Supplementary Material 1. FAO lab capacitation.

#	Area	Category	Sub Category	4	3	2	1	Assessments scores		
								A	B	C Current
1	General Laboratory Profile	Geographic location	Strategic placing	Isolated compound outside of any residential area	Isolated compound in low populated area	Single building in low populated area	Building within residential area			
2			Accessibility	Proper containment + guard (24 hr) + Restricted access to building by use of Identity card (employees) only	Restricted access, doors are locked + guard at the entrance for 24 h	Doors are closed but not locked / low biosecurity level / guard is not always present	Easy access to laboratory compound even by visitor / stranger / doors are open / no guard present			
3			Location, access	Access to highway, airport, harbor and / or station within 30 minutes	Access to highway, airport, harbor or station within 60 minutes	Access to road; but sometimes limitations (traffic, road condition, flooding)	Regular limitations in access to transport means (traffic, bad road, airport is far)			
4		Laboratory Budget	Financial autonomy (allocation of funds)	Lab is financially autonomous, lab funds (>90%) from public source and/or self-generated	Lab is almost financially autonomous; lab funds from public source or self-generated (>60%) AND development programmes (<40%)	Lab has insufficient own budget (<60%), activities dependant on development partners (>40%)	Lab has no autonomous budget; all activities exclusively rely on external funding source			
5			Research autonomy (n of publication / year)	Lab budget allows ample opportunity for research (>10 publications/year) besides routine diagnostic/production	Lab budget allows limited research (1 to 10 publications/year according to the lab context), but mainly routine diagnostic/production	Lab budget is insufficient for research, but results from ongoing work are published in national journals/bulletin or regularly presented	No research activity due to insufficient lab budget			
6			Autonomous infrastructural upgrading (n of constructions / year)	Lab budget sufficient for regular (1/year) upgrading / renovation of larger lab infrastructure	Lab budget allows irregular (1 / 3 years) independent upgrading / renovation of infrastructure	Constructions or renovation by use of lab budget irregular and only for minor infrastructural changes	Construction or renovation in general only possible under external funding			
7		Basic supply	Regular (hours of) electricity supply	Constant (24 hours) stable electricity supply + stabilizer and automatic stand-by generator	24 hours electricity supply + stabilizer and back-up generator (manually operated)	Frequent electrical instability/voltage irregularity, manually/automatically operated generator + stabilizer	Electricity supply (temporarily) less than 10 hours per day, generator does not run permanently (not existent, no fuel)			

8			Regular water supply (access and quality)	Daily and unlimited supply of good-quality (drinkable) water (pipe) through public source; no risk of water shortage	Sufficient daily supply of low quality (not drinkable) water through pipe or tank ; back-up tank available	Supply of water through tank; sometimes insufficient or low quality (not drinkable)	Irregular and insufficient water supply, also low quality (not drinkable)			
9			Access to purified, deionized, distilled water	Unlimited access to purified water; own production of deionised and distilled water	Easy access to deionised and distilled water (external/internal source)	Limited access to deionised and/or distilled water (external/internal source)	Difficult or no access to deionised and/or distilled water			
10		Organization	Sustainable personnel organization system	Organigram and organization system in place + written description of responsibilities according to personnel skill level	Organigram and organization system in place; staff mostly know their roles, but not written down	Organization system in place, but frequent changes, staff not always clear on their roles	Frequent shifting of personnel, no stable organization system			
11	Infrastructure, equipment, supplies	Infrastructure	Containment (means of containment)	All lab departments (of different Biosafety levels) are clearly separated and well contained by airlock, personnel shower/changing room, sterilizing and storage rooms; use of disinfections, identity badges or other means (then describe). It can be accessed only by lab staff from the department	Lab departments are separated (e.g. different buildings, different floors) with restricted access but can be accessed by lab staff from other department with change of lab clothes including shoes and use of disinfectants	Lab departments are separated (e.g. different buildings or different floors for different departments), all lab staff can enter the different departments any time, change of lab clothes possible but not always required/followed	No clear separation, e.g. one-room-lab or one floor harbours different departments (rooms) that can be easily accessed without changing clothes, without using disinfectants			
12			Functionality of all departments (safety)	Lab facilities of all departments are air locked, have a fire extinguisher, gas supply; emergency exit and alarm system; monitoring for staff adherence to safety rules and practices; there is room for upgrade	Lab facilities of more than 70% of departments are well-maintained, have a fire extinguisher, gas supply; safety rules and practices are followed, but absence of monitoring system; there is room for upgrade	Only some facilities (<70%) are well-maintained, e.g. virology, pathology section, are regularly maintained; room for upgrade is limited; safety rules and practices are not always required/followed	>60% of labs of the departments are in poor status, only few temperature control system/mainly window ventilation, no fire extinguisher, there are hardly any safety rules and practices; room for upgrade is limited			
13			Biosafe virology lab	BSL-3/4 Virology lab (Biosafety Cabinets Class (BSC)-III)	BSL-2/3 Virology Lab (BSC-II)	BSL-1/2 Virology lab (one BSC-II)	No biosafe Virology lab (BSC-II not functioning or not existent)			

