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REPORT of the Thirty-seventh Session of the Animal Production and Health Commission for Asia and the Pacific (APHCA)

Thimphu, Bhutan, 22-26 September 2013

THE EIGHTEEN APHCA MEMBER COUNTRIES

AUSTRALIA	**MONGOLIA**
BANGLADESH	**MYANMAR**
BHUTAN	**NEPAL**
INDIA	**PAKISTAN**
INDONESIA	**PAPUA NEW GUINEA**
IRAN	**PHILIPPINES**
DPR KOREA	**SAMOA**
LAO PDR	**SRI LANKA**
MALAYSIA	**THAILAND**

Report OF THE

THIRTY-SEVENTH SESSION OF THE ANIMAL PRODUCTION AND HEALTH COMMISSION FOR ASIA AND THE PACIFIC (APHCA)

Thimphu, Bhutan, 22–26 September 2013

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
REGIONAL OFFICE FOR ASIA AND THE PACIFIC
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RECOMMENDATIONS

The Commission welcomes:

- FAO's ongoing process of decentralization towards a more flexible and innovative decentralized office network;
- FAO's renewed emphasis on South-South cooperation and participatory consultative processes;
- That the Regional Technical Commissions are considered the Regional priority-setting bodies for the sub-sectors for which they are competent and that their recommendations complement and inform the discussions during the Asia-Pacific Regional Conference on the Programme of Work and the Regional Priority Framework.

The Commission emphasizes that:

- Seventy percent of the world's poor livestock keepers and 40 percent of the global livestock population reside in the Asia-Pacific Region;
- More than 25 percent of the children in the region suffer from under-nutrition;
- The livestock sector is undergoing exceptionally rapid and significant growth and transformation.

With respect to developments in the Asia-Pacific Region, the Commission is concerned about the:

- Rising regional shortfalls in animal feed and its impact on food security;
- Significant impact of animal diseases on livestock production and trade of animal products;
- Sustained emergence of infectious diseases affecting humans and animals;
- High human burden of endemic zoonotic and food-borne diseases;
- High and rising prevalence of antimicrobial resistance in livestock-associated microorganisms;
- Growing pressure on natural resources (land, water and nutrients) and environmental impact of rapidly growing livestock production;
- Likely effects of climate change including increasing frequency of severe weather events (e.g. droughts, floods) on livestock production and health;
- Exclusion of smallholder livestock keepers from growing markets for high-value agricultural products;
- Inadequate capacity among the member countries in analyzing trade-offs and implementing specific measures to support more sustainable livestock sector development.

With respect to FAO's and the Commission's capacity to support Member countries to address the above issues, the Commission notes that:

- Human and financial resources made available to the Regional Office seem incommensurate with the Office's increase in responsibilities following 'decentralization';
- Arrears of APHCA Member countries have steadily increased over the past three years.

The Commission recommends that FAO:

- Increases the human and financial resources allocated to address the multiple problems associated with the rapidly growing and transforming livestock sector;
- Enhances livestock sector policy analysis, formulation and implementation capacity of member countries in the region;
- Continues to support regional initiatives and actions to address problems of transboundary nature (e.g. emerging diseases, feed scarcity, zoonoses, antimicrobial resistance), in close collaboration with related agencies and intergovernmental organizations;
- Promotes within- and cross-country collaboration so as to encourage stakeholder action and investment towards the broader goal of sustainable livestock production;
- Promotes and supports national mechanisms of prioritization of livestock production and health activities;
- Amends the APHCA Agreement to open membership to intergovernmental organizations within the APHCA region.

The Commission welcomes:

- The Secretariat of the Pacific Community (SPC) as member of APHCA with specific functions of representing and providing services to the other countries in the Pacific, that are not members of APHCA;
- Applications for Membership from countries and intergovernmental organizations in the APHCA region;
- Extra contributions to the Commission's Trust Fund or to the member countries' National Currency Funds (the latter for TCDC activities in particular).

Minutes of the 74th Executive Committee Meeting and the 37th Session of APHCA

The 74th Executive Committee Meeting

Sunday, 22 September 2013, 15:00 to 16:50 hours

- The meeting was chaired by Dr W.K. de Silva, delegate from Sri Lanka. Present were the delegates from Australia, Bhutan (Vice Chairperson), Myanmar, Samoa and The Philippines. The meeting was furthermore attended by members of the APHCA Secretariat.
- The Chairperson welcomed the delegates, commended APHCA for its steadfastness and instrumental activities in support of member countries and thanked Bhutan for hosting the Session.
- The APHCA Secretary welcomed the delegates and expressed his appreciation for their presence. He informed that all APHCA member countries, with the exception of DPR Korea, had accepted the invitation. Unfortunately, the delegate from Mongolia was prevented from attending due to other commitments while the delegates from Iran and Nepal were not able to finalize their travel arrangements in time. The Session would thus be attended by delegates of 14 of the 18 member countries
- The APHCA Secretary informed the ExCom that Dr K. Cokanasiga, Adviser, Animal Health and Production Land Resources Division, Secretariat of the Pacific Community, Dr H. Kugita, Regional Representative, OIE Representation for Asia and the Pacific and Dr T Ishibashi, Deputy Regional Representative, OIE Representation for Asia and the Pacific would attend the Session as observers. Furthermore, 10 observers from government of Bhutan offices would attend the session and workshop.
- The ExCom reviewed and adopted the agenda of the 37th Session and associated, OIE co-funded, regional workshop on zoonoses, food-borne diseases and antimicrobial resistance (AMR) in the Asia-Pacific Region.
- The ExCom reviewed and approved the minutes of the 73rd Executive Committee Meeting and 36th Session.
- The APHCA Secretary reported on the financial situation of the Commission. At the beginning of 2013 (01.01.2013), the cash balance in the APHCA Trust Fund stood at US$260 810 plus US$90 850 of cumulative interest earned. A budget revision has been carried out and the earned interest has been transferred into the cash balance. Contributions received for 2013 up to 31 August amount to US$40 766.86 (outstanding 2013 contributions total US$49 775.14). Overall the financial situation

of APHCA has remained stable over the past years with the cash balance fluctuating between US$200 000 and US$300 000.

- The ExCom noted with disappointment that Bangladesh had still not reduced its considerable arrears and that some other countries were also accumulating arrears, which at the end of 2012 totaled US$59 551.01 and urged the next Chairperson to take the matter up once again with the Bangladesh and other counterparts.
- The APHCA Secretary provided a brief summary of activities carried out since the last meeting in Negombo, Sri Lanka. Activities of FAO-RAP Livestock Group staff encompassed technical support to more than 30 projects, organization of symposia, meetings, workshops and other events as well as representation of FAO and APHCA at events organized by other organizations. The main activities carried out in relation to the APHCA workplan for 2013 were the organization of an APHCA Expert Meeting '*Towards Standardization and Harmonization of Monitoring of AMU in Livestock and AMR in Livestock-associated Micro-organisms in the Asia-Pacific Region'*, a Regional Workshop on '*Animal Feed Resources and their Management in the Asia-Pacific Region*', continuation of work linked to the smallholder dairy development programme, co-organization of the *4th Sustainable Animal Agriculture Development Conference (2013 SAADC)*, held in Lanzhou, China, and ongoing activities to enhance information dissemination and visibility carried out by the Information Unit. The *4th FAO-APHCA/OIE Regional Workshop on Brucellosis Diagnosis and Control in the Asia-Pacific Region* (Proficiency Test and Ways Forward) is planned for December 2013.
- The livestock policy officer, leading the smallholder dairy development activities of FAO and APHCA in the region requested APHCA to endorse the dairy training center established in Chiang Mai, Thailand, under the CFC dairy project as 'regional APHCA dairy training centre'. This would encourage Thai Dairy Promotion Organization to provide funds to upgrade the center through the Thai NCF. A business plan to ensure financial sustainability of the centre would be developed using APHCA TF funds allocated to smallholder dairy development. The ExCom agreed to the request and suggested a close link to be established between the dairy training center and the animal nutrition centre also located in Chiang Mai.
- Given some under-spending to be expected in 2013 vis-à-vis the proposed budget, the Secretary requested permission to carry-over unspent 2013 allocations into 2014 to carry complete activities planned for 2013 (as was agreed at the 36th Session for 2013).
- The APHCA Secretary provided a brief outlook on thematic areas APHCA might consider to systematically address in the coming years. These thematic areas comprise:
    a. Continued attention to *smallholder dairy development* as an important 'tool' for poverty reduction and rural development.
    b. Further and refined assessments of the burden and impact of *zoonoses, food-borne diseases and antimicrobial resistance*, building on intensified

collaboration with OIE and WHO, to support decision making on resource allocation of national health systems. In this context, standardization and harmonization of veterinary AMR assessments across APHCA countries would be an important step to obtain a more reliable overview of the true extent of the problem.

c. Given the rising cost of animal feed and the soaring feed import bill of many APHCA countries, the establishment national *feed resource assessment systems* would be useful for providing some guidance to livestock sector development. Establishment of a common approach for feed resource assessment across interested countries, drawing on national and international expertise, is an area for APHCA engagement as expressed by the national feed experts attending the feed assessment workshop.

d. In view of the multiple and complex challenges facing public sector agencies in guiding livestock sector development on a path to a sustainable role in food security and equitable economic development in an increasingly resource-constrained, urbanizing and affluent world, there is a need for *capacity building in livestock sector policy analysis, design and negotiation* across countries at various levels of administration.

- At the 36th Session, the Secretariat was requested to review the scale of contributions (which has been unchanged since 2003) in accordance with the original criteria used for their establishment, maintaining 3 categories and phasing of the increment over successive years. The Secretariat's proposal for a raise in the level of contributions to the 2012 US$ purchasing power equivalent of the 2003 scale of contributions in two steps (2014 and 2015) was endorsed by the ExCom.
- The ExCom requested the Secretariat to ask FAO HQ to issue the annual call for funds in the first quarter of the calendar year and urged the Secretariat to continue its practice of copying the call for funds to the national delegate.
- The ExCom discussed the request for APHCA membership by the Secretariat of the Pacific Community (SPC). The Secretary pointed out that a positive decision would require a slight modification of Article III, para 1, defining eligibility for membership, to broaden the latter to include intergovernmental organisations within the 'Region'. The ExCom was unanimously in favour of granting APHCA membership to SPC and suggested that SPC and other intergovernmental organizations in the region should fall into contribution band A.
- The proposed APHCA workplan and budget for 2014 amounts to US$135 000 for six thematic thrusts: (i) smallholder dairy development – US$25 000 (ii) zoonoses and food safety – US$20 000 (iii) feed resource management – US$20,000 (iv) AMR Risk management – US$20 000 (v) livestock policy capacity development – US$20 000 and (vi) information dissemination and APHCA positioning – US$30 000. FAO's anticipated contributions to the workplan are estimated at US$135 000.
- The Chairperson closed the meeting at 17:50

The 37th APHCA Session

Monday, 23 September 2013

- **Opening**: The opening of the 37th APHCA Session was presided over by H.E. Lyonpo Yeshey Dorji, Minister, Ministry of Agriculture and Forestry. Delegates from 14 member countries (Australia, Bangladesh, Bhutan, India, Indonesia, Iran, Lao PDR, Malaysia, Myanmar, Pakistan, Philippines, Samoa, Sri Lanka, and Thailand) and observers from the OIE Regional Representation for Asia and the Pacific, Tokyo, and the Secretariat of the Pacific Community (SPC) attended the Session.
- **Adoption of the Agenda**: The Agenda was adopted.
- **Election of the Chairperson and Members of the Executive Committee**: The Executive Committee was elected as follows:

Chairperson:	Bhutan
Vice-chairperson:	Thailand
Members:	Indonesia, Pakistan and Papua New Guinea
Ex-officio member:	Sri Lanka

  The outgoing Chairperson, Dr W.K. de Silva, thanked the delegates for their support and handed over the chairmanship of the Session to Dr T. Dorji, Director General a.i., Department of Livestock, MoAF, Bhutan.
- **Approval of the Minutes of the 73rd Executive Committee Meeting and the 36th APHCA Session**: The Minutes were reviewed and approved by the delegates.
- **Statement of Accounts**: The Secretary presented the status of the APHCA accounts for 2012 and expenditures for 2013. The approved budget for 2012 was US$100 000 while the 2012 expenditures amounted to US$38 125 (APHCA 2013/04). The reason for this under-spending have primarily been recoveries on the salary of the APHCA IT clerk, who had been seconded to other units in FAO RAP in 2011 and had so far not reimbursed APHCA for the salary outlays.

  Overall, over the past three to four years, APHCA's cash balance has fluctuated between US$200 000 and US$300 000. At the beginning of 2013 (01.01.2013), the cash balance in the APHCA Trust Fund stood at US$260 810 plus US$90 850 of cumulative interest earned. A budget revision has been carried out and the earned interest has been transferred into the cash account at disposal for APHCA activities.

  Delegates took note of and approved the statement of accounts for the year 2013.

  Contributions received for 2013 so far (31.08.2013) amount to US$40 766.86 (outstanding 2013 contributions total US$49 775.14). Cumulative outstanding contributions total US$105 041.15, nearly 40 percent of which is accounted for by Bangladesh. Expenditures in 2013 are likely to be slightly below the approved budget due to higher than expected co-funding of activities from other sources. The

Secretary requested permission by the member countries to utilize unspent 2013 funds for completion of approved 2013 activities in 2014, to which no objections were raised.

Delegates requested the Chairperson and Secretariat to (i) officially take up the issue of arrears with the respective counterparts and (ii) to invite more countries and intergovernmental organizations in the region to join APHCA.

Delegates furthermore requested the Secretariat to ask FAO-HQ to issue the annual call for funds in the first quarter of a calendar year so as to allow more flexibility in the timing of payment. They also urged the Secretariat to continue its practice of copying the call for funds, usually addressed to the Ministry of Finance, to the national delegate.

- **Overview of Activities**: The Secretary presented the activities conducted by APHCA and the RAP livestock group (RAP-LG) solely or in collaboration with other groups, irrespective of sources of funding and not limited to APHCA Member countries (APHCA 2013/05).

  Since the last Session, the RAP livestock group has been involved in the implementation of 38 country-specific as well as sub-regional (e.g. SAARC, ASEAN, Greater Mekong Sub-Region) projects with animal health and / or animal production components (up from 21 projects in the 2011/12 period). About half of the projects are financed by FAO through its Technical Cooperation Programme (TCP) while the remaining half receive funding from other national or international agencies through uni- or multilateral donor trust funds.

  Partly in conjunction with but also in addition to engagement in project implementation staff of the RAP-LG have (co-)organized 13 meetings, workshops and other events. Two FAO-APHCA workshops were organized in the reporting period, namely the FAO-APHCA Expert Workshop 'Towards Standardization and Harmonization of Monitoring of AMU in Livestock and AMR in Livestock-associated Micro-organisms in the Asia-Pacific Region' held in Bangkok in May 2013 and the Regional Workshop on 'Animal Feed Resources and their Management in the Asia-Pacific Region', held in Bangkok in August 2013. Furthermore, FAO-APHCA strongly contributed to the organization and implementation of the 'Waste to Worth' workshop held under the overall auspices of the Agenda of Action for Sustainable Livestock Development. In addition, as part of the smallholder dairy development thrust, RAP-LG co-organized the Thailand Celebration of World Milk Day.

  In the reporting period, RAP-LG staff attended 16 congresses, symposia, meetings or workshops to (re)present FAO/APHCA and to provide technical expertise. FAO-RAP co-funded the organization of the 4th International Conference on Sustainable Animal Agriculture for Developing Countries (SAADC) held in Lanzhou, China, in July 2013.

  In line with the Vision of APHCA to establish itself *as a prime source of information, knowledge, expertise and experience on all aspects of livestock sector development*

in the Asia-Pacific region formulated at the APHCA Strategy Workshop, the Information Unit has devoted considerable time to further improving the APHCA website. Close to 400 news items, 80 videos and 50 documents have been uploaded since the 36th Session. Nearly 280 000 visits have been recorded in the 11 month period with close to 84 000 document downloads. The site is currently ranked among the top 15% of more than 30 million sites monitored by www.webstats.com.

Finally, RAP-LG have commissioned a number of studies in various countries in the region on topics such as fodder resources, livestock sector developments and food security, livestock and livestock product trade, patterns of livestock product consumption, swine disease emergence, antimicrobial resistance etc. Some of these studies are carried out as part of the projects implemented by RAP-LG while others have been commissioned as part of FAO's Regular Programme.

Smallholder Dairy Network Activities: The Livestock Policy Officer, Dr V. Ahuja, presented a brief overview of the smallholder dairy activities in Asia and the Pacific Region comprising the three regional dairy development interventions:

- Smallholder Dairy Development in Bangladesh, Myanmar and Thailand: Improving the Bargaining Power and Sustainable Livelihoods through the Enhancement of Productivity and Market Access in Dairy (MTF/RAS/CFC/259)
- Enhancing Milk Consumption and Livelihoods through School Milk Programmes Linked to Smallholder Dairy Operations (TCP/RAS/3309 (D), and
- A third supporting intervention, the ***'Asia Dairy Network'*** funded by APHCA

The overall objective of these interventions is to improve the bargaining power and livelihoods sustainability of smallholder milk producers in participating countries. This objective is to be realized through the attainment of the following main outputs:

- A sustainable 20% improvement in milk productivity and the substitution of dairy imports with improved locally produced milk and dairy products;
- Improved market access for 5 000 smallholder milk producers;
- Improved milk quality in terms of hygiene, fat content, bacteria and TB negative animals;
- Introduction of new technologies for milk processing;
- Strengthened skills and capacity to develop and implement intervention strategies, which are tailored to introduce or expand school milk programmes in rural areas;
- Establishment of an Asian Dairy Network to represent the interests of the smallholder dairy sector in Asia;
- Expanding the remit of the Chiang Mai Dairy Training Centre, currently focussed primarily on national training needs, to a Regional Dairy Training Centre.

A recent mid-term review of the projects concluded that they have made good progress in implementing the activities planned for implementation so far. During the first two years the implementing teams focused on (i) mobilisation, planning, coordination and awareness raising; (ii) coaching and mentoring the three country teams; and (iii) priority field activities. As a result there is compelling evidence of strong ownership of project activities across all three countries along the entire dairy value chain. In terms of achievements to date, the project highlights include launch of school milk activities in Myanmar and Bangladesh, a well coordinated dairy extension programme in Thailand, introduction of Napier Packchong 1 forage variety in the three countries, dairy farmer trainings and introduction of quality control and improvement systems.

