is also a key part of the agriculture sector. However, the availability of pastures is a challenge constrained by a lack of technical knowledge of small livestock holders, poor governance of pasture management, inefficient management of community livestock, shortage of feed during winter months, environmental degradation, and lack of access to good-quality feed. Due to the mountainous terrain of Tajikistan's geography, it is extremely challenging to develop sustainable farming, which limits internal and external trade (IFAD, n.d.).

In Tajikistan, more than 90 percent of cattle, sheep, and goats are owned by household farms, with most households owning one to three lactating cows and five to ten sheep and goats for domestic consumption or local sales of milk (USAID, 2014).

There are opportunities to modernize and strengthen livestock production, but these will require overcoming environmental, institutional, and human capacity challenges, including the improvement of veterinary services (VS).

FAO has provided support for the development of regulations and the establishment of a new Committee on Food Security directly subordinate to the government. Three state services – Veterinary Inspection, Phytosanitary and Plant Quarantine, and Breeding – are represented on the Committee.

The central veterinary and animal breeding division oversees five subnational representations (Khatlon, Sughd, Dushanbe City, Rayons of Republican Subordination, and Gorno-Badakhshan Autonomous regions).

Table 2: Number and types of animals representing livestock in Tajikistan (thousand head)

#	Tajikistan	Cattle	Horses	Sheep and goats	Yaks
1	Tajikistan	2 658.800	65.200	8 304.100	30 498.400
2	Dushanbe City	0	0	0	0
3	Rayons of Republican Subordination	619.320	14.380	1 494.370	0.622
4	Khatlon Region	978.460	59.796	2 425.620	0.037
5	Sughd Region	667.076	8.440	1 590.130	2.010
6	Gorno-Badakhshan Region	111.769	0.327	358.328	26.95

Source: **TAJSTAT**. 2022. Agency on statistics under the President of the Republic of Tajikistan. In: *TAJSTAT*. Tajikistan. Cited 8 July 2022. https://www.stat.tj/en

Mission summary

The mission started on 5 April 2021 with a meeting with the relevant decision-makers and actors. Participants in this meeting included 21 key decision-makers of the animal disease surveillance system in Tajikistan, including representatives from various departments within the Committee of Food Security (CFS), Dushanbe City Veterinary Division, Veterinary Association, the Ministry of Health (MoH), the Ministry of Internal Affairs (MoIA), and the Ministry of Ecology (MoE).

The initial presentation highlighted the development of SET, as well as the goals of the mission. Interviews were conducted after the meeting with the Head and epidemiologists from the Animal Health and Breeding Division of the CFS, MoH, MoIA, and MoE; the Head of Serology from the National Diagnostic Center; the Head of the CFS Border Control Division in Dushanbe; the Deputy Director of the Republican Antiepizootic Centre (RAC) of the CFS; the Head of the Veterinary Association; and the Head of the *Journal on Food Security*.

The first day of the interviews allowed the evaluation team to gain a clearer understanding of the structure and function of the system at the central level, as well as the level of integration between human and animal surveillance systems in place at the time.

The evaluation team then commenced the field portion of the mission (Figure 1). To conduct a representative assessment of Tajikistan's animal disease surveillance system, there was a need to identify and select the appropriate stakeholders to interview and areas to visit while taking into consideration the logistical and time limitations of the fieldwork, the political situation in some border territories, and the COVID-19 restrictions. Stakeholders selected for interviews originated from the Sughd Region, various rayons, and city centres for food security, laboratories, as well as livestock farmers, abattoir workers, field veterinarians, and para-veterinarians. A total of 78 interviewees were interviewed at all levels of the system to obtain a thorough understanding of the context of surveillance in Tajikistan.

Following the data gathering phase, the team reconvened in Dushanbe on 12 April to summarize the information from the interviews and begin scoring the system using SET. A SWOT analysis (strengths, weaknesses, opportunities, and threats) was conducted to help identify specific recommendations to improve the gaps.

A closing meeting took place on 16 April, where findings of the mission and recommendations were presented to key decision-makers, who were then provided with an opportunity to comment on the preliminary findings.

TAJIKISTAN

Figure 1: Areas visited during the SET evaluation mission in Tajikistan, April 2021

Source: **UN GEOSPATIAL**. 2021. Tajikistan. In: United Nations, New York, UN. Cited 8 July 2022. https://digitallibrary.un.org/record/3795637?ln=en

Composition of the evaluation team

The evaluation team consisted of five members as described in Table 3. Due to COVID-19 restrictions, only two evaluators were allowed in the FAO vehicle.

Table 3: Evaluation team during the SET mission to Tajikistan, April 2021

Team member	Title and organization
Dinara Imanbayeva	International consultant on animal health, FAO Sub-Regional Office for Central Asia (Team Leader)
Tolibjon Khakimov	National Animal Health Expert, FAO Tajikistan
Abdulvakhob Avgonov	Veterinary epidemiologist, CFS Tajikistan
Khurshed Boboshoyev	Deputy Director, RAC, CFS Tajikistan
Said Rayonshoyev	Veterinary specialist, CFS Tajikistan

Source: Author's own elaboration

Evaluation results

Description of surveillance system

Central and sub-national organization

The VS of Tajikistan was restructured on 29 December 2017 according to the Decree of the Government of Tajikistan 595 to the CFS. This restructuring was the result of FAO support that led to the establishment of the independent agency directly subordinate to the government, rather than the Ministry of Agriculture (MoA). Under the decree, the CFS is in charge not only of veterinary issues, but also of phytosanitary, seed production, and animal breeding. The VS acts as a central executive body of state service, representing executive, control, permission, and other functions. The structure of the CFS consists of one Veterinary and Animal Breeding Division with nine experts (seven veterinarians and two animal production officers) in charge of veterinary and animal breeding issues. Those seven CFS epidemiologists at the central level supervise 17 epidemiologists of the regional offices of CFS, and 137 epidemiologists at the rayon level. Figure 2 presents the structure of the CFS.