14			Biosafe post mortem room	BSL-3/4 Postmortem (PM) room + BSC-III	BSL-2/3 PM-room + BSC-II	BSL-1/2 PM-room (BSC-II)	No biosafe PM-room, no BSC			
15			Biosafe Bacteriology lab	BSL-3/4 Bacteriology lab + BSC-II	BSL-2/3 Bacteriology lab + BSC-II	BSL-1/2 Bacteriology lab + 1xBSC-II	No biosafe Bacteriology lab (BSC-II not functioning or not existent)			
16			Animal facilities	BSL-3 Animal facility in use for experiments and bioproducts (diagnosis)	Animal facility in use (BSL 1-2) for production of diagnostic reagents (SPF-eggs, sera etc.)	Animal facilities available but not in use; and no BSL	Animal facilities not available			
17			Cleaning plan and checking process	Cleaning plan and checking process in place, regular microbiological controls	Cleaning plan and checking process in place, no microbiological controls	Occasional cleaning , no cleaning plan drafted	No cleaning , no cleaning plan drafted			
18			Separated rooms for PCR (number of rooms and BSC/PCR hood/laminar flow cabinet)	PCR set-up (extraction, master mix, template, machine) separated (2-3 rooms/workstations, air flow controlled, 1-2 BSC-II + 1 PCR-hood) including change of lab clothes (coats and shoes) + dedicated small PCR equipment (centrifuges, vortex, micropipettes)	PCR set-up (extraction, master mix, template, machine) separated (2-3 rooms/workstation, 1-2 BSC-II + 1 PCR hood), including change of lab clothes (coats and shoes) , but no dedicated small PCR equipment (centrifuges, vortex, micropipettes)	Different rooms available (3 rooms or 2 rooms and 1 BSC-II + 1 laminar flow far from each in one room), but not in consequent use for PCR set-up separation, no change of lab clothes and no dedicated micropipettes	No or insufficient separation of PCR set-up (1 room for all 4 activities or 0-1 BSC-II (not functional equals 0)			
19			Biosafe and biosecure labs (no of labs without air-lock, AC)	All labs are closed rooms and harbour Air Conditioner (AC) in all departments	Labs of at least 3 departments (virology, bacteriology and molecular biological) are closed and lockable rooms and harbour AC	Only few labs in selected departments (e.g. AI-Lab in virology department) have closed rooms and harbour AC, other rooms have windows or not functional (old) AC	In the majority of labs doors or windows do not properly close, if AC in rooms they are not or rarely functional			
20		Equipment	Equipment for diagnosis of viral diseases	Virology department sufficiently equipped to carry out biosafe and rapid diagnosis of various viral diseases (>10 viruses including TAD/zoonoses) by virus isolation and other tests (including cell culture, electronic microscopy, etc.); Samples received are processed within 24 hours	Virology department sufficiently equipped to carry out biosafe and rapid diagnosis of only selected diseases (5 to 10 viruses) by virus isolation and other tests (including cell culture, electronic microscopy, etc.); Samples received are processed within 24 to 48 hours	Virology department uses old equipment (more than 10 years). Some equipment may be broken or is not well-maintained. Only few diseases can be tested (less than 5)	Virology department lacks functional equipment for appropriate diagnosis of viral diseases, for any technique			

21			Equipment for serology department	Serology department sufficiently equipped to carry out diagnosis of various diseases (>10 diseases including TAD/zoonoses) by various techniques.	Serology department is equipped to carry out diagnosis of only selected diseases (5 to 10 diseases) by various techniques.	Serology department uses old equipment (more than 10 years). Some equipment may be broken or is not well-maintained. Only few diseases can be tested (less than 5).	Serology department lacks functional equipment. Only rough-and-ready techniques can be performed.			
22			Equipment for molecular biological diagnosis	Molecular section sufficiently equipped (functional BSC-II, PCR hood, PCR cycler…) to carry out diagnosis of various diseases (>15 pathogens); including real-time PCR and functional sequencer or access to efficient sequencing services (results within 48 hours)	Molecular section sufficiently equipped to carry out diagnosis of 5 to 15 selected pathogens (including real-time PCR and access to sequencing machine/services)	Molecular section lacks modern equipment but may harbour old PCR cyclers and gel-electrophoresis equipment for 3 to 15 selected pathogens	Molecular section lacks even basic equipment, is not functional or is not existent			
23			Pathology department equipment for necropsies	Pathology department sufficiently equipped to carry out necropsies of variable size animals, including big animals. Biosafety and biosecurity conditions are good (protection against contamination of personnel and of the environment).	Pathology department sufficiently equipped to carry out necropsies of variable size animals, including big animals. Biosafety and biosecurity conditions are not fully respected to protect against contamination of personnel and of the environment).	Pathology department can carry out necropsies of some species. Some biosafety and biosecurity conditions are not respected (personal protective equipment, use of facilities, effluent management ...) to protect against contamination of personnel and of the environment).	Pathology department lacks basic equipment for appropriate necropsies. Biosafety and biosecurity conditions are not respected.			
24			Pathology department equipment for histo-pathological techniques	Pathology department sufficiently equipped to carry out up-to-date histo-pathological techniques (including immunohistochemistry)	Pathology department is equipped to perform basic histopathological techniques. These techniques are routinely performed.	Pathology department is equipped to perform basic histopathological techniques, but these techniques are performed rarely.	Pathology department lacks basic equipment for appropriate histopathological analysis.			
25			Equipment for diagnosis of bacterial diseases	Bacteriology department sufficiently equipped to carry out biosafe and rapid diagnosis of a broad range of bacterial diseases (>10 bacterial diseases/ including TAD/zoonoses)	Bacteriology department sufficiently equipped to carry out biosafe diagnosis of at least the most important bacterial diseases (5-10 TAD/zoonoses)	Bacteriology department uses old (>8years) equipment for diagnosis of important bacterial diseases; only few (max 5) bacteria can be typed/cultivated	Bacterial department lacks basic equipment for appropriate diagnosis of bacterial diseases (e.g. equipment not existent or not functional)			

