

# WORKSHOP REPORT



## 4<sup>th</sup> Laboratory Directors' Meeting and Workshop for SAARC Member States

01-02 June 2016, Dhaka, Bangladesh



Food and Agriculture  
Organization of the  
United Nations



Japan  
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Reduction



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## Acronyms and Abbreviations

AAHL	Australian Animal Health Laboratory
ADB	Asian Development Bank
ASEAN	Association of South East Asian Nations
BLRI	Bangladesh Livestock Research Institute
BSC	Biological Safety Cabinet
CDC	Centre for Disease Control
CDIL	Central Disease Investigation Laboratory
CVDRL	Central Veterinary Diagnostic and Research Laboratory
CVL	Central Veterinary Laboratory
CVOs	Chief Veterinary Officers
DoPH	Department of Public Health
ECTAD	Emergency Centre for Transboundary Animal Disease
EID	Emerging Infectious Disease
ELISA	Enzyme-Linked Immunosorbent Assay
FAO	Food and Agriculture Organization of the United Nations
FDIL	Field Disease Investigation Lab
FMD	Foot and Mouth Disease
GLP	Good Laboratory Practice
HPAI	Highly Pathogenic Avian Influenza
HPEDs	Highly Pathogenic Emerging Diseases
IEDCR	Institute of Epidemiology, Disease Control and Research
ISO	International Organization for Standardization
IQC	Internal Quality control
LMT	Laboratory Management Tool
MOFA	Ministry of Fisheries and Agriculture
MoPH	Ministry of Public Health
MSs	Member States

NARC	National Agricultural Research Centre
NDV	New Castle Disease Virus
NIHSAD	National Institute of High Security Animal Diseases
NSP	Non Structural Protein
OIE	World Organization for Animal Health
PPR	Peste des Petits Ruminants
PT	Proficiency Testing
QA/QC	Quality Assurance and Quality Control
RAP	FAO Regional Office for Asia and Pacific
RDL	Regional Diagnostic Laboratory
REC	Regional Epidemiology Centre
RLN	Regional Laboratory Network
RRAP	Regional Representative Asia-Pacific
RSU	Regional Support Unit
SAARC	South Asian Association for Regional Cooperation
SAC	SAARC Agriculture Centre
SOPs	Standard Operating Procedure
TADs	Transboundary Animal Diseases
TAG	Technical Advisory Group
VRI	Veterinary Research Institute
WHO	World Health Organization



## Executive Summary

The Regional Support Unit for SAARC (RSU-SAARC) of the Food and Agriculture Organization of the United Nations (FAO) in partnership with the SAARC Secretariat organized the 4<sup>th</sup> Laboratory Directors Meeting and Workshop for SAARC Member States (MSs) from 1-2 June 2016 in Dhaka, Bangladesh. The main objectives of the meeting were to review the laboratory networking mechanism among SAARC MSs and the SAARC regional diagnostic laboratories (RDLs) and to further consolidate the laboratory network in the region.

In the opening session, Mr Mike Robson, FAO Representative in Bangladesh delivered the welcome remarks on behalf of FAO. Dr Santanu Bandyopadhyay, RSU Coordinator, introduced the objectives and the expected outputs of the meeting. Mr MJH Javed, Director (ARD), SAARC Secretariat, illustrated the importance and necessity of the SAARC Networking Mechanism for food and nutritional security in the sub-region as a whole.

Other opening remarks were delivered also by Dr Hirofumi Kugita, OIE Regional Representative Asia-Pacific (RRAP), Mr Ajay Kumar Ray DG, Department of Livestock Services, Bangladesh, Dr Talukder Nurunnahar, DG, Bangladesh Livestock Research Institute (BLRI) and the Chief Guest of the Opening Ceremony, Md. Maksudul Hasan Khan, Secretary, Ministry of Livestock and Fisheries, Government of Bangladesh. Mr Khan affirmed the total commitment of the Government of Bangladesh for all regional collaborations, including adequate support to the Regional Diagnostic Laboratory on PPR, located in Savar, Dhaka, Bangladesh.

The meeting was attended by over 30 participants from National Laboratories from eight SAARC MSs, SAARC RDLs for PPR, FMD and HPAI, World Reference Laboratories (Pirbright Institute in UK, National Institute for High Security Animal Diseases (NIHSAD), Bhopal India and the Australian Animal Health Laboratory (AAHL) in Geelong, Australia. Other participants included technical experts from FAO Regional Office for Asia and the Pacific (FAO RAP), RSU-SAARC, OIE, SAARC Secretariat and the SAARC Agriculture Centre (SAC).

A series of presentation were made during three technical sessions, mostly comprising updates from international organizations and linkages, OIE reference laboratories and updates from OIE-FAO reference laboratories, regional diagnostic laboratories as well as linkages between RDLs and national laboratories. The World Cafe workshop provided the opportunity to each country delegates to present the current status, challenges and opportunities for their respective

national laboratories. Group exercises were organized during the meeting for generating a collective decision on how to make the laboratory network more efficient and sustainable.

At the end of the two-day deliberations, a set of recommendations emerged to carry forward the laboratory networking mechanism further and to find ways and means to make these three RDLs self-sustaining.

## Background and Meeting Objectives

The Regional Support Unit for SAARC (RSU-SAARC) of the Food and Agriculture Organization of the United Nations (FAO) in Kathmandu, Nepal, is implementing an ADB-funded project entitled "Regional Capacity Development for Regional Cooperation on Food Security through Control of Transboundary Animal Diseases in South Asia" under the SAARC umbrella. The project will build upon the activities within the SAARC MSs carried out through the EU-funded Highly Pathogenic and Emerging Diseases (HPEDs) programme during 2010-2014 and further integrate these activities to underpin the control and management of the three most important Transboundary Animal Diseases (TADs), e.g., FMD, PPR and HPAI.

Three SAARC Regional Diagnostic Laboratories (RDLs) were identified and strengthened by RSU, which are located in Bangladesh (PPR), India (FMD) and Pakistan (HPAI). These laboratories coordinated a network of national diagnostic laboratories for each of the three diseases of the SAARC MSs, primarily focusing to maintain uniform diagnostic standards, support training of laboratory scientists/technicians and backstop regional surveillance and epidemiological studies. The activities were further supported by the international reference laboratories of OIE and FAO like the Australian Animal Health Laboratory (AAHL), Geelong, Australia, the National Institute of High Security Animal Diseases (NIHSAD, Bhopal, India and FAO Reference Laboratory for FMD, Mukteshwar, India

The laboratory networking mechanism was initiated in March 2011 followed by the First Laboratory Directors' Meeting and Workshop on Laboratory Networking and Proficiency Testing for Priority HPEDs in SAARC Countries in January 2012 in Dhaka, Bangladesh. Subsequently, the Second Laboratory Directors' Meeting and Workshop had a thematic focus on Enhancing the Laboratory Expertise through Quality Management Systems in March 2013 in Colombo, Sri Lanka. The "Third Laboratory Directors' meeting and workshop on Biorisk Management in SAARC Countries" was held from 5-6 March 2014 in New Delhi, India.

The 4<sup>th</sup> Laboratory Directors meeting and workshop for SAARC MSs was organized by RSU-SAARC in partnership with the SAARC Secretariat to build national and regional laboratory capacity and network in South Asia. The main objectives of this meeting were to keep the directors of the three Regional Diagnostic Laboratories (RDLs) and the key national laboratories updated on ongoing activities related to laboratory capacity building and laboratory networking mechanism among the SAARC MSs vis-à-vis the RDLs in South Asia and provide a platform for interactions between experts of the regional, national and international laboratories.

These three regional laboratories (FMD, PPR and HPAI) have the facilities to carry out diagnosis of the identified priority TADs and undertake antigenic and molecular characterization of virus isolates. In addition to providing confirmatory diagnostic facility, these regional laboratories also support and coordinate a network of national diagnostic laboratories. The networks are the basis for sharing virus isolates and disease information and maintain uniform diagnostic standards.

Apart from these three RDLs, the national animal disease diagnostic laboratories are responsible for supporting the disease diagnosis and surveillance programme in their respective countries towards early detection and response in a timely manner. Regional Laboratory Networks enhance capacity in these national laboratories for the diagnosis of priority animal diseases, and promote sharing of reagents, biological materials and information. The leading laboratories having the capability for molecular characterization of the viruses are encouraged to increase capacity in order to assist national animal disease diagnostic laboratories in the diagnosis and characterization of viruses and also to promote sharing of virus sequence information through the laboratory networks.

Considering that the effective diagnostic laboratory capacity is an important tool for early detection and control of the TADs in the region, the designated national and regional laboratories need to conduct and deliver efficient laboratory diagnostic services. In order to strengthen laboratory quality assurance in the region, the Australian Animal Health Laboratory (AAHL) and FAO had collaborated to organize laboratory training for Proficiency Testing (PT) for Veterinary Diagnostic Laboratories in SAARC countries. The training which covered PT, Quality Assurance (QA), Standardization of Diagnostic Reagents and Bio-safety was specifically designed to strengthen regional laboratory diagnostic capacity by improving QA and especially production and QA of diagnostic reagents.

Strengthening diagnostic capacity of the RDLs and other national laboratories was extensively discussed during 5<sup>th</sup> Meeting of the SAARC Chief Veterinary Officers (CVOs) Forum in April, 2016 as well as the First Regional PPR Roadmap Meeting for South Asia. In order to gain credibility and earn trust of the SAARC MSs, a need was felt to assess the capacities of the national laboratories, develop a regional standard operational procedure and protocol for Proficiency Testing (PT), harmonization of laboratory techniques and sharing of material and information between the national and the regional laboratories.