Figure 2: Organization of the Committee of Food Security, Tajikistan, April 2021
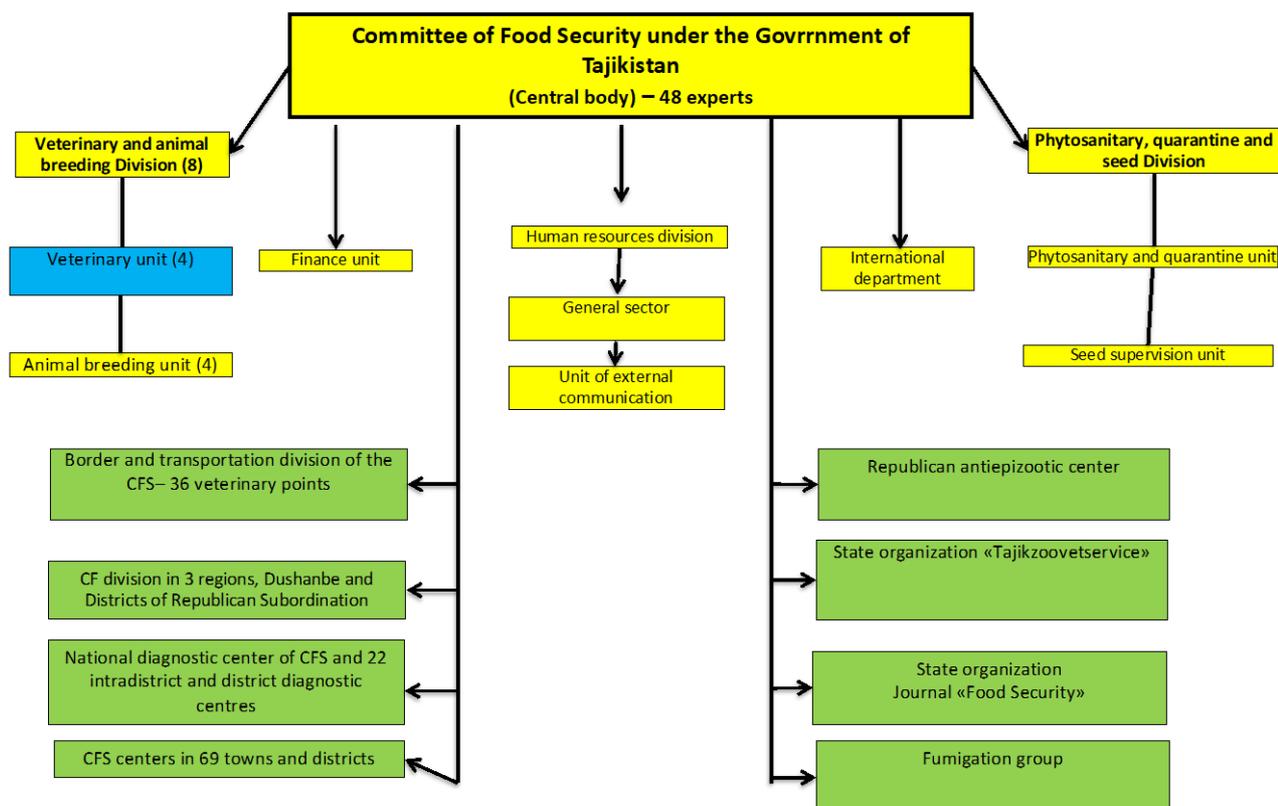
Source: **Committee for Food Security**. 2022. In: *Tajikistan*. Cited 8 July 2022. http://www.cfs.tj/

Due to the recent reorganization, most regulations are undergoing revision. Legislation covering all emergencies will be revised as the main legal acts are outdated and do not include the chain of command based on the new structure. Decree N487 from 4 October 2011 on "Fund of antiepizootic activities" of the Republic of Tajikistan has identified eight priority diseases (Table 4) that play a key socio-economic role for the country. No specific control strategies were developed against these diseases. Brucellosis and tuberculosis are the only diseases covered by the surveillance plans (testing). Interviewees noted the need to develop strategic plans to reflect recent risk assessments.

Table 4: Priority animal diseases

Priority animal diseases	
Foot-and-mouth disease	Anthrax
Sheep and goat pox	Peste des petits ruminants
Tuberculosis	Brucellosis
Newcastle disease	Rabies

Source: Author's own elaboration.

Tajikistan is administratively divided into three economic regions, as well as the Rayons of Republican Subordination and Dushanbe City. Each of these administrative divisions has CFS representation.

The chain of command on disease reporting, despite the small number of intermediate actors, is still limited and slows down sampling, delivery of samples to the laboratory, and delivery of the laboratory result back to the field. Currently, laboratory results are first confirmed by the CFS and then sent to the Rayon CFS centres to notify field veterinarians. This flow is inefficient and time-consuming, affecting early detection and the possibility of a rapid response. Moreover, there is an unavailability of resources and an absence of direct involvement of the Republican Antiepizootic Centre (RAC) in rapid response, whose duties based on the Soviet period structure involve rapid response to disease outbreaks.

Overall, the CFS oversees surveillance activities planning with its regional and rayon level centres. There is a RAC in charge of the prompt response to disease outbreaks, which has representatives in each region. However, due to the absence of resources and transportation, this RAC is not capable of prompt and adequate disease control.

The border and transportation divisions with their 36 points are consolidating competent authorities for animal health and plant protection. These posts are subordinate to the CFS, although there are discussions on moving the border inspection points under the Customs Department. The border inspectors apply quarantine and border security procedures based on international standards. It was mentioned that quarantining live animals at the final destination is posing a risk of introducing diseases from outside, as it is difficult for the Rayon and field veterinarians to control whether the animal owner strictly follows the quarantine. For this reason, having quarantine facilities in the bordering territories within Tajikistan would be an asset according to the border inspectors.

The sub-national level of the CFS is represented as centres in 69 towns and districts (Figure 2). Such centres have five to six professionals in charge of phytosanitary,

veterinary, and animal breeding issues. In some cases, those professionals do the work of other units (e.g. phytosanitary, food safety) within the centre.

One veterinary epidemiologist at the Rayon level oversees six to ten field veterinarians. The routine work of such epidemiologists is focused on collecting monthly reports, as well as receiving notification of disease suspicion from the field. Normally, such reports are sent via email or delivered to the office by the field veterinarians. Supervisory visits by these epidemiologists are occasional due to limited financial resources dedicated to surveillance activities. Field veterinarians conduct surveillance activities, covering five to ten villages each, which is equivalent to 50 000–80 000 head of cattle and small ruminants. The number of animals in these villages can vary, easily exceeding the normal workload of field veterinarians. This is especially difficult considering the lack of transportation to conduct routine work. Each field veterinarian conducts state surveillance activities focusing mostly on the implementation of planned activities under active surveillance within disease control programme testing and the provision of treatment services for farmers if needed. They also implement planned vaccinations against brucellosis that is available only for organized farms; those with just a few animals in the backyard (households) are not eligible for such vaccination. Sampling for brucellosis is conducted regularly at the organized farms, and for households. It was noticed that households are interested in vaccinating their animals and ready to pay for the vaccine; however, the vaccine supply is limited and not available for them. Field veterinarians are responsible for the entire total population in their assigned territory covering about ten villages. It was noted, however, that accessing the backyards within the same village or remote pasture areas and villages was a challenge due to transportation issues (no access to vehicles) and the reduced profitability of these visits. The VS is not capable of providing the necessary equipment to conduct surveillance activities. The technical equipment of field veterinarians is primitive, and they lack the means to maintain the cold chain (for sample submission) or sampling materials (i.e. insufficient glass tubes and needles). Often, just one needle is used for sampling all animals, with the subsequent risk of iatrogenic infections.

The evaluation identified the absence of an acting Steering Committee that guides and defines the objectives of the surveillance system and makes strategic decisions. There is also an absence of legal documents or any memorandum that includes all the relevant stakeholders from all relevant ministries, international organizations, and non-profit organizations for the planning and implementation of joint surveillance activities for early detection and prevention.