26			Equipment for diagnosis of parasitological diseases	Parasitology department sufficiently equipped to carry out up-to-date diagnosis of a broad range of parasitological diseases (>10 including most important)	Parasitology department sufficiently equipped to carry out up-to-date diagnosis of at least the most important parasitological diseases (5-10)	Parasitology department uses old (>8years) equipment for diagnosis of important parasitological diseases; only few parasites (max 5) can be typed	Parasitology department lacks basic equipment for appropriate diagnosis of parasitological diseases (e.g. equipment not existent or not functional)			
27			Maintenance procedures for autoclave(s)	Periodic maintenance procedures in place for all autoclave(s); annual maintenance by specialist the last 3 years; systematic use of steam autoclave indicator	Periodic maintenance procedures not fully in place for all autoclave(s); annual maintenance by specialist the last 3 years; systematic use of steam autoclave indicator	Periodic maintenance procedures not fully in place for all autoclave(s); at least one full maintenance by specialist done the last 3 years; use of steam autoclave indicator not systematic.	Autoclave(s) never maintained; no constant use of steam autoclave indicator			
28		Reagent supply	Fresh reagent supply, procurement, affordability	Reagents for all operating procedures can be autonomously procured; fresh supplies are always available for continuous service/work	Only selected reagents can be autonomously procured for diagnostic use; fresh supplies are not always available	Only few reagents can be autonomously procured for diagnostic use; always come with delay upon request -> reagents are often missing	All reagents for diagnostic use must be procured by external funding/organization			
29			Own production of diagnostic reagents (type, quality)	Key diagnostic reagents/material (antigen, antisera, cell lines, buffer solution, red blood cells (RBC)…) is self-produced in good quality (according to standards and monitored, documented) in sufficient amount and validated; animals serving for diagnostic material are SPF	Some reagents/material for diagnostic use (RBC, buffer solution, culture medium, chicken eggs) can be self-produced; efforts taken to produce in good quality according to standards (animals serving for reagent material are kept in quarantine and monitored for diseases (SAN)	Limited reagents/material for diagnostic use are produced (e.g. RBC, buffer), quality questionable with regard to animal source for reagents (not quarantine, not monitored for diseases (not SPF, or not SAN)	No self-production			
30			Proper stocking/storage of reagents	Separate storage and documentation (updated inventory log) of different material (reagents, sera, samples …) according to QA / QMS standards	Separate storage of different material (reagents, sera, samples…), a list is available but no inventory log of all supplies and reagents	No correct separation of storage of different material; expired reagents; a list may or may not be available	No separation of storage of different material, storage conditions doubtful because of limitations in functionality or availability of appropriate rooms or freezer / fridges / electricity, insufficient documentation, expired supplies			

31			Validity of reagents for virological investigations	Reagents for daily virological diagnosis by several techniques (excluding serology) are available for a range of viral diseases, including cell culture (>10 viruses including TAD/zoonoses or all viral testing under their mission*)	Reagents for daily virological diagnosis by several techniques (excluding serology) are available for a range of viral diseases, including cell culture (5-10 viruses including TAD/zoonoses or partial viral testing under their mission). Some reagents are expired.	Limited reagents for diagnosis of few viral diseases (1-5) through rough-and-ready techniques; Reagents are usually not properly stored (no constant freezing), 40 to 70% of reagents are expired	Virology (excluding serology) department hardly harbours any reagents, or reagents are expired or have not been properly stored (>70%).			
32			Validity of reagents for daily immuno-serological diagnosis	Reagents for daily immuno-serological diagnosis by several techniques are available for a range of diseases (>10 diseases including TAD/zoonoses or all diseases under their mission*)	Reagents for daily immuno-serological diagnosis by several techniques by several techniques are available for a range of diseases (5-10 diseases including TAD/zoonoses or partial diseases under their mission*). Some reagents are expired.	Limited reagents for immuno-serological diagnosis (1-5 diseases) through rough-and-ready techniques; Reagents are usualy not properly stored (no constant freezing), 40 to 70% of reagents are expired	Immuno-serological department hardly harbours any reagents, or reagents are expired or have not been properly stored (>70%).			
33			Validity of reagents for PCR and sequencing	Reagents for daily molecular diagnosis are available in sufficient amount and stored in good condition (including for real-time PCR technology and for sequencing); enzymes are stored at constant -20°C	Reagents for daily molecular diagnosis are available -and stored in good conditions- but with some limitations (e.g. no real-time PCR, but conventional PCR, reagents for sequencing limited)	Reagents for daily molecular diagnosis are frequently limited (frequent shortages, especially in real-time PCR reagents and extraction kits; not properly stored; some are expired)	Molecular diagnosis cannot be carried out due to constant or almost constant lack of valid reagents			
34			Validity of reagents for bacteriological investigations	All necessary reagents for daily diagnosis of a broad range of bacterial diseases (excluding serology) are available (>10 bacterial diseases including TAD and zoonosis or all diseases under their mission*)	All reagents for diagnosis of a limited range but of the most important bacterial diseases (excluding serology) (5-10; zoonosis, TADs or partial bacterial diseases under their mission*)	Limited reagents for diagnosis of bacterial diseases (1-5); reagents are not properly stored (no constant freezing), 40-90% of reagents are expired	Bacteriology department harbours hardly any reagents for diagnosis of bacterial diseases, or reagents are expired, or have not been properly stored			