The Asia Dairy Network was launched in a symposium as part of the AAAP Congress in Bangkok in November 2012. Since then the network membership has grown to exceed 200 members. A network coordinator has been appointed, a new website launched and a listserv created for wider communication. An electronic conference is now planned later this year under the auspices of Asia Dairy Network.

As per project plan, the Dairy Training Centre in Chiang Mai has been upgraded. The centre has the capacity to offer training in (i) milk pasteurization, (ii) milk packaging, (iii) drinking yoghurt, ice cream, butter and cheese making, and (iv) milk quality testing and management.

It was proposed that APHCA consider recognizing the Chiang Mai Dairy Training Centre as a Regional Dairy Training Centre that can cater to the training needs of other interested countries in the region. In addition to meeting the growing regional needs, this would also facilitate resource mobilization through APHCA financial mechanisms.

Delegates were favorable to the proposal and endorsed, in principle, the Chiang Mai Dairy Training Centre as a Regional Dairy Training Centre. At the same time, however, the delegates requested the Secretariat to develop (i) a plan of activities / services the regional dairy training center would conduct / provide and (ii) a business plan to ensure long-term financial sustainability of the centre.

- **RAP Animal Health Activities**: The Animal Health Officer, Dr C. Benigno, presented a brief overview of the animal health activities conducted in the past year. The presentation focused on activities under four functional thrusts, namely: capacity building, information sharing, field support and coordination. Capacity building activities were designed to strengthen skills on outbreak investigation, field surveillance, laboratory capacity and use of GIS for animal health planning. Publications on swine health management and guidance documents for H7N9 were also released and shared amongst countries. Field projects on disease specific problems but covering the four functional areas are in place to support individual countries. FAO coordinates closely with partners like the OIE, WHO and regional specialized organizations such as ASEAN, SAARC and SPC to achieve synergies in animal health activities.

APHCA, in collaboration with the OIE Regional Representation for Asia and the Pacific, is continuing to invest in regional capacity building for brucellosis diagnosis. The meeting was informed of the upcoming workshop (December 2013) to discuss the proficiency testing results involving 17 laboratories in the region, carried out under the technical responsibility of the brucellosis laboratory of NIAH Thailand. (The latter completed the OIE twinning programme with ANSES, the OIE and FAO World Reference Laboratory for brucellosis.)

- **Agenda of Action for Sustainable Livestock Sector Development**: The Livestock Policy Officer, Dr V. Ahuja, presented a brief overview of the background, history and the current status of Global Agenda of Action for Sustainable Livestock (GAA). He highlighted that growing resource scarcity has tremendous implications for livestock production in the region and that it is imperative that the sector stakeholders embrace the principle of sustainability in all their actions.

  APHCA has been an active partner in shaping the GAA and APHCA Chairpersons have participated in the previous two Multi Stakeholder Platform (MSP) meetings. Dr Ahuja recommended that this practice should continue to the extent possible and that APHCA should not only maintain but even seek to deepen its level of engagement so as to ensure the representation and contribution of regional concerns in the global action.

  APHCA delegates endorsed continued engagement in the Agenda of Action as well as the proposal that the APHCA Chairman participate in the next MSP meeting, scheduled in Ottawa, Canada from October 13 to 19, 2013.

- **Country Reports on Actions taken on AMR Management**: Country delegates presented short overviews of national activities to contain the growing threat of antimicrobial resistance. The full country reports are available at the end of this document.

  Australia: The Australian Antimicrobial Resistance Prevention and Containment (AMRPC) Steering Group was established in February 2013 to provide high-level governance and leadership on antimicrobial resistance (AMR). The steering group is jointly chaired by the Secretaries of the Department of Health and Ageing (DoHA) and the Department of Agriculture, Fisheries and Forestry (DAFF). The Australian Chief Medical Officer and Chief Veterinary Officer are also members. The group will also oversee the development of a comprehensive National AMR Prevention and Containment Strategy for Australia.

  The steering group recently endorsed the overarching framework for the development of the AMR prevention and containment strategy. The key elements of the framework are: (i) Governance, (ii) Surveillance, (iii) Infection prevention and control, (iv) Regulation, (v) International engagement, (vi) Communication (which includes Education, Stakeholder engagement and Partnerships, and (vii) Research.

  To develop the strategy, the steering group will consult widely with stakeholders. In July 2013, the Australian One Health AMR Colloquium was convened by the

Australian Commission on Safety Quality in Health Care (ACSQHC) to start this process. The colloquium brought together food animal, animal health and human health experts to discuss key 'One Health' priorities and strategies to address AMR in Australia, with particular reference to surveillance strategies, regulatory measures and the most significant zoonotic AMR risks. The outcomes of the colloquium are being used to assist DoHA and DAFF to identify gaps and set priorities for action, and to develop advice to the steering group on next steps.

Bangladesh: There has been little systematic study of AMR in animal isolates of bacteria with the exception of *Salmonella spp*. and *E. coli*. Available AMR information can be summarized as follows:

- *E. coli*: resistance is seen with tetracycline, aminoglycosides, sulphonamides and ampicillin;
- *Salmonella spp*.: resistant to tetracycline, sulphonamides and streptomycin;
- *Campylobacter*: isolates resistant to erythromycin, tetracycline are found;
- *Enterococci*: found to be resistant against vancomycin, macrolide-lincosamide streptogramin group (tylosin);
- *Staphylococci and other non-enteric bacteria*: antibiotic resistance is quite common.

The main factors contributing to AMR are (i) unregulated manufacture and dispensation of antimicrobials, (ii) use of antibiotics as growth promotants and (iii) truncated antimicrobial therapy.

Although Bangladesh has enhanced its capacity to address the problem in the livestock sector there are still some limitations in this context. Important interventions made by the government that could support AMR management are:

- Establishment of an epidemiological unit in DLS.
- Strengthening support services for disease surveillance and monitoring activities through development projects.
- Regular and frequent coordination meetings between animal and human health sectors.
- Coordinated approach in surveillance and monitoring of zoonoses under One-Health concept.
- Imminent enforcement of the Food Safety Act.
- Certification system for safe food of animal origin.

Bhutan: A high level committee meeting on Antimicrobial Resistance and Antibiotic control in Bhutan was conducted recently. The committee, involving all the relevant stakeholders, developed a consensus that the existing Drug Technical Advisory Committee (DTAC), which acts as an advisory body to the Bhutan Medicine Board, will shoulder the additional responsibilities of National Steering Committee on Antimicrobial Resistance. The DTAC will include the role of the National steering committee on AMR as one of their mandates. The National Steering Committee on AMR will take up the responsibilities of developing a national action plan for AMR

including public awareness and education, information material development and campaigns to improve awareness on AMR.

The Drugs, Vaccines and Equipment Unit of the National Centre for Animal Health have revised the essential veterinary drugs for use in the country and have produced a National Drug Formulary 2013. This formulary includes necessary guidelines for the users. The unit is also responsible to monitor and evaluate the usage of veterinary drugs in the country including quality control and adverse drug reactions. Further, the unit is drafting standard treatment guidelines for the users.

Based on the evaluation of the performance of veterinary services (PVS) through OIE missions, the Royal Government of Bhutan formed a task force to review the existing livestock legislation *vis-à-vis* with other closely related legislation such as the Food Act (2005) and its rules and regulations (2007) as well as the Bhutan Medicine Act of 2003. The revised livestock legislation although in draft stage at the moment will address issues such as developing guidelines and regulations to encourage responsible and prudent use of antimicrobials.

Currently Bhutan does not have a veterinary Statutory Body (VSB). Veterinary Council Act is in draft stage and is being pursued strongly by the Department. VSB is foreseen and will be developed using OIE as a relevant guide. The VSB will eventually require a legislative framework giving required authority over all veterinarians; the role of para-professionals and community animal health workers who will form part of this framework. Thus the development of regulations and guidelines to promote responsible and prudent use of antimicrobials and improvement on policy is expected.

The National Centre for Animal Health, which is also the National Referral Laboratory currently carries out some of the functions of Antimicrobial Resistance. The unit is equipped to carry out Antimicrobial Sensitivity testing using disc diffusion method utilizing CLSI protocol. However, most of the antimicrobial sensitivity testing performed by the unit is treatment based. Very few planned surveys are carried out for antimicrobial resistance. None of the Regional Veterinary Laboratories in the country are equipped to carry out the AMR functions. Therefore, strengthening of these laboratories in terms of skilled human resources and facilities is proposed in the 11th Five Year Plan, which ends in 2018.

India: The impact of AMR on human health has been recognized by all stakeholders in India. These include the Ministry of Health & Family Welfare (Directorate General of Health Services), Ministry of Agriculture (Department of Animal Husbandry, Dairying & Fisheries (DADF), Indian Council of Agricultural Research (ICAR), Council for Scientific and Industrial Research (CSIR), etc, which have initiated programmes considering the relevance of AMR and are motivated to implement projects to address AMR developing very widely amongst microbes isolated from human, livestock, poultry and fish. Other regulatory bodies responsible for the manufacture, standards and use of antimicrobials are motivated to take up the AMR issue at their levels.

In the National Policy for Containment of Antimicrobial Resistance, India 2011, a multidisciplinary and cross sectoral National Task Force Committee was constituted comprising experts from a number of agencies. During the last year this multidisciplinary committee has met several times to develop a number of pertinent guidelines, which will be finalized soon.

India has a huge network of veterinary institutions, research institutions under the Indian Council of Agricultural Research Institutes (ICAR, under Ministry of Agriculture), State Veterinary and Agricultural Universities, which would be directed to initiate awareness about threats of mis-use and over-use of antimicrobials leading to AMR and the impact human health among farmers and farmer organizations; veterinarians, para-veterinarians, veterinary faculty staff members; policy-makers; consumers and civil society. ICAR has a total of 633 Krishi Vigyan Kendras in all districts of the country, which contain multidisciplinary teams that also include animal science, veterinary and fisheries science subject matter specialists, who may initiate awareness programmes amongst farmers once the guidelines are finalised.

There are 250 state laboratories at district and state levels to look after disease diagnosis and surveillance. In addition the ministry has one Central Disease Diagnosis Referral Laboratory and five Regional Disease Diagnosis Referral Laboratories. In addition, ICAR, State Veterinary Agricultural Universities, Research Institutions and national centers have adequate infrastructure and large numbers of competent human resources to take up various issues relating to AMR.

With regard to data on the use of antimicrobials as well as antimicrobial resistance, studies have been undertaken in different institutions throughout the country. A few examples are mentioned here for reference. In a study, more than 80% strains of enterococci of equine origin were found resistant to Vancomycin and 99.6% were multiple-drug resistant in Northern India (Singh et al., *J Infect Dev Ctries* 2009; 3(7):498-503). In a most recent study, it was observed that a large portion of *Staphylococcus spp*. isolates of pig, pig handler and sheep origins were found to be resistant (44-83%) to penicillin in addition to showing variable resistance to other antibiotics (Shome and Shome, 2013, PD-ADMAS Annual report-2012-13, pp31-34).

India is rich in ethno-veterinary medicine and indigenous traditional knowledge (ITKs) with regard to prevention and cure of human and animal diseases. This knowledge has been documented by ICAR institutions.

In addition, various stakeholders in the country are vigorously taking up improved animal husbandry practices, control programmes and bio-security measures to reduce the use of antimicrobials.

Programmes are being arranged to create public awareness as well as awareness in physicians, veterinarians etc. for judicial use of antimicrobials.

Indonesia: An initial pilot AMR monitoring programme was continued in 2012 and 2013, but is still not recognized as programme to monitor antimicrobial resistance in indicator bacteria (*E. coli* & *Salmonella spp*). Bacterial isolates were collected from

samples of the National Monitoring Programme for Microbial Contamination of Food of Animal Origin (particularly chicken meats) limited to Java Island area. Isolates identified as *E. coli* and *Salmonella spp* were tested for susceptibility to selected antimicrobial drugs (as recommended by OIE). Laboratory testing was done in the National Quality Control Laboratory for Livestock Products. The results are shown in the full report at the end of this document.

A collaborative research proposal in eco-health to formulate a strategy for prudent use of antimicrobials to control antimicrobial resistance in human, animal, and environmental health was developed by a multi-disciplinary group of Asian researchers during 2011 to 2012. In 2013, the proposal was approved by IDRC which is funding a three-year research programme, starting at the end of this 2013. The collaborative research team involved in the project consists of veterinarians, medical doctors and socio-economic experts.

Communication between veterinarians in the Ministry of Agriculture and medical doctors from Ministry of Health with regard to AMR is being initiated under the Indonesia Antimicrobial Watch program.

Lao PDR: Lao PDR considers AMR as an important issue and recognized the need to revise current measures that govern the import, production, marketing and use of antimicrobials. Currently, Lao PDR has five legal documents which contain comprehensive provisions that regulate the production, importation, exportation, distribution and use of antimicrobials but do not provide a legal basis for implementing AMR monitoring and control as recommended by international organizations.

In 2003, Lao PDR established a Food and Drug Committee, which consists of multi-sectoral agencies including representatives from the human and animal health sector. Unfortunately, this committee has not functioned very well and this year its role is under revision. Lao PDR has also assigned National Focal Points for Veterinary Products with OIE. However, for surveillance and management of AMR Lao PDR needs to improve:

- Microbiology laboratory facilities;
- Competency of human resources;
- Budget allocations for AMR monitoring/surveillance
- Coordination between parties (government, hospitals, research institutions and clinicians) to develop an integrated system of AMR management.

Lao PDR's overall expectation is to develop a system that can survey and collect data on antimicrobial resistance in relevant animal pathogens and quantities of antimicrobial agents used in food producing animals at the national level following international standards. Lao PDR is highly committed to AMR risk management and requests FAO, APHCA, OIE and WHO to seek opportunities to assist Lao PDR to develop an AMR monitoring system meeting international requirements.

Malaysia: Malaysia has formulated and AMR Action Plan comprising seven major lines of activity: (i) awareness campaigns, (ii) establishment of MIC testing capacity for AMR assessments, (iii) AMR information dissemination, (iv) promotion of collaborative AMR research, (v) capacity building and harmonization of laboratory methods / protocols, (vi) development of a national AMR surveillance programme for poultry at farm and processing plant level and (vii) establishment of a joint AMR working group comprising representatives of the Department of Veterinary Services and the Ministry of Health.

Myanmar: Research on AMR has been ongoing at the University of Veterinary sciences but not much has been done to undertake a nationwide situational analysis. Establishment of a National Task Force is still in the organizing phase. The development and implementation of communication and public awareness on AMU and AMR is under negotiation within the department. In addition, review and development of improved practical legislation and regulatory framework are in process. However, although the legislation has not yet been updated, the national assay laboratory has been upgraded by increasing and providing training to staff and other facilities have been equipped for the detection of AMR. Systematic monitoring and surveillance of AMU and AMR is under discussion within the department.

Pakistan: AMR is currently not recognized as a major issue in Pakistan. Some recent reports have, however, indicated that a number of pathogens are becoming resistant to drugs used in animal production. The development of AMR has been observed specifically for the treatment and recovery time of the animal diseases like mastitis, staphylococcal and streptoccocal infections, foot rot, navel illness, pneumonia, uro-genital tract infections, etc. Causative pathogens have developed resistance even to third generation antibiotics. The situation has become more complicated because some zoonotic pathogens originating from animals have also acquired resistance against several drugs used for their treatment in human patients.

Papua New Guinea: The incidence of antimicrobial resistance is not quantifiable in PNG given that neither the public health and animal health sectors are properly resourced and empowered to address the problem. However since AMR is a global issue, there is momentum in PNG currently to address this through policy developments such as the National Medicines Policy, the Food Safety Policy and the Public Health Act review that are currently underway. The animal health sector is fully engaged in these developments to ensure that issues of AMR are properly addressed.

Philippines: The Department of Health (DoH) and the Department of Agriculture (DA) are collaborating to address the risk of AMR and have formed a technical working group (TWG) as well as an Interagency Committee on AMR (ICAMR). The latter, in addition to DoH and DA, comprises representatives of the Department of the Interior and the Department of Science and Technology. The TWG has proposed the issuance of an Executive Order entitled 'Developing a Comprehensive and

Sustainable National Plan to Combat Antimicrobial Resistance in the Philippines', which will require approval and endorsement by the President.

In the meantime, DA has promoted a risk and HACCP-based inspection system for animal feeds, conducted seminars for veterinary drug and feed suppliers to raise awareness about AMR and is strengthening its regulatory activities. The current administration is promoting organic agriculture, which, while not directly addressing AMR risk, might indirectly mitigate the latter.

Samoa: A key recommendation that was raised in the 36th APHCA Session highlighted the need to introduce AMR as a technical issue for public awareness into existing mandatory food regulating authorities and committees. To date, there has been no effort by MAF to see this through. However over the last year, the Animal Production and Health Division (APHD), MAF, has made several attempts to link up with the Ministry of Health, particularly the Public Health Division. Unfortunately, there has been very poor feedback from MOH and a lack of willingness to share information and collaborate.

There are three main sources of veterinary drugs in Samoa, which include the Ministry of Agriculture and Fisheries, the Animal Protection Society (APS) and the Agricultural Store. MAF uses veterinary medicines to treat sick or injured livestock at the discretion of the Government Veterinarian and trained para-veterinarians. The medicines include five main groups of antibiotics, which all require that individual cases complete the recommended course of antibiotics. The Agriculture Store only dispenses anthelmintics and vitamins. This has a low risk implication for AMR development, but instead implicates anthelmintic resistance, which is a separate yet common problem in the livestock industry in Samoa now. The APS deals mainly with small animals and also administers and dispenses antibiotics at the discretion of their veterinarian.

APHD aims to collect information from the latter two organizations on their dispensary of veterinary drugs and integrate this information into the Ministry's animal health database.

There is currently no formal legislation to regulate the use and dispensation of veterinary medicines, which will be one of the key activities in APHD's annual work plan for 2013 – 2014.