In order to review the laboratory networking mechanism among SAARC MSs and the RDLs and to consolidate the network, the 4<sup>th</sup> Laboratory Directors Meeting and Workshop was organized from 1-2 June 2016 in Dhaka, Bangladesh by RSU-SAARC in partnership with the SAARC Secretariat with the following objectives:

- to review the activities and past recommendations related to laboratory capacity building and laboratory networking of OIE Reference Laboratory for HPAI, Regional Diagnostic Laboratories (HPAI, FMD and PPR) and key national diagnostic laboratories of SAARC countries and to get update on existing SOPs and protocols used in the region;
- to discuss the possibilities of upgrading the regional laboratories to FAO or OIE Reference Laboratories or twinning with such reference laboratories elsewhere;
- to discuss the problems and issues related to the national veterinary diagnostic laboratories and the laboratory networking within the SAARC MSs.
- to discuss the status/activities and expectations/opportunities of the national and regional laboratories with problems and challenges for collaboration among laboratories;
- to discuss the mechanism to organize regular meetings to review, assess and plan network activities on sharing of information and enhancing the laboratory expertise;
- to review how to advocate for support and sustain regional laboratory networks;

The meeting was attended by over 30 participants from the National Laboratories, RDLs for PPR, FMD and HPAI in eight SAARC MSs, OIE Reference Laboratories (the Pirbright Institute in UK, National Institute for High Security Animal Disease Laboratory, Bhopal, India and the AAHL in Geelong, Australia). Other participants included technical experts from FAO RAP, RSU-SAARC, OIE, SAARC Secretariat, the SAARC Agriculture Centre (SAC), and Bangladesh Institute of Epidemiology Disease Control and Research (IEDCR). A complete list of participants is appended with this report (Annex 3).

## Inaugural Session

The opening session was facilitated by Dr Santanu Bandyopadhyay, RSU Coordinator, RSU-SAARC. Mr Mike Robson, FAO Representative, Bangladesh delivered the welcome remarks on behalf of FAO, followed by Dr Santanu Bandyopadhyay, RSU Coordinator, who introduced the objectives and the expected meeting outputs. Mr MJH Javed, Director (ARD), SAARC Secretariat, pointed out the importance and necessity of the SAARC Networking Mechanism for food and nutritional security in the sub-region.

Other invited guests and speakers, who spoke on the occasion included Dr Hirofumi Kugita, OIE Regional Representative for Asia and the Pacific (RRAP), who stressed upon the importance of quality assured diagnostic facility as an essential component of efficient veterinary services of the countries. Mr Ajay Kumar Ray, Director General (DG), Department of Livestock Services, Bangladesh gave an account of the initiatives of his Department on development of the livestock sector in Bangladesh not only as



Dignitaries at the opening session

a livelihood option for the rural poor but also to enhance per capita availability of protein through milk, meat and egg. Dr Talukder Nurunnahar, DG, BLRI highlighted the research initiatives taken by her institute on enhancing production and productivity of livestock and development of diagnostics and vaccines against important livestock diseases. The Chief Guest of the Opening Session, Md. Maksudul Hasan Khan, Secretary, Ministry of Livestock and Fisheries, Government of Bangladesh, while welcoming all the participants in Dhaka, Bangladesh, stressed upon the necessity for collaborative efforts towards control and eradication of major TADs in South Asia region. He also assured that all the necessary support will be provided to the RDL for PPR located in BLRI, Savar, Bangladesh.

## Technical Sessions

### Session 1: Updates from International Organizations and Linkages to Regional and National laboratories

#### 1.1 Background of the laboratory directors' meeting and key recommendations of the previous lab directors meetings

The presentation was made on the background of the present meeting and key recommendations of the previous Lab Directors meetings. The brief introduction

was provided on the current ongoing project “Regional Capacity Development for Regional Cooperation on Food Security through Control of Trans-boundary Animal Diseases in South Asia” Funded by ADB, 2015 – 2017. In South Asia, there are already established regional platforms such as RSU-SAARC and, REC in Kathmandu Nepal and three SAARC Regional Diagnostic Laboratories (RDLs) located in Bangladesh (PPR), India (FMD) and Pakistan (HPAI). The genesis of regional initiatives on laboratory development started way back in 2005 in SAARC, when GF-TADs mechanism was endorsed and laboratory and surveillance network coordination were established for HPAI. The laboratory networking in SAARC was initiated in March 2011 followed by the four Laboratory Directors' Meeting (2012, 2013, 2014, and 2016). All the recommendations originating from the first four Laboratory Directors' Meeting have been already endorsed by the SAARC CVOs Forum. A brief account of the past three meetings and their recommendations were reviewed. It was observed that some of the recommendations have continued over the years indicating perhaps that more actions will require to be taken by the RDLs as well as the national reference laboratories for the three major TADs to progress further.

## **1.2 Global and regional strategic framework for lab capacity building- linkage with regional and national lab and networking**

Filip Claes, Regional Laboratory Coordinator, FAO RAP, Bangkok, presented the Global and Regional Strategic Framework for laboratory capacity building, linkage and networking between regional and national laboratories. The available laboratory support at the global and regional level under EPT-2 would help in the implementation of QA/QC programme in the sub-region through regional QA programme with AAHL. Similarly support could be provided on laboratory biosafety through regional biosafety programme with Mahidol Oxford Research Unit (MORU) and laboratory efficiency assessments by using FAO LMT/BLMT. FAO's technical support on laboratory diagnostic capacities for rapid and accurate diagnosis of animal diseases is aimed at enhancing the capacity of animal health laboratories in order to detect and diagnose the TADs and other animal diseases promptly and accurately. Efficient laboratory support is the basis for policy development towards disease control and sustainable development. The progressive development of regional laboratory networking strategy in ASEAN is well established through Regional Animal Health Laboratory Technical Advisory Group (Lab-TAG) to provide technical advice to the Member states on strategic planning and laboratory capacity building activities. There is also a newly developed Laboratory Algorithm of Avian Influenza Investigation among poultry including recent clade and sub-clade distribution in Asia. It has now become apparent that the clade 2.3.2.1 of H5N1 avian influenza virus is most prevalent in South Asia.

### **1.3 Role of a reference laboratories in proficiency testing, capacity building, quality assurance (QA) and standardization of diagnostic reagents and biosafety**

Dr Chris Morrissy, Diagnostic Virologist from AAHL presented the “Role of reference laboratories in proficiency testing, capacity building, quality assurance (QA) and standardization of diagnostic reagents and biosafety”. The role of reference laboratories is considered as the key component to understand the management of a laboratory system specifically underscoring the importance of a quality assurance (QA) System (ISO17025). All the regional and national laboratories are encouraged to have QA system to ensure the best laboratories practices. The role of a reference laboratory in the area of QA and proficiency testing (regional and national IQC reference controls), standardization of diagnostic reagents, capacity building and biosafety are the essential elements of a good laboratory management system.



Participants interacting during the technical session

### **1.4 OIE International reference laboratories and twinning mechanism**

Dr Fania Dwi (Ms) from OIE Regional Representative for Asia and the Pacific. From Tokyo, Japan, presented “OIE Process for Recognition of International Reference Laboratories and Twinning Mechanism”. The principal mandate of an OIE Reference Laboratory is to function as a world reference centre of expertise on designated pathogens or diseases; and “OIE Collaborating Centre” the principal mandate is to function as a world centre of research, expertise, standardization of techniques and dissemination of knowledge on a disease.. The process to become an OIE Reference



Laboratory (selection criteria, new guidelines for applicant, the pathway to designation of an OIE Reference Centre, delisting of reference centre and submission deadlines) are provided in the OIE website. An overview including background concept, aims and objectives and scope on twinning programme were provided in the presentation. Other areas in the presentation were on submission of a proposal, step after twinning, output, twinning projects, situation update etc. She also provided the links to the OIE Reference Centres, Twinning Programme and National Focal Points for Laboratories for detail information. The details of OIE reference centres, OIE collaborating centres, twinning programme and national focal points are provided in the links below;

**Links related to the Reference Canters:**

- [www.oie.int/en/our-scientific-expertise/overview/](http://www.oie.int/en/our-scientific-expertise/overview/)
- [www.oie.int/en/our-scientific-expertise/collaborating-centres/introduction/](http://www.oie.int/en/our-scientific-expertise/collaborating-centres/introduction/)
- [www.oie.int/en/our-scientific-expertise/reference-laboratories/introduction/](http://www.oie.int/en/our-scientific-expertise/reference-laboratories/introduction/)

**Twinning Programme:**

- [www.oie.int/en/support-to-oie-members/laboratory-twinning/](http://www.oie.int/en/support-to-oie-members/laboratory-twinning/)

**National Focal Points for Laboratory:**

- [www.rr-asia.oie.int/about-us/focal-points/veterinary-laboratories/](http://www.rr-asia.oie.int/about-us/focal-points/veterinary-laboratories/)

**1.5 Harmonized laboratory procedures and protocols for zoonotic/emerging and re-emerging diseases in Bangladesh - linkage with regional and national labs**

ASM Alamgir, Institute of Epidemiology, Disease Control and Research (IEDCR) presented an account of National laboratory system in the context of Bangladesh public health management. The presentation was aimed to update on the harmonized national laboratory procedures and protocols for zoonotic/emerging and re-emerging diseases. The following are the key observations in the presentation.

- Public Health Institute based laboratory services exist in the county since pre-independent period and are further expanded with the establishment of IEDCR.
- The ICDDR institute originated from Cholera Research Laboratory, which has been providing services since 1960s.
- Laboratory services for animal health are based at livestock research institute which began during 60s and expanded during late 70s and 80s creating CDIL, FDIL, VPHL and BLRI
- Science laboratories in Bangladesh have been providing laboratory services for environmental contamination and food testing since pre-independent period.
- The laboratory service in Bangladesh for public, animal and environment health have been working in isolation/separately with their own system without much effective linkage among the Institutions, which is considered as one of the major gaps.

## 1.6 A brief account of the outcome and recommendations of the Workshop to develop a regional strategic plan for bioinformatics

Filip Claes from FAO RAP gave an account of the “Outcomes of the regional workshop to develop a regional strategic plan for bioinformatics”, which was held in Bangkok from 10-12 May, 2016. The workshop primarily focused on viral genomes such as novel serotypes (H5N6, H5N8), new re-assortments (H5N2) and other emerging infectious diseases (EIDs) in the Asia Pacific. This presentation was very important to understand that mammalian adaptation, heat adaptation, mutants, and other unknown dangerous mutations among the existing pathogens could still lead to a potential pandemic threat. Therefore the importance of bioinformatics and risk assessment must be communicated to the policy makers/decision makers, as how best we can use bio-informatics and molecular tools for guiding surveillance, epidemiology, and policy towards disease control. The objectives, conclusion and recommendations of the regional workshop to develop a regional strategic plan for bioinformatics is provided in Annex 1.