35			Validity of reagents for pathological methods	All reagents for histo-pathological investigations are daily available (staining, IFT-antibodies, fluorescent dyes…)	Pathology department harbours all necessary reagents for necropsies / gross-pathology but often lacks some reagents for histo-phatology (e.g. staining, IFT-antibodies…)	Pathology department harbours limited reagents for pathology; in general, histo-pathology is not functional due to a lack of valid and appropriate reagents	Pathology department hardly harbours any reagents for histo-pathological exam, or reagents are expired, or have not been properly stored; only gross pathology possible			
36			Validity of reagents for parasitic methods	All necessary reagents for diagnosis of a broad range of parasitic diseases are daily available (>10 parasitic diseases including TAD and zoonosis or all diseases under their mission*)	All reagents for diagnosis of a limited range but of the key parasitic diseases (5-10; zoonosis, TADs)	Limited reagents for diagnosis of parasitic diseases (1-5); reagents are not properly stored 40-90% of reagents are expired	Parasitology department hardly harbours any reagents, or reagents are expired, or have not been properly stored			
37	Laboratory performance	Staff skills + availability	Number of trained and experienced staff per department	Each department counts at least one senior and two junior scientists and at least 2 technicians/co-workers. All staff is trained and experienced	Each department has at least one senior and one junior scientist and 2 or more technicians/ co-workers, but not all are well-trained or experienced or always available	In each department, the number of staff is not sufficient (1 scientist, 1 technician) or are not available for more than 2 working days per week	Serious lack of skilled (trained and experienced) personnel in most of the departments (<1 scientist or <1 technician per department); or their availability is of less than 2 working days per week			
38			Expertise of staff in virology/serology (continuing education and accuracy of testing)	All staff in virology/serology department is experienced, well-trained and continuously educated (>2 training opportunities per year); all tests are reported within 48 hours, test results are validated and recorded before release	Well-trained and motivated but not very experienced staff in virology/serology department; <2 opportunities per year for continuing education; tests reported sometimes with delay; test results are recorded	Trained staff in virology/serology department, but lack experience/ motivation, <1 training opportunity per year; tests reported sometimes with delay, results not always recorded	Staff in virology/serology department not trained or motivated; samples often left uninvestigated, no prompt reporting, results not always recorded			

39			Expertise of staff in molecular biology (continuing education and accuracy of testing)	All staff in molecular department is experienced, well-trained and continuously educated (>2 training opportunities per year); all tests are reported within 48 hours, test results are validated and recorded before release	Well-trained and motivated but not very experienced staff in molecular department; <2 opportunities per year for continuing education; tests reported sometimes with delay; test results are recorded	Trained staff in molecular department, but lack experience/ motivation, <1 training opportunity per year; tests reported sometimes with delay, results not always recorded	Molecular section does not exist or staff in molecular section not trained or motivated; samples often left uninvestigated, no prompt reporting, results not always recorded			
40			Expertise of staff in bacteriology and parasitology (continuing education and accuracy of testing)	All staff in bacteriology and parasitology departments is experienced, well-trained and continuously educated (>2 training opportunities per year); all tests are reported within 48 hours, test results are validated and recorded before release	Well-trained and motivated but not very experienced staff in bacteriology and parasitology departments; <2 opportunities per year for continuing education; tests reported sometimes with delay; test results are recorded	Trained staff in bacteriology and/or parasitology department, but lack experience/ motivation, <1 training opportunity per year; tests reported sometimes with delay, results not always recorded	Staff in bacteriology and/or parasitology department not trained or motivated; samples often left uninvestigated, no prompt reporting, results not always recorded			
41			Expertise of staff in pathology (continuing education and accuracy of testing)	All staff in pathology department is experienced, well-trained and continuously educated (>2 training opportunities per year); all tests are reported within 48 hours, test results are validated and recorded before release	Well-trained and motivated but not very experienced staff in pathology department; <2 opportunities per year for continuing education; tests reported sometimes with delay; test results are recorded	Trained staff in pathology department, but lack experience/ motivation, <1 training opportunity per year; tests reported sometimes with delay, results not always recorded	Staff in pathology department not trained or motivated; samples often left uninvestigated, no prompt reporting, results not always recorded			
42			Staff emergency service	Staff for emergency available for 24 hours + weekend shifts	Irregular availability (only in special situation) of staff for emergency ; weekend shifts are planned	Irregular availability of staff for emergency and weekend shifts only rarely (<20 weekends per year)	Less than 10 weekend shift per year, no staff for emergency available;			
43			Availability of maintenance staff	Maintenance staff (plumbing, electricity, mechanics etc.) employed and daily available, with emergency service	Maintenance staff available during working hours	Maintenance staff available with delay in arrival (sometimes hours, sometimes days of delay)	Very difficult to get hold of maintenance staff			
44		Sample accessio n	Carcass accession (number of carcasses per week, month or year)	Pathology department receives carcasses >25 weekly or >100 monthly or >1200 per year for post-mortem	Pathology department receives 15-25 carcasses weekly or 60-100 monthly or 720-1200 yearly for post-mortem	Pathology department receives 5-15 carcasses weekly or 20-59 monthly or 240-719 yearly for post-mortem	Pathology department receives <5 carcasses weekly or <20 monthly or < 240 yearly for post-mortem			