Sri Lanka: The Department of Animal Health and Production (DAPH) has recognized the importance of AMR and residues in food of animal origin and is in the process of updating the regulations of the Animal Diseases and Animal Feed Acts pertaining to antimicrobials. DAPH has prohibited the use of therapeutic antibiotics in feed, is screening selected poultry pathogens (*E. coli*, *Campylobacter spp*. and *C. perfringens*) for AMR and has strengthened the controlling of illegal antibiotic sales.

Thailand: in May 2013, the National Committee on Preparedness, Prevention and Resolution of Emerging Infectious Diseases appointed by Prime Minister in July 2012 and chaired by Deputy Prime Minister had established the Sub-Committee on

Prevention, Control and Resolution of Antimicrobial-Resistant Pathogens. The Sub-Committee composes of relevant personnel working on animal health and public health from public, private and academic sectors. It is chaired by the permanent secretary of the Ministry of Public Health with the secretary team composed of the Directors General from Department of Disease Control, Department of Medical Services, Department of Medical Sciences and Department of Livestock Development and the Dean of Faculty of Medicine Siriraj Hospital.

The DLD is amending the existing DLD Working Group on Antimicrobial-Resistant Organisms and Genetics in Animals, Animal Products and Farm Environment, which was established in 2011, to include more relevant private and academic sectors in order to support and put into practice the action plan of the Sub-Committee on Prevention, Control and Resolution of Antimicrobial-Resistant Pathogens in the field of animals.

In collaboration with the Center for Antimicrobial Resistance Monitoring in Foodborne Pathogens (in cooperation with WHO), Faculty of Veterinary Science, Chulalongkorn University, DLD organized a workshop to harmonize the laboratory techniques for AMR testing of the nine DLD laboratories.

Meanwhile, Ministry of Agriculture and Cooperatives is going to issue a Notification under the Feed Quality Control Act to prohibit mixing of animal feed with pharma chemicals, salt of pharma chemicals and semi-processed pharma chemicals which are used for manufacturing of medicines for treatment, relief, cure or prevention of human and animal disease or illness. The draft notification has already passed the public hearing.

Communication and public awareness on AMU and AMR has been raised through:

- Training on antimicrobial resistance in foodborne pathogens for ASEAN universities, 26-30 Aug 2013 by the Faculty of Veterinary Science, Chulalongkorn University; and
- International seminar “Strides on antimicrobial resistance in livestock” in Thailand Lab 2013 exhibition, 29 Aug 2013 at BITEC Bangna, Bangkok

- **Country Reports on National Currency Funds**: Country delegates briefly reported on the status of the National APHCA Currency Fund and other financing mechanisms available to support activities in line with the APHCA work programme. Bhutan and Thailand are the only two APHCA member countries that have established a specific fund to support APHCA activities. In many countries establishment of a specific fund is severely constrained by administrative rules and regulations. However, most countries have incorporated specific activities, e.g. AMR awareness raising, improvement of AMR testing capacity into their regular operating budgets. In addition to the budget earmarked for specific activities, some countries can access budget allocations for ‘international cooperation’, which can be used to support ‘networking’ activities.

- **Request for APHCA Membership by SPC**: SPC officially requested membership of APHCA through letter of the Deputy Director General of 21 June 2013 (APHCA 2013/06). Dr K. Cokanasiga, animal health and production advisor of SPC provided some background on SPC and its request for APHCA membership.

  The Secretary pointed out that a positive decision would require a slight modification of Article III, para 1, defining eligibility for membership, to broaden the latter to include intergovernmental organizations within the 'Region'.

- **Scale of Contributions**: At the 36th Session, the secretariat was requested to review the scale of contributions in accordance with the original criteria used for their establishment, maintaining 3 categories and phasing of the increment over successive years. The secretary presented the proposed scale of contributions for 2014 and 2015 and explained the rationale behind the proposal (APHCA 2013/06).

- **Proposed 2014 Workplan and Budget**: The Secretary presented the proposed workplan and budget for 2014. The proposed budget for 2014 amounts to US$135 000 for six thematic thrusts: (i) smallholder dairy development – US$25 000 (ii) zoonoses and food safety – US$20 000 (iii) feed resource management – US$20,000 (iv) AMR Risk management – US$20 000 (v) livestock policy capacity development – US$20 000 and (vi) information dissemination and APHCA positioning – US$30 000. FAO's anticipated contributions to the workplan are estimated at US$135 000. The operational breakdown as well as FAO's anticipated contributions to the workplan are detailed in APHCA 2013/06.

Thursday, 26 September 2013, morning

- **Decisions taken**: The delegates attending the Session, representing more than a two-thirds majority of the membership of the Commission, unanimously agreed on the following:

  SPC membership: To amend the APHCA Agreement to open membership to intergovernmental organizations within the APHCA region (Article III, para 1) and to accept SPC as new APHCA member. It was furthermore decided that Intergovernmental organizations should fall into Group A in the scale of contributions.

  Scale of contributions: To adopt the scale of contributions proposed by the Secretariat for 2014 and 2015 as follows:

Group	Countries	2014	2015
A	Australia, China, India, Japan, New Zealand	12 000	14 000
B	Afghanistan, Bangladesh, Indonesia, Iran, Rep. Korea, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam	7 500	8 400
C	Bhutan, Cambodia, Fiji, Lao PDR, Maldives, Mauritius, Mongolia, Nepal, PNG, Singapore, DPRK, Samoa	2 400	2 750

Workplan and budget for 2014: To approve the workplan and budget for 2014 as proposed by the Secretariat and detailed in the tables below.

Operational Budget, APHCA TF and Estimated Contribution of FAO-RAP

Budget line	APHCA TF	FAO's Estimated Contribution	Total
5011 Salaries Prof.	0	45,000	45,000
5012 Salaries GS	25,000	25,000	50,000
5013 Consultants	26,000	30,000	56,000
5014 Contracts	30,000	25,000	55,000
5020 Locally Contracted Labour	1,000	0	1,000
5021 Travel	46,000	10,000	56,000
5023 Training	0	0	0
5024 Expendable Procurement	1,000	0	1,000
5025 Non-expendable Procurement	0	0	0
5026 Hospitality	2,000	0	2,000
5028 GOE	4,000	0	4,000
Total	**135,000**	**135,000**	**270,000**

Functional Budget, APHCA TF

Activity / Thematic Area	Amount (US$)
Smallholder Dairy Development	25,000
Feed Resource Management	20,000
Zoonoses and Food Safety	20,000
Antimicrobial Resistance (AMR) Management	20,000
Livestock Policy Capacity Development Plan	20,000
Information Dissemination and APHCA Positioning	30,000
Total	**135,000**

- **Any other business***:* The Secretary informed delegates that FAO-APHCA and the OIE Regional Representation for Asia and the Pacific had engaged in discussions to identify areas for close collaboration and joint activities, which would not duplicate activities carried out within the ambit of existing initiatives. Three areas for close collaboration and joint activities have been identified, namely: (i) brucellosis, (ii) AMR management, and (iii) 'neglected zoonoses'.

  With regards to brucellosis, the intention of FAO-APHCA and the OIE Regional Representation is to build on the long-standing joint capacity building activities in brucellosis diagnostics and move forward to jointly promote the intensification of national and regional control activities. Veterinary AMR management is an issue of strong mutual interest and close collaboration would exploit the complementarity of the two organizations, with OIE focusing on the development of standards (and

guidelines) and collection of antimicrobial usage data, while FAO-APHCA would focus on supporting countries in their endeavour to comply with the international standards. A first common step in the area of 'neglected zoonoses' would be a deeper joint assessment of country priorities, building on work done by FAO and ILRI (zoonotic disease burden) and OIE in 2012 (country priorities), and subsequent targeting of a limited number of zoonoses, so far not addressed by international programmes.

Delegates welcomed the proposed collaboration and recommended FAO and OIE to engage with the respective authorities in the member countries and to foster a systematic and inclusive assessment process.

The Chairperson, fully acknowledging the significance of animal health issues in the region, made a strong plea for FAO-APHCA not to exclusively direct its efforts animal health issues but to also address important problems in the area of animal production, such as animal feeding and nutrition, and value chain development.

- **Next venue and dates:** Thailand proposed to host the 38th Session putting forward Chiang Mai as preferred venue. For climatic, cultural and fiscal reasons early November 2014 would be the most suitable time for the Session.

  Delegates welcomed Thailand's offer to host the 38th Session in November 2014. It was agreed that the Technical Meeting held in conjunction with the Session should focus on animal nutrition / feeding and smallholder dairy value chains.

  The Malaysian delegate offered to explore the possibility of Malaysia hosting the 39th Session in 2015.

- **Closure**: The Chairperson thanked the Secretariat for its commitment and dedicated work since the 36th Session and commended the delegates for their constructive contributions made at the current Session. He urged APHCA members to increase 'ownership of their' Commission and welcomed SPC as new prospective member, hoping that APHCA membership would further expand. The Chairperson closed the Session at 10:30.

Timetable and Agenda (APHCA 2013/01)

Timetable

Sunday, 22 September

Arrival of guests

The 74th Executive Committee meeting (for APHCA executive members – Sri Lanka (Chair), Bhutan (Vice-chair), Australia, Myanmar, Samoa and The Philippines (*ex-officio* member)) between 16:00 and 17:00 hours.

Free evening

Monday, 23 September

Morning: 37th APHCA Session

08:30 – 09:30	Registration
09:30 – 10:00	Opening Ceremony
10:00 – 10:30	Tea / Coffee Break
10:30 – 12:30	Business Session
12:30 – 14:00	Lunch

Afternoon: 37th APHCA Session

14:00 – 15:30	Business Session (cont.)
15:30 – 16:00	Tea / Coffee Break
16:00 – 17:30	Business Session (cont.)

19:00 – 21:00 Reception dinner hosted by Hon'ble Secretary, MoAF

Tuesday, 24 & Wednesday, 25 September

- 24 & 25 September: APHCA-OIE Regional Workshop: *Zoonoses, Food-borne Diseases and Antimicrobial Resistance – Incidence, Impact and Interventions in the Asia-Pacific Region*
- 25 September: Field trip
- 25 September: Dinner hosted by His Excellency, the Minister, MOAF

Thursday, 26 September

Morning: 37th APHCA Session (cont.)

08:30 – 09:30 Business Session (cont.)
09:30 – 10:00 Tea / coffee break
10:00 – 11:00 Business Session (cont.), adoption of session report and closure

Provisional Agenda

Monday, 23 September

08:30 – 09:30 Registration
09:30 – 10:00 Opening Ceremony
- Traditional Marchang ceremony
- Welcome by Offg. Director, Department of Livestock, Dr Tashi Dorji
- Welcome by APHCA Chairperson, Dr W.K. de Silva
- Welcome Address on behalf of FAO, APHCA Secretary, Dr Joachim Otte
- Opening Address by Guest of Honour, Mr Yeshi Dorji, His Excellency, the Minister, Ministry of Agriculture and Forests
- Vote of Thanks, RAP Livestock Policy Officer, Dr Vinod Ahuja

10:00 – 10:30 Tea / Coffee Break
10:30 – 12:30 Business Session, Provisional Agenda Items
- Election of New Chairperson, Vice-Chair and 3 ExCom Members
- Adoption of the agenda
- Approval of the Minutes of the 74th ExCom and 36th Session
- Summary statement of APHCA account
- Summary of activities performed between Oct. 2012 and Sept. 2013

12:30 – 14:00 Lunch
14:00 – 15:30
- Smallholder Dairy Network activities
- RAP animal health activities (TADs & zoonoses control / management)
- Agenda of Action for sustainable livestock sector development

15:30 – 16:00 Tea / Coffee Break
16:00 – 17:30
- Country reporting on (i) AMR management actions undertaken as follow-up of 36th Session and (ii) status of National Currency Fund (Delegates)
- Items for decision
    - Scale of contributions
    - Membership requests
    - Proposed work plan and budget Q4 2013 and FY 2014

18:30 – 20:30 Reception dinner hosted by Hon'ble Secretary, MoAF (Hotel Phuentsho Pelri)

Thursday, 26 September

08:30 – 09:30 Business Session (cont.), Provisional Agenda Items
- Decisions on items tabled for decision
- Recommendations emanating from the Business Session and from zoonoses, food-borne diseases and AMR workshop

09:30 – 10:00 Tea / Coffee Break

10:00 – 11:00 Business Session (cont.)
- Recommendations emerging from the Business Session and from the zoonoses, food-borne diseases and AMR workshop (cont.)
- Next venue and dates
- Any other business
- Adoption of the minutes / report of the session
- Closure

Provisional Workshop Programme

Tuesday, 24 September

08:30 – 09:30 **Registration**

09:30 – 10:30 **Opening Session**
Welcome: APHCA Chairperson
Keynote: Zoonotic and food-borne disease challenges in a globalised world – *Prof. D.U. Pfeiffer, RVC*

10:30 – 11:00 **Tea / Coffee Break**

11:00 – 12:30 **Session 1: Country Reports on Incidence, Impact and Control of Zoonoses and Food-borne Diseases** (3 reports of 20 minutes each plus 10 minutes discussion) – Chair: tbd
Bhutan – *Dr N.P. Dahal*
SPC – *Dr K. Cokanasiga*
Viet Nam – *Dr N.H. Tung (tbc)*

12:30 – 14:00 **Lunch**

14:00 – 15:30	**Session 2: Activities of International Organizations on Zoonoses and Food-borne Diseases in the Asia-Pacific Region** (3 reports of 20 minutes each plus 10 minutes discussion) – Chair: tbd FAO – *Dr W. Kalpravidh and Dr C. Benigno (FAO Bangkok)* OIE – *Dr T. Ishibashi (OIE Tokyo)* WHO – *Dr C. Winter (WHO Bhutan)*
15:30 – 16:00	**Tea / Coffee Break**
16:00 – 18:00	**Session 3: International Zoonoses and Food-borne Disease Research Programmes in the Asia-Pacific Region and Salient Findings** (4 reports of 20 minutes each plus 10 minutes discussion) – Chair: tbd ACIAR – *Dr M. Nunn (ACIAR, Australia)* CIRAD – *Dr J. Capelle (CIRAD, Cambodia)* ILRI – *Dr J. Gilbert (ILRI, Lao PDR)* Oxford University – *Dr J. Bryant (OXU, Ho Chi Minh City)*
18:30 – 20:30	**Dinner hosted by FAO-APHCA and OIE (at the Folk Heritage Museum Restaurant)**

Wednesday, 25 September

08:30 – 10:30	**Session 4**: **Antimicrobial Resistance (AMR) associated with Animal Production, its Management and Alternatives to Antimicrobials** (4 reports of 20 minutes each plus 10 minutes discussion) – Chair: tbd U. Utrecht – *Prof J. Wagenaar: International research on antimicrobial resistance at the animal-human interface in the Asia-Pacific region* OIE – *Dr E. Erlacher-Vindel: FAO-OIE-WHO Tripartite approach and OIE activities on AMR* U. Utrecht – *Dr D. Speksnijder: Tailored interventions to promote prudent antimicrobial use; theory and practice* U. Tokyo – *Dr K. Hirayama: Trends in bacterial food poisoning and possible control by normal and beneficial bacteria*
10:30 – 11:00	**Tea / Coffee Break**
11:00 – 13:00	**Session 5: Discussion, Conclusions and Recommendations** Chair: tbd
13:00 – 14:00	**Lunch**
14:15 – 18:00	**Field trip organized by RgoB** (Druk Wangyal Chorten Dochula, Kuensel Phodrang, Buddha Point, Tashi Choe Dzong)
18:45 – 20:45	**Dinner hosted by His Excellency Minister for MoAF (Namgay Heritage)**

Dates and Venues (Host Countries) of APHCA Sessions (APHCA 2013/02)

First
Bangkok, Thailand, 7-11 June 1976
Chairman: Dr J.C. Madamba (Philippines)
Vice-Chairman: Dr M.N. Menon (India)
Members of the Executive Committee:
Delegates from Malaysia, Sri Lanka and Thailand

Second
Kuala Lumpur, Malaysia, 22-26 August 1977
Chairman: Dr S. Thuraisingham (Malaysia)
Vice-Chairman: Dr A. Bandaranayake (Sri Lanka)
Members of the Executive Committee:
Delegates from Australia, Nepal and Thailand

Third
Bangkok, Thailand, 16-21 July 1978
Chairman: Dr S. Thuraisingham (Malaysia)
Vice-Chairman: Dr A. Bandaranayake (Sri Lanka)
Members of the Executive Committee:
Delegates from Australia, Philippines and Thailand

Fourth
Manila, Philippines, 3-7 September 1979
Chairman: Dr S.H. Escudero III (Philippines)
Vice-Chairman: Dr Y. Prased (India)
Members of the Executive Committee:
Delegates from Bangladesh, Malaysia and Singapore

Fifth
Bangkok, Thailand, 6-11 October 1980
Chairman: Dr Tim Bhannasiri (Thailand)
Vice-Chairman: Dato' Dr Osman bin Din (Malaysia)
Members of the Executive Committee:
Delegates from India, Indonesia and Sri Lanka

Sixth
Colombo, Sri Lanka, 10-15 August 1981
Chairman: Dr S.B. Dhanapala (Sri Lanka)
Vice-Chairman: Dr J.H. Hutasoit (Indonesia)
Members of the Executive Committee:
Delegates from Australia, India and Malaysia

Seventh
Surabaya, Indonesia, 13-18 December 1982
Chairman: Prof. Dr J.H. Hutasoit (Indonesia)
Vice-Chairman: Dato' Dr Osman bin Din (Malaysia)
Members of the Executive Committee:
Delegates from India, Philippines and Thailand

Eighth
Bangkok, Thailand, 3-8 October 1983
Chairman: Dato' Dr Osman bin Din (Malaysia)
Vice-Chairman: Dr O.N. Singh (India)
Members of the Executive Committee:
Delegates from Australia, Bangladesh and Papua New Guinea

Ninth
New Delhi, In, 8-13 October 1984
Chairman: Dr O.N. Singh (India)
Vice-Chairman: Dr I.G.R. Davis (Australia)
Members of the Executive Committee:
Delegates from Nepal, Singapore and Sri Lanka

Tenth
Melbourne, Australia, 7-13 October 1985
Chairman: Dr R.W. Gee (Australia)
Vice-Chairman: Dr Giam Choo Hoo (Singapore)
Members of the Executive Committee:
Delegates from Pakistan, Sri Lanka and Thailand