## 1.7 Updates on QA/PT of selected laboratories of SAARC Member Countries

Chris Morrissy from AAHL, Geelong, Australia presented the outcome of the “QA/PT and LMT Assessment of the SAARC Laboratories 2015”. The details of the participating laboratories and results of the assessment are provided in below table. The Influenza A PCR panel for 2015 consisted of 14 inactivated allantoic fluid samples, which were sent to each participating laboratory with instructions to test the samples using the standard diagnostic PCR used at the individual laboratory for: (1). Influenza A Matrix real-time PCR, (2). Influenza A (H7) and (3). Influenza A (N9). Laboratories with the capability were also directed to test positive samples for Influenza A H9 and N2.

### *Participating laboratories and results received*

Laboratory	City	Country	Results received		
			Matrix	H7	N9
Bangladesh Livestock Research Institute (BLRI),	Dhaka	Bangladesh	Yes	No	No
National Centre for Animal Health (NCAH)	Thimphu	Bhutan	No	No	No
Central Veterinary Laboratory (CVL)	Kathmandu	Nepal	Yes	Yes	Yes

- *Bangladesh: result received on Matrix- Acceptable*
- *Bhutan: unable to participate due to machine fault*
- *Nepal: reported issues with performance of assays*

## **1.8 Importance of Epi-Lab networking and coordination**

From ECTAD, Bangladesh, Nitish Debnath gave an account of the “Importance of Epi-Lab networking and coordination” for efficient disease control and management. The information on four-way linking (Sharing of Animal Health Epidemiological Data, Animal Health Laboratory Data and Public Health Epidemiological Data, Public Health Laboratory Data) is also important while dealing with zoonotic disease surveillance and outbreak investigation. The two-way (veterinary laboratory and epidemiology) and four-way linkages (animal-public health) are the important mechanisms for communication and understanding between the two disciplines of epidemiology and laboratory for disease surveillance and outbreak investigation. Epi-Lab networking and coordination mechanism also provides the field epidemiologist with a better understanding of basic microbiology techniques and analysis and interpretation of results. The two way sharing of information is also important to convey the laboratory perspective of public health investigations to field epidemiologists. There is a need of such network and coordination mechanism at regional and national levels.

## **Session 2: Updates on OIE/FAO Reference Laboratories and Linkage with National and Regional Laboratories**

### **2.1 Pirbright Institute: updates on circulation of FMD and PPR viruses**

Satya Parida from the Pirbright Laboratory gave an account of the functioning and strength of the Pirbright Laboratory with particular reference to its status as the World Reference Laboratories for FMD and PPR. With the current distribution of various genepools of FMD viruses, he drew attention to the fact that in spite of very region-specific distribution of genepool of FMD viruses globally, there is increasing evidence for movement of South Asian FMD virus type O into the middle-east and to south-east Asia. The global distribution of FMD virus serotypes and genotypes including results of vaccine matching studies of various commercial manufacturers with the prevalent virus strains in a country or a region was described. The presentation also included information on the global distribution of PPR and the recent spread of Lineage IV to China, Mongolia as well as to north-African countries. The Bayesian analysis of the whole genome sequences of selective PPR viruses across the globe and the lineages clearly distinguishes the Lineage IV as the most prevailing in Asia and northern Africa while the other three lineages are mostly confined to rest of Africa. Specifically for the interest of the South Asia region, detail molecular epidemiology of recent outbreaks of PPR in China and Central Asia was also presented.

## 2.2 National Institute of High Security Animal Diseases (NIHSAD), India

Nagarajan S. Sundaram, Senior Scientist from NIHSAD delivered a presentation on "OIE Reference Laboratory on Avian Influenza- High Security Animal Diseases Laboratory (HSADL) India and its linkages with national laboratories". The NIHSAD (formerly known as HSADL) is under the administrative control of Indian Council of Agricultural Research DARE, MoAg & FW, Government of India. The institute has a BSL3+ biocontainment facility having a laboratory wing and an animal wing. The NIHSAD has excellent diagnostic facilities to carry out diagnosis of priority emerging Transboundary Animal Diseases (TADs) including AI. The laboratory also performs the characterization of virus isolates in addition to providing the confirmatory diagnostic services. The NIHSAD is an OIE Regional Reference Laboratory for highly pathogenic avian influenza (HPAI) and is ISO 9001:2008 certified.



A presentation ongoing in the technical session.

Avian Influenza viruses are routinely diagnosed in the laboratory using the Real time RT-PCR and RT-PCR, virus isolation, AGID and HI tests, whereas ELISA and HI tests are employed for antibody detection primarily among duck and migratory bird samples. Phylogenetic analysis HPAI H5N1 revealed that the viruses isolated from poultry in India belong to two major genetic clades; clade 2.2 (isolated during 2006 to 2010) and clade 2.3.2.1 (isolated during 2011-13). The viruses isolated during 2011-2013 from India belonged to clade 2.3.2.1, and grouped closely with the isolates from Bangladesh and Bhutan. All the viruses were highly pathogenic to poultry; however, species specific variations within H5N1 viruses of both the clades have been found

in mice and ducks. The NIHSAD has also developed monoclonal antibodies against NS1 and NP protein of avian influenza virus and following characterization selected those, which are most useful for diagnostic purposes.

The detail information on H5N1 Molecular phylogeny (**Annex 5, Figure 1**) and MJ network analysis on Clade 2.3.2.1a (**Annex 5, Figure 2-4**) are presented separately. More information on the laboratory can be obtained from the website of the NIHSAD ([www.nihsad.nic.in](http://www.nihsad.nic.in)).

### **2.3 Regional Diagnostic Laboratory for PPR, Bangladesh**

Md Rafiqul Islam, Senior Scientific Officer, Animal Health Research Division of BLRI and Lab In-charge, delivered the presentation on, "PPR Regional Leading Laboratory – PPR RDL (Bangladesh) and linkages with national laboratories". Government of the People's Republic of Bangladesh promoted the Virology Laboratory of Bangladesh Livestock Research Institute, Savar, Dhaka as the SAARC Regional Leading Diagnostic Laboratory for PPR. The RDL has the diagnostic facilities to carry out diagnosis of PPR using RT-PCR and ELISA tests. The laboratory also performs characterization of virus isolates in addition to providing the confirmatory diagnostic facilities.

The institute has successfully tested approximately 181 (clinical samples-nasal/fecal) and 2792 serum samples for diagnosis or surveillance for PPR between January, 2014 to December, 2015. Out of which, about 50.82% of total clinical samples and 64.94% of serum samples were positive for PPR. The laboratory is capable of providing the test results within 2-3 days. The research activities undertaken are development of improved diagnostics for ELISA as well as development of monoclonal antibodies, enhance disease surveillance and epidemiology for PPR and PPR like diseases, improved disease control options and vaccine development. The major constraints are unavailability of technical staff and space in the laboratory and less resources. The detail information on PPR virus profile is provided in **Annex 5, Figure 5**.

### **2.4 Regional Diagnostic Laboratory for FMD, India**

Bana Bihari Dash, Senior Scientist from PD-FMD, IVRI Campus, Mukteshwar, India, delivered a brief presentation on "FMD Regional Diagnostic Laboratory – FMD RDL (India) and linkages with national laboratories". The Directorate of FMD, Mukteshwar is designated as the National Reference Laboratory/FAO-FMD Reference Centre/SAARC Regional Diagnostic Laboratory for FMD. The laboratory is under the administrative control of ICAR, Department of Agricultural Research and Education, Ministry of Agriculture and Farmer's Welfare, Government of India. This laboratory

has been upgraded to the status of Project Directorate on Foot and Mouth Disease with its headquarter at Mukteswar and having a network of 23 laboratories located all over the country. The institute is a member of the Global FAO/OIE Network of FMD Reference Laboratories along with ten other leading FMD laboratories in the world. The institute is also a member of Global FMD Research Alliance. The PDFMD has successfully produced and supplied appropriate and specific kits for FMD Diagnosis, Surveillance and Software for epidemiological data analysis.

The institute has developed various diagnostic techniques such as sandwich ELISA and multiplex PCR, r3AB3 NSP-ELISA and LPB ELISA. Between January 2014 to December, 2015, the institute has successfully tested 182 only referred clinical material (115 positives) from its own laboratory network and 68,948 serum samples (16,139 positive) using r3AB3 NSP-ELISA. The institutes has also tested 46,893 serum samples (random) and 191,402 serum samples under FMD-CP (Government of India sponsored FMD Control Programme) with 26,527 (O), 25,543 (A) and 28,581 (Asia1) sero-positive samples using LPB ELISA. The major constraint faced by this Laboratory was limited space. However, the lab is going to become an International Centre for FMD in a new facility with state of the art features of bio-safety and bio-containment (BSL 3) which is likely to be commissioned by 2017 at Bhubaneswar, Orissa. The detail information on characterization of FMD viruses is provided in **Annex 5, Figure 6-8**. More information on the laboratory can be obtained from the link [www.pdfmd.ernet.in](http://www.pdfmd.ernet.in);

## 2.5 Regional Diagnostic Laboratory for HPAI, Pakistan

Naila Siddique, Senior Scientific Officer and Programme Leader of National Ref Lab for Poultry Diseases (NRLPD)/ Animal Sciences Institute (ASI), National Agricultural Research Centre (NARC), Islamabad, presented on “Regional Leading Laboratory – HPAI RDL (Pakistan) and linkages with national laboratories”. The National Reference Lab for Poultry Diseases (NRLPD) is also designated as SAARC Regional Diagnostic Lab (RDL) for HPAI. The National Reference Laboratory for Poultry Diseases (NRLPD) is an entity within the Animal Sciences Institute at the NARC of the Pakistan Agricultural Research Council (PARC) Islamabad, Pakistan. The NRLPD has biosafety level 2plus and acquired international accreditation status of ISO/IEC-17025:2005 for running conventional and selected molecular diagnostic assays.

The major areas of research addressed at the NRLPD include biological and molecular characterization of emerging and prevailing strains of various avian pathogens for better understanding of their pathogenesis, diagnosis and control. The institute has excellent diagnostic facilities to deal with diagnosis of major avian diseases through conventional and molecular diagnostic assays. The institute has also developed

some home grown diagnostic reagents and also procures the standard commercial kits.