Intersectoral collaboration

The collaboration related to the outbreak response with the MoH, the Ministry of Environmental Protection (MoEP), and the MoIA is not governed by any official document or agreement. The interviewees reported the existence of certain collaboration limited to information exchange when zoonoses are reported. The regional level intersectoral cooperation, despite the absence of official documents, is better organized, i.e. surveillance partners are in regular contact and share information.

Meetings of all stakeholders involved are usually conducted yearly, during government meetings or in the face of emergencies (e.g. an anthrax outbreak). The evaluation has identified the absence of an acting Steering Committee that defines

the orientations and objectives of the surveillance system, makes the strategic decisions, and provides legal documents.

The Veterinary Association can provide scientific and technical support to the CFS through training (with FAO financial support). The involvement of scientific institutes in evaluating surveillance protocols has been weakened compared to previous years.

The evaluation team identified the lack of collaboration of the VS with the private sector. While commercial farms cooperate with the VS through existing active surveillance plans, households are rarely aware of their rights and obligations. Another issue was identified concerning private veterinary practice, which is not regulated by the government. Private veterinary practices often operate illegally providing services to households. This creates additional obstacles to the state veterinarians, as they are not aware of the type of services provided for which households because private veterinarians do not submit reports or pay taxes for the provided services.

Laboratory

The National Diagnostic Center (NDC) of CFS was established after a reorganization to coordinate the work of all laboratories in the country involved in food safety control (e.g. veterinary, phytosanitary laboratories). Considering this reorganization, the former Republican Veterinary Laboratory was joined by the phytosanitary laboratory staff at central, inter-Rayon and Rayon levels. Overall, NDC supervises a network of three regional and 19 Rayon/inter-Rayon laboratories in the country.

The NDC in Dushanbe is the main veterinary laboratory in the country and has a state budget to provide diagnostics for brucellosis in the context of active surveillance. There is a price list for diagnosis of other priority diseases listed in the State Decree N487 from 4 October 2011 (foot-and-mouth disease (FMD), peste des petits ruminants (PPR), Newcastle disease, anthrax, tuberculosis, infectious epididymitis, rabies, and sheep and goat pox). These tests are expected to be covered by the animal owner if agreed. The capacity of Rayon-level laboratories is extremely limited and able to provide only basic testing on brucellosis (Rose Bengal Test and Milk Ring Test). Enzyme-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR) are available at the NDC, but with no diagnostic kits. For brucellosis, 693 000 cattle and small ruminants are tested annually. This includes organized farms as well as a small number of households. The sampling plan is not based on risk assessment or random sampling.

The laboratory system is not able to cover the country's needs related to surveillance objectives to provide prompt sample preparation and testing for disease suspicion. In addition, only the central laboratory in Dushanbe has a good capacity (compared to other laboratories in the country), i.e. with PCR equipment and two professionals capable of conducting PCR tests. The absence of diagnostic kits (due to the high price) does not allow for the regular use of PCR.

All diagnostic tests in the country are carried out by the NDC. There are no private laboratories involved in animal disease diagnosis.

The NDC at the central level is accredited to ISO/IEK 17025-2019 by the National Accreditation Center of Tajikistan. However, it was noticed that SOPs and standards used by the laboratories are outdated: most of them are from the Soviet period and are not compliant with current international standards and recommendations. The

same applies to disease diagnosis schemes, which also follow old and outdated recommendations. The laboratory staff is not aware of the OIE requirements for disease diagnosis and follows outdated SOPs.

The latest inter-laboratory proficiency tests were conducted for brucellosis more than three years ago. These proficiency tests were not conducted according to the plan on an annual basis. Currently, limited resources and the absence of proper management do prevent the resumption of inter-laboratory proficiency testing. There is an agreement with the ARRIAH Institute (Russian Federation) on laboratory support, including proficiency tests for Tajikistan. However, the cost of such proficiency tests is extremely high for the VS, together with the logistics challenges (i.e. providers for the transportation of biological material are not available in the country).

At the time of the SET assessment, there was a Laboratory Mapping Tool (LMT) evaluation being conducted in Tajikistan that will provide a detailed and comprehensive assessment of the laboratory network capacity.

In case of emergency events, the central laboratories are not able to provide support to the Rayon-level laboratories concerning staffing, diagnostic testing, or equipment needs. Central laboratories are involved directly in the emergency events in case priority diseases are suspected, or if the animal owner is ready to pay for the diagnosis of other diseases (from the price list). Studies for other diseases are not conducted due to financial limitations, administrative barriers (procurement process), and the absence of relevant legislation.

There are limited diagnostic techniques available to differentiate suspected from confirmed cases based on the Soviet period standards, but case definitions have not been defined in national regulations. (OIE definitions are not used at all.) Data management on laboratory samples arrival, registration, and movement within the laboratory up to getting a final result is organized on paper or Excel files (where available). The majority of Rayon-level laboratories use obsolete sample registration forms. Reports are prepared in Excel to be sent to the central laboratory in Dushanbe. There are no laboratory information management systems (LIMS) in the laboratory network. Laboratory results are first communicated to the central levels and then to the field, which delays the rapid response.

Surveillance activities

There is an Animal Health unit within the CFS structure with four veterinarians in charge of surveillance and other veterinary activities (animal health, veterinary public health, animal welfare, licensing of private practitioners and drugstores, and organization of veterinary controls at the border). There are no surveillance protocols in place. There is a cross-sectoral state programme of food security for the period 2019–2023 that indirectly refers to animal protection. FAO, under the agreement between the MoA, has developed a strategy for developing a VS in Tajikistan through the Service Policy Formulation/GCP/TAJ/013/EC project on "Strengthening Institutions and Capacity of the Ministry of Agriculture and State Veterinary Inspection Service for Policy Formulation". This strategy has been drafted and will be shared with the VS for further consideration and approval.

The main goal of this strategy is to provide the strategic framework for animal health services in Tajikistan, a long-term vision for capacity building, and the strategic improvement of the veterinary system performance, including surveillance activities with clear objectives and performance indicators.

Even though there is a list of priority diseases, control activities focus only on tuberculosis (TB) and brucellosis (i.e. TB testing and serology on brucellosis according to the annual plan). This does not provide a clear picture of the real epidemiological situation of priority diseases in the country.

There is no document detailing early detection, notification, and response procedures.

Field veterinarians submit reports on seromonitoring and vaccination conducted according to the annual plan that is hand-delivered every month to the Rayon-level epidemiologist at the CFS that checks and confirms the information provided. All data is prepared in Excel files. It was stated that all the reports are generally filled correctly with minor errors. Field veterinarians confirmed that forms are easy to fill out. OIE six-monthly reports and annual reports are submitted on time.