Eleventh
Bangkok, Thailand, 7-13 October 1986
Chairman: Dr Giam Choo Hoo (Singapore)
Vice-Chairman: Dr J.A. deS. Siriwardene (Sri Lanka)
Members of the Executive Committee:
Delegates from Iran, Malaysia and Philippines

Twelfth
Islamabad, Pakistan, 5-10 October 1987
Chairman: Dr M. Anwar Khan (Pakistan)
Vice-Chairman: Dr A. Mustaffa Babjee (Malaysia)
Members of the Executive Committee:
Delegates from India, Philippines and Thailand

Thirteenth
Bangkok, Thailand, 25-31 October 1988
Chairman: Dr Vitoon Khumnirdpetch (Thailand)
Vice-Chairman: Dr Soehadji (Indonesia)
Members of the Executive Committee:
Delegates from India, Malaysia and Sri Lanka

Fourteenth
Jakarta, Indonesia, 30 October – November 1989
Chairman: Dr Soehadji (Indonesia)
Vice-Chairman: Dr A.K. Chatterjee (India)
Members of the Executive Committee:
Delegates from Australia, Philippines and Sri Lanka

Fifteenth
Bangkok, Thailand 17-22 October 1990
Chairman: Dr A.M.B.H. Babje (Malaysia)
Vice-Chairman: Dr R.N. Alcasid (Philippines)
Members of the Executive Committee:
Delegates from Australia, Iran and Pakistan

Sixteenth
Kuala Lumpur, Malaysia, 7-12 October 1991
Chairman: Dr R.N. Alcasid (Philippines)
Vice-Chairman: Dr W.A. Geering (Australia)
Members of the Executive Committee:
Delegates from Iran, Myanmar and Thailand

Seventeenth
Manila, Philippines, 17-21 November 1992
Chairman: Dr W A. Geering (Australia)
Vice-Chairman: Dr A.A. Motallebi (Iran)
Members of the Executive Committee:
Delegates from Indonesia, Malaysia and Thailand

Eighteenth
Darwin, Australia, 17-20 August 1993
Chairman: Dr A.A. Motallebi (Iran)
Vice-Chairman: Dr Wipit Chaisrisongkram (Thailand)
Members of the Executive Committee:
Delegates from Nepal, Philippines and Singapore

Nineteenth
Tehran, Iran, 20-24 November 1994
Chairman: Dr Wipit Chaisrisongkram (Thailand)
Vice-Chairman: Dr S.K. Shrestha (Nepal)
Members of the Executive Committee:
Delegates from Australia, India and Indonesia

Twentieth
Bangkok, Thailand, 30 August-2 September 1995
Chairman: Dr S.K. Shrestha (Nepal)
Vice-Chairman: Mr K. Rajan (India)
Members of the Executive Committee:
Delegates from Australia, Malaysia and Sri Lanka

Twenty-First
Kathmandu, Nepal, 3-6 March 1997
Chairman: Mr G.R. Patwardhan (India)
Vice-Chairman: Dr A.S. Abeyratre (Sri Lanka)
Members of the Executive Committee:
Delegates from Australia, Indonesia and the Philippines

Twenty-Second
Bangkok, Thailand, 22-24 June 1998
Chairman: Dr S.S.E. Ranawans (Sri Lanka)
Vice-Chairman: Mr G.R. Patwadham (India)
Members of the Executive Committee:
Delegates from Laos, Myanmar and Thailand

Twenty-Third
Kochi (Cochin), India, 4-6 September 1999
Chairman: Dr V.K. Taneja (India)
Vice-Chairman: Dr T.A. Abilay (Philippines)
Members of the Executive Committee:
Delegates from Nepal, Papua New Guinea and Thailand

Twenty-Forth
Dhaka, Bangladesh, 6-9 November 2000
Chairman: Dr V.K. Taneja (India)
Vice-Chairman: Dr T. A. Abilay (Philippines)
Members of the Executive Committee:
Delegates from Bangladesh, Papua New Guinea and Nepal

Twenty-Fifth
Manila, Philippines, 24-26 September 2001
Chairman: Dr J.Q. Molina (Philippines)
Vice-Chairman: Dr Mohd Nordin Mohd Nor (Malaysia)
Member of the Executive Committee:
Delegates from Australia, Bhutan, and Thailand

Twenty-Sixth
Subang Jaya, Malaysia, 24-26 August 2002
Chairperson: Dr J.Q. Molina (Philippines)
Vice-Chairperson: Dato' Dr Mohd. Nordin Haji Mohd. Nor (Malaysia)
Members of the Executive Committee:
Delegates from Bhutan, Pakistan and Thailand
Ex-Officio Member: Delegate from India

Twenty-Seventh
Lahore, Pakistan, 25-29 August 2003
Chairperson: Dr Rafaqat H. Raja (Pakistan)
Vice-Chairperson: Delegate from Indonesia
Members of the Executive Committee:
Delegates from India, Nepal and Thailand
Ex-Officio Member: Delegate from the Philippines

Twenty-Eight
Chiang Mai, Thailand, 27 September – 1 October 2004
Chairperson: Dr Rafaqat H. Raja/Dr M. Afzal (Pakistan)
Vice-Chairperson: Delegate from Indonesia
Members of the Executive Committee:
Delegates from India, Nepal and Thailand

Twenty-Ninth
Bali, Indonesia, 26-29 September 2005
Chairperson: Dr Mathur Raidy (Indonesia)
Vice-Chairperson: Delegate from Thailand
Members of the Executive Committee:
Delegates from India, Myanmar and Sri Lanka
Ex-Officio Member: Delegate from Pakistan

Thirtieth
Luang Prabang, Lao PDR, 22-26 October 2006
Chairperson: Dr Bounkhouang Khambounheuang (Lao PDR)
Vice-Chairperson: Delegate from Sri Lanka
Members of the Executive Committee:
Delegates from India, Myanmar and Thailand
Ex-Officio Member: Delegate from the Indonesia

Thirty-First
Chiang Mai, Thailand, 29 October – 1 November 2007
Chairperson: Dr M.J. Nunn (Australia)
Vice-Chairperson: Delegate from Nepal
Members of the Executive Committee: Delegates from Bhutan, India and Mongolia
Ex-Officio Member: Delegate from Lao PDR

Thirty-Second
Bangkok, Thailand, 27-30 October, 2008
Chairperson: Dr M.J. Nunn (Australia)
Vice-Chairperson: Delegate from Nepal
Members of the Executive Committee: Delegates from Bhutan, India and Mongolia

Thirty-Third
Pokhara, Nepal, 26-28 October 2009
Chairperson: Dr Prabhakar Pathak (Nepal)
Vice-Chairperson: Delegate from Thailand
Members of the Executive Committee: Delegates from Iran, Malaysia and PNG
Ex-Officio Member: Delegate from Australia

Thirty-Forth
Phuket, Thailand, 25-27 October 2010
Chairperson: Mr P Somboonprasert (Thailand)
Vice-Chairperson: Delegate from the Philippines
Members of the Executive Committee: Delegates from Australia, Samoa and Sri Lanka
Ex-Officio Member: Delegate from Nepal

Thirty-Fifth
Cebu, Philippines, 2-4 November 2011
Chairperson: Delegate from the Philippines
Vice-Chairperson: Delegate from Sri Lanka
Members of the Executive Committee: Delegates from Bangladesh, Myanmar and Samoa
Ex-Officio Member: Delegate from Thailand

Thirty-Sixth
Negombo, Sri Lanka, 21-24 October 2012
Chairperson: Sri Lanka
Vice-Chairperson: Delegate from Bhutan
Members of the Executive Committee: Delegates from Australia, Myanmar and Samoa
Ex-Officio Member: Delegate from the Philippines

List of APHCA Chairpersons by Country (as of 2012)

Australia	4	Lao PDR	1	Philippines	5
Bangladesh	0	Malaysia	5	Samoa	0
Bhutan	0	Mongolia	0	Singapore	1
India	4	Myanmar	0	Sri Lanka	3
Indonesia	3	Nepal	2	Thailand	4
Iran	1	Pakistan	3		
Korea DPR	0	PNG	0		

List of APHCA Executive Committee Members by Country (as of 2012)

Australia	12	Lao PDR	1	Philippines	8
Bangladesh	3	Malaysia	7	Samoa	3
Bhutan	5	Mongolia	2	Singapore	3
India	10	Myanmar	6	Sri Lanka	11
Indonesia	4	Nepal	7	Thailand	16
Iran	4	Pakistan	4		
Korea DPR	0	PNG	3		

Minutes of the 73rd Executive Committee Meeting and the 36th APHCA Session (APHCA 2013/03)

The 73rd Executive Committee Meeting

Sunday, 21 October 2012, 17:00 to 18:45 hours

- The meeting was chaired by Dr R. Cresencio, delegate from the Philippines, who took over from Dr E. Nuestro upon his change in position. Present were the delegates from Myanmar, Samoa, Sri Lanka, Thailand. The delegate from Bangladesh could not attend as the nomination had been received too late to make travel arrangements. The meeting was furthermore attended by members of the APHCA Secretariat.
- The Chairperson welcomed the delegates, commended APHCA for its steadfastness and instrumental activities in support of member countries and thanked Sri Lanka for hosting the Session.
- The APHCA Secretary welcomed the delegates and expressed his appreciation for their presence. He informed that all APHCA member countries, with the exception of Mongolia, have accepted the invitation, while the delegate from Bangladesh has not been able to finalize travel requirements in time and the delegate from Papua New Guinea had cancelled his travel due visa problems.
- The ExCom reviewed and adopted the agenda of the 36th Session and associated workshop on antimicrobial use (AMU) and resistance (AMR) in the Asia-Pacific Region.
- The ExCom reviewed and approved the minutes of the 72nd Executive Committee Meeting and 35th Session.
- The APHCA Secretary reported on the financial situation of the Commission. At the beginning of 2012 (01.01.2012), the cash balance in the APHCA Trust Fund stood at US$223,063 plus US$90,453 of cumulative interest earned. Contributions received for 2012 so far (31.09.2012) amount to US$54,066.14 (outstanding 2012 contributions total US$36,475.86). Overall the financial situation of APHCA has remained stable over the past years with the cash balance fluctuating between US$200,000 and US$300,000.
- The APHCA secretary requested permission for transfer of APHCA's accumulated interest of US$90,453 into the disposable cash account.
- The ExCom noted with disappointment that over the years Bangladesh had accumulated arrears of US$42,294.00 and urged the next Chairperson to take the matter up with the Bangladesh counterpart.

- The APHCA Secretary provided a brief summary of activities carried out since the last meeting in Cebu, Philippines. Activities of FAO-RAP Livestock Group staff encompassed technical support to more than 20 projects, organization of symposia, meetings, workshops and other events as well as representation of FAO and APHCA at events organized by other organizations. The main activities carried out in relation to the APHCA workplan for 2012 are the organization of the APHCA Strategy workshop, continuation of work linked to the smallholder dairy development 'programme' including co-organization of the First Asia Dairy Goat Conference, organization of an Asia Livestock Policy Forum in Bangkok and activities leading to enhance information dissemination and visibility carried out by the Information Unit.
- Given some under-spending to be expected in 2012 vis-à-vis the proposed budget, the Secretary requested permission to carry-over unspent funds into 2013 to carry complete 2012 planned activities.
- The APHCA Secretary provided a brief outlook on salient issues APHCA might consider to systematically address in the coming years, following the mission, vision and guiding principles established at the APHCA Strategy Workshop held in March 2012. Thematically, the issues comprise continued attention to smallholder dairy development as an important 'tool' for poverty reduction and rural development. In-depth assessments of the burden and impact of zoonoses, food-borne diseases and antimicrobial resistance, building on intensified collaboration with OIE and WHO, to support decision making on resource allocation of national health systems. Given the rising cost of animal feed, national feed resource assessments would be useful in guiding livestock sector development. Establishment of a common approach for feed resource assessment across interested countries, drawing on national and international expertise, could be an area for APHCA engagement. Finally, the APHCA Secretary proposed improving of APHCA's information dissemination, communication and visibility through more information exchange between member countries and the secretariat and the establishment of a Livestock Policy Network as a two other key areas of investment closely linked to two areas of strategic actions recommended at the APHCA Strategy workshop.
- The proposed APHCA workplan and budget for 2013 amounts to US$125,000 for five thematic thrusts: (i) smallholder dairy development, to expand into dairy goats – US$35,000 (ii) zoonoses, food safety and AMR – US$30,000 (iii) the development of feed assessment systems – US$20,000 (iv) information dissemination and APHCA positioning, and (v) support to the development of a detailed proposal for a livestock policy network – US$10,000. FAO's anticipated contributions to the workplan are estimated at US$165,000.
- The ExCom discussed the issue of National Currency Funds (NCF) which in the past have been very useful for financing in-county activities in support of APHCA activities and suggested that member countries investigate and report on the status of their NCFs at the next Session.
- The Chairperson closed the meeting at 18:45.

The 36th APHCA Session

Monday, 22 October 2012, morning

- Opening: The opening of the 36th APHCA session was presided over by H.E. H.R. Mithrapala, Deputy Minister, and Dr. Thilak Kenderagama, Secretary, Ministry of Livestock and Rural Community Development. The session was attended by delegates from 15 member countries (Australia, Bhutan, India, Indonesia, Iran, Korea DPR, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Samoa, Sri Lanka, and Thailand) and observers from OIE and ACIAR.
- Adoption of the Agenda: The Agenda was adopted.
- Election of the Chairperson and Members of the Executive Committee: The Executive Committee was elected as follows:

  The Executive Committee comprises:

Chairperson:	Sri Lanka
Vice-chairperson:	Bhutan
Members:	Australia, Myanmar and Samoa
Ex-officio member:	The Philippines

  The outgoing Chairperson, Dr Rubina Cresencio, thanked the delegates for their support and handed over the chairmanship of the Session to Dr de Silva.

- Approval of the Minutes of the 72nd Executive Committee Meeting and the 35th APHCA Session: The Minutes were reviewed and approved by the delegates.
- Statement of Accounts: The Secretary presented the status of the APHCA accounts for 2011 and expenditures for 2012. The approved budget for 2011 was US$75,000 while the 2011 expenditures amounted to US$90,098 (APHCA 2012/04). The reason for this overspending have been higher than budgeted travel costs for participants to attend APHCA (co-)sponsored workshops, for example the OIE-APHCA Workshop on bluetongue diagnosis and control held in Indonesia.

  Overall, over the past three to four years, APHCA's cash balance has fluctuated between US$200,000 and US$300,000. At the beginning of 2012 (01.01.2012), the cash balance in the APHCA Trust Fund stood at US$223,063 plus US$90,453 of cumulative interest earned. The Secretary requested consent of the delegates for accumulated interest earned up to 31.12.2011 to be moved into the cash account at disposal for APHCA activities.

  The statement of accounts for the year 2011 was approved.

  Up to 31.09.2012, contributions received for 2012 amount to US$54,066.14 (outstanding 2012 contributions total US$36,475.86). Cumulative outstanding contributions total US$81,597.06, more than half of which is accounted for by Bangladesh. Expenditures in 2012 are likely to be slightly below the approved budget due to higher than expected co-funding of activities from other sources.

Delegates requested the Chairperson to officially take up the issue of arrears with the counterpart of Bangladesh. Delegates furthermore requested the Chairperson and Secretariat to invite more countries, e.g. Japan, China, Vietnam, Cambodia and Pacific island states to join APHCA.

Prior to issuance of invitations to join, in line with the decision taken at the 34th Session to raise the contributions, the secretariat was requested to review the scale of contributions in accordance with the original criteria used for their establishment, maintaining 3 categories and phasing of the increment over successive years. The proposed scale of contributions would be circulated to the Executive Committee and thereafter to Member countries.

- **Report of Activities**: The Secretary presented the activities conducted by APHCA and the RAP livestock group (RAP-LG) solely or in collaboration with other groups, irrespective of sources of funding and not limited to APHCA Member countries (APHCA 2012/05).

  Since the last Session, the RAP livestock group has been involved in the implementation of 21 country-specific as well as sub-regional (e.g. SAARC, ASEAN, Greater Mekong Sub-Region) projects with animal health and / or animal production components. About half of the projects are financed by FAO through its Technical Cooperation Programme (TCP) while the remaining half receive funding from other national or international agencies through uni- or multi-lateral donor trust funds.

  Partly in conjunction with but also in addition to engagement in project implementation staff of the RAP-LG have organized 19 meetings, workshops and other events. Fifteen workshops were organized as part of the abovementioned projects while the 2nd Global Multi-stakeholder Platform Meeting on the Global Agenda for Sustainable Livestock, the APHCA strategy workshop and the Regional Livestock Policy Forum were funded from diverse sources, including the APHCA trust fund. In addition, as part of the smallholder dairy development thrust, RAP-LG co-organized the Thailand Celebration of World Milk Day.

  In the reporting period, RAP-LG staff attended 21 congresses, symposia, meetings or workshops to (re)present FAO/APHCA and to provide technical expertise. FAO (RAP and HQ) co-funded and contributed to the organization of the First Asia Dairy Goat Conference held in Malaysia in April 2012.

  In line with the Vision of APHCA to establish itself *as a prime source of information, knowledge, expertise and experience on all aspects of livestock sector development in the Asia-Pacific region* formulated at the APHCA Strategy Workshop, the Information Unit has devoted considerable time to improving the APHCA website. Since the Strategy Workshop (March 2012), the home-page was converted to being 'news-based', electronic documents to which FAO has copyrights were uploaded, the net was searched for relevant links (e.g. research institutes, national authorities, open access journals, etc) and these were posted on the website. The changes made

have considerable increased APHCA's web-presence, site visits now reaching more than 10,000 per month.

Finally, RAP-LG have commissioned a number of studies in various countries in the region on topics such as fodder resources, livestock sector developments and food security, livestock and livestock product trade, patterns of livestock product consumption, swine disease emergence etc. Some of these studies are carried out as part of the projects implemented by RAP-LG while others have been commissioned as part of FAO's Regular Programme.

A number of new projects and activities will be initiated before the end of 2012, amongst others comprising a school milk project in Bangladesh funded by Rabobank and a Dairy Symposium held in conjunction with the 15th AAAP in Bangkok.

The Secretary requested permission by the member countries to utilize unspent 2012 funds for implementation / completions of approved activities in 2013.