45			Case sample throughput in Immunoserology (nb of biological samples per year)	Immunoserology laboratory receives more than 100,000 routine samples per year.	Immunoserology laboratory receives between 50,000 to 100,000 routine samples per year.	Immunoserology laboratory receives between 10,000 and 50,000 routine samples per year.	Immunoserology laboratory receives less than 10 000 routine samples per year.			
46			Case sample throughput in virology (nb of biological samples per year)	Virology laboratory receives more than 5,000 routine samples per year.	Virology laboratory receives between 2,500 and 5,000 routine samples per year.	Virology laboratory receives- between 1,000 and 2,500 routine samples per year.	Virology laboratory receives less than 1,000 routine samples per year.			
47			Case sample throughput in bacteriology (nb of biological samples per year)	Bacteriology laboratory receives more than 5,000 routine samples per year.	Bacteriology laboratory receives more between 2,500 and 5,000 routine samples per year.	Bacteriology laboratory receives more between 1,000 and 2,500 routine samples per year.	Bacteriology laboratory receives less than 1,000 routine samples per year.			
48			Case sample throughput in paraistology (nb of biological samples per year)	Parasitology laboratory receives more than 5,000 routine samples per year.	Parasitology laboratory receives more between 2,500 and 5,000 routine samples per year.	Parasitology laboratory receives more between 1,000 and 2,500 routine samples per year.	Parasitology laboratory receives less than 1,000 routine samples per year.			
49			Sample throughput by PCR	Investigation of samples by PCR: >20 samples weekly or >80 monthly or >960 per year	Investigation of samples by PCR: 10-20 samples weekly or 40-80 monthly or 480-960 per year	Investigation of samples by PCR: 5-9 sample weekly or 20-39 monthly or 240-479 per year	No PCR performed, or only in rare circumstances (<5 sample weekly, <20 monthly, <240 per year)			
50			Sample throughput from surveillance or monitoring	Lab is regularly involved in active surveillance or monitoring of >3 animal diseases that generates more than 20,000 samples per year	Lab is involved in active surveillance of 2-3 animal diseases that generates 10,000-20,000 samples per year	Lab is involved in surveillance of 1 animal disease and receives 1,000-9,999 samples per year	Lab is currently not involved in active surveillance or monitoring			
51			Prompt sample processing	Processing of overall diagnostic samples is carried out same day of reception by trained and experienced lab staff	Overall sample processing is usually carried out within 1-2 days by trained and experienced lab staff (e.g. days before the week end or holidays or when samples arrive in the afternoon)	Samples are usually put into fridge or freezer for some days until investigation; or samples are stored for maximum 3 days and then shipped to another laboratory	Diagnosis samples are usually put into fridge or freezer over 3 days before being processed because of lack of staff; OR: some samples are sent to another lab, but often not immediately			

52		Available technology	Post mortem capability (skills and experience of pathologists) in necropsies	All necropsies conducted by specifically trained and/or experienced (>5 years) pathologists. The volume of activity allows to maintain this skill	All necropsies conducted by specifically trained and/or experienced (>5 years) pathologists, but the volume of activity is not sufficient to maintain this skill	Necropsies are not all conducted by specifically trained and/or experienced (>5 years) pathologists	No available experience in necropsy in the laboratory			
53			Skills and experience of histologists	Specifically trained and/or experienced (>5 years) histologists. The volume of activity allows to maintain this skill	Specifically trained and/or experienced (>5 years) histologists, but the volume of activity is not sufficient to maintain this skill	No histology competence available in the laboratory, but has access to reliable and effective sub contracted services	No competence in histology available in the laboratory, and no access to reliable and effective sub contracted services			
54			Prompt bacteria identification	All required operating methods (SOPs) available at the laboratory describing the method of identification / isolation of all important bacteria* causing disease in animals and/or zoonotic. The laboratory regularly performs (at least once per quarter) these methods	Most SOPs describing the method of identification / isolation of all notifiable bacteria** causing disease in animals and/or zoonotic in the region are generally available in the laboratory. The laboratory regularly performs (at least once per quarter) these methods	Only a few SOPs describing the method of identification / isolation of all notifiable bacteria** causing disease in animals and/or zoonotic in the region are available in the laboratory and/or the laboratory does not regularly performs (less than once per quarter) these methods	No operating methods describing the method of identification / isolation of notifiable bacteria** causing disease in animals and/or zoonotic expected to be present in the region are available in the laboratory.			
55			Prompt parasite identification	All required operating methods (SOPs) available at the laboratory describing the method of identification of all important parasites* causing disease in animals and/or zoonotic. The laboratory regularly performs (at least once per quarter) these methods	Most SOPs describing the method of identification of all parasites** causing notifiable disease in animals and/or zoonotic in the region are generally available in the laboratory. The laboratory regularly performs (at least once per quarter) these methods	Only a few SOPs describing the method of identification of parasites** causing notifiable disease in animals and/or zoonotic in the region are available in the laboratory and/or the laboratory does not regularly perform (less than once per quarter) these methods	No SOPs describing the method of identification of parasites** causing notifiable disease in animals and/or zoonotic expected to be present in the region are available in the laboratory.			
56			Microscopy capacity	Microscope functional and in regular (weekly) use	Microscope functional but no operator or infrequently used (< 1 per months)	Microscope available but not satisfactory	No microscope			
57			Cell culture (virology) capability	Well-established (>5 years) and biosafe/clean cell culturing with >5 different cell lines	Cell-culturing possible but with limited cell types (<5 cell lines) or established less than 5 years ago	Cell-culturing possible with limited cell types (<2 cell lines), but limited expertise	No cell-culture			