Overall, although there is an understanding of the disease surveillance system's importance among field veterinarians, the lack of government support and limited financial resources are serious constraints. Farmers should notify disease suspicions to the field veterinarian or local municipality, although they rarely do so due to the absence of government compensation. It was reported that field veterinarians tend to act promptly. However, due to the absence of transportation, when disease suspicions are reported in neighbouring villages, the visit to the farmer may take longer. Due to the absence of a Rapid Response Team, disease response protocols, and a budget dedicated to controlling disease outbreaks, the VS cannot provide adequate support to farmers. Therefore, farmers tend to respond to the disease outbreak themselves, i.e. without reporting it to national authorities. Due to the absence of offices for field veterinarians in the majority of Rayons (they usually work from home), the notification procedure is normally informal via landline or mobile phone. Poor internet connection and the absence of computers limit communication between veterinarians and farmers. Field veterinarians are covered by the necessary legislation when they require farm access, with fines permitted if access is not allowed, as stated by the Code of Administrative Offence. However, due to the current moratorium on inspections of the private sector (e.g. farmers, production facilities), few visits were being conducted at the time of the mission. If a visit is conducted, the veterinarian must notify the farmer in advance of the date of the visit and obtain the farmer's consent.

The evaluation has indicated that there are no objectives, case definitions for priority diseases, or performance indicators of the surveillance system. The VS lacks an understanding of case definitions. It was reported that nearly all active surveillance plans for the country are completed on an annual basis. Active surveillance is conducted on brucellosis (seromonitoring) and tuberculosis (TB testing). For other listed diseases (anthrax, rabies, FMD, PPR, TB, sheep and goat pox, and Newcastle disease), seromonitoring is conducted only when the animal owner agrees to test and pay for diagnosis, according to the price list.

Other surveillance activities are passive and include providing paid services for farmers/households to test for other diseases if there is an interest. Interviewed households confirmed that the prices are affordable. There is no surveillance conducted at slaughterhouses. All animals are accepted for slaughter. Even though slaughterhouses are obliged to report monthly on slaughtered animals and the pre- and post-mortem examination results, the evaluation team did not see the recording of the identified post-mortem examination diseases (e.g. echinococcosis).

Procurement processes are slow and often limit the process of prompt procurement of the necessary vaccines, reagents, and materials in cases of emergency.

The VS has no capacity to conduct outbreak investigations. There is a risk analysis division within the RAC expected to conduct a risk assessment. However, the division only collects monthly reports to prepare an annual report on the surveillance plan, as well as short analytical documents to the CFS on the epidemiological situation. The division requires training on the application of risk assessment methodologies.

The evaluation team noted an absence of the application of risk assessment in animal health surveillance. Adequate outbreak investigation is also missing. This is due to a lack of trained experts at the field and central level as well as financial difficulties.

Epidemiology workforce

Terms of reference (TORs) are in place for laboratory personnel only. There are no TORs available for veterinarians at different levels, including field veterinarians and para-veterinarians. The heads of the Rayon CFS are in charge not only of all epidemiological activities, planning, and response but also of phytosanitary and animal breeding issues.

On-the-job training at Rayon and field level is conducted sporadically, normally based on the availability of funds from international organizations, and therefore occurring spontaneously once or twice a year in case of an emergency. It was noted that this training is not meeting the requirements and needs of Rayon and field veterinarians. Training with general information on diseases is provided, whereas the training needs are more on disease recognition and early prevention. All new staff follow on-the-job mentorship.

The training funded by international organizations is normally delivered by the Tajik Veterinary Association. Field-level interviewees specifically requested more training on surveillance.

Each veterinarian at the Rayon and central level is required to have a veterinary degree. However, due to the lack of professionals at the Rayon and field level, para-veterinarians and technicians are often employed as epidemiologists. Para-veterinarians have a veterinary college level that is equivalent to three years of study as veterinarians.

Data management

Tajikistan has not implemented an animal identification system (although some commercial farms have their internal management systems that were implemented through different collaborative programmes with international partners). There is no database available. All reports are prepared and submitted to the central level bodies on paper or via email. When computers are available, the reports are prepared in Excel files at the office. Another option for field veterinarians when working from home is to use personal computers (if available). Paper or Excel files are collected by the centres and combined in the Rayon report. Some field veterinarians have a working space in the local municipality; others have to work from home due to the absence of working space.

In the case of a disease suspicion, farmers have the contact number of the field veterinarian. Field veterinarians then phone the Rayon CFS, which oversees taking prompt action and notifying the regional and central levels.

Data analysis is currently performed at a basic level by the RAC. Geographic Information System (GIS) software is not utilized, and mapping of disease events is not conducted. The surveillance-related analysis is presented to the central level for further planning of activities. The reports submitted to Headquarters are not shared at the field/Rayon level.

Communication and evaluation

Meetings with field veterinarians within the Rayon are held from time to time, normally when reports are submitted. The central level holds monthly meetings with Rayon veterinarians related to routine work of the CFS, including general management, phytosanitary issues, and animal breeding issues. Such monthly meeting results and other news related to the work of the CFS are publicized in the Committee's *Journal on Food Security*. The central unit occasionally visits the field for supervisory purposes.

When finances allow it, leaflets or bulletins are published and distributed among farmers and other relevant actors during events (e.g. World Food Safety Day) or meetings. There is no specific regulation on horizontal and vertical communication. Horizontal and vertical communication across central, regional, and Rayon levels is organized via phones or emails (if computers with internet connections are available).

Communication with international organizations (OIE, FAO, and others) is managed by the CFS's focal point. The evaluation team noticed an absence of sufficient financial and material resources to conduct required communication needs including computers, videoconferencing, printing, publishing of scientific articles, improvements to internet connectivity, and IT specialists. There is an International Department within the CFS that should be in charge of communication with international organizations. The evaluation identified the need to structure the work of the International Department.

Formal performance indicators and methodology for the surveillance system are absent; the central level ad-hoc internal evaluations cover some basic aspects of surveillance. Veterinarians are assessed individually once every three years on their knowledge of veterinary legislation. The surveillance system lacks a comprehensive, regular, and measurable evaluation of activities. Excluding the present evaluation, the surveillance system has partially been externally evaluated by the OIE (PVS Follow-up Mission in 2017) and FAO; however, not all the provided recommendations were captured in the existing work plan.

Bilateral agreements with neighbouring countries involve disease situation reporting and data sharing (Azerbaijan, Kyrgyzstan, Kazakhstan, and other Commonwealth of Independent States (CIS) countries). There is also improved cooperation with Uzbekistan.

SET outputs

Two types of outputs are provided by the evaluation:

- core results (Table 5, Figure 3); and
- performance attributes (Table 6, Figure 4).

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 SET (Table 1). All scores are expressed as percentages, based on an ideal situation where scores of four are given to all indicators (100 percent).

The strongest individual category scores were "Central institutional organization" (57.1 percent) as explained in the "Central and sub-national organization", where the recently established CFS has been directly subordinated to the Government of the Republic of Tajikistan to lead to prompt actions and decisions to be taken without intermediate actors, and "Surveillance data collection" presented regularly by the 28th of each month to the central VS and the RAC for analysis. "Laboratory analytical aspects" and "External communication and resources" (55.6 percent) receive continuous support through FAO animal health projects, and continuous training is delivered to the laboratory staff. This score can also be explained by the speed of the laboratory result obtained as per SOP.