The institute has successfully tested approximately 40000 samples (Tissues, swabs, sera, eggs, environmental samples of avian origin) using serological and *in ovo* inoculations, bacteriological evaluation and post-mortem. The laboratory is capable of providing the results in the same day for referral samples, 2-3 days for sero-surveillance and other tests. The major constraint are limited financial resources and technical guidelines, inadequate training on bio-safety cabinet validation and trouble shooting and certification of thermal cyclers, regular communication with regional and national laboratories and sample flow from national laboratories in the region. The detail information on phylogenetic analysis of H9N2 during 1995-2016 is provided in **Annex 5, Figure 9**. More information can be obtained from the link <http://www.parc.gov.pk/index.php/en/nrlpd-introduction>;

### **Session 3: Country updates on Overview of Activities/ Key country updates on National laboratories in the SAARC Countries**

All the country participants were provided beforehand with the template on “overview of activities/key country updates on national laboratories” to prepare the posters. The country presentations were delivered through these posters except India. The summary of country presentation is provided below.



Participants interacting in the country presentation session.

### 3.1 Afghanistan

The participant from Central Veterinary Diagnostic and Research Laboratory (CVDRL), Kabul provided the updates on the status of the national laboratory of the country. The laboratory has sufficient diagnostic facilities to deal with major diseases such as FMD, PPR, HPAI, Rabies, Brucellosis, Anthrax, Newcastle disease by serology and molecular methods (ELISA and Real time PCR). The national lab is equipped with Biosafety Level- BSL-2 and laboratory operation is monitored through LIMS. However, the national laboratory does not maintain any cell line for virus isolation. The laboratory does not have ISO or HACCP or any other accreditation. The laboratory has linkage/networking with country epidemiology unit through LIMS software. A total of 1270 samples of FMD, 514 samples of PPR and 4 samples of HPAI have been tested between Jan 2014 to Dec 2015. The sequencing and characterization of the FMD and PPR virus were performed with the support from MWG in Germany. There is a lack of communication with regional reference laboratories, especially SAARC RDLs. Other constraints are lack of separate sections and limited staff in each sections, inadequate training on Bacteriology, Toxicology and Veterinary Public Health.

### 3.2 Bangladesh

The Central Disease Investigation Laboratory (CDIL) is proposed as National Reference Laboratory for FMD. The laboratory is equipped with Biosafety Level-2, with essential equipment and capacity of diagnosing other animal diseases by using serology (ELISA) and PCR (RT-PCR). The common animal diseases that can be diagnosed are FMD, HPAI, ND, TB, Anthrax, Salmonellosis, and Blood protozoa. From January 2014 to December 2015, the laboratory has tested 225 FMD samples, out of which 223 samples were positive for O serotype by using ELISA technique. Similarly out of 356 samples of avian origin tested, 214 samples were positive for HPAI by Real-time PCR during the same period. The laboratory does not maintain any cell line and is not accredited by ISO or HACCP or any other agencies. The laboratory management does not have LIMS. The major constraints are lack of space and limited staff, inadequate training on various disciplines.

### 3.3 Bhutan

National Veterinary Laboratory of the National Centre for Animal Health presented the updates on laboratory activities carried out in Bhutan. The National Veterinary Laboratory provides minimum diagnostic services for SAARC priority diseases (FMD, PPR, HPAI) by serology and virological tests. Between January 2014 and December 2015, the national laboratory received 1303 serum samples for FMD testing, out of which, 19 samples were NSP rapid positive (1.5%) and 91 samples were NSP ELISA positive (7.0%). All the 11 epithelium samples for FMD virus were diagnosed positive for serotype O. During the same period, 615 samples for PPR diagnosis



were collected, however, the testing was not carried due to shortage of reagents. Out of 25 swab samples collected for HPAI diagnosis, 2 samples were rapid positive (12%) and 6 samples (24%) detected positive by PCR.

The laboratory does not maintain any cell line and is not accredited by ISO or HACCP or any other accreditation. The laboratory is equipped with Biosafety Level-BSL-2 with a web based software using PHP/Java scripting language which has four modules- 1. Sample management module; 2. Laboratory inventory module; 3. Chemical/reagent management module; and 4. System administration module. There is an efficient linkage with different national and international laboratories such as DoPH, MoH, Bhutan for Leptospirosis, NIAH, Bangkok for PRRS, HPAI, Brucellosis, Chulalongkorn University, Bangkok for Rabies, World Reference Laboratory, Pirbright (UK) for FMD, AAHL, Geelong, Australia for HPAI, Oita University, Japan for Rotavirus, Rabies, CDC, Atlanta, USA for Anthrax, NIHSAD, Bhopal, India for AI and Infectious Bursal Disease. The major constraints are lack of space and limited staff. However, the staffs are very skilful and competitive in their respective work. There is an inadequate regional training support and need to enhance the communication between national and regional laboratories.

### **3.4 Maldives**

Mohamed Anees, Senior Quarantine Officer from Plant and Animal quarantine Unit, Ministry of Fisheries and Agriculture (MOFA) provided the updates on the status of the laboratory activities. Maldives does not have much on the domestic animal laboratory and there is limited technical manpower for the diagnosis of the TADs. The laboratory is not equipped even with minimum diagnostic facilities for any priority diseases (FMD, PPR, HPAI). The country exclusively depends upon the regional and/or international reference laboratories for testing of such samples. During January 2014 to December 2015, laboratory sent 34 samples for PPR testing, out of which, 33 samples were positive for PPR virus. The major constraints are lack of technical staff and laboratory facilities.

### **3.5 Nepal**

The participant from Nepal presented and updated on the country laboratory status. With the establishment of molecular diagnostic techniques at the Central Veterinary Laboratory (CVL), routine molecular diagnosis of Avian Influenza, ND, and IBD are in-place along with serological test such as the ELISA, HA/HI, AGPT. However, there are no tissue culture and cell line facilities available in the laboratory. The FMD and TADs laboratory separate unit having the facilities for FMD and other TAD diagnosis. The national laboratories have not been accredited by ISO or HACCP or any other accreditation. In both the laboratories, diagnosis capacities have been improved especially in the molecular biology section. During January 2014 to December 2015,

FMD and CVL laboratory tested 224 samples for FMD serotype (65 samples were positive for serotype- O). Similarly CVL has tested 441 PPR samples (31 positive for PPR antibody), and 456 AI samples (210 rapid test positive positive). The CVL is equipped with Biosafety Level- 2 with recently installed LIMS system which will be linked with national epidemiology unit in the future. The major constraints are frequent transfer of the trained staff, insufficient budgetary provision to procure essential equipment, and reagents, e.g., primers and reagents.

### **3.6 Pakistan**

Aamer Bin Zahur, Principal Scientific Officer, Animal Health Programme provided the updates on the status of the laboratory which is under the Ministry of National Food Security and Research. The National Veterinary Laboratory has excellent diagnostic facilities for PPR which includes ELISA, PPRV Isolation, molecular Identification and sequencing. The national laboratory is equipped with Biosafety Level--2 with LIMS system. There are tissue culture facilities and the Laboratory maintained the cell line (Primary Goat Kidney Cells Culture, Vero cell line). During January 2014 to December 2015, national laboratory received >2000 samples for PPR diagnosis. Out of which, 1650 samples were positive. Regarding the recent virus circulation, there are two strains of lineage 4 PPR viruses circulating in Pakistan. More than 50 PPR virus gene sequences have been already submitted to Gene-Bank. The major constraints are inadequate training on capacity building of laboratory staff for PT and sequence data analysis. There is also a need for frequent meeting of laboratory experts.

### **3.7 Sri Lanka**

M D N Jayaweera Director, Animal Health Division from the Veterinary Research Institute provided the updates on the status of the national laboratory. The institute acts as a national referral laboratory for all SAARC priority TADs (FMD, PPR and HPAI). The institute is also an OIE reference laboratory for Haemorrhagic Septicaemia for South Asia. The laboratory has good diagnostic facilities to deal with major TADs such as FMD by ELISA, PPR by RT-PCR (Only test available) and HPAI by RT-PCR. The institute is having Biosafety Level-2 facilities with LIMS-VRI- system software for laboratory management. The institute is also ISO 9001:2008 certified and has applied for ISO 17025 certification. There is no tissue culture facility however it has maintained the cell line (BHK 21). During January 2014 to December 2015, the institute has tested 93 samples for FMD diagnosis by using ELISA, of which, 73 samples were serotype-O positive. The institute is facing problem due to lack of containment facilities, inadequate availability of positive controls, limited training facilities and huge calibration costs. There is also need for creating awareness for policy makers and higher officials on the importance of laboratory diagnosis and research for effective disease control and eradication.

## Session 4: Group Exercise and World Café Workshop



Participants interacting in a group exercise session.

### 4.1 Group A: Opportunities and expectations in the networking mechanism among National Laboratories, OIE Reference Lab, and RDLs

#### Background

In spite of having created the Laboratory Network for the three identified priority TADs in the region, some of the countries in the region still do not have adequate diagnostic facilities, competent technical manpower and no linkages among the laboratories within the country or outside, e.g., RDLs or WRLs. A lack of communication between the laboratory and the field epidemiology and lack of transparency in sharing real-time disease diagnostic results are quite evident. This group exercise has been designed to evolve a consensus on how to enhance inter-laboratory collaboration, intra-discipline information-sharing, e.g., laboratory and epidemiology and remove constraints, if any, to enhance diagnostic services in the region.

#### Which are the areas in which RDLs and National/Central Veterinary Laboratories (CVLs) could collaborate?

- The following key suggestions emerged from the Group: Regional Diagnostic Laboratories should be responsible to harmonize laboratory protocols. For AI, currently AAHL, Geelong protocol is used in most of the countries;
- Training/capacity building, data sharing, sharing of information through emails, website, biannual meeting etc.;

- Laboratory linkage between National/Central Veterinary Laboratories (CVLs) and Regional Diagnostic Laboratories (RDLs)); Effective linkages is required among Nationals, RDLs and International laboratories beyond testing to include training, data and information sharing, and laboratory based surveillance.
- Standardized/harmonized SOP for laboratory diagnosis in SAARC region;
- RDLs should be responsible to conduct the proficiency testing, If the funding is problem, teleconferences through webinar, skype, lab net meeting, Example: SEA lab net meeting
- Each laboratory should share information/ disease situation in the region;
- Provision of troubleshooting guidelines for the laboratories;
- Sharing of mailing list of focal points from respective RDLs for FMD, PPR, HPAI;

### **How effective is the mechanism for sharing of specimen, information and reporting of the diseases?**

Though, there had been various initiatives earlier for sharing of specimen, information and reporting of the diseases in the region, it is still far from ideal at the moment

### **What are the current constrains if improvement on 1 and 2 are needed?**

Transportation of specimen: There is difficulty in receiving the samples especially in Bangladesh. Custom/airport authorities need regulations for courier services; In case of In Bhutan/Maldives, there are no certified couriers. International shipment of samples remains a major constraint to share samples between laboratories in the region. FAO, OIE and WHO must engage with international shipment companies and IATA to facilitate faster and easier sample shipment. There is a need to develop framework agreements with international shippers to facilitate sample shipments.