58			Egg culture (virology) capability	Biosafe (BSC-II and III or BSL-3 conditions) virus isolation with Embryonated chicken eggs (ECE)	Culturing with Embryonated chicken eggs (ECE) under limited BSL (BSC-II only)	Limited and irregular use of ECE for various reasons (limited access to SPF or SAN eggs, no experienced operator, no functioning incubator, no BSC-II…)	No or rare (<1 per 6 months) use of ECE, and limited BSL			
59			Serological capability	Weekly use of serological assays; all following assays are implemented: ELISA, HI, Immuno-histochemistry, Immuno-Fluorescence, AGID for diagnosis of broad range of diseases including all key animal diseases (>10)	Weekly use of serological assays; all following assays are implemented: ELISA, HI, Immuno-histochemistry, Immuno-Fluorescence, AGID for diagnosis of key animal diseases (5-10)	Only use of basic serological assays like HI, AGID for a few key diseases (<5); limitation in use of ELISA or immunofluorescence	No use or rare use (<1 assay per 4 months) of serological assays like ELISA, HI, Immuno-histochemistry, AGID			
60			Molecular capability	PCR technology (including realtime) weekly used for >10 genome targets	PCR technology (including realtime) used for 5-10 genome targets	Conventional PCR technology applied only for <5 genome targets	No PCR technology applied			
61			Annual maintenance of PCR cycler	Annual maintenance of PCR cycler	Irregular maintenance of PCR cycler	No/or rare maintenance of PCR cycler	No PCR			
62			Sequencing capability	Sequencing technology applied and frequently used (≥ 2 per month or more than 100 sequences per year) and maintained following manufacturer's instructions	Sequencing technology is set up, but rarely used (<2 per month); infrequent maintenance; easy access to external sequencing services	Sequencing technology available but not in use (not functional, no kits, no experienced operator…) and/or some access to external sequencing services	No direct access to sequencing services			
63			Animal experiment capability	Animal experiments as diagnostic method (esp. ICPI, IVPI, mouse inoculation, inoculation of larger animals) applied under biosafe conditions	Animal experiments as diagnostic method applied under unsatisfactory conditions (e.g. insufficient biosafety)	A few animal experiments (e.g. mouse inoculation for rabies) may be used but lacks of appropriate expertise/other conditions (no biosafe conditions, no easy access to animals, no experienced operator)	No experiments performed on animals			
64	QA, Biosafety/Biosecurity	Training	External training in lab performance	Staff (scientist, technicians) of each/every department receives at least 1 external training per year in lab diagnosis	Not every staff, and/or not all department receives at least 1 external training per year in lab diagnosis	Only few selected staff* receives at least 1 external training per year in lab diagnosis	Only few selected staff* receive occasional (< 1 per year) external training in lab diagnosis			
65			Internal training in lab performance/GLP	Every staff of each department receives documented weekly in house [training / updates / meetings] on GLP	Not every staff, and/or not all department receives at least 1 internal [update/training/meeting] on GLP per month	Only selected staff* receive rare (<1) internal [update training/meeting] on GLP per month	No weekly or monthly in house [training/updates/meeting] on GLP			

66			Training in QA/QC	Key staff receives documented and regular (>1 per year) training in quality assurance (QA)/quality control (QC)	Key staff receives regular (1 per year) training in QA/QC; consistent documentation on QA/QC not always available	Key staff rarely receives (< 1 per year) training in QA/QC; consistent documentation on QA/QC not available	No (< 1 every 2 years) training opportunity in QA/QC			
67			Training in maintenance and calibration	Key staff receives documented and regular (≥ 1 per year) training in equipment maintenance and calibration	Key staff receives irregular (<1 per year) training in equipment maintenance and calibration; consistent documentation on maintenance and calibration not always available	Rare trainings (<1 every 2 years); consistent documentation on maintenance and calibration not available	No training in equipment maintenance and calibration in the last 3 years			
68			Training in lab management	Directors/managers regularly (1/year) trained in lab management	Directors/managers irregularly (1 every 2 years) trained in lab management	Directors / managers irregularly train themselves through self-education or e-learning on lab management	No training in lab management			
69			Training in biosafety	All staff receive regular documented training in biosafety practices (>1 per year)	Selected* staff receive regular (1 per year) training in biosafety practices; and/or no consistent documentation	Staff rarely trained but good level of awareness in biosafety	No training opportunity for most of the staff in biosafety practices, low awareness level among the staff			
70			Training in shipping of infectious substances	Up-to-date certification for shipping of infectious substances (IATA standards), -for more than one person	Up-to-date certification for shipping of infectious substances (IATA standards), for one person in the lab	Out-of-date certification for shipping of infectious substances (IATA standards)	No certification for shipping of infectious substances (IATA standards) (since 3 years)			
71		Quality Assurance	Standard requirements for the competence to carry out tests and calibrations	Quality system applied in 80% of departments, accreditation of 80% of analytical parameters	Quality system applied in 80% of departments, accreditation of 40% of analytical parameters	No accreditation yet but in the process of adapting ISO 17025 standards in most departments for future accreditation	Quality system not in place			
72			Corrective and preventive actions management	System established to manage corrective and preventive actions, registration in the quality management system, customer complaints management	System established to manage corrective and preventive actions, registration in the quality management system, no customer complaints management	System established to manage corrective and preventive actions, no registration in the quality management system	No management of nonconforming testing			
73			Best practice testing of particular diseases	Satisfactory results (>75% correct) in Proficiency Testing for at least 3 selected diseases* in the past 18 months	Participation to Proficiency Testing for at least 3 selected diseases* and satisfactory results (>75% correct) in at least one in the past 18 months	Participation in Proficiency Testing in the past 18 months for selected diseases*	No participation in Proficiency testing within the past 18 months			

74			Methodology standardization	SOPs for all performed tests prepared and in use; including available biosafety information relevant to the tests	SOPs only for selected key diseases* in use including biosafety procedures	SOPs for selected test under development, or SOPs developed and in use but biosafety information missing	No or only a few SOPs available/under development			
75			Correct performance of tests / methodology and kits	Proper and documented validation of in house tests / commercial kits by using reference material before use on routine basis	Validation of in house tests / commercial kits by using reference material before use on routine basis; but insufficient documentation available	No regular validation of in house tests or kits by using reference material before use on routine basis; No documentation available	No kits/test validation			
76			Overall lab quality assurance	Quality officer/manager assigned + quality manual fully applied	No quality officer/manager assigned, or Quality manual only partially applied	No quality officer/manager assigned, and/or Quality manual still under process	No Quality officer/manager and no quality manual developed			
77			Test quality assurance	Use of internal test quality control (QC) in all tests according to international standards	QC not always applied; not necessarily according to international standards	QC rarely applied for key tests, but not in all runs/tests	No experience in QC			
78			Sample identification and follow-up	Identification and tracking of each sample entering the lab by use of LIMS or bar-coding or comparable technology	Identification and tracking of each sample entering the lab by use of well documented Log-Book or Excel file	Identification and tracking of each samples for only a few diseases	Irregular identification and tracking of samples			
79			Application of international recommendations	OIE/WHO/FAO/CDC guidelines and OIE Terrestrial Manual are applied	OIE Manual and/or other guidelines are in place, but not sufficiently followed	OIE Manual and/or other guidelines rarely used	No notice of OIE Manual or other guidelines			
80			Metrology procedures	All departments have described and routinely implemented metrology procedures*	Some departments have described and routinely implemented metrology procedures*	All or some departments have metrology procedures described but not implemented routinely	None of the departments have metrology procedures described			
81			Maintenance procedures	All departments have described and routinely implemented maintenance procedures	Some departments have described and routinely implemented maintenance procedures	All or some departments have maintenance procedures described but not implemented routinely	None of the departments have maintenance procedures described			
82		Biosafety/Biosecurity	Biosafety / biosecurity application	Biorisk officer officially assigned and SOPs for personnel biosafety / biosecurity well documented, available at the right places and applied	Key-Staff is well-trained in biosafety/biosecurity; but SOPs for personnel biosafety / biosecurity not all finalized and applied	Some staff is aware of biosafety/biosecurity principles. No or rare SOPs developed and applied	Only vague knowledge of biosafety/biosecurity principles, no SOPs			