"Objectives and context of surveillance" (25.0 percent) and "Workforce management" (26.7 percent) scored lowest, as the surveillance system has no objectives, and the priority diseases listed in the legislation do not correspond with the existing surveillance gaps. Categories that received low scores also included "Intersectoral collaboration" (33.3 percent) due to the absence of an officially established Steering Committee, as well as the absence of a surveillance plan that involves partners from the relevant organizations (Table 5, Figure 3).

Table 5: SET outputs for Tajikistan, April 2021

Area	Score by area (%)	Category	Score by category (%)
Institutional	45.6	Central institutional organization	57.1
		Field institutional organization	41.7
		Intersectoral collaborations	33.3
Laboratory	41.0	Lab - Operational aspects	50.0
		Lab - Technical aspects	33.3
		Lab - Analytical aspects	55.6
Surveillance activities	45.2	Objectives and context of surveillance	25.0
		Surveillance data collection	57.1
		Surveillance procedures	37.0
		Animal health investigation	50.0
		Risk assessment	33.3
Epidemiology workforce	29.6	Workforce management	26.7
		Training	33.3
Data management	38.1	Information system	33.3
		Data processing and exploitation	40.0
Communications	52.4	Internal communication	50.0
		External communication and resources	55.6
Evaluation	41.7	Internal evaluation	33.3
		External evaluation	50.0

Source: Author's own elaboration.

Figure 3: Comparative SET graphical outputs for Tajikistan by category, April 2021
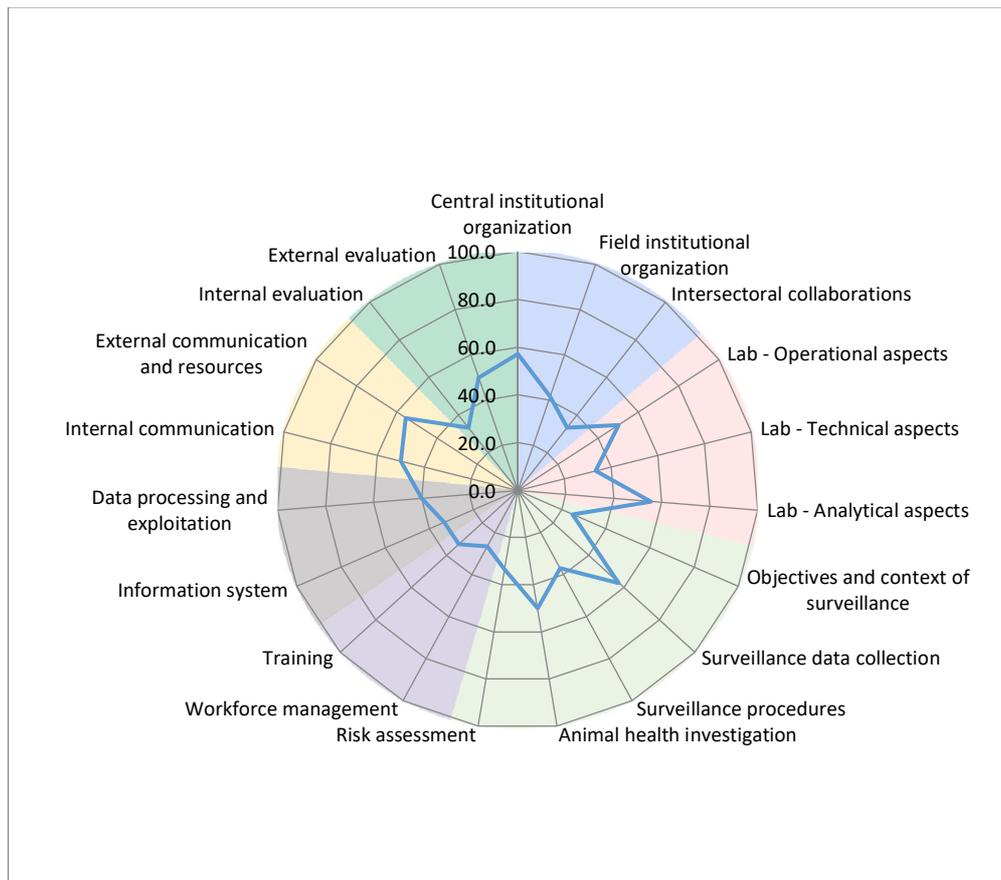
Source: Author's own elaboration.

Performance attributes

Qualitative attributes have been identified and used by several international organizations to evaluate the general performance of a surveillance system (Table 6) (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 4). 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 four on all indicators). An exhaustive list of the relationship between indicators and attributes is available on request.
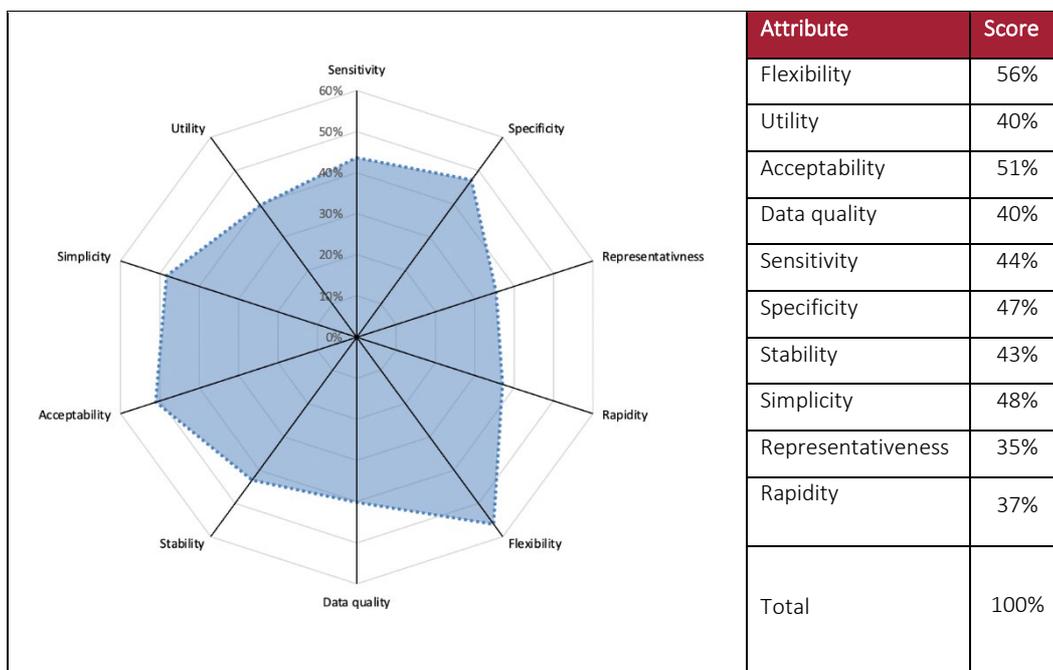
Table 6: Performance attributes evaluated by SET

Attribute	Definition
Sensitivity	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.
Specificity	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 people 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.
Representativeness	A representative surveillance system that 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.
Rapidity/Timeliness	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.
Flexibility	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.
Data quality (reliability)	Reflection of the completeness and validity of the data recorded in the public health surveillance system.
Stability	The surveillance system's ability to collect, manage, and provide data properly, and its availability (the ability to be operational when it is needed).
Acceptability	Assessed by the willingness of people conducting surveillance and those providing data to generate accurate, consistent, and timely data.
Simplicity	Refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives.
Utility/usefulness	The usefulness of a surveillance system is assessed by whether it leads to prevention or control or a better understanding of health events.