### **How these constraints could be removed?**

On PT program, respective RDLs need to support to all the national laboratories through on-site training adapting the local country situation

- Exchange of specimen;
- Exchange of information;
- Reporting;

## **4.2 Group B: Self-sustainability of the RDLs and their Networking mechanism for the SAARC MSs in the future**

### **Background**

Sustaining an effective regional laboratory network is cost-intensive. The cost of laboratory diagnostic services are being borne by the hosting countries themselves including the cost of manpower in the laboratories. The network has been created

for SAARC RDLs and the National Laboratories with donor-supported projects so far in RSU. However for the network to continue to function, as envisaged under the SAARC Work Plan (2008) for the control of the three identified priority TADs, e.g., FMD, PPR and HPAI, a mechanism has to be found for sustaining the activities of the laboratories particularly in capacity building through training, harmonization of laboratory methodologies, proficiency testing, quality assurance, apart from the overwhelming costs of laboratory operations. This exercise has been designed to consider various options for sustaining the laboratory network for the SAARC through mutually beneficial services and cost-sharing mechanism.

The following questions were asked to the group and the responses of the Group to each are given below:

**What is the current source of funding of the RDLs:**

The RDLs for PPR and FMD are funded fully by their respective Governments. In case of RDL for HPAI, 50% of the funding is from Government and rest funded through research projects.

**Are these RDLs in a position to support the CVLs with capacity building, reagent supply, QA/PT and molecular epidemiology?**

- All the three RDLs have the capacity to support the CVLs (National Laboratories) with the diagnostic services and molecular epidemiology.
- With regard to the supply of reagents, while the RDL for PPR has the ability to supply the ELISA test kits to CVLs, the RDLs for HPAI and FMD will be able to supply the kits, antigen, antisera and PCR controls (positive and negative) on demand. In addition, the RDL for FMD will also be able to supply the controls for multiplex PCR. However, the group expressed that there is a need for additional funding for the supply of kits and reagents to other laboratories.
- In case of QA/PT, apart from national PT programme, the RDL for FMD has conducted international PT programs for Bangladesh, Sri Lanka, Nepal and Bhutan and can be expanded further if the funding is provided by RSU or any other international agencies. The RDL for HPAI is conducting national PT programme and can conduct the international PT programme if funding is provided. The RDL for PPR is yet to start PT programme and can continue the same if funding is provided.

**Would the RDLs like the CVLs to pay for their services?**

- All the three RDLs have expressed their readiness not to charge the CVLs for diagnostic services, when samples are referred to their laboratories.
- However, all of them expressed their views that the CVLs will have to bear the cost of shipment of the samples.

**Could the livestock owners pay for their diagnostic services?**

- The RDLs of PPR and FMD do not charge at this point of time.
- The RDL for HPAI has indicated their preference to charge the big companies for the diagnostic services.

**Compare to the current funding, what percent of additional funds will be required by RDLs to support CVLs of other countries**

- All the RDLs have indicated their inability to quantify for the additional funding required since operational costs of all the laboratories depend upon the scale and scope of activities planned.
- The OIE reference laboratories for HPAI, Bhopal India has expressed the willingness to offer the diagnostic services without additional funds with the cost of sending of samples borne by the CVLs.
- The need for alternative mechanism to sustain the regional cooperation has been discussed in detail.
- Some suggestions that came from discussions are
  - A regional epidemiological study of live bird markets including Bangladesh, Bhutan, India and Nepal.
  - Interactions among the Laboratory directors and scientists through Skype and WhatsApp groups. It has been agreed by the participants to form three skype/social media groups one each for HPAI, PPR and FMD.

**Session 5: Recommendations and Conclusions****Recommendations:**

Based on the deliberations of the Fourth Laboratory Directors' Meeting and Workshop for SAARC Member States, the following conclusions and recommendations were discussed and agreed:

**The Meeting considering that**

- National Animal Disease Diagnostic Laboratories are responsible for supporting the disease surveillance programs in their respective countries, towards early detection and response in a timely manner;
- Regional Laboratory Networks have enhanced laboratory capacity for the diagnosis of priority diseases (FMD, PPR and HPAI) and are committed to promote sharing of reagents, biological materials and information;
- the Laboratory Directors' Meeting can provide a platform to discuss regionally relevant problems of mutual interest and issues among national laboratories and RDLs of SAARC Region;

### **The Meeting acknowledged**

Key inputs from international partners and key experts from animal and public health on their expertise and knowledge on laboratory capacity building, Quality Assurance, standardization of diagnostics and roles of international reference laboratories;

- Key inputs from OIE reference laboratories and RDLs participants on their current expertise and activities and the challenges and opportunities in the SAARC region;
- Updates on laboratory status, laboratory activities and disease status by SAARC MSs;
- The updates on laboratory-epidemiology coordination and bioinformatics by FAO-RAP;
- The updates by international reference laboratories on FMD vaccine selection, PPR genetic diversity, and regional laboratory QA/PT and outcomes of regional laboratory assessments using the FAO Laboratory Mapping Tool.

### **The Meeting concluded that**

There is a need for continued laboratory capacity building to improve diagnosis, quality assurance, biosafety and bioinformatics in the SAARC region;

- There is a need for in country in situ hands-on trainings to be provided by RDLs/OIE Reference Laboratory experts;
- RDLs are capable to provide training and capacity building, distribute reference reagents and molecular epidemiology training, but currently lack sufficient funds and policy support to engage more in the region;
- International shipment of samples remains a major constraint to share samples between laboratories in the region;
- There is a need to share information of standard operating procedures (SOPs) and test algorithms used by MSs to work towards regional harmonization and standardization of diagnostic protocols;
- There is a need to share reference controls by the RDLs with national veterinary diagnostic labs to evaluate national diagnostic tests used.

### **The meeting recommended**

- To institutionalize the SAARC Laboratory Directors' Forum with commitment from Member States to organize on their own regular/annual meetings/teleconferences with participation from the National and Regional Diagnostic Laboratories;
- To create a Laboratory Technical Advisory Group (TAG) with well-defined Terms of reference (ToR). Members of the TAG should include regional lab focal points, international experts on regional priority diseases, and international organizations (FAO, IAEA, OIE, etc.). This TAG should convene

once a year back to back with the SAARC laboratory directors forum and invite the laboratory directors as observers to the TAG meeting;

- To create 3 technical working groups (one for each priority disease) to discuss laboratory issues related to AI, PPR and FMD. The RDLs focal points will be the coordinator of the groups and will convene the group via Skype or other media once every 3 months or on an ad hoc basis if needed. Regional Diagnostic Laboratories to develop the agenda for these meetings. SAARC-RSU will assist with the coordination of the groups;
- RDLs to take the initiative to ensure full ownership of the network and support capacity building and laboratory networking activities on a long term basis;
- The RDLs, FAO Reference Centres and OIE Reference Laboratories to make efforts to get laboratory accreditation as per ISO guidelines (ISO 9001/ ISO/IEC 17025);
- RDLs to verify fitness for purpose of diagnostics tests/kits, and recommend diagnostic tests at regional level, e.g. validation of diagnostic kits, rapid diagnostic kits and molecular tests;
- RSU-SAARC through the laboratory directors forum and in collaboration with RDLs, OIE reference laboratories and national labs to draft a regional strategic framework for laboratory capacity building and laboratory networking in the SAARC region
- All regional and national laboratories to conduct laboratory assessments through the FAO LMT. Based on these laboratory assessments, a set of guidelines and programme be developed by the laboratories to address the deficiencies and shortfalls in implementing quality assurance (QA), quality management (QM), biosafety and trainings;
- National and regional diagnostic laboratories are to put in place a Network Quality Control (NQC)/Internal Quality Control (IQC) reference controls for tests for key diseases, e.g., FMD, AI & PPR to monitor performance of tests and allow comparison of laboratory results to ensure tests are giving accurate and correct results.
- All regional and National laboratories to assess specific needs on biosafety management and constraints, through consultation with laboratory staff, using international biosafety standards;
- Explore the possibility to conduct biosafety laboratory assessments by international experts using FAO BLMT, BMBL or other international standards in the national veterinary laboratories in the SAARC region
- FAO, OIE and WHO to engage with international shipment companies and IATA to facilitate faster and easier sample shipment or to develop framework agreements with international shippers to facilitate sample shipments (as WHO did with World Courier for shipment of influenza samples within the NIC network).



## Closing Remarks

H Kugita, OIE Regional Representative, Japan, expressed his happiness in being able to participate and contribute to the proceedings of the Workshop. He once again emphasized the need for continuous and sustained efforts for improving laboratory capacity in the region and assured help and assistance of OIE to all the Member States in the region. On behalf of the Bangladesh Government, HB Golam Mahmud, CVO expressed sincere thanks for choosing Bangladesh to host this meeting. He assured that his Department will initiate appropriate action in implementing the recommendations to the extent possible.

Naila Siddique from the RDL on HPAI in Pakistan offered the closing remarks on behalf of the participants. She thanked the organizers in RSU and appreciated this type of gathering. She suggested that PT panels can be provided by respective RDLs. She also felt the need for RDLs to discuss with national focal persons, which will help to solve the difficulties faced by the national laboratories. Overall, she suggested that sharing of protocols will benefit everyone, and expressed that this type of meeting are important to share their views and knowledge.

MJH Javed, Director (ARD), SAARC, congratulated RSU-SAARC for organizing and successful completion of the workshop. He hoped that the recommendations from this workshop are fruitful to the MSs and urged for timely implementation of the important recommendations by all the stakeholders especially the MSs. He also conveyed his sincere thanks to all the participants on behalf of the Secretary General of SAARC.