- **Special Issues**: The Secretary presented a brief overview of special issues (APHCA 2012/06) deemed to require APHCA attention and providing the rationale for the 2013 workplan and budget proposal.

  APHCA's Strategic Plan – The first item under this point of the agenda were the 'cornerstones' of APHCA's Strategic Plan as they were elaborated in the Strategy Workshop held in March 2012. The Secretary reiterated that the 'Vision' developed at the workshop was for APHCA to be recognized as a prime source of information, knowledge, expertise and experience on all aspects of livestock sector development in the Asia-Pacific region. In order to realize this vision, APHCA has to develop into a knowledge network requiring enhanced exchange of information and experience between members but also with other institutions. For FAO / RAP-LG one of the prerequisites for contributing to the vision is to improve its analytical power and to enhance its capacity to provide information and communication services.

  Antimicrobial Resistance – The second item covered was the growing threat of antimicrobial resistance (AMR) across drug classes and around the world as background and justification for the APHCA workshop on hosting of the international workshop on the use of antimicrobials in livestock production and antimicrobial resistance in the Asia-Pacific region. Given AMR is a transboundary risk, which no country can successfully manage on its own, taking stock of the extent of AMR in the region and initiating collective action for AMR management should become one of APHCA's work areas. FAO-RAP is co-funding the workshop through TCP/RAS/3404 and will be able to provide some funds through the TCP for specific follow-up activities.

  Zoonoses – One of the topics covered in depth at the Livestock Policy Forum held in Bangkok in August 2012 was 'human health risks at the animal-human interface'. A review of studies on the burden of human disease attributable to zoonoses suggests that gastrointestinal zoonoses are causing considerable human suffering in South and Southeast Asia while food-borne parasitic diseases are high on the list of priority

zoonoses in East and Southeast Asia. The estimates of the human disease burden associated with leptospirosis and brucellosis are beset with high degrees of uncertainty. Given that gastrointestinal zoonoses are to a large extent caused by agents which are among those developing relatively high levels of AMR, zoonoses, food safety and AMR containment might warrant more attention by APHCA than has hitherto been the case.

Feed Assessment Systems – Population growth, urbanization, and income growth are driving enormous increases in demand for foods of animal origin. The capacities of existing livestock production systems are being stretched due to increasing demands for livestock feeds relative to availabilities. This situation is particularly acute in developing countries. Accurate assessments of current and future supplies and demands for livestock feed are needed for national food security policy and planning, as well as the setting of environmentally sustainable stocking rates. Feed resources should be assessed and monitored to provide information for the development and implementation of policies that will contribute to the sustainable growth of national livestock sectors. Given rising feed costs and likely under-utilization of alternative feed resources, APHCA should consider providing an institutional framework for the establishment of National Feed Assessment Systems in support of sustainable and 'feed secure' livestock production.

Livestock Policy Network – The issues listed above are but a small sample of the challenges posed and confronted by the livestock sector and livestock industries in the Asia-Pacific countries will have to proactively adapt to the emerging social, environmental and economic changes. To best guide livestock sector development, policy-makers need to understand the different options with their pros and cons in a decision-making context strongly influenced by regional and global interdependencies. Economics and ecology are transcending national borders and an understanding of what is happening at the global, regional, national and local levels is critical to relevant and appropriate decision making. Timely access to unbiased and broad-based analysis of issues and information exchange among peers is thus becoming increasingly important, particularly in the context of an over-load of information and increased lobbying by commercial interests. To address the growing information needs of policy makers, the APHCA secretariat proposed the establishment of a highly proactive livestock policy network (LPN). In the first phase, to funded by a regional TCP, a network of specialists would be established, that can quickly generate policy advice as issues emerge. Furthermore, the LPN would work with groups of countries to produce multi-country / sub-regional policy studies to identify approaches and solutions to common problems and challenges. Finally, the LPN will provide training and capacity-building for livestock institutions in the region, particularly national livestock departments. The Secretariat sought feedback on the proposal, which, if initiated through TCP funds, would require countries to request FAO action in this regard.

- **Proposed 2013 Workplan and Budget**: The Secretary presented the proposed workplan and budget for 2013 by five thematic thrusts: (i) smallholder dairy

development, to expand into dairy goats – US$35,000 (ii) zoonoses, food safety and AMR – US$30,000 (iii) the development of feed assessment systems – US$20,000 (iv) information dissemination and APHCA positioning – US$30,000, and (v) support to the development of a detailed proposal for a livestock policy network – US$10,000. The total budget requested amounts to US$125,000. The operational breakdown as well as FAO's anticipated contributions to the workplan, estimated at US$165,000, are detailed in APHCA 2012/06.

Thailand proposed to host two inter-related brucellosis activities on proficiency testing in 2013, up to US$30,000 and to be co-funded by OIE-Asia Pacific. Part of the APHCA contributions would derive from unspent 2012 funds earmarked for this activity.

Wednesday, 24 October 2012, morning

- Endorsements: Delegates endorsed the following requests made by the Secretariat on Monday, 22 October:
    a. Accumulated interest up to 31.12.2011 can be moved into the APHCA cash account at disposal for APHCA activities,
    b. Unspent 2012 funds can be used in 2013 to complete agreed 2012 activities,
    c. Brucellosis proficiency testing and related workshop to be conducted drawing on unspent funds from 2012 (app US$15,000) and additional funding for 2013 (app. US$15,000) as joint FAO-APHCA/OIE-Asia-Pacific activity in 2013,
    d. Workplan for 2013 to incorporate brucellosis activities as separate line item bringing total approved budget to US$140,000;
    e. Member countries replenish / establish the respective NCFs and report on the status at the next Session.
- Summary and recommendations from the AMU & AMR Workshop: The International Workshop on the Use of Antimicrobials in Livestock Production and the Risks from Antimicrobial Resistance in the Asia–Pacific Region was held in Negombo, Sri Lanka, on 22–23 October 2012 in conjunction with the 36th APHCA Session.

  In the first session of the workshop, Dr J. Otte outlined the objectives of workshop and introduced the subject experts who addressed the workshop. Professor J. Wagenaar presented a keynote address on the epidemiology and impact of antimicrobial resistance (AMR) and the links between antimicrobial use (AMU) in livestock and AMR in humans.

  In the second session, APHCA delegates then presented short country reports on AMU and AMR in their respective countries. In the third session, subject specialists presented a series of five case studies on AMU and AMR in animals (including

livestock and aquatic animals) in the Asia–Pacific region, providing data and information of relevance to APHCA delegates.

In the fourth session, Professor D. Pfeiffer gave a presentation on systems for monitoring and integrated surveillance of AMU and AMR, and Professor Wagenaar then gave a presentation that explored alternatives to antimicrobials (ATA). Dr A. Adara–Kane outlined WHO and FAO initiatives to reduce risks from AMR and Dr T. Myint outlined OIE initiatives to promote the responsible and prudent use of antimicrobials.

In the final session of the workshop, delegates and resource persons split into two working groups, facilitated by APHCA staff, that explored what actions APHCA member countries could take to help reduce the risks from AMR. Each working group reported back to a plenary session and the outputs were synthesised into a common list of potential actions in an approximate order of priority. Delegates acknowledged the importance of AMR and agreed that the international workshop was a useful and timely reminder of the need for animal health authorities in the Asia–Pacific region to give greater attention to AMU and AMR.

Delegates noted that there is a wide variation in the awareness of and capacity to manage the risks from AMR across APHCA member countries. However, they agreed that the case studies presented during the workshop demonstrated both that AMR was a problem in countries in the Asia–Pacific region and that appropriate action could and should be taken to ensure prudent use of antimicrobials in animals to reduce the risks from AMR. Delegates recognised that although AMR is a global problem local action in each APHCA member country was needed to underpin regional and global risk reduction measures.

The synthesis of feasible local actions identified in the workshop is shown in Figure 1. Delegates noted that it was not feasible to undertake all of these quickly but recognised that it was important to undertake a situational analysis to understand the roles and motivations of all stakeholders in antimicrobial value chains in their respective countries. They noted that AMU is not just a technical issue and that addressing it and the risks from AMR also required consideration of social, economic, environmental, ethical and policy factors.

Delegates recognised the need to work to establish, where not already in place in their respective countries, a broadly based multidisciplinary national taskforce on AMU and AMR. They noted that having a broadly based multidisciplinary and cross-sectoral National Taskforce on Antimicrobials would help to facilitate a number of other actions identified (e.g. increasing awareness). They also noted that some support was available from WHO for countries to take action to reduce risks from AMR, and that both FAO and OIE produce useful guidance including a range of standards and guidelines for good practice.

Delegates recognised the need for relevant legislation and regulatory frameworks, including compliance capacity, which they noted was limited in a number of

countries in the Asia–Pacific region. However, they recognised that developing or reviewing legislation was longer-term action that first required broad consensus on national policy. Delegates also recognised the need for capacity-building (of both human resources and laboratory infrastructure) for monitoring AMU and surveillance of AMR, but acknowledged that this was also an action that would require longer-term planning and investment.

Delegates agreed that they would each progress a number of local actions identified in the workshop that were relevant to their respective countries, and report progress at the next APHCA meeting. APHCA Secretariat is requested to pursue the issue with the three countries that were not represented at the Session / Workshop.

Delegates noted that some of the local actions identified in the workshop actions would require external funding support, particularly in terms of longer-term actions such as capacity-building. They acknowledged that it would be useful for some priority be given to exploring mechanisms for obtaining external funding to support undertaking some longer-term actions in a number of APHCA member countries.

Delegates agreed that it would be useful for APHCA to facilitate obtaining external funding to support undertaking some longer-term actions in a number of APHCA member countries.

Figure 1: Local in-county actions to reduce risks from AMR (as identified in the workshop)

1. Undertake a *situational analysis* (to improve understanding of what is occurring with AMU and AMR) to understand the roles and motivations of all stakeholders in antimicrobial value chains in their respective countries;
2. Establish a National Task Force on Antimicrobials that is multidisciplinary and cross-sectoral to provide a forum to lead policy development and support action on AMU and AMR;
3. Improve *awareness* at different levels (including farmers and farmer organizations; veterinarians, paraveterinarians, veterinary faculty staff members; policy-makers; consumers and civil society);
4. Develop, review and improve *practical legislation and regulatory frameworks*, including compliance capacity, for AMU and AMR:
   - Develop national policy;
   - Develop guidelines and regulations to encourage responsible and prudent use of antimicrobials (e.g. on prescription for both animal and human AMU).
5. Build *capacity* (of both human resources and laboratory infrastructure) for monitoring AMU and surveillance of AMR:
   - Review current national capacity;
   - Explore options for capacity-building to fill gaps identified.
6. Undertake *monitoring and surveillance* of AMU and AMR:
   - Collect data on AMU (e.g. types and of volume of antimicrobials used, purpose of use);

- Design and undertake targeted surveillance for AMR;
- Explore options for developing a national programme for monitoring AMU and surveillance of AMR.

7. Promote *alternatives to AMU*, particularly improved infection control, good husbandry practices, and farm biosecurity;
8. Develop and implement communications and public *awareness* on AMU and AMR.

- Venues and Dates of the 37th and 38th Sessions: As agreed at the 35th Session, the 2013 Session will be held in Punakha or Thimphu, Bhutan, tentatively in the last week of September 2013.

  Government of Myanmar, through its delegate, proposed to host the 38th Session in Myanmar, venue to be confirmed.

- Any Other Business: No other business was raised.

- Adoption of the Minutes of the 73rd Executive Committee Meeting and the 36th APHCA Session: The Minutes and the Session Report were approved.

- Closure: The Chairperson thanked the APHCA Secretariat and all the delegates for their hard work and attendance. The Session was closed at 10:30.

Summary Statement of APHCA Account (APHCA 2013/04)

Cash Balance as of 1 January 2013

TRUST FUND No. 9167.00 – MTF/INT/005/MUL

Funds received up to 31.12.2011		**US$**
3051 Contributions received		2,414,635
3052 Cumulative interest earned***		90,453
	Total	**2,505,088**
Funds received in 2012		
3051 Contributions received		75,871
3052 Interest earned in 2012*****		397
	Total	**76,269**
Funds received up to 31.12.2012		
3051 Contributions received		2,490,507
3052 Cumulative interest earned***		90,850
	Total	**2,581,357**
Expenditures		
Expenditures up to 31.12.2011		2,191,572
Expenditures in 2012 (Jan. to Dec.)		38,125
	Total	**2,229,697**
Effective cash balance (without interest earned) as of 01.01.2013		**260,810**

*** N.B. Interests, although received into the account, **cannot** be spent without approval of APHCA members. Therefore the effective cash balance is calculated on the contributions received (without interest) minus expenditures.

Expenditures in 2012

Budget line	**US$**
5012 Salaries General Service	-10,486
5013 Consultants	166
5014 Contracts	0
5020 Locally Contracted Labour	23
5021 Travel	40,710
5023 Training	608
5024 Expendable Procurement	453
5026 Hospitality	1,155
5028 General Operating Expenses	5,496
Total Expenditure	**38,125**

Status of Contributions

Oracle Activity: TF RAPXD TFAA97AA89142, Status as of 31.12.2012

Member Country	Outstanding 31/12/2011	Contribution due for 2012	Contributions received 2012	Outstanding 31/12/2012
Australia	0.00	10,724.00	10,724.00	0.00
Bangladesh	35,792.00	6,502.00	6,502.00	35,792.00
Bhutan	0.00	2,128.00	2,128.00	0.00
India	323.05	10,724.00	10,724.00	0.00
Indonesia	0.00	6,502.00	6,502.00	0.00
Iran	6,502.00	6,502.00	6,502.00	6,502.00
Korea DPR	0.00	2,128.00	0.00	2,128.00
Lao PDR	0.00	2,128.00	0.00	2,128.00
Malaysia	0.00	6,502.00	6,502.00	0.00
Mongolia	0.00	2,128.00	2,128.00	0.00
Myanmar	0.00	2,128.00	2,128.00	0.00
Nepal	(2,128.00)	2,128.00	0.00	0.00
Pakistan	6,593.15	6,502.00	0.00	13,095.15
PNG	(2,119.00)	2,128.00	0.00	9.00
Philippines	0.00	6,502.00	6,502.00	0.00
Samoa	(54.00)	2,128.00	2,202.14	-103.14
Sri Lanka	25.00	6,502.00	6,502.00	25.00
Thailand	0.00	6,502.00	6,502.00	0.00
Total	**44,934.20**	**90,488.00**	**75,871.19**	**59,576.01**

Oracle Activity: TF RAPXD TFAA97AA89142, Status as of 31.08.2013

Member Country	Outstanding 31/12/2012	Contribution due for 2012	Contributions received 2013	Outstanding 31/08/2013
Australia	0.00	10,724.00	10,724.00	0.00
Bangladesh	35,792.00	6,502.00		42,294.00
Bhutan	0.00	2,128.00	2,128.00	0.00
India	0.00	10,724.00		10,724.00
Indonesia	0.00	6,502.00		6,502.00
Iran	6,502.00	6,502.00		13,004.00
Korea DPR	2,128.00	2,128.00	2,128.00	2,128.00
Lao PDR	2,128.00	2,128.00		4,256.00
Malaysia	0.00	6,502.00		6,502.00
Mongolia	0.00	2,128.00	2,128.00	0.00
Myanmar	0.00	2,128.00		2,128.00
Nepal	0.00	2,128.00	2,128.00	0.00
Pakistan	13,095.15	6,502.00		19,597.15
PNG	9.00	2,128.00		2,137.00
Philippines	0.00	6,502.00	6,502.00	0.00
Samoa	-103.14	2,182.00	1,999.86	25.00
Sri Lanka	25.00	6,502.00	6,527.00	0.00
Thailand	0.00	6,502.00	6,502.00	0.00
Total	**59,576.01**	**90,542.00**	**40,766.86**	**109,297.15**

*Note: Outstanding up to 31.12.2010: US$23,173.48; outstanding up to 31.12.2011: US$44,932.20; outstanding up to 31.12.2012: 59,576.01

Approved Budget for 2013 and Expenditures to 31.08.2013

Budget line	Approved budget	Expended on 31.08.2013	Balance
5011 Salaries Prof.	0	0	0
5012 Salaries GS	25,000	16,986	8,014
5013 Consultants	26,000	18,134	7,866
5014 Contracts	30,000	0	30,000
5020 Locally Contracted Labour	1,000	-653	1,653
5021 Travel	46,000	28,768	17,232
5023 Training	5,000	1,129	3,871
5024 Expendable Procurement	1,000	1,876	-876
5025 Non-expendable Procurement	0	0	0
5026 Hospitality	2,000	0	2,000
5028 General Operating Expenses	4,000	-3,895	7,895
Total	**140,000**	**62,345**	**77,655**

Scale of Contributions for 2013

Member Country	Amount (US$)*
Australia	10,724.00
Bangladesh	6,502.00
Bhutan	2,128.00
India	10,724.00
Indonesia	6,502.00
Iran	6,502.00
Korea DPR**	2,128.00
Lao PDR	2,128.00
Malaysia	6,502.00
Mongolia	2,128.00
Myanmar	2,128.00
Nepal	2,128.00
Pakistan	6,502.00
PNG	2,128.00
Philippines	6,502.00
Samoa	2,128.00
Sri Lanka	6,502.00
Thailand	6,502.00
TOTAL	**90,488.00**

* Note: This scale of contributions has been in effect since 2003

** Note: Korea DPR became a member of APHCA effective 2010

Activity Report (APHCA 2013/05)

Introduction

The following is a general overview of the activities carried out by the RAP livestock group in the livestock sector in the APHCA region – i.e. not limited to APHCA member countries – since the last Session in Negombo, 20-24 October 2012. The activities are funded from a variety of sources, such as the APHCA trust fund, FAO's regular programme (RP), FAO's technical cooperation programme (TCP) as well as unilateral and multilateral donor trust funds. The RAP Livestock group supports and is supported by colleagues from RAP ECTAD and FAO HQ and also greatly benefits from support and links provided by the FAO in countries representations.

In accordance with FAO's overall strategic objectives, the Asia-Pacific livestock programme aims to maximize livestock' s contribution to attaining food security and reducing poverty while at the same time enhancing resilience and sustainability and reducing health risks to humans and animals (including the threat from antimicrobial resistance).