Source: Author's own elaboration.

Performance outputs for animal disease surveillance in Tajikistan revealed a surveillance system with lower scores for "representativeness" (35 percent), "rapidity" (37 percent), "utility" and "data quality" (40 percent, respectively). This is in part due to the inadequate surveillance system in place, and incomplete data presented that also has a negative effect on the rapidity of the notification presented to the relevant actors for prompt outbreak response. The low score for data quality is explained by the need for more specific data collection and management at all levels, and the relevance of the surveillance objectives and context. The scores for "stability" (43 percent) and "sensitivity" (44 percent) are explained by the lack of financial resources and qualified staff to understand and develop better prevention and control activities, as well as detection of true health events. This is also connected to limited intersectoral collaboration and the absence of a Steering Committee, where partners are not considered. The highest score is

for "flexibility" (56 percent) which does not demonstrate the ability to adapt to new reporting needs due to resources available and the epidemiology workforce. This is also limited to the classic diagnostic techniques still following Soviet standards, and the absence of implementation of international standards in the surveillance activities conducted.

Figure 4: SET outputs for Tajikistan by performance attribute of the system, April 2021

Attribute	Score
Flexibility	56%
Utility	40%
Acceptability	51%
Data quality	40%
Sensitivity	44%
Specificity	47%
Stability	43%
Simplicity	48%
Representativeness	35%
Rapidity	37%
Total	100%

Source: Author's own elaboration.

Recommendations

SWOT analysis

A strengths-weaknesses-opportunities-threat (SWOT) analysis was conducted to gain a better understanding of the animal disease surveillance system in place in Tajikistan. In this context, the strengths of a surveillance system refer to those aspects that are done well and need to be maintained or reinforced. On the contrary, weaknesses are characterized by areas where the system needs improvement to function better. Opportunities and threats refer to external factors that can positively or negatively impact the system, respectively.

Strengths

Network:
- good geographic coverage by the CFS of the country territory;
- possibility to visit farmers without legal restrictions and apply fines in case of violation of laws in accordance with the Administrative Offence Code;
- well-developed scientific support provided by the Veterinary Association; and
- timely submission of monthly reports.

Modernization:

- newly established CFS directly subordinate to the government allowing decision-making to bypass intermediate actors;
- quarterly published *Journal on Food Security* publicizing the activities and achievements of the CFS; and
- implementation of the National Plan on Reducing the Advance of Antimicrobial Resistance.

Weaknesses

Funding:

- limited budget for surveillance activities, material, and technical equipment;
- young veterinary professionals not interested in working in the field due to the low salaries;
- field-level veterinarians not motivated to perform routine work due to low salaries, as well as an absence of transportation to reach isolated villages, farms, or households;
- wildlife not included in the surveillance programme;
- laboratories often do not have the necessary reagents, kits, and materials for diagnosis.
- diagnosis of other diseases needs to be conducted at the expense of the farmer as the state budget only covers brucellosis seromonitoring; and
- slow procurement process does not allow the prompt purchase of reagents, vaccines, and materials in the case of an emergency.

Facilities:

- most slaughterhouses not compliant with international standards to conduct surveillance;
- absence of proper internet connection, computers, and animal identification system affects the planning and implementation of surveillance activities;
- poor material and technical equipment at all levels; and
- absence of working space for field veterinarians in most areas.

Workforce:

- insufficient field veterinarians to conduct surveillance;
- insufficient epidemiologists at the central level;
- laboratory personnel not involved in surveillance activity planning;
- laboratory system requires sample processing and operations software (LIMS);
- veterinary epidemiologists at the central, regional, and Rayon levels cannot focus on surveillance because they are also involved in phytosanitary and animal breeding work because of the poor organizational structure of the CFS; and
- personnel at all levels not well trained in disease recognition, prevention, and control.

Administrative:

- lack of coordination between central level epidemiologists and Rayon centres;
- lack of coordination with the scientific institutes and other partners (MoH, MoE, MoIA, and others);
- no unified One Health strategic plan or technical/steering committees (fixed in the memorandum and managed by the OH Council);
- no compensation is paid to farmers for culled animals;
- animal owners pay for testing on other highly contagious animal diseases as CFS only covers brucellosis testing;
- private veterinary practices not legally justified and controlled;
- only the central level laboratory accredited;
- insufficient internal communication at all levels (CFS decision-makers are often not aware of the needs and problems of the veterinary unit, field veterinarians are not communicated to by the central level on epidemiological situations, surveillance procedures, etc., and no unofficial WhatsApp groups are available);
- priority diseases not reviewed (social, technical, historical, and political situation);
- strategy for the development of the VS not in place;

- inadequate risk analysis and assessment (based on reports collection and development of an annual report on surveillance activities conducted, planning is based on funds available with no indication of risk areas, etc.);
- absence of surveillance objectives and interpretation of surveillance and disease situation data;
- absence of risk-based surveillance plans with clear performance indicators;
- case definitions do not readily differentiate confirmed from suspected cases;
- planning of surveillance activities not representative;
- international surveillance requirements not followed; and
- outdated SOPs and regulatory documents are not compliant with international recommendations (laboratory tests, risk assessment, case definitions, disease-specific strategic plans development).

Opportunities

- support from international organizations continuously provided (international organizations' evaluations, training, material, and technical support);
- FAO support in the development of a strategy for VS that will be implemented by the CFS; and
- natural barriers (mountains, rivers) prevent the uncontrolled movement of animals between the regions.

Threats

- ongoing reforms of the veterinary system (absence of full support of the VS within the CFS);
- educational programmes at universities require revision with an emphasis on practical epidemiology and risk assessment;
- an epidemiological situation in the country (underreporting of diseases), and in neighbouring countries;
- COVID-19 situation limits the implementation of projects by international organizations as the CFS relies heavily on support from external partners;
- uncontrolled animal movements at the border with Kyrgyzstan, Uzbekistan, and Afghanistan; and
- political situation with neighbouring Kyrgyzstan (absence of clear border demarcation allows uncontrolled animal and people movement posing a risk of disease introduction from outside).

Recommendations and priority actions for improvement

The final product of a SET evaluation is a series of strategies for the improvement of the local animal disease surveillance system. These strategies are presented in the form of priority actions to be taken for improvement with realistic, measurable, and time-bound recommendations that will allow the development of a more detailed action plan based on the identified major recommendations using the information gathered during interviews.