While expressing great satisfaction on the outcome of this meeting, Santanu Bandyopadhyay, RSU Coordinator from RSU-SAARC Kathmandu, Nepal thanked the SAARC MSs, and RDLs, for deputing delegates to the workshop. He emphasised that this is the 3<sup>rd</sup> Laboratory Directors meeting and an important part of the Lab network. He also thanked FAO-RAP for providing the mentorship to conduct this workshop and also for facilitating participation of the Regional Laboratory Coordinator and the representative from AAHL, Geelong, Australia. He also emphasised the need of RSU and RDLs to be supported by the respective MSs. Sincere gratitude were expressed to the FAOR Bangladesh, ECTAD- Bangladesh, OIE Regional Representation and SAARC Secretariat for their continuous support for this meeting in particular and for the RSU-SAARC in general. The support provided by ADB through the Japanese Fund for Poverty Reduction was also duly acknowledged.

The tremendous support of the Programme and Operation staff of RSU, FAO-ECTAD in Bangladesh and FAOR offices in MSs in organizing this event with excellent logistic support was lauded by all the participants in the end.

## ANNEXES

### Annex 1: Regional workshop to develop regional plan for bioinformatics

The objectives of the consultation was

- Discuss a plan to strengthen bioinformatics capacity in South and Southeast Asia including main goals and regional vision
- Develop a list of objectives and activities to support the developed goals (from basic bioinformatics skills to next generation sequencing)
- Identify how bioinformatics can support epidemiology, national policy and decision making
- Identify training needs and approaches to efficient training curricula (for lab and epi)
- Identify potential partnership with public health sector initiatives in order to avoid duplication of efforts

#### Main conclusion

- Bioinformatics is a key component in controlling and preventing animal and zoonotic diseases.
- The key benefits of strengthening bioinformatics capacities within the region are:
  - To guide and improve targeted disease surveillance.
  - To improve diagnostic capacities to detect animal and zoonotic diseases.
  - To guide decision-makers on disease prevention and control strategies.
  - To improve molecular epidemiology and overall understanding of the spread, evolution and ecology of pathogens.
  - Gaps and needs in bioinformatics capacities, including human resources, technology and knowledge, are present within the region and must be addressed to improve the use of bioinformatics in controlling and preventing animal and zoonotic diseases

#### Recommendation

- The establishment of 3 working groups of bioinformatics experts: mapping the existing capacity, training development, and outreach to other stakeholders
- Mapping the current laboratory and human resources in bioinformatics in the region
- The finalization of the regional plan for strengthening bioinformatics and the presentation of this draft to regional platforms in ASEAN (Lab-Tag and ALDF) and SAARC (Lab Directors and CVO Forums) for consideration and implementation.

- The development of basic and advanced training modules for workshops, as well as modules for other stakeholders, including decision-makers, epidemiologists and communications experts.
- The engagement of other key stakeholders and networks, such as public health and epidemiology networks, and private sector, to make use of synergies and collaborative opportunities to aid in the implementation of the regional bioinformatics strategy.
- The organization of regional workshops on bioinformatics targeting Member states for the presentation of the regional plan and the piloting of training modules.
- The organization of in-service trainings at the country level on targeted support for bioinformatics when and where needed.
- The inclusion of bioinformatics as a key component in existing expert groups, such as Lab-Tag and laboratory director's forum (ASEAN) and laboratory directors meeting (SAARC).
- Continuing support from FAO in coordinating expert working groups and efforts to develop training modules, standard operating procedures and other relevant materials.

## Annex 2: Concept Note and Agenda

### Background

The Regional Support Unit for SAARC (RSU-SAARC) of the Food and Agriculture Organization of the United Nations (FAO) in Kathmandu, Nepal is implementing a ADB-funded project entitled "Regional Capacity Development for Regional Cooperation on Food Security through Control of Transboundary Animal Diseases in South Asia" under the SAARC umbrella. The project will build upon the activities within the SAARC Member states carried out through the EU-funded Highly Pathogenic and Emerging Diseases (HPEDs) programme during 2010-2014 and further integrate these activities to underpin the three most important trade limiting diseases: FMD, PPR and HPAI.

Three SAARC Regional Diagnostic Laboratories (RDLs) were established under the EU-funded Project and are located in Bangladesh (PPR), India (FMD) and Pakistan (HPAI). These laboratories coordinated a network of national diagnostic laboratories of the SAARC Member states, primarily focusing to maintain uniform diagnostic standards, support training of laboratory scientists/technicians from the Member states, and backstop regional surveillance and epidemiological studies. The activities were supported by the international reference laboratories of OIE and FAO like the Australian Animal Health Laboratory (AAHL), Geelong, Australia and the High Security Animal Disease Laboratory (HSADL), Bhopal, India.

In order to coordinate and harmonize the activities of these RDLs', the First Laboratory Directors Meeting and Workshop on Laboratory Networking and Proficiency Testing was held during 23-24 January 2012 in Dhaka, Bangladesh, followed by the Second and Third Laboratory Directors Meeting during 12-13 March 2013 in Colombo, Sri Lanka and during 5-6 March 2014 in New Delhi, India, respectively.

These laboratories have the facilities to carry out diagnosis of priority Transboundary Animal Diseases (TADs) and undertake characterization of virus isolates. In addition to providing confirmatory diagnostic facility, these regional laboratories also form and coordinate a network of national diagnostic laboratories. The networks are the basis for sharing virus isolates and disease information and maintain uniform diagnostic standards.

Apart from these three RDLs, the national animal disease diagnostic laboratories are responsible for supporting the disease diagnosis and surveillance programmes in their respective countries towards early detection and response in a timely manner. Regional Laboratory Networks will enhance capacity in these national laboratories for the diagnosis of priority animal diseases, and promote sharing of reagents,

biological materials and information. The leading laboratories having the capability for molecular characterization of the viruses are encouraged to increase capacity in order to assist national animal disease diagnostic laboratories in the diagnosis and characterization of viruses and also promote sharing of virus sequence information through the laboratory networks.

Considering that effective diagnostic laboratory capacity is an important tool to early detection and control of the TADs in the region, the designated national and regional laboratories need to conduct and deliver efficient laboratory diagnostic services. The Australian Animal Health Laboratory (AAHL) and FAO collaborated to organize laboratory training for Proficiency Testing (PT) for Veterinary Diagnostic Laboratories in SAARC countries. The training which covered PT, Quality Assurance (QA) and Standardization of Diagnostic Reagents and Bio-safety was specifically designed to strengthen regional laboratory diagnostic capacity by improving QA and especially production and QA of diagnostic reagents.

Strengthening of PPR and other TADs diagnostic capacity was extensively discussed during the recently held 5<sup>th</sup> Meeting of the SAARC Chief Veterinary Officers (CVOs) Forum and the First Regional PPR Roadmap Meeting for South Asia. There is a need to strengthen RDLs in order to develop a regional PT, disease diagnosis, laboratory networking, harmonization of techniques and assessing national laboratory capabilities.

In order to review the laboratory networking mechanism among SAARC Member states vis-à-vis the RDLs and to consolidate the network, the 4<sup>th</sup> Laboratory Directors Meeting and Workshop will be organized from 1-2 June 2016 in Dhaka, Bangladesh by RSU-SAARC in partnership with the SAARC Secretariat.

### **Meeting Objectives**

- to review the activities and past recommendations related to laboratory capacity building and laboratory networking of OIE reference (HPAI), Regional Diagnostic Laboratories (HPAI, FMD and PPR) and key national diagnostic laboratories of SAARC countries and to get update on existing SOPs and protocols used in the region;
- to discuss the possibilities of upgrading the regional laboratories to FAO or OIE Reference Laboratories or twinning with such reference laboratories elsewhere;
- to discuss the problems and issues related to the national veterinary diagnostic laboratories and the Laboratory Networking within the SAARC Member states.

- to discuss the status/activities and expectations/opportunities of the national and regional laboratories with problems and challenges for collaboration among laboratories;
- to discuss the mechanism to organize regular meetings to review, assess and plan network activities on sharing of information and enhancing the laboratory expertise;
- to review how to advocate for support and sustain regional laboratory networks;

### **Expected Outputs**

- Updated on the activities related to laboratory capacity building and laboratory networking in the region.
- Gaps identified in efficient diagnostic service delivery of the regional laboratories
- Key points and next steps identified for the mechanism to sustain the mechanism for laboratory networking in the SAARC region.
- Key recommendations identified for national and regional laboratory networks
- A report of the meeting produced.

**Agenda**

<b>DAY1: 1 June 2016, Wednesday</b>		
<b>Time</b>	<b>Events/Activities</b>	<b>Speaker/Facilitator</b>
08.30-09.00	Participants Registration	RSU-SAARC/FAO
<b>Opening Session; Facilitator: Santanu</b>		
	Welcome Remarks	Mr Mike Robson FAO Rep in Bangladesh
	Introduction to the Meeting and expected outputs	Dr Santanu Bandyopadhyay RSU Coordinator, RSU-SAARC
	Importance and necessity of the SAARC Networking Mechanism for food and nutritional security in the sub-region	Mr MJH Jabed, Director (ARD) SAARC Secretariat
09.00-09.45	Opening Remarks <ul style="list-style-type: none"> <li>• Dr Hirofumi Kugita Regional Representative Asia Pacific (RRAP) (Tokyo) OIE</li> <li>• Mr Ajay Kumar Ray DG, Department of Livestock Services, Bangladesh</li> <li>• Dr Talukder Nurunnahar DG, Bangladesh Livestock Research Institute (BLRI)</li> <li>• Md. Maksudul Hasan Khan Secretary, Ministry of Livestock and Fisheries, Bangladesh</li> </ul>	
10.00-10.30	Group Photo and Tea/Coffee Break	
<b>Technical Session: updates from international organizations and linkages to regional and national laboratories- Facilitator: Santanu</b>		
10.15-10.45	Introduction of participants Background of the Laboratory Directors' meeting and key recommendations of the previous Lab Directors meetings	Khadak, RSU-SAARC Santanu/Khadak