FAO's work builds on strong partnerships with international 'sister' organizations through the regional and sub-regional offices of OIE, and the WHO offices for Southeast Asia (SEARO) and for the Western Pacific (WIPRO) and in close consultation with national counterpart institutions of Member countries, fostered through FAO country offices.

The Animal Production and Health Commission for Asia and the Pacific, APHCA, provides a long-standing forum for information exchange, mutual support and coordination of collective action in the livestock sector.

Personnel (RAP Livestock Group)

- Joachim Otte, Senior Animal Production and Health Officer and Secretary of APHCA
- Carolyn Benigno, Animal Health Officer
- Vinod Ahuja, Livestock Policy Officer
- Vishnu Songkitti, APHCA Liaison Officer
- Yupaporn Simuangngam, APHCA IT Clerk
- Tuanchai Laisakun, Support Staff

Field Projects Supported by RAP Livestock Group

FAO Technical Cooperation Programme (TCP) – National Projects

- TCP/AFG/3403 (TCPF) – Afghanistan Poultry Policy and Strategy Development [VA]
- TCP/BGD/3302 – Establishment of Livestock Health Care System at Kotalipara and Tungipara Upazilas in the Gopalgonj District [CB]
- TCP/IND/3302 & UTF/IND/185 – A Strategy and an Action Plan for an Animal Identification and Traceability System for India (completed Q3 2013) [VA]
- TCP/IND/3301 (TCPF) – Strengthening Smallholder Livestock Rearing and Fodder Producing Agro-ecosystem Management (completed Q2 2013) [JO]
- TCP/IND/3402 – Support for Piloting Integrated Smallholder Livestock Rearing Interventions in two States of India, and Documenting and Disseminating Successful Smallholder Livestock Rearing Interventions under the South Asia Pro-Poor Livestock Policy Programme [JO]
- TCP/INS/3302 – Enhanced Coordination of Control Efforts, Capacity Building, Awareness Raising and Rapid Outbreak Response to Control Rabies in Bali, Indonesia (completed Q2 2013) [CB]
- TCP/MDV/3401 (TCPF) – Formulation of Project Proposal: Development of Domestic Egg Industry in the Maldives (completed Q2 2013) [VA]
- TCP/MDV/3402 – Support for the Development of a Domestic Egg Industry in the Maldives [VA]
- TCP/MYA/3402 (TCPF) – Formulation of Project Proposal: Improved Farmer Livelihoods through Improved Livestock Disease Control and Supply Chains (completed Q3 2013) [JO]
- TCP/MYA/3402 (TCPF) – Formulation of Project Proposal: Animal Feeding Strategies for Improved Livestock Production in Myanmar [VA]
- TCP/THA/3306 – Emergency Assistance to Support the Recovery of Agriculture-based Livelihoods Systems of Flood-affected Farmers (completed Q4 2012) [JO]
- TCP/THA/3401 – Enhancement of Beef Productivity through Animal Identification and Traceability [CB]
- TCP/VIE/3302 (TCPF) – Formulation of Project Proposal: Developing a Livestock Policy Analysis and Monitoring System in Vietnam [VA]

FAO Technical Cooperation Programme (TCP) – Regional Projects

- TCP/RAS/3306 – Cross-border Trade and TAD Risk Reduction (with a special focus on FMD) (completed Q1 2013) [CB]
- TCP/RAS/3309 – Enhancing Milk Consumption and Livelihoods through School Milk Programmes (Bangladesh, Myanmar and Thailand) [VA]

- TCP/RAS/3401 – Enhancing Regional Coordination of FMD Control (SAARC and ASEAN) [CB]
- TCP/RAS/3404 (TCPF) – Livestock Production and Antimicrobial Resistance in Asia with an Emphasis on the SAARC Sub-Region [JO]
- TCP/RAS/3406(E) Emergency Assistance for Surveillance of Influenza A (H7N9) Virus in Poultry and Animal Populations in Southeast Asia [CB]
- TCP/INT/3402(E) Emergency Support to Global and Coordinated Response to Influenza A (H7N9) Virus in Poultry and Other Animals [CB]

Bi-lateral and Multi-lateral Donor Funding – National

- UTF/AFG/079/AFG – Dairy Industry Development in Kabul, Logar and Parwan provinces [VA]
- GCP/BGD/048/USA – Improving food security of women and children by enhancing backyard and small-scale poultry production in the Southern Delta Region in Bangadesh [VA]
- MTF/BGD/052/RBK – Linking School Milk with Smallholder Dairy Development in Tala, Sathkira, Bangladesh [VA]
- GCP/CMB/039/EC – Micro and Small Enterprise Development to Achieve Food Security, Food Safety and Self-Reliance for Urban Poor in Phnom Penh [JO]
- OSRO/CMB/101/EC – Improving Food Security and Market Linkages for Smallholders in Otdar Meanchey and Preah Vihear Provinces in Cambodia [JO]
- OSRO/LAO/101/BEL – Emergency assistance to restore the livelihoods of vulnerable farming families affected by floods in Khammouan, Savannakhet and Champassack provinces in Lao PDR [JO]
- UTF/LAO/018/LAO – Technical Assistance for the Development of the SPS-related Legal Framework in the Lao People's Democratic Republic [CB]
- UTF/MON/009/MON – Mongolia Integrated Livestock-based Livelihoods Support Programme (ILBLSP) [JO]
- UNTS/THA/033/UNO – United Nations Joint Programme on Integrated Highland Livelihood Development in Mae Hong Son Province [VS]

Bi-lateral and Multi-lateral Donor Funding – Regional

- GCP/RAS/252/IFA – South Asia Pro-Poor Livestock Policy Programme (completed Q4 2012) [JO]
- MTF/RAS/CFC/259 – Improving the Bargaining Power and Sustainable Livelihoods through the Enhancement of Productivity and Market Access in Dairy (Bangladesh, Myanmar and Thailand) [VA]

- GCP/RAS/244/ITA – Sub-regional Environmental Animal Health Management Initiative for Smallholder Production in Southeast Asia, Phase 3 [CB]
- GCP/RAS/283/ROK – FMD Control in Southeast Asia (Cambodia, Lao PDR and Vietnam) through Application of the Progressive Control Pathway [CB]
- OSRO/GLO/102/AUL – Partnership on Global Animal Health and Biosecurity Initiatives (Bangladesh, Philippines, Thailand, Vietnam) [CB]
- OSRO/RAS/901/EC – Improvement of Regional Capacities for Prevention, Control and Eradication of Highly Pathogenic and Emerging Diseases including Highly Pathogenic Avian Influenza in the ASEAN and SAARC Countries [CB]
- GCP/RAS/279/JPN – Information Sharing for Transboundary Animal Diseases in Asia [CB]
- OSRO/INT/02/USA – IDENTIFY: Support for Strengthening Animal Health Laboratory Capacities in Hot Spot Regions to Combat Zoonotic Diseases that Pose a Significant Public Health Threat [CB]
- OSRO/INT/001/USA – Characterizing Influenza Viruses Posing Risks as the Next Global Pandemic [CB]
- USAID supported projects on HPAI (Bangladesh, Cambodia, China, India, Indonesia, Myanmar, Nepal, Vietnam, Regional) [CB]

Pipeline Projects

- TCP, China – Developing Prevention and Control Technologies for African Swine Fever (ASF) in China [CB].
- TCPF, Maldives – Animal Quarantine Improvement [CB]
- GCP, Myanmar – Improved Farmer Livelihoods through Improved Animal Health and Production Services [JO]
- TCPF, Sri Lanka – Dairy Feeding in Sri Lanka [tbd]
- TCP, Vietnam – Development of a Livestock Policy Analysis and Monitoring System in Vietnam [VA]

Meetings, Workshops and Events (Co-)Organized

- 29 November 2012, Thailand, Bangkok, Planning Dairy Development Programmes, Symposium held at the 15th AAAP Congress [VA]
- 14-18 January 2013, Cambodia, Phnom Penh, Training Course on Economywide Assessment of High Impact Animal Diseases in Cambodia [JO]
- 4-6 March 2013, Fiji, Nadi, 2nd FAO/OIE/SPC Sub-regional Meeting on GF-TADs for SPC [CB]

- 12-14 March 2013, Thailand, Bangkok, Preliminary Meeting on Reporting Indicators and National Focal Points Meeting of the Sub-regional Environmental Animal Health Management Initiative (EAHMI) for Enhanced Smallholder Production in Southeast Asia, GCP/RAS/244/ITA [CB]
- 23-26 April 2013, Thailand, Chiang Mai, Mid-Term Review and Second Regional Dairy Task Force Meeting [VA]
- 14-15 May 2013, Thailand, Bangkok, APHCA Expert Workshop 'Towards Standardization and Harmonization of Monitoring of AMU in Livestock and AMR in Livestock-associated Micro-organisms in the Asia-Pacific Region' [JO, VS]
- 1 June 2013, Thailand, Bangkok, ASEAN Dairy Symposium and WMD [VA, VS]
- 4-6 June 2013, Thailand, Bangkok, Workshop 'Understanding and Integrating Gender Issues into Livestock Projects and Programmes' [CB]
- 12-20 July 2013, Thailand, Bangkok, preparatory meeting for QC/QA of brucellosis laboratory at NIAH-Thailand and proficiency testing of 16 laboratories under the Joint FAO-APHCA/OIE Brucellosis Diagnosis and Control Programme in the Asia-Pacific Region [VS]
- 13-15 August 2013, Thailand, Bangkok, Regional Workshop on 'Animal Feed Resources and their Management in the Asia-Pacific Region' [JO, VS]
- 27-30 August 2013, Thailand, Bangkok, Agenda of Action Meeting (Waste to Worth component [VA, VS]
- 18-19 September 2013, Manila, Philippines, Environmental Animal Health Management Initiative (EAHMI) Conference [CB]
- 22-26 September 2013, Thimphu, Bhutan, 37th APHCA Session and Regional FAO-APHCA OIE Workshop on Zoonoses, Food-borne Diseases and Antimicrobial Resistance [CB, JO, VA & VS]

Congresses, Symposia, Meetings and Workshops Attended

- 13-14 November, 2012, Tokyo, Japan, First Coordination Committee Meeting of OIE/JTF Project for FMD Control in Asia [CB]
- 26-28 November 2012, Bali, Indonesia, The Third Regional Workshop on Multi-Sectoral Collaboration on Zoonoses Prevention and Control [CB]
- 16-18 January 2013, Bangkok, Thailand, 38th International Conference on Veterinary Science [JO]
- 29 January – 2 February 2013, Bangkok, Thailand, Prince Mahidol Award Conference 2013 [JO]
- 19-22 March 2013, Singapore, 19th Meeting of the OIE Sub-Commission for FMD Control in SEA and China [CB]

- 4 April 2013, Hanoi, Viet Nam, Viet Nam Agricultural Outlook Conference
- 23 April 2013, Tokyo, Japan, OIE Expert Group Meeting on Swine Influenza in Asia Pacific Region [CB]
- 26 April 2013, Bali, Indonesia, Bali Rabies Control Stakeholders Lessons Learnt Workshop (FAO TCP Project 3302 I) [CB]
- 2-3 May 2013, Thailand, Bangkok, H7N9 Technical and Programmatic Coordination Meeting [JO]
- 16 July 2013, Tokyo, Japan, 4th EU-HPED Steering Committee Meeting [CB}
- 17-18 July 2013, Tokyo, Japan, 7th Regional Steering Committee Meeting of GF-TADs for Asia and the Pacific [CB]
- 27-29 July, China, Lanzhou, 4th International Conference on Sustainable Animal Agriculture for Developing Countries, SAADC2013 [JO]
- 1-3 August 2013, Manila, Philippines, Technical Consultation for AMR Surveillance in the WHO Western Pacific Region [CB]
- 21-23 August 2013, Luang Prabang, Lao PDR, 16th SEACFMD National Coordinators Meeting [CB]
- 26 August 2013, Bangkok, Thailand, Training on AMR in Foodborne Pathogens for ASEAN Universities (at Chulalongkorn University) [JO]
- 2-6 September 2013, Nadi, Fiji, 15th Australasia/Oceania CVA Regional Conference [CB]

Commissioned Studies

- Trends in the Emergence of Swine Pathogens, Royal Veterinary College [JO] (completed)
- A Study of Patterns and Trends of Regional Trade in Live Animals, Livestock Products and Animal Feed (Ingredients) in the GMS Countries and their Implications for Regional Food Security; Chiang Mai University [JO, VA] (completed)
- Cambodia Fodder Resources, CELAGRID, Cambodia [CB] (completed)
- Cambodian Livestock Breeds and Guidelines on Management of Animal Genetic Resources; Royal University of Agriculture, Cambodia [CB] (completed)
- Study of Animal Protein Consumption Patterns in Rural and Urban Areas of Cambodia to Develop a Predictive Model of Future Demand; Royal University of Agriculture, Cambodia [CB] (completed)
- Market Supply Chain Survey in Selected Provinces: Quang Ninh, Hai Duong, Quang Nam and Dong Thap, Vietnam; Research Development Center for Agro-foresty and Fisheries, Vietnam [CB] (completed)

- National Survey of Veterinary Check Points, Infrastructure and Disease-Free Farm Locations in Vietnam; Department of Animal Health, Vietnam [CB] (completed)
- Desk study Review of Culled Animal Disposal Regulations and Practices in Vietnam; Hanoi University of Agriculture [CB] (completed)
- Mapping and Description of Duck Markets and Duck Market Dynamics in Seven Provinces of Cambodia; National Veterinary Research Institute, Cambodia [CB] (completed)
- A Study on Cheese Consumption Behavior in Bangkok and Chiang Mai; DLD team [VA] (completed)
- Linking school milk with smallholder dairy development strategy: Thai experience and design considerations for a pilot project in Bangladesh; M. Jabbar and V. Ahuja [VA] (completed)
- Myanmar School Milk Nutrition Programme Review; B. Dugdill [VA] (completed)
- Changing Consumption Patterns of Livestock Products; A. Kundu [VA] (ongoing)
- An Analytical Framework for Integrated Animal Disease Impact Assessment: Applications to FMD in the Greater Mekong Sub-Region; UC Berkeley and Norwegian Institute of International Affairs [JH, JO] (ongoing)
- A Review of Antimicrobial Resistance in Bacterial Micro-Organisms Isolated from Livestock and Livestock Products in the Asia-Pacific Region; Chulalongkorn University [JO] (ongoing)

Publications (hard copy)

- Proceedings of the 1st Asia Dairy Goat Conference (2012) (Conference Proceedings)
- Frequently asked questions on pig biosecurity and disease reporting (2012) (Guide)
- Guide to prevent and control porcine reproductive and respiratory syndrome (2012) (Guide)
- Handbook on swine health field surveillance (2012) (Guide)
- Asian Livestock Challenges, Opportunities and the Response (2013) (Conference Proceedings)
- Utilization of Fruit and Vegetable Wastes as Livestock Feed for Generation of Other Value-Added Products (RAP Publication 2013/04)

Smallholder Dairy Development Activities

The project *Smallholder Dairy Development in Bangladesh, Myanmar and Thailand* commenced in February 2011 with official launch meetings in Bangkok and Chiang Mai,

Thailand. This project is the first intervention under the Strategy and Investment Plan for Smallholder Dairy Development in Asia – ***a glass of Asian milk every day for every Asian child*** – developed by APHCA member countries in 2008. The project in Bangladesh, Myanmar and Thailand consists of three mutually reinforcing projects. These are:

- *Smallholder Dairy Development in Bangladesh, Myanmar and Thailand: Improving the Bargaining Power and Sustainable Livelihoods through the Enhancement of Productivity and Market Access in Dairy (MTF/RAS/CFC/259)* – funded by the Common Fund for Commodities (CFC)
- *Enhancing Milk Consumption and Livelihoods through School Milk Programmes Linked to Smallholder Dairy Operations (TCP/RAS/3309 (D))* – funded by FAO, and
- *Asia Dairy Network – the way forward* –funded by APHCA

A mid-term review of the project was conducted in March-April 2013 and the findings of the review were presented at the Regional Dairy Task Force meeting held in Chiang Mai on 23-25 April 2013. The review concluded that overall, there is solid evidence the project has made good progress and there is compelling evidence of strong ownership of the project across all three countries and along the entire dairy value chain where the Smallholder Dairy Development Project (SDDP) intervenes.

The project has promoted a dairy extension model in Thailand with support from the Regional (DLD) Livestock Office, Animal Nutrition Research Centre and Chiang Mai University. The model has been appreciated by all stakeholders and is already showing results in Thailand in terms of improved milk quality. Results also indicate that replacing expensive concentrates with high quality / lower cost green forage in Thailand can produce a profitable productivity increase response. This has been possible due to close coordination and communication between Chiang Mai University, Regional Livestock Office, Animal Nutrition research Centre, the participating cooperatives and FAO. Due to this coordinated effort the Royal Thai Government conferred the 2012 Public Service award to this project.

The pilot school milk nutrition schemes in Myanmar started in Mandalay and Yangon in August 2012 with supply to over 5 000 primary school children financed by private sector sponsors, including milk processors and other trading companies. These schemes use local milk and are the first in the country. A further scheme funded by the packaging company Tetra Pak through LBVD using UHT milk imported from Thailand was piloted for six weeks. Both schemes plan to scale up during the coming academic year starting July 2013 to serve about 70 000 children. With financial contributions from local dairy processors, Myanmar Dairy Association has established a Foundation Trust Fund in support of school milk activities and international private sector processors such as Friesland Campina have pledged support for the programme. Recently, Mandalay regional government announced a soft loan provision of 100 million Myanmar Kyats for local private processors who participate in school milk programmes. Overall the

programmes have been considered a great success by all stakeholders and early indications are that the programmes are making positive impact on children's health and school attendance. The Myanmar Dairy Association received the World Food Day award in 2012 for SDDP activities under the school milk component.

In Bangladesh the school milk activities have progressed also well with new partners – the Bangladesh Milk Producers' Union Limited (better known by its brand name 'Milk Vita') and Rabobank – joining the programme. Official pilot schemes benefitting 4 000 children are scheduled to be launched on August 24, 2013.

The review further noted that the project continues to benefit from the high level of commitment of all three Governments and keen support from dairy industry stakeholders across all three countries with Thailand especially providing more support, e.g. for improved dairy cow feeding and the pilot school milk schemes. Increasingly, partners are making cash as well as in kind contributions to the SDDP.