All recommendations are deemed to provide a significant positive impact on the animal disease surveillance system. Recommendations correspond directly with gaps in the surveillance system as visible in the scoring spider graph (Figure 4), while secondary recommendations provide more general system improvements (affecting multiple indicators) or gaps forecasted to occur based on findings during interviews.

Recommendations are then prioritized by the evaluation team into short-term (1–2 years), mid-term (3–4 years), and long-term (5–6 years) based on feasibility (Table 7).

Table 7: Prioritized recommendations from SET outputs, Tajikistan, April 2021

Recommendations	Short-term 1–2 years	Mid-term 3–4 years	Long-term 5–6 years
1. Revise and update the surveillance plans to address and resolve problems related to the control of infectious diseases	🟧		
2. Improve the level of intersectoral collaboration (regulatory document, a communication plan, One Health approach)	🟧		
3. Provide advanced epidemiology capabilities at the central level (continuous training on epidemiology)	🟩	🟩	
4. Develop a human resource plan to comprehensively address current and future requirements	🟩	🟩	
5. Implement quality data for better risk assessment and planning of surveillance activities	🟥	🟥	🟥

Source: Author's own elaboration.

Priority actions for improvement

1	**Revise and update the surveillance plans to address and resolve problems related to the control of infectious diseases**

Issues identified:
- objectives and context of surveillance indicated at 25 percent;
- absence of surveillance objectives and performance indicators;
- development of a VS disease surveillance strategy not in place;
- Case definitions do not readily differentiate confirmed vs. suspected cases;
- planning of surveillance activities not representative; and
- international requirements not followed.

Strategy:
- Develop a VS surveillance strategy with clear and measurable objectives.
- Establish a surveillance scientific committee with clear mandates and TORs involving all partners related to disease surveillance.
- Revise and update disease surveillance plans to match the international standards, including relevant objectives, case definitions, and inputs from the risk assessment and previous surveillance results.
- Implement disease surveillance objectives based on risk assessment.
- Develop case definitions for both suspected and confirmed cases for all notifiable diseases differentiated by species.
- Involve all partners related to disease surveillance (i.e. establishment of a Scientific Commission).
- Deliver strategic goals to field veterinarians and local executive authorities.
- Revise planned preventive and diagnostic activities (redirect funds based on objectives).
- Revise the concept of the "Special Account" to motivate those Rayon food security centres that earned more by providing paid services.
- Implement international requirements and standards.

Roles and responsibilities:

- lead: CFS; and
- partners: Veterinary Association, Scientific Institutes, MoA, International organizations (FAO, OIE).

Resources/inputs:

- internal expert meeting incorporating laboratory staff, internal analysts, and epidemiologists to determine definitions, objectives, and indicators;
- development of a legal basis;
- focal points and funding for annual evaluation of the system; and
- external expert support.

Outputs:

- disease or species-specific surveillance plans developed and adopted according to international recommendations;
- surveillance objectives and key performance indicators regularly revised by the Steering Committee reflecting the objectives and partners involved;
- surveillance activities planned based on objectives;
- development of the technical aspects of surveillance by the Scientific Committee (sampling methodologies and protocols, including active and passive surveillance, epidemiological analyses, case definitions developed, revision or development of SOPs with timelines for reporting and analyses written as well as performance indicators and standard methodology for self-evaluation development); and
- allocated funds redirected in accordance with the strategic objectives; and
- all necessary strategic documents approved.

Outcomes:

- increased efficiency of the surveillance system through the ability to differentiate confirmed vs. suspected cases and the creation of measurable objectives and surveillance indicators allows the progress of surveillance activities to be evaluated;
- strategic objectives achieved, and the epidemiological situation improved;
- improved income from paid services;
- compliance with international guidelines and OIE standards;
- step forward to the development of the FMD and PPR control programmes;
- all partners involved in the surveillance programme; and
- donors involved in the planning of other surveillance activities.

Timeline for completion:

- Surveillance objectives to be developed within 2 years. The following 3–4 years to be spent on the development of protocols, methodologies, and SOPs.

2	Improve the level of intersectoral collaboration

Issue identified:

- insufficient involvement of partners in surveillance activities.

Strategy:

- Establish a One Health Steering Committee coordinating surveillance activities with the private sector, public health, environment protection, internal affairs, and other relevant stakeholders (farmers, slaughterhouses, animal traders, markets, veterinary associations).
- Identify responsibilities and appoint focal points from a relevant group of stakeholders.
- Develop a regulatory cooperation and communication plan.
- Collect data, process, and analyze disease cases in humans and wildlife.

Roles and responsibilities:
- lead: CFS; and
- partners: MoH, MoE, MoIA, local executive bodies, donors (OIE, FAO).

Resources/inputs:
- development and approval of the collaboration mechanisms (written protocols, training, simulation exercises);
- development of a detailed plan for prevention and response to disease outbreaks;
- availability and motivation of appointed coordinators; and
- external expert support.

Outputs:
- a signed regulatory document (Memorandum of Cooperation) with written protocols on cooperation mechanisms;
- regular meetings held to develop joint actions on zoonoses control;
- wider range of information shared by public health professionals and veterinary professionals for bilateral access for joint risk assessment;
- simulation exercises and training; and
- comprehensive participation of all partners in disease surveillance.

Outcomes:
- improved management and communication of zoonotic diseases because of increased stakeholder participation;
- reduction of zoonoses cases in humans (brucellosis, anthrax);
- well-developed network of intersectoral partners;
- early detection and rapid response in combating zoonoses, transboundary, and other priority diseases; and
- increased awareness of veterinary epidemiology monitoring, disease detection, analysis, outbreak investigation, and regulatory documents with the participation of all partners in the surveillance system.

Timeline for completion:
- A regulatory document or a Memorandum of Cooperation to be signed within 1 year with the intersectoral partners adopting a One Health approach. A further year for implementation of cooperation mechanisms.

3	Provide advanced epidemiological capabilities at the central level

Issues identified:
- not enough qualified epidemiologists at the central level;
- no capability and knowledge for comprehensive risk analysis;
- significant gaps in risk management; and
- epidemiology and risk analysis not adequately or routinely performed.

Strategy:
- Use the RAC's risk analysis division to conduct a preliminary risk assessment (risk analysis, risk management, risk communication).
- Develop GIS (using freely available mapping software) and risk modelling methods for surveillance activities planning.
- Provide training on the design and implementation of animal disease surveillance plans.
- Provide training in standardized risk assessment approaches (including laboratory staff) and the analysis and interpretation of surveillance (and other animal health) data.

Roles and responsibilities:

- lead: CFS; and
- partners: RAC, international organizations (FAO, OIE, CDC, WHO, IFAD, etc.), NDC, other divisions of the CFS and regional and Rayon divisions.