10.45-11.45	Global and Regional strategic framework for lab capacity building-linkage with regional and national lab and networking	Filip Claes FAO RAP
	Role of a Reference Lab in Proficiency Testing, Capacity Building, Quality Assurance (QA) and Standardization of Diagnostic Reagents and Biosafety:	Chris Morrissy AAHL
	OIE International Reference Laboratories and twinning mechanism: OIE Regional Office, Asia	Dr Fania Dwi (Ms)
	Harmonized lab procedures & protocols for zoonotic/emerging and re-emerging diseases- linkage with regional and national labs	Dr Mahmudur Rahman IEDCR
<b>Technical Session: Updates on OIE reference and regional diagnostic laboratories and linkages with national laboratories Facilitator: Khadak</b>		
11:45-12:00	OIE Reference Laboratory on Avian Influenza- <i>HSADL India and linkages with national laboratories</i>	HSADL
12:00-12:20	PPR Regional Leading Laboratory- <i>PPR RDL (Bangladesh) and linkages with national laboratories</i>	RDL PPR
12:20-12:40	FMD Regional Leading Laboratory – <i>FMD RDL (India) and linkages with national laboratories</i>	RDL FMD
12:40-13:00	HPAI Regional Leading Laboratory – <i>HPAI RDL ( Pakistan) and linkages with national laboratories</i>	RDL HPAI
13:00-14:00	Lunch Break	
<b>Group Exercise and World Café Workshop</b>		
14:00-15:00	Opportunities and expectations (area of collaboration, exchange of specimen and information and reporting) in the networking mechanism among the National Laboratories (PPR, FMD, HPAI/AI) from the OIE Reference and Regional Diagnostic laboratories. Self-sustainability of the RDLs and their Networking mechanism for the SAARC Member states in the future	Facilitator: RSU, RAP and AAHL



15:00-15:30	Tea/Coffee Break	
<b>DAY 2: 2 June 2016, Thursday- Facilitator: Nitish</b>		
<b>Technical Session: Overview of Activities/Key country updates on National laboratories</b>		
Gallery walk/Presentation-Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan, Sri Lanka		
9.00-10.30	Country updates on the activities of the laboratories of priority diseases (FMD, PPR and AI) Updates on emerging diseases Updates on other lab related activities in respective countries, e.g., capacity development, quality assurance,	Facilitator: Santanu/ Khadak
10.30-11:00	Tea/Coffee Break	
11.00-13.00	Review of the progress made  The importance of lab-epi networking and coordination:  A brief account of the outcome and recommendations of the Workshop to develop a regional strategic plan for bioinformatics held in Bangkok from 10-12 May 2016.  Vaccine strain selection for FMD with reference to virus circulation and Genetic diversity of PPR virus	Khadak Bisht, RSU  Eric/Nitish, ECTAD Bangladesh  Filip Claes, RAP  Prof Satya Parida, Pirbright Institute, UK
14.00-15.00	Recommendations and Concluding Session	FAO RAP/RSU ECTAD RAP Laboratory Coordinator SAARC Director (ARD)
15.00-15.30	Tea/Coffee Break and end of programme	
<b>DAY 3: 3 JUNE 2016, FRIDAY: DEPARTURE</b>		

## Annex 3: List of Participants

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## **Annex 4: Group Discussion- Questionnaires**

### **GROUP 1: Opportunities and Expectations**

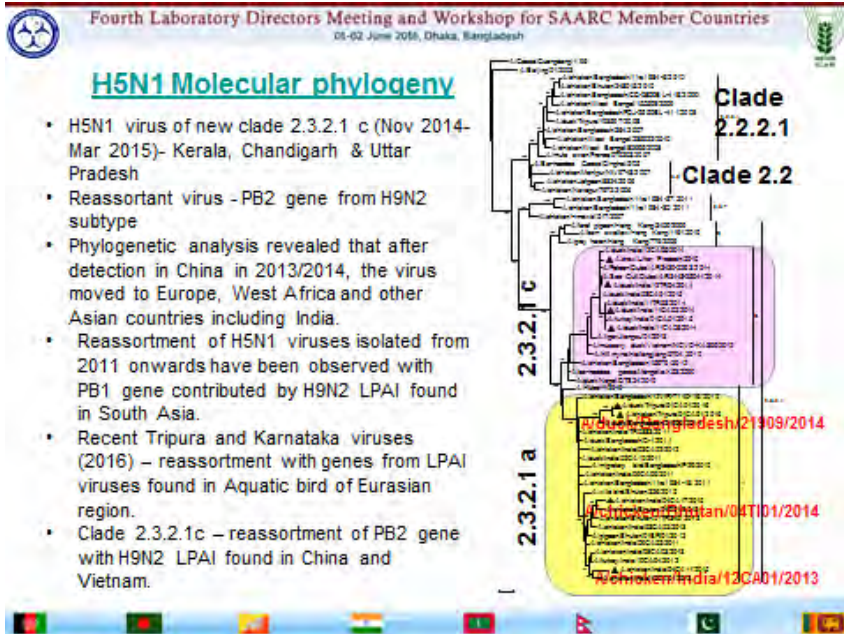
- Which are the areas in which Regional Diagnostic Laboratories (RDLs) and National/Central Veterinary Laboratories (CVLs) could collaborate?
- How effective is the mechanism for sharing of specimen, information and reporting of the diseases?
- What are the current constrains if improvement on 1 and 2 are needed?
- How these constraints could be removed?

### **GROUP 2: Self-sustainability of the RDLs and their networking with the National/ Central Veterinary Laboratories (CVLs)**

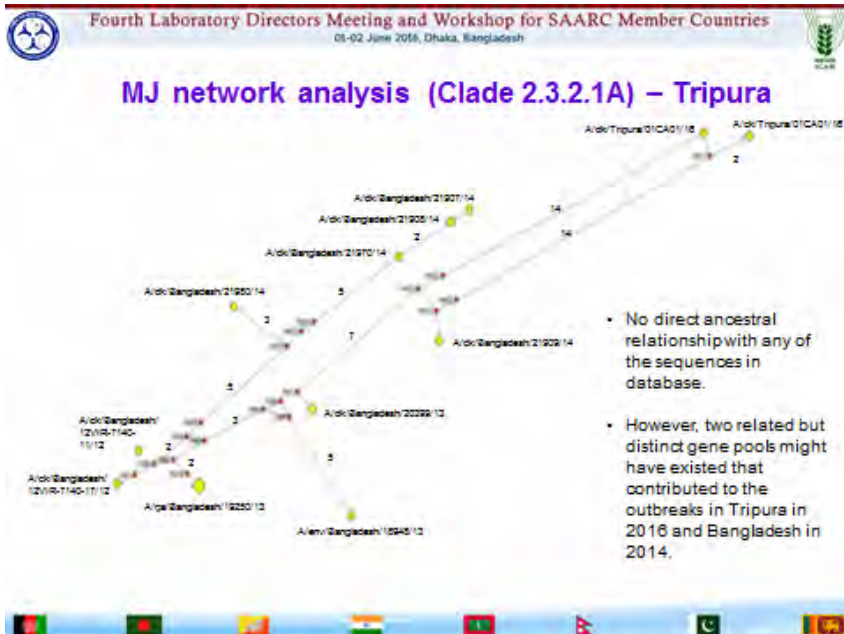
- What is the current source of funding of the RDLs?
- Are these RDLs in a position to support the CVLs with capacity building, reagent supply, QA/PT and molecular epidemiology?
- Would the RDLs like the CVLs to pay for their services?
- Could the livestock owners pay for their diagnostic services?
- Compare to the current funding, what percent of additional funds will be required by RDLs to support CVLs of other countries;

### Annex 5: List of Figures

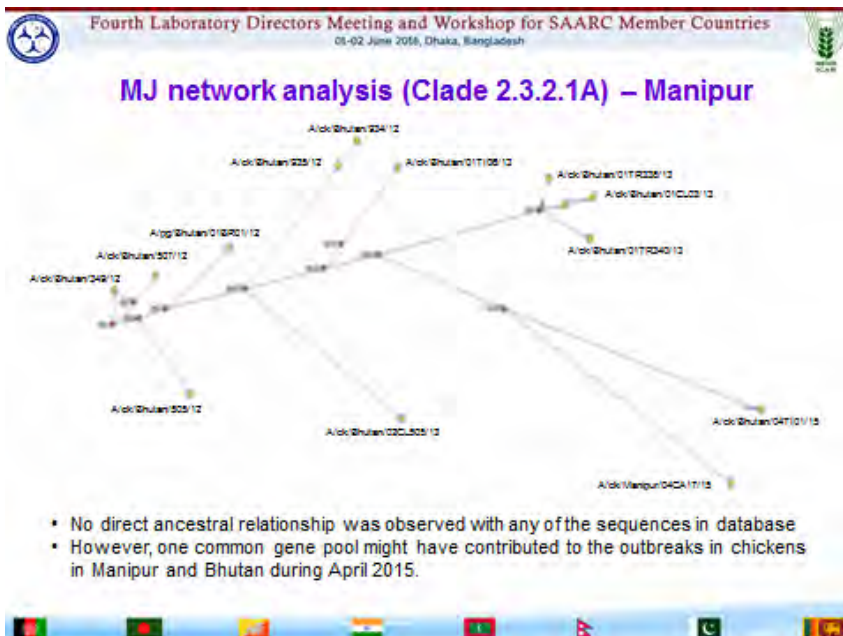
**Figure 1: H5N1 Molecular phylogeny, National Institute of High Security Animal Diseases (NIHSAD), India**