Based on the outcome of the mid-term review, the project will focus on following key priority activities during the third year of implementation.

Bangladesh: (i) mobilising farmers, reinforcing farmer groups and enhancing dairy service delivery (dairy extension system); (ii) introducing rapid platform quality testing and monitoring systems at selected milk collection points and chilling centres of the Milk Vita partner; (iii) piloting and documenting the school milk nutrition scheme.

Myanmar: (i) strengthening farmer groups and enhancing sustainable dairy service delivery (dairy extension system); (ii) installing equipment at MPOs/MPUs; (iii) documenting, scaling-up and sustaining the pilot school milk nutrition schemes.

Thailand: (i) dairy feeding interventions and enhancement dairy extension service provision; (ii) regional training activities at Chiang Mai Dairy Training Centre; (iii) instruments for sustaining the Regional Dairy Training Centre.

Regional: (i) reinforcing training along the entire value chain from cow to consumer training, including more country-to-country learning and training events, and advocacy; (iii) fully operationalising the Asia Dairy Network (I) (iv) embedding a dairy cow key performance indicator tool into the milk production enhancement component of the project.

Activities under the Asia Dairy Network have progressed as well. The network was launched at a specially organized side event symposium—Planning Dairy Development Programmes in Asia—under the auspices of 15th AAAP (Asia Australasia Association of Animal Production Societies) Congress held in Bangkok in November 2012. A website www.dairyasia.org has also been launched and a distribution list FAO-DairyAsia-L has been created on the FAO list server. Through these platforms, members now receive regular updates on project activities and dairy related developments in the region.

Animal and Veterinary Public Health Activities

Infectious diseases of animals pose a long-term threat to livestock production in the region and the wider world, as well to human health. Changing livestock production systems, combined with greater movement of people, animals, goods and services, technology and investments, are challenging regulatory authorities. These not only have to keep abreast of these changes but are also required to make the necessary adjustments, such as defining and enforcing good farming practices and implementing timely, effective and efficient disease control measures.

Livestock sector developments in the Asia-Pacific region are creating a fertile ground for the emergence of animal diseases, some of which may have zoonotic potential, and call for increased investments in animal health management capacities. Animal health management strategies needs to be informed by a good understanding of the differential and localized costs of disease outbreaks, the role of production and marketing systems in generating and dispersing pathogens, and the role of policymakers and regulatory authorities in addressing these issues. Better information about the direct and indirect costs of animal diseases for producers, industries, consumers, as well as to the economy as a whole needs to be generated and translated into greater awareness and commitment to disease control by all concerned.

To address above issues, FAO carries out a number of activities in the Asia-Pacific region which, functionally, broadly fall into the following main areas: (i) strategy / policy guidance, (ii) coordination, (iii) information generation and knowledge sharing, (iv) technical capacity building, and (v) support to field programme implementation.

Strategy/Policy Guidance

Animal disease management in Asia is generally weak due to poor regulatory systems and heterogeneity in the capacity (and motivation) of (local) animal health services to detect and respond to disease outbreaks. Outdated and sometimes weak legislative capacity and institutional deficiencies in Asia and Pacific make it almost impossible to monitor cross-border animal movements and to implement border control and other disease management measures at national and regional levels.

Policy interventions put in place by FAO, on animal health and disease transmission integrate animal health programmes, food safety and socio economic impact assessment. Some specific examples are the development of animal health legislation for Lao PDR in support of their membership to WTO (UTF/LAO/018/LAO), the Environmental Animal Health Management Initiative (GCP/RAS/244/ITA), which looks at disease within its environmental context and the animal identification and traceability system in Thailand (TCP/THA/3401).

Coordination

Strong regional coordination is required to harmonize policies, strengthen public and private veterinary services, and to develop regional disease control and prevention programmes.

FAO partners with OIE and WHO, the regional groups (ASEAN, SAARC, SPC) and other technical partners as well as countries to synergize and complement animal health management activities and to efficiently use its resources.

To date, FAO is hosting the Regional Support Units of ASEAN and SAARC within the GF-TAD mechanism and has recruited nationals of both sub-regions to work under this set up. It is hoped, that by recruiting nationals as staff technical capacity within the region will be further strengthened.

Capacity Building

Significant investments in locally available human skills and institutions, and the implementation of much more rigorous and organized programmes that use multiple disciplines (such as epidemiology, economics, etc.) to assist in decision-making have been made and are continuously being made.

FAO-RAP has designed and is implementing programmes to strengthen:

- national capacities to understand patterns of disease occurrence within its environmental context through the environmental animal health management initiative (EAHMI),
- field and laboratory surveillance through the Field Epidemiology Training Programme (FETPV),
- cross-border emergency preparedness and response through market chain studies,
- diagnostic capacity for priority diseases such as FMD, CSF, PRRS, rabies, brucellosis through a skills, biosafety and biosecurity programme and quality assurance programmes (e.g. through FAO-APHCA/OIE's joint laboratory quality assurance and proficiency testing programme for brucellosis).

Information Generation and Knowledge Sharing

Networks have been formed to facilitate the exchange of information amongst partners and stakeholders. Amongst these networks are the *FAO-OIE Network of Expertise on Animal Influenza (OFFLU)*, the *Epidemiology Consortium* which promotes disease information sharing, the *4-Way Linking of Human and Animal Influenza Information* and the *Laboratory Network*.

A number of studies, such as for example market chain studies, have been commissioned to better understand the dynamics and context of the occurrence of livestock diseases (for details see 'commissioned studies').

Support to Field Programme Implementation

FAO-RAP designs and implements field projects, both disease-specific as well as cross-cutting throughout the region. About 20+ animal health related projects are currently operational in the region (see activity report section). These projects may be national or regional in scope, but are designed to strengthen capacities of countries on disease control and prevention.

A vital lesson from the animal health interventions is that tailored disease risk mitigation approaches throughout the food chain should incorporate a multidisciplinary dimension of disease control that would foster improved animal health management practices, enhance food safety/quality along the food chain, and support the development of safe animal trade. Ensuring healthy animals and animal products and by-products along the food chain ultimately lowers public health risks and lowers disease costs to society.

AMU and AMR in the Asia-Pacific Region

At the 36th APHCA Session delegates from 15 countries in the Asia-Pacific region presented and reviewed the extent of antimicrobial use (AMU) in livestock production and antimicrobial resistance (AMR) in micro-organisms isolated from livestock and livestock products. Although only limited data is available on the use of antimicrobials in farm animals in Asia-Pacific indirect evidence of widespread (mis-)use of antimicrobials in livestock production in the region is provided by the high prevalence of AMR to selected compounds found in enteric microorganisms isolated from food-producing animals and retail meat across Asian countries (see below table for AMR in Salmonella isolates).

AMR in non-typhoidal *S. enterica* isolates from livestock and livestock products in Southeast Asia

Country	No of isolates	Source	Percentage of resistant isolates			
			TET	AMP	SUL	MDR
Cambodia	152	Poultry	21	17	13	ND
Malaysia	33	Various lstk	64	24	48	49
Malaysia	55	Poultry	85	29	ND	75
Thailand	211	Poultry & pigs	59	49	68	66
Thailand	131	Raw pork	67	35	55	44
Vietnam	89	Pigs	92	41	57	56
Vietnam	91	Meat & shellfish	41	22	17	21
Vietnam	241	Cattle, pigs & poultry	49	26	30	40

TET = Tetracyclines, AMP = Ampicillin, SUL = Sulfonamides, MDR = Multidrug resistance (resistance to at least three different classes
Source: Van et al., 2012

Against this background, APHCA delegates recognized that action in each member country was needed to underpin regional and global AMR risk reduction measures.

Delegates however also noted that AMR can only be tackled through a collective effort requiring a degree of harmonization and standardization of approach.

To foster a process of harmonization and standardization for the management of AMR, APHCA convened an Expert Workshop held in Bangkok on 14 and 15 May, bringing together national and international experts with the specific objectives to:

- Exchange information about various protocols for AMU and AMR monitoring / surveillance used in countries of the Asia Pacific region
- Review approaches for monitoring of AMU in livestock that allows identification (and quantification) of risk factors for the development and occurrence of AMR
- Review approaches to antimicrobial susceptibility testing (antimicrobial agents, test ranges, interpretive criteria, etc)
- Based on the OIE guidelines for AMR surveillance develop proposal for standardized AMR monitoring protocols
- Familiarize participants with methods for AMR risk assessment and risk management, and
- Identify country-specific support requirements to implement / move towards implementation of the above proposed protocols (Working groups)

One the outcomes of the Expert Workshop was the unanimous decision to form an *Expert Working Group on Veterinary Antimicrobial Resistance Risk Management*. The objective of the working group would be to advocate for increased national and regional policy development and action in APHCA member countries and the region as a whole on the issue of AMR in bacteria of food animal origin (including pathogens of food animals, zoonotic bacteria and commensals).

A core group of invited experts will assist selected APHCA country experts to fulfill the following Terms of Reference.

- Develop educational and information materials on AMR and risk management approaches to facilitate discussions on policy and funding
    - Identify key decision-makers in each country
    - Identify key stakeholders in each country
    - Prepare communication / outreach plan to engage in dialogue
- Develop context-specific guidelines for the responsible and prudent use of antimicrobials in food animal production tailored to the situation prevailing in APHCA member countries
- Propose harmonized science-based guidelines for AMR monitoring programme development:
    - Appropriate collection methodology of samples for the isolation of farm animal-related bacteria to be assessed for AMR
    - Standardized laboratory methods for the assessment of AMR
    - Collation, analysis and reporting of AMR laboratory results on a regular basis

- Propose science-based guidelines for AM sales/use data programme development
    - Harmonized reporting among countries as much as possible, depending on data sources, availability, etc.
- Develop national or regional regulatory agency AMR risk assessment for antimicrobial products that guide risk management decisions
    - To take into consideration the AMR monitoring and AM sales/use data
- Establish an information / data base on alternatives to antimicrobial use in food animal production
    - Disease prevention practices; biosecurity, consumer hygiene practices, etc.
    - Alternative, locally available disease control interventions
- Share the results of the work conducted via symposia, web-posting or other means
- Seek financial support to enhance national AMR management capabilities and capacities

So far, Bhutan, the Philippines and Thailand have nominated national expert members for the working group while international experts have been identified for the following specific subject areas: (i) international standards on AMR risk management and prudent use of antimicrobials, (ii) surveillance & epidemiology, (iii) microbiology & AMR surveillance, (iv) regulatory affairs, and (v) evolutionary biology of AMR.

Although a proposal for funding of working group activities has not been successful, Malaysia and the Philippines have already taken steps to improve their AMR monitoring programmes drawing on the expertise of the international working group members.

National Feed Assessments

Increases in population and disposable income in Asian countries are driving an unprecedented rise in demand for food of animal origin, i.e. meat, milk and eggs (see table overleaf). This rapidly growing demand will severely stretch the capacity of existing food production and distribution systems with major implications for natural resource use and consequential environmental, health – both animal and human – and socio-economic impacts.

Feed is the foundation of the livestock production, with feed costs generally accounting for up to 70% of the cost of production. Feed prices have been increasingly volatile due to negative impacts of climate change and natural disasters, as well as from increasing competition in the use of grains between feed and bio-fuel. Animal feeding systems impact on animal reproduction, health and welfare, and the safety and quality of animal products. Ensuring access to feed in sufficient quantity and quality is therefore among key strategic priorities for livestock sector development. For the region as a whole, net imports of feed and fodder have grown from $2.8 billion in 2000 to $8.0 billion in 2010 (with South Asia and Australia / New Zealand being net exporters) while the balance of

payments for soybean imports, a large share of which is used as animal feed, has deteriorated from net imports worth $4.8 billion to net imports of $27.6 billion over the same period.

Absolute and relative growth in total and *per capita* consumption of animal source food in Asia-Pacific 2000 to 2010

		National consumption		*Per capita* consumption	
Sub-region	**Lstk pro-duct**	**Absolute growth** (1000 tons)	**Relative growth** (%)	**Absolute growth** (kg/yr)	**Relative growth** (%)
South Asia	Meat	3,264	39.5	1.3	22.1
	Milk	33,532	35.6	11.9	18.2
	Eggs	1,406	53.3	0.7	36.4
East Asia	Meat	17,566	24.8	9	19.1
	Milk	27,113	110.6	16.6	101.2
	Eggs	5,147	22.2	2.5	16.4
SE Asia	Meat	6,002	64.2	8.4	46.7
	Milk	1,686	23.3	1.4	10.1
	Eggs	1,005	48.5	1.3	32.5
Australia & NZ	Meat	429	17.3	3.2	3.0
	Milk	308	6.6	-13.1	-6.4
	Eggs	20	13.2	0	0.0
SWP	Meat	15	15.5	-0.2	-0.3
	Milk	10	10.6	-1.4	-3.5
	Eggs	2	21.0	0	-1.3

Source: FAOSTAT

Absolute and relative change in Asia-Pacific feed and soybean trade balances 2000 to 2010 (million $)

Sub-region	Item	1999-2001	2009-2011	% Change
South Asia	Feed / fodder	245.2	740.1	201.8
	Soybeans[1]	-132.2	-472.8	257.5
East Asia	Feed / fodder	-2,447.0	-4,478.5	83.0
	Soybeans	-3,976.6	-25,217.4	534.1
Southeast Asia	Feed / fodder	-971.1	-4,523.9	365.9
	Soybeans	-738.5	-1,862.0	152.1
Australia & NZ	Feed / fodder	362.7	324.7	-10.5
	Soybeans	0.3	0.8	203.2
SWP	Feed / fodder	-17.6	-49.4	180.2
	Soybeans	0.0	-0.1	497.9
TOTAL	Feed / fodder	-2,827.8	-7,987.0	182.4
	Soybeans	-4,847.0	-27,551.5	468.4

[1] Various proportions used in animal feed

The prospect of dramatically increasing demand for animal source food and consequential growth in demand for animal feed raises the question as to how these feed requirements can be met, particularly in land-constrained countries and regions, and in the face of the growing food – feed – fuel competition.

In order to better monitor and guide national and regional livestock sector development strategies, it is essential to develop systematic approaches to accurately assess livestock feed supplies and to obtain better insight into how these feed resources are being utilized, and how the prices are changing.

Accurate estimation of feed resource availability and use would improve assessments of the environmental impacts of livestock, both through land use change and through greenhouse gas emissions associated with livestock production. Accurate information on the proportions of cereals being diverted to animal feed is a critical element for assessing national and regional food security situations. Furthermore, feed assessments, including the price developments, are essential pre-requisites for developing optimal feeding strategies at various levels and thus environmental sustainability and food security.

Unfortunately, despite their strategic role in livestock sector development planning, feed balances are not usually available and where available, they tend to be rather inaccurate. Sub-optimal input data for country-level food/feed input-output analyses and the inability to accurately assess environmental impacts of livestock are challenges that all initiatives and stakeholders involved in sustainable livestock development are confronted with.

Against this background, FAO and APHCA organized a regional workshop entitled *Animal Feed Resources and their Management in the Asia-Pacific Region* with the following envisaged outcomes:

- An agreed and systematic approach for:
  a) conducting feed assessments,
  b) characterizing feeding systems,
  c) generating quantitative information on compound feed and concentrate mixes and their utilization, and,
  d) systems for regularly updating the above information

and

- The foundations for a regional initiative towards better use of feed in livestock production in Asia.

Guidelines for conducting *national feed assessments* (NFAS) based on lessons learned across a wide range of feed situations, from spatially extensive rangeland and grasslands to highly intensive crop-livestock systems produced by AGA, FAO in 2012 were taken as the basis for generating the national feed inventories and feed balances. In May, a uniform format for data compilation was sent to all potential participants by the APHCA secretariat. This format covered feed assessment, herd structure (required for

calculation of feed balance), characterization of feeding systems and estimation of the amounts of cereals used for animal feed production. The senior feed expert from FAO HQ provided regular mentoring and guidance to the participants.

The workshop was attended by (i) national delegates involved in animal production with particular expertise in the field of animal feeding, (ii) directors of animal production in ministries of Livestock or Agriculture, (iii) experts in livestock development, animal nutrition, feed technology, and (iv) private processors and feed producers.

Delegates representing 13 countries presented their national feed assessments. The focus of these presentations was on the approaches used in their countries for generating the information. Group discussions were held on: i) identification of approaches for national feed assessments and establishing and updating of national feed assessments, and ii) approaches for characterization of feeding systems and how countries should characterize feeding systems. Also facilitated discussions were conducted on: i) knowledge gaps in feed assessments and characterization of feeding systems, and ii) establishment of a network / platform / mechanism to institutionalize feed use / availability data collection and sharing system. The conclusions and recommendations from the workshop are being finalized and will be integrated into the updated and agreed guidelines document. These guidelines will be followed by all participants to generate additional data and to improve the country report, a final version of which shall be submitted by November 2013.

Addressing the second envisaged outcome, it was suggested to form an 'Asia-Pacific Animal Feed (APAF) Network' under the auspices of FAO-RAP / APHCA. A broad outline of the network being considered is presented below.

Outline of an Asia-Pacific Animal Feed Network

Outputs

- Feed (resource) inventory with regular updates
- Feeding systems characterization and mapping
- Assessment and forecast of feed demand and supply (feed balances)
- Price monitor for feed and feed ingredients
- Trade figures for feed and feed ingredients
- Guidelines on feed resource management

Clients / users

- National public sector agencies / departments responsible for polices in areas affecting and affected by livestock sector development (i.e. beyond Ag ministries, e.g. natural resources / environment, trade, etc)
- Bi- and multilateral development agencies, NGOs, CSOs
- Academia
- Feed industry and producer associations
- Farmers

Information sources / suppliers

- National public sector agencies / departments
- Academia
- Feed industry and producer associations

Functional set-up

- National 'lead group' / champion
- National task force
- Recognized role model(s) (example(s) from which national can 'learn')
- Network catalyst (FAO / APHCA)
- Network coordinator (based in Bangkok)

Resource requirements (year 1) (USD)

• Meeting(s)	20 to 30k
• Professional network coordinator[1]	50 to 60k
• Miscellaneous	10 to 20k

Participants urged FAO and APHCA to build on the momentum generated by the workshop and to initiate formation of the network by establishing and funding the position of network coordinator. Additionally, FAO and APHCA were asked to develop a strategy to ensure longer-term funding to support network activities, while potential national champions / focal points were identified for India, Indonesia, Malaysia and Thailand.