Resources/inputs:

- external expert support (to train on risk assessment and risk modelling, using mapping tools), as well as interpretation of surveillance and other disease data;
- software (free mapping tool or GIS) for the RAC;
- material and technical equipment;
- guidelines and risk assessment materials; and
- training.

Outputs:

- continuing education opportunities for central level departments (universities, PhDs, free online courses on epidemiology, risk assessment, mapping tools, other training, etc.);
- mapping and modelling of risk zones;
- communication of results to the surveillance partners, including field veterinarians;
- developed/extended functional responsibilities of the risk analysis department; and
- planning of future surveillance activities based on comprehensive analysis.

Outcomes:

- budget management improved due to prioritization focused on risk-based surveillance;
- compliance with international recommendations on risk-based analysis applied epidemiology understanding;
- future surveillance activities guided by comprehensive analysis; and
- understanding and identification of risk zones.

Timeline for completion:

- Within 3–4 years.

4	Implement data collection, distribution, and storage for better risk assessment and planning of surveillance activities

Issues identified:

- data processing and exploitation indicated at 40 percent, respectively;
- absence of an information system for data collection;
- weakness in the reporting from field to central level; and
- absence of an animal identification system.

Strategy:

- Provide detailed and accurate data collection identifying and mapping disease risk areas.
- Better plan disease prevention and diagnosis activities.
- Establish a real-time national disease reporting system.
- Provide capacity building with the support of donors to improve data collection and processing.

Roles and responsibilities:

- lead: CFS; and
- partners: Government of the Republic of Kazakhstan, NDC, IT companies, international organizations, Veterinary Association, and scientific institutes.

Resources/inputs

- software (with a focus on free options such as Q-GIS, free mapping tools, free data collection and reporting tools, data analysis tools, and disease risk modelling tools);
- external expert support (provided by international organizations and research institutions);

- guidelines and data analysis material; and
- funds for the identification system (e.g. ear tags and software) and laboratory management system provided with the support of donors.

Outputs:
- donor support for identification systems, for example, ear tags procurement and software development;
- reliable and accurate reporting for data analysis;
- basic training on computer skills for field veterinarians; and
- training opportunities for experts working in the system.

Outcomes:
- improved application of international requirements;
- reliable data analyses and planning of surveillance activities;
- speedy data collection and presentation;
- data management system in place to track birth, slaughter/death, and movement of animals;
- compliance with international standards;
- improved fund allocation for surveillance activities (livestock census improved); and
- improved analytical aspects.

Timeline for completion:
- Within 4–5 years. However, this depends on donors. Otherwise data analysis improvement via training in computer skills (using Excel files and producing tables and diagrams for analysis at all levels).

5	Develop a human resource plan to comprehensively address current and future requirements

Issues identified:
- human resources management scored at 26.7 percent.
- few epidemiologists at the central level with a total of eight veterinarians representing the structure of the VS at the central body;
- most field veterinarians close to retirement; and
- CFS is not investing enough in the VS (workforce, resources).

Strategy:
- Attract young professionals and retain specialists for a longer period (i.e. reduce staff attrition).
- Plan and forecast veterinary personnel management (quantitative and qualitative) for sustainable development that should be based on fair distribution.
- Recruit additional epidemiologists.
- Provide job opportunities for technical assistants (para-veterinarians, technicians, and assistants of farmers).
- Improve work conditions and workloads.
- Develop additional motivation mechanisms to encourage veterinarians to work in the field and stay.
- Have the MoE revise the university programmes following international requirements.
- Regulate private veterinary practice (licensing).
- Strengthen the Veterinary Association.

Roles and responsibilities:
- lead: CFS; and
- partners: International organizations, CFS divisions at the regional and Rayon level, MoE, MoF, Veterinary Association.

Resources/inputs:
- material and technical equipment;
- experience exchange;
- incentives/awards; and
- continuous analysis of needs.

Outputs:
- an official personnel management plan developed with a forecasting methodology and future needs for personnel specialists (additional staff is expected to be hired in 2022);
- private veterinarians licensed to provide services for farmers;
- scope of the Veterinary Association expanded for private veterinarians with the possibility of attracting new specialists and the Association now independent of the government (advertising, promoting a business to increase revenue, negotiating group benefits, etc.);
- continuous education of field veterinarians; and
- continuous motivation of Rayon and field veterinarians (incentives/award).

Outcomes:
- prediction of needs for specialists and active adoption of measures to meet needs before a shortage of specialists occurs;
- independent (including financially) private veterinary structures; and
- competitive quality of field veterinarian services.

Timeline for completion:
- Within 3–4 years.

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Appendix I – SET interviews programme

SET MISSION PROGRAM in Tajikistan between 5-16 April, 2021

Day 0 (Sunday)	Day 1 (Monday 5 April)	Day 2 (Tuesday 6 April)	Day 3 (Wednesday 7 April)	Day 4 (Thursday 8 April)	Day 5 (Friday 9 April)	Day 6 (Saturday 10 April)
Afternoon	**Interviews at central level (Dushanbe):** 09:00 – Launching meeting with key decision-makers (Committee of Food Security, border control division, Public Health, Ministry of Internal Affairs, Committee of Environment of Protection, Dushanbe city Veterinary Department, Veterinary Association, Food Security Journal, Republican Antiepizootic centre) – Interviews with participants of the meeting	**Interviews at Central level (Dushanbe)** 09:00 Food Security Division for Dushanbe city; 10:30 – Food Safety Laboratory in the Mehragon market;	**Field (Sughd oblast)** 9:00 Interview at the regional and district level: - Office of the CFS in the Sughd region; - CFS Center in Khujand; - Department of the Office of the CFS at the state border and transport in the Sughd oblast; 10:00 - Center for Diagnostics of Food Safety in Sughd oblast; 11:00 - Slaughterhouse in Khujand	**Field** Drive towards the city of Isfara (1h.30 min.) 10:30 District level interview: - Center for Food Security in Isfara;	**Field** Drive towards the city of Istaravshan (1 h.30 min.) 10:30 Interview at the district level: - Center for Food Security in Istaravshan;	**Return to central level** Revision of the information obtained from the field. Preparation to the scoring session
- HQ team arrival: to Dushanbe Flight No.: KC 622 Lands at:12 pm						
					Afternoon	
					13:30 - Center for Diagnostics of Food Security in Istaravshan	
				Afternoon 14:00 Visit to a livestock farm;	14:30 Animal owner	
			Afternoon Drive to B. Gafurov rayon (30 min): 14:00 CFS division in B. Gafurov rayon level; 15:00 Visit of cattle farm; 16:00 Farmers	16:30 Animal owner	15:00 Return to the central level in Dushanbe city (5 hours)	
	Afternoon -UNDP security debriefing -Central Diagnostic Vet Lab	**Afternoon** 13:30 Slaughterhouse in Dushanbe 15:00 Departure to the Northern part of Tajikistan (Khudjand) 5 hours drive				
Hotel: Atlas	**Hotel:** Atlas	**Hotel:** Atlas	**Hotel:** in Chkalovsk	**Hotel:** in Chkalovsk	**Hotel:** Atlas	