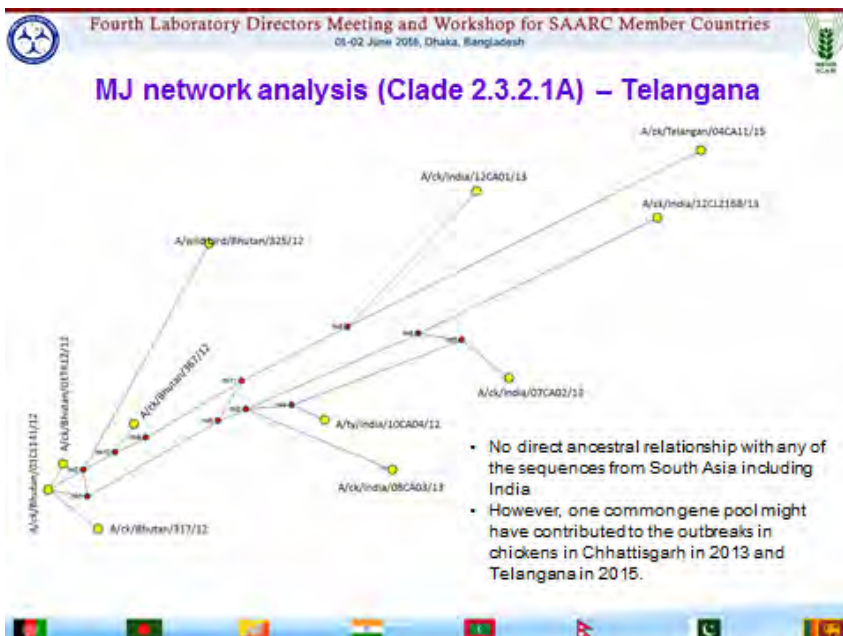
**Figure 2: MJ network analysis of A-H5N1 in Tripura, India**



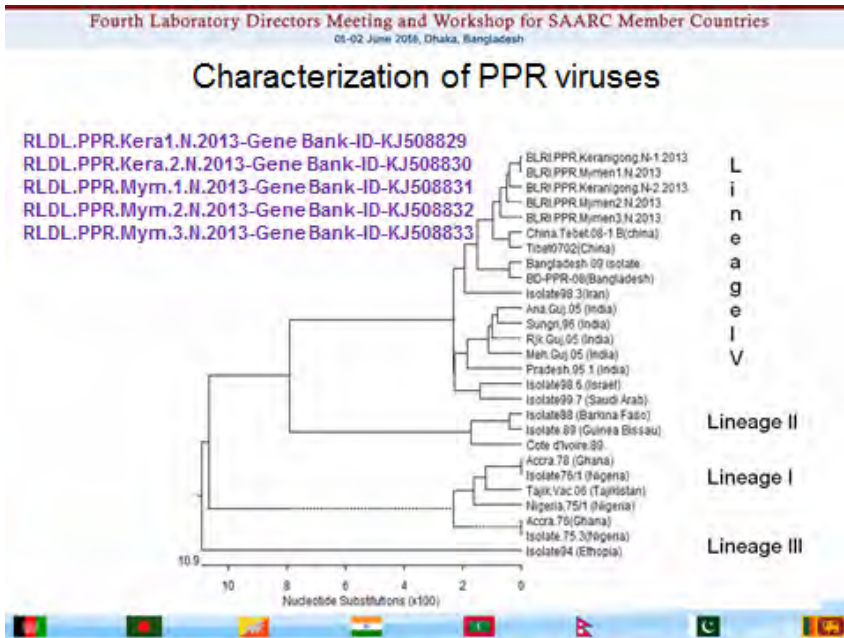
**Figure 3: MJ network analysis of A-H5N1 in Manipur, India**



**Figure 4: MJ network analysis of A-H5N1 in Telangana, India**



**Figure 5: Characterization/phylogenetic profile of PPR virus, Bangladesh**



**Figure 6: Characterization of recent FMD virus O in India**

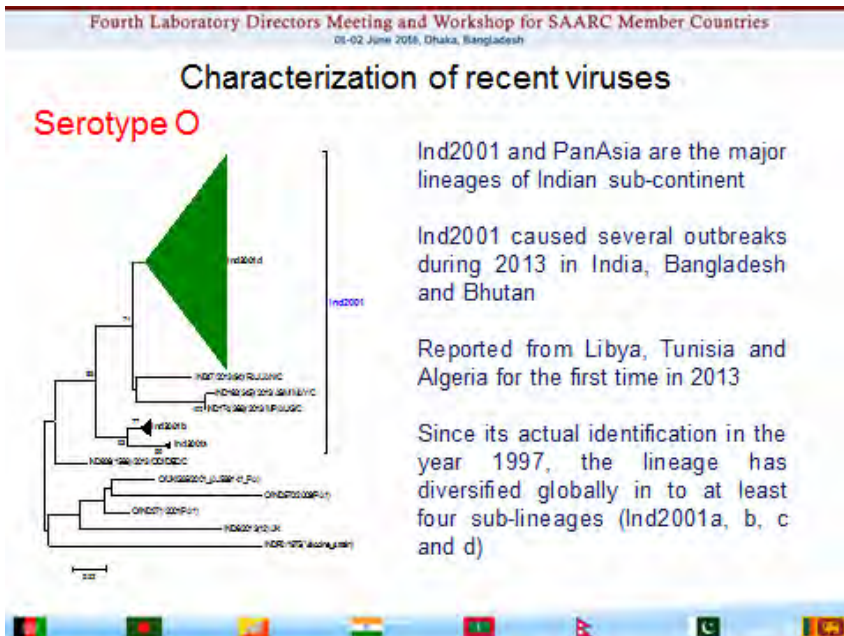




Figure 7: Characterization of recent FMD virus A in India

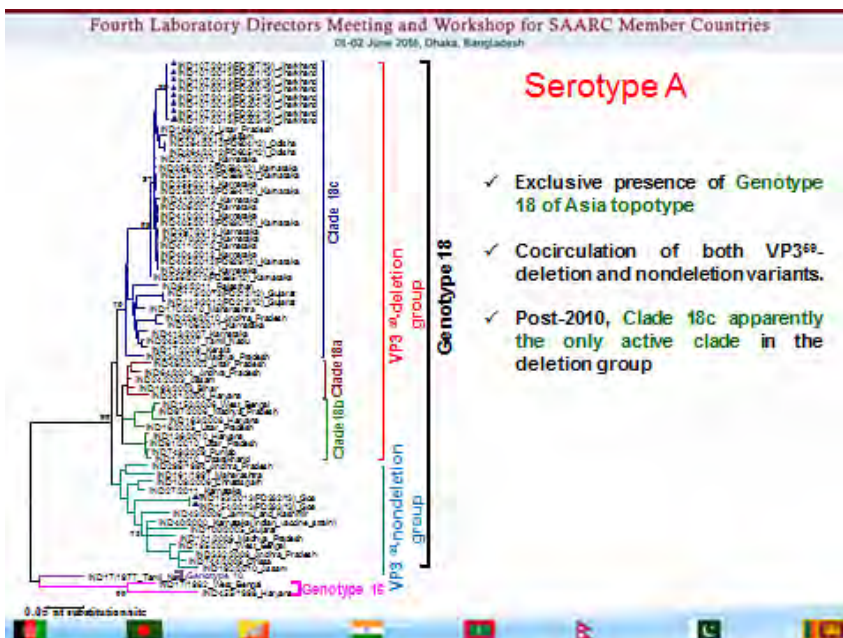


Figure 8: Characterization of recent FMD virus Asia 1 in India

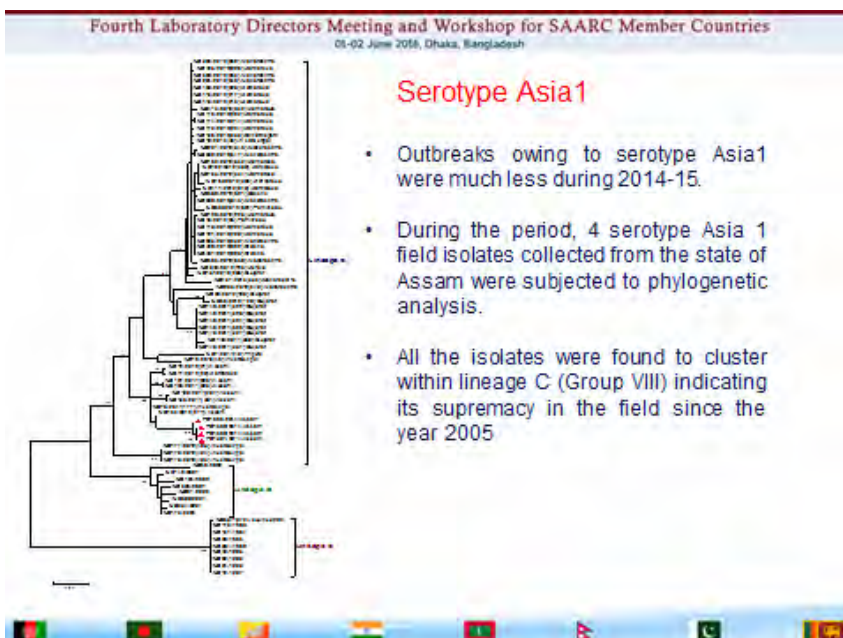
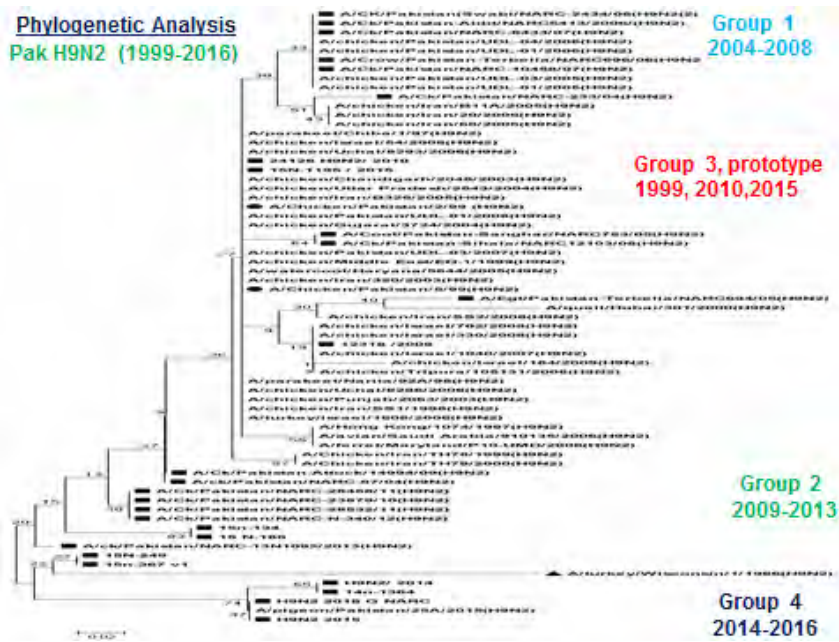


Figure 9: Phylogenetic analysis of A-H9N2 (1999-2016), Pakistan





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