83			Preparation for emerging diseases	A risk assessment for biocontainment of all high consequence pathogens has been conducted	A risk assessment for biocontainment of some high consequence pathogens has been conducted	Biocontainment of high consequence pathogens has been discussed among the director and staff	Biocontainment of high consequence pathogens has not been discussed			
84			Biosafety cabinets tested	Biosafety cabinets are tested (under recognized standard NSF49 or EN12469) and validated annually by NSF certified assessors	Biosafety cabinets are tested (under recognized standard NSF49 or EN12469) at least every 2 years by NSF certified assessors, and corrective measures are taken if needed	Biosafety cabinets are tested (under recognized standard NSF49 or EN12469) at least every 2 years by NSF certified assessors but insufficient corrective measures are taken	Biosafety cabinets have not been tested (NSF49 or EN12469) by NSF certified assessors for 5 years or more			
85			Biosafety cabinets in conformity with international recognized standards	100% biosafety cabinets (BSC) are in conformity with internationally recognized standards (NSF49 or EN12469) and are properly placed in the lab premises	100% BSC are in conformity with internationally recognized standards (NSF49 or EN12469) but 5-10% are not properly placed in the lab premises	100% BSC are in conformity with internationally recognized standards (NSF49 or EN12469) but more than 10% are not properly placed in the lab premises	Some BSC are not in conformity with internationally recognized standards (NSF49 or EN12469) and/or more than 10% are not properly placed in the lab premises			
86			Staff protection from biohazards	PPE are available and used when required; consequent change of lab clothes including shoes according to requirements of respective biosafety level	PPE are available but used under rare occasions (in outbreak / critical situations); when necessary change of lab coat but not shoes	PPE are available, but not used; inconsequent use of lab clothes	PPE are not sufficiently available, inconsequent use of lab clothes			
87			Unintentional release of pathogens from the lab (quarantine)	Lab staff has to follow an obligatory quarantine period of 3-7 days (depending on pathogens manipulated) before entering any animal holding and is never involved in taking samples during active surveillance	Lab staff generally follows a quarantine period of 1-3 days (depending on pathogens manipulated) before entering any animal holding, is not (or only in emergency situations) involved in taking samples during active surveillance	Laboratory staff is sometimes or often actively involved in taking samples from animals (esp. in outbreak times) but follows a quarantine period of 1-3 days prior entering any flock (depending on pathogens manipulated).	Lab staff is actively involved in taking samples from farm / domestic animals without prior quarantine period			
88			Unintentional release of pathogens from the lab (waste management)	Proper waste management by compulsive use of incinerator, autoclave, chemical waste treatment, sharp disposal	Frequent use of incinerator and autoclave, but sharp disposal rarely in the lab; chemical waste treatment partially addressed	Incinerator, autoclave are available, but only used in situations where the lab deals with specific bio agents; no chemical waste treatment	Improper waste management, no incinerator (or not functional) and/or no autoclaving (or not functional) of infectious material			

89			Intentional release of pathogens from the lab (controlled access)	Completely controlled and restricted access only for key staff to BS-Labs and freezer rooms by use of security system (biometric system, ID-badges, camera)	Controlled and restricted access only for key staff to BS-Labs and freezer rooms by physical security (eg. lock, guard)	Controlled and restricted access only for staff to BS-Labs and freezer rooms but no use of locks	Easy access to all labs and freezers / fridges during working hours			
90		Staff Security/Health	Health Check	Health check of all lab staff on regular basis (at least annually)	Irregular health check of lab staff (< 1 per year)	Health check of lab staff only on request or in case of an accident	No health check, even in case of an accident : staff has to seek doctor at own expenses			
91			Staff protection from zoonoses (vaccination)	Annual vaccination of staff working with zoonotic agents according to WHO recommendations (rabies, influenza…)	Vaccination on request but possibly at own expense	Post-exposure vaccination or immunization in case of accident	No vaccination available			
92			Eye wash and emergency shower	Eye wash and emergency shower available and functional in each department and after departing BSL-3 labs	Eye wash and/or shower available and functional in some labs	Eye wash and shower available in some labs but with limitations (not regular checked or not functional or only cold water etc.)	Not available or not functional			
93	Lab collaboration and networking	Communication means	Connectivity to landline phone/fax (hours of availability, use of cell phones)	24 hours of constant public cellphone/landline telephone and good fax connectivity	Good public cellphone/landline telephone and/or fax connectivity, sometimes interrupted (not constant on 24 hours)	Connectivity of public cellphone/landline phone and /or fax often interrupted, private cellphones are sometimes used	Public cellphone/landline phone and/or fax not/badly working or not existent; private cell phones (if any) are exclusively used			
94			Access to internet (hours per day or days/week)	Good and speedy 24 h internet connection, all staff have access in all areas (labs, office…)	Good internet connection (12-24 h) in offices; not all staff members have access	Internet connection limited (< 12 hours daily), but in general working; only selected staff member have access	Internet is slow and interrupted (availability <3d/week) ; only selected staff member have access			
95			Access to scientific publications	All Staff have free access to library during or even outside of working hours providing current scientific publications and to online-journals including at least 3-5 restricted-access journals	Free access to up-to-date library during working hours for all staff, but limited access to online-journals (free journals only)	Library might be existent, but not up-to-date, limited access to freely accessible online-journals	No access to library in the field of scientific interest, and only to few online journals (free access)			

96			Distribution of scientific results (updates of website, frequency of publications)	Institute have website with updates < 2 month old and produces periodic (>1/year) bulletin on generated scientific results and >10 publications in peer-reviewed international journals	Institute has website (updates are older than 2 months) and irregularly (1-10 publications/year) publishes scientific information in peer-reviewed journals	Annual reports are public documents and available on request; publications are rare (<1-5 publications per year in peer-reviewed international journals)	No website, no regular information sharing			
97		National lab networking	Regular contacts with national laboratory network	Close collaboration /communication (daily contact) with and constant support to/from members of the national lab network	Regular contact /communication (1 per week) with members of the national lab network, but support limited due to insufficient lab budget	Contact with members of the national lab network, but collaboration/communication difficult (irregular contact, <1 per month)	Very scarce collaboration/contact/communication with members of the national lab network (<1 per 3 months)			
98			Support to/by members of the national lab network by training (n trainings/year)	Support to/by members of the national lab network by provision of training on regular basis (>2/year)	Support to/by members of the national lab network by training on irregular basis (<2/year)	Support to/by members of the national lab network by rare training (<1/year)	No training provided by/to members of the national lab network			
99			Support to/by members of the national lab network by provision of material	Support to/by members of the national lab network by provision of material/reagents/kits upon request and also regularly without request	Support to/by members of the national lab network by irregular provision of material/reagents/kits upon request only	Rare provision of material/reagents/kits because of own limited resources	No possibility for provision of material/reagents/kits from a central lab to the national lab network			
100		Laboratory collaboration	In-country lab networking	Lab has regular (>1 per 3 months) contacts / collaborations with >3 labs/institutions within the country	Lab has regular (1 per 3 months) contacts / collaborations with 1-3 labs/institutions within the country	Lab has regular (1 per 3 months) contacts / collaborations with 1 lab/institution within the country	Lab has no regular (<1 per 3 months) contacts / collaborations labs/institutions within the country			
101			Regional lab networking	Lab has key role in regional lab-networking (provision of material, expertise, training, meetings, PT) and takes this role very seriously	Lab is actively involved in regional lab-networking (presence at all meetings, participation in PT, training…) and shares data	Lab attends meetings (not always present) for regional lab-networking, but is not active in regional networking	Lab is not involved in regional lab-networking			
102			International collaboration	Lab participates in >3 international projects for TAD/zoonotic diseases* of major importance	Lab participates in 1-3 international projects for key TADs/zoonotic diseases of major importance*	Lab participates in 1 international project for TAD/zoonotic diseases of major importance*	Lab does not currently participate in any international project			

103			Networking with international labs	Lab communicates and has regular direct or bilateral contacts (once a month) with >3 international laboratories (including reference or regional support/leading labs)	Lab has some contacts (1 per 6 months) with international laboratories (reference or regional support/leading labs) AND/OR regular contacts (1 per month) with 2 or 3 international labs	Lab has irregular contacts (<1 per 6 months) with international laboratories (reference or regional support/leading labs) AND/OR regular contacts (1 per month) with 1 international lab	Lab has hardly any contact (<1 per year) with international laboratories (including reference or regional support/leading labs)			
104			International lab networking / twinning	Lab participates in >2 twinning projects (OIE, EU) or offers twinning	Lab participates in 1-2 twinning projects	Lab considers/plans to participate in twinning	No twinning (considerations)			
105			Information retrieval from public sources	Lab regularly (>1/month) consults (open-access) disease-related web pages (OIE, FAO, WHO, OFFLU, Promed…)	Lab sometimes (1 per 6 months) uses (open-access) disease-related web pages	Lab rarely (<1 per 6 months) uses (open-access) disease-related web pages	Lab does not or cannot use (open-access) disease-related web pages			
106			Information retrieval	Databases (GenBank, EMPRES, WAHIS..) are regularly (>1/month) used to access information	Databases (GenBank, EMPRES, WAHIS..) are irregularly (1/month) used to access information	Databases (GenBank, EMPRES, WAHIS..) are rarely (<1 per month) used to access information	Databases are not used			
107			Information sharing	Regular (>1/month) information shared by lab staff through web-based platforms or databases; and/or submission of more than 20 sequences from 3 pathogens to public sequence database (eg. GenBank) within the last 12 months	Irregular Information (1/month) shared by lab staff through web-based platforms; and/or submission of 6 to 19 sequences to public sequence database (eg. GenBank) within the last 12 months	Information only shared by lab staff very occasionally through web-based platforms; and/or submission of less than 6 sequences to public sequence database (eg. GenBank) within the last 12 months	No information shared by lab staff through web-based platforms within the last 12 months; no sequence submission to a public sequence database (eg. GenBank)			
108			Expertise in using e-platforms for epidemiological data analysis / risk assessments	Lab / Epi department routinely works with e-platforms (TAD-Info, GIS, others)	Lab / Epi department rarely uses e-platforms (TAD-Info, GIS, others)	Lab / Epi department has e-platforms installed, but no expertise in usage	No use of such platforms			

Note. The tool can be obtained on request from the FAO EMPRES Laboratory Unit.