Support to the Agenda of Action for Sustainable Livestock Sector Development

The *Agenda of Action* is a global initiative involving a multi-stakeholder process with participation of governments, private sector actors, academia and concerned civil society representatives to formulate an agreed response to the urgent question as to how the global livestock sector can play a sustainable role in food security and equitable economic development in an increasingly resource-constrained, urbanizing and more affluent world.

Natural resource use efficiency and the consideration of positive and negative externalities have been identified as the common ground. Three focus areas have been agreed and developed: (i) *Closing the Efficiency Gap*, (ii) *Restoring Value to Grasslands* and (iii) *Waste to Worth*.

As a fundamental component of the Agenda's consultation processes, three Multi-Stakeholder Platform (MSP) meetings have thus far been organized: The first in Brasilia, Brazil (May 2011), the second in Phuket, Thailand (December 2011), and the third in

[1] Qualifications: Basic degree in Animal Nutrition, good knowledge in economics, statistical analysis and modelling; excellent skills in data and database management, experience of managing networks; good English writing skills

Nairobi, Kenya (January 2013). In addition, workshops were organized in Rome, Italy (April 2012), Seoul, Republic of Korea (April 2012); Brasilia, Brazil (May 2012), Braunschweig, Germany (April 2013), Rome, Italy (June 2013) and Bangkok, Thailand (August 2013). Outcomes of these meetings and further updates on the progress of the *Agenda* are available from www.livestockdialogue.org.

FAO-RAP has been actively engaged in the initiative since its inception in Brasilia in May 2011 and the RAP Livestock Policy Officer has been assigned as the regional focal point for agenda activities. FAO and APHCA representatives have participated and made presentations in all MSP meetings (FAO-RAP officer in Brasilia and respective APHCA Chairpersons in Phuket and Nairobi) and selected focus area meetings (Seoul in April 2012). FAORAP, APHCA and Royal Thai Government also co-hosted the second MSP meeting in Phuket and the *Waste to Worth Focus Area* meeting in August 2013 in Bangkok.

Agenda activities remain highly relevant to livestock sector developments in the region and it would be worthwhile exploring mechanisms and activities to (i) further deepen the regional engagement with the *Global Agenda,* and (ii) promote a regional platform to inform and support national and regional policy making in pursuit of broader goal of sustainable livestock sector development.

APHCA Information Unit

In line with the Vision of APHCA to establish itself *as a prime source of information, knowledge, expertise and experience on all aspects of livestock sector development in the Asia-Pacific region* formulated at the APHCA Strategy Workshop, the Information Unit has devoted considerable time maintenance and improvement of the APHCA website. The current 'content' and 'activity' of the APHCA website is summarized in the table below.

Content of APHCA website, visits and downloads – 30.09.12 and 31.08.2013

Item	30.09.12	31.08.13	Diff.
News items posted	87	482	395
Links to videos	0	82	82
Links to institutional web-sites	142	158	16
Uploaded documents	146	194	48
Unique visitors	na	4,588	Na
Visits	39,222	319,026	279,804
Downloads	28,714	112,645	83,931

Over the 11-month period from 30 September 2012 to 31 August 2013, the site was visited 279,804 times by 4,588 unique visitors, of which 2,143 (47%) reside in APHCA member countries. The site is currently ranked among the top 15% of more than 30 million sites monitored by www.webstats.com.

Around 84,000 document downloads were recorded over the 11-month period. The three most frequently downloaded documents by document category are presented in the table below.

Most frequently downloaded documents by category

Document type	Title	Year of Publication	Downloads 2012/13
Book	Meat Processing Technology	2007	1,473
	The Yak Second Edition	2003	1,175
	Economics of Livestock Sector Development	2012	611
Guide / Manual	A Basic Laboratory Manual	2002	1,324
	Designing and Implementing Livestock Value Chain Studies	2012	1,067
	Semi-Intensive Growing Pig Management	2006	1,050
Proceedings	1st Asia Dairy Goat Conference	2012	2,035
	Goats – Undervalued Assets in Asia	2006	1,388
	APHCA Strategy Workshop	2012	1,062
Working Paper / Study	Qualitative Risk Assessment of the Risk of Introduction and Transmission of H5N1 HPAI Virus	2009	1,580
	Non-Conventional Feed Resources in Asia and the Pacific	1985	1,279
	Livestock Production Systems in South Asia and the Greater Mekong Sub-Region	2010	1,005
Research Brief	Promoting Rural Livelihoods and Public Health through Poultry Microfinance: Lao PDR	2012	688
	Pro-Poor Disease Risk Reduction for Smallholder Poultry Supply Chains in Cambodia	2012	534
	Promoting Rural Livelihoods and Public Health through Poultry Contracting: Thailand	2012	492

Hardcopies and CD-ROMS of FAO and APHCA publications have been distributed upon request and in conjunction with workshops and meetings.

Requests for information by media were received on the following issues:

- Food safety issues in China (Finish Newspaper, Beijing office)
- Animal-human relationships: synergies, competition and risks (IRIN)
- Indian beef industry and exports (Financial Times, India office)
- Illegal dog trade and dog meat industry in Southeast Asia (Deutsche Welle)

Submission of studies and other documents by member countries and establishment of links from their institutional websites is solicited.

Livestock Sector Policy Capacity

As mentioned earlier, increases in human population and disposable income in the Asia-Pacific region are driving an unprecedented rise in demand for meat, milk and eggs, a

rise which is expected to continue over the next decades. (See below projections for various types of meat in India and China to 2021.)

Consumption of meat in India and China, 2009-2011 and 2021 (1 000 tons)

Country	Product	2009-2011	2021	Diff.	% Change
India	Beef	1,859	2,498	639	34.4
	Mutton	650	887	237	36.5
	Pig	486	578	92	18.9
	Poultry	2,657	4,401	1,744	65.6
	Total	5,652	8,364	2,712	48.0
China	Beef	5,588	6,472	884	15.8
	Mutton	4,026	4,341	315	7.8
	Pig	50,428	60,140	9,712	19.3
	Poultry	16,971	24,228	7,257	42.8
	Total	77,013	95,181	18,168	23.6

Source: OECD-FAO Outlook 2012

Asian animal agriculture is adapting to this tremendous increase in demand by increasing livestock numbers, a shift towards short-cycle species (particularly chicken), acceleration of production cycles (to a large extent due to increased use of concentrate feeds), larger farming units characterized by high-throughput and their spatial concentration (close to feed sources and / or markets), stratification and vertical integration of production and regionalization of supply chains.

The rapid expansion of and structural changes in Asia's livestock sectors have ensured increased supplies of ASF for Asia's growing and more affluent populations. However, these truly remarkable developments of the livestock sector have come at the expense of:

(i) increased risks to human and animal health from pathogens harboured by animals, either wildlife or livestock themselves;
(ii) environmental degradation, pollution and acceleration of climate change through livestock associated emission of green house gasses, and
(iii) marginalization of smallholder livestock keepers and exploitation of agricultural labourers.

Health: The intensification of agriculture and livestock production is not always a human health risk amplifier and a number of zoonotic diseases decrease as livestock systems intensify and animals are moved into highly regulated environments. However, the rapid growth and intensification of livestock production within a poorly regulated environment and without the concomitant strengthening of animal and veterinary public health systems generates major health risks for livestock (e.g. hp-PRRS, HPAI, FMD, etc) through increased movement of animals, animal products and inputs to livestock production and for humans through emerging infectious diseases (e.g. SARS, Nipah, H7N9, etc) and proliferation of antimicrobial resistance linked to excessive antimicrobial use in animal production. These health risks are not confined to local

populations but, in view of expanding trade and increased mobility, affect health security on a regional and in some cases global scale.

Environment: Large proportions of the vast rangelands (app 1 billion ha, two thirds of the regions agricultural land) of the Asia-Pacific region are considered degraded due to overgrazing. In addition, in many areas animal wastes originating from intensive livestock systems have become a liability rather than a valued input for soil improvement, as is the case in traditional mixed livestock-cropping systems – solely the pig population of China is generating around 250 000 tons of solid waste per day, disposal of which has become a significant problem. Globally, animal agriculture is responsible for nearly half of the total non-CO_2 GHG emissions (methane and nitrous oxide) directly attributable to agriculture and thereby significantly contributes to climate change. In addition to the direct GHG emissions from livestock, land use changes for feed production and associated reduction in CO_2 absorption capacity of vast tracts of land further contribute to climate change**.**

Social: In the Asia-Pacific region, smallholders still constitute the vast majority of households engaged in food animal production and processing and the region is home to nearly 500 million poor (<2$/day) livestock keepers (close to 70% of the global total). Rapid expansion of corporate industrial food animal production and marketing systems carries the risk of excluding many small-scale livestock producers and processors from the high-value food markets due to their generally limited access to inputs, services and knowledge of smallholders as well as due to non-level playing fields. Excluding smallholders from these expanding and lucrative markets blocks one of the main pathways for rural poverty reduction and thereby perpetuates rural poverty and enhances urban – rural disparities. The experience with contract farming in the region is mixed with legal arrangements between large-scale corporate enterprises and private contract farmers tending to be tilted in favour of the former while hired farm labour is often subjected to exploitative employment conditions with little if any legal recourse.

The difficulties faced by public agencies in guiding livestock sector development to take a path that maximizes social benefits while keeping risks at acceptable levels cannot be overstated. Unfortunately systems to capture detailed, up-to-date and comprehensive information to support the policy making process are rare and capacity for livestock policy analysis is usually rather undeveloped. As a consequence, livestock sector policies and programmes often depend on anecdotal evidence and decisions are taken without informed assessment of the larger economic, social and environmental implications.

To address the above shortcoming, the formulation of a project proposal for the formation of a Livestock Policy Network was agreed at the 36th APHCA Session. An advanced draft of the project proposal has been elaborated and shared with a number of donors (BMGF, IFAD, FAO-TC), however with disappointing results. Notwithstanding the reluctance of donors to support the formation of a livestock Policy Network, it should be in the interest of APHCA members to strengthen national capacity of livestock sector policy formulation. It is therefore suggested that APHCA considers developing a programme for national livestock policy capacity building drawing on the trust fund.

Work Planned up to End 2013

- 25-26 September 2013; World School Milk Day Celebrations and TCP closing workshop in Myanmar [VA]
- 8-9 October 2013, Inception workshop for TCP/MDV/3402 Support for the development of a domestic egg industry in the Maldives [VA]
- 28-30 October 2013, Fiji, Nadi, One Health for SPC [CB, JO]
- 23-24 October 2013, Stakeholder workshop for poultry policy formulation in Afghanistan [VA]
- 11-14 December 2013, Thailand, Ayutthaya, 4th FAO-APHCA/OIE Regional Workshop on Brucellosis Diagnosis and Control in the Asia-Pacific Region (Proficiency Test and Ways Forward) [VS]

Decision Items and Proposed Budget for 2014 (APHCA 2012/06)

Scale of Contributions

The current scale of contributions has remained unchanged since 2003 and at the 36th Session APHCA Members requested the Secretariat to develop a proposal for a revised scale of contributions that offsets the real term decline.

The Secretariat could not find any record of the criteria used to originally establish the three levels of contributions, which are laid out in the APHCA agreement along with the countries falling in each, irrespective of APHCA membership at the time. The first APHCA Session reports (late 1970s) indicate that the original contributions were set as US$5 000; US$3 000; and US$1 000 for Group A, B, and C countries respectively. Corresponding 2012 US$ amounts would be US$17 750; US$10 650; and US$3 550; some 66% above the current scale of contributions.

Taking the 1999 scale of contributions as reference point (US$9 330; 6 020 and 1 970) and adjusting these to 2012 prices would yield a scale of contributions of US$12 969, 8 368 and 2 738 for group A, B and C countries. This scale would appear 'realistic and acceptable' (similar values would be obtained taking the 2003 scale of contributions as reference). Following India's advice to incrementally raise contributions, the Secretariat is putting forward for consideration the following:

- for 2014 the scale of contributions shall be US$12 000, 7 500 and 2 400,
- for 2015 the scale of contributions shall be US$14 000, 8 400 and 2 750,
- for subsequent years the scale of contributions shall be decided at the 2015 Session.

Historical and proposed scale of contributions

Group	Countries	Scale of Contributions			Proposed	
		1970s	1999	2003 to 2013	2014	2015
A	Australia, China, India, Japan, New Zealand	5 000	9 330	10 724	12 000	14 000
B	Afghanistan, Bangladesh, Indonesia, Iran, Rep. Korea, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam	3 000	6 020	6 502	7 500	8 400
C	[Bhutan],Cambodia, Fiji, Lao, Maldives, Mauritius, Nepal, PNG, Singapore, [DPRK], [Samoa]	1 000	1 970	2 128	2 400	2 750

Membership of Secretariat of Pacific Countries (SPC)

The below letter dated 21 June 2013 was received from the Secretariat of Pacific Countries requesting to become member of APHCA.

SPC Suva Regional Office
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SPC CPS
SECRETARIAT OF THE PACIFIC COMMUNITY
SECRÉTARIAT GÉNÉRAL DE LA COMMUNAUTÉ DU PACIFIQUE

SPC Headquarters
BP D5
98848 Noumea Cedex
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SPC file no.:

21st June, 2013

Dr. Joachim Otte
Secretary/Senior Animal Production and Health Officer
Animal Production and Health Commission for Asia and the Pacific (APHCA)
Food and Agriculture Oraganisation(FAO)
9 Phra-Atit Road, Banlampoo
Phra Nakhon
Bangkok 10200
THAILAND.

Dear Sir,

RE: SECRETARIAT OF THE PACIFIC COMMUNITY MEMBERSHIP OF APHCA

This letter is to register the Secretariat of the Pacific Community's interest in joining FAOs Animal Production and Health Commission for Asia and the Pacific (APHCA).

APHCA's Mission of enhancing the level of nutrition and standard of living of livestock keepers, especially smallholders, livestock value-chain actors, and communities at large through equitable, sustainable and safe livestock sector development, through promoting information-generation and exchange, providing normative guidance, and coordinating joint action among member countries and other stakeholders are also in line with the SPC's mission objectives.

We also believe that SPC's work programmes can benefit greatly through the sharing of expertise, experiences, especially with your Asian livestock production and health experts, and livestock sector stakeholders.

SPC is already working with FAO in our the pacific region's Agricultural and Forestry development programmes and formalizing our association with APHCA, will greatly enhance our collaborative efforts in the livestock sector of our two regions, namely, Asia and the Pacific.

We look forward to further collaboration with your commission.

Yours faithfully,

(Fekitamoeloa 'Utoikamanu)(Mrs.)
DEPUTY DIRECTOR GENERAL
Suva Regional Office

SPC Headquarters: Noumea, New Caledonia. Regional offices: Suva, Fiji Islands, and Pohnpei, Federated States of Micronesia.
Country office: Honiara, Solomon Islands.
For contact details – Website: www.spc.int Email: spc@spc.int

Proposed APHCA Trust Fund Budget for 2014

Operational Budget, APHCA TF and Estimated Contribution of FAO-RAP

Budget line	APHCA TF	FAO's Estimated Contributions	Total
5011 Salaries Prof.	0	45,000	45,000
5012 Salaries GS	25,000	25,000	50,000
5013 Consultants	26,000	30,000	56,000
5014 Contracts	30,000	25,000	55,000
5020 Locally Contracted Labour	1,000	0	1,000
5021 Travel	46,000	10,000	56,000
5023 Training	0	0	0
5024 Expendable Procurement	1,000	0	1,000
5025 Non-expendable Procurement	0	0	0
5026 Hospitality	2,000	0	2,000
5028 General Operating Expenses	4,000	0	4,000
Total	**135,000**	**135,000**	**270,000**

Functional Budget, APHCA TF

Activity / Thematic Area	Amount (US$)
Smallholder Dairy Development	25,000
Feed Resource Management	20,000
Zoonoses and Food Safety	20,000
Antimicrobial Resistance (AMR) Management	20,000
Livestock Policy Capacity Development Plan	20,000
Information Dissemination and APHCA Positioning	30,000
Total	**135,000**

List of Participants (APHCA 2013/07)

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Country Reports

Australia

Dr Peter BLACK
Director, One Health Section
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This country overview paper reports on the incidence of zoonoses, food borne diseases and antimicrobial resistance in Australia.

Zoonoses[2]

The zoonoses notifiable to the National Notifiable Disease Surveillance System (NDSS) included in this report are anthrax, Australian bat lyssavirus infection, brucellosis, leptospirosis, ornithosis and Q fever.

Anthrax

Most cases of anthrax in livestock tend to occur in a belt within two states in Australia: namely New South Wales and Victoria. Since 2010, there have been seven anthrax incidents in livestock in New South Wales and none in Victoria. In all instances, properties were subject to the recommended protocol of quarantine, disposal of carcasses, and vaccination and tracing of at-risk animals and their products.

Over the previous 10 years, only two human cases of anthrax were reported in Australia—one in 2006 and one in 2007. Both cases were cutaneous anthrax. Australia has never recorded a human case of gastrointestinal or inhalational anthrax.

Australian bat lyssavirus

Classical rabies virus does not occur in Australia, although a related virus called Australian bat lyssavirus was identified in 1996 and is present in some Australian bats and flying foxes. Only three known cases of ABL infection in humans have been reported in Australia, in 1996, 1998 and 2013. All cases are presumed to have occurred after close contact with an infected bat and all have been fatal. Surveillance indicates that ABLV may have been present in Australian bats for a considerable period of time before its first detection. Sick and injured bats and changes in bat ecology pose an increased public health risk. Public awareness message about not handling bats are an important component of the overall risk management strategy for this zoonoses in Australia. In 2013, two horses were confirmed to be infected with ABLV. This is the first detection of ABLV in a species other than bats.

[2] This section of the report is based on data and information published in recent editions of the Animal Health in Australia Reports (http://preview.tinyurl.com/k4mvspm) and on data and information in the *Communicable Diseases Intelligence* Volume 36 No 1 - March 2012 which is produced by the Australian Government Department of Health and Ageing. (http://preview.tinyurl.com/ny9vq7n)

Brucellosis

Several *Brucella* species can infect both animals and humans including *Brucella melitensis* from sheep and goats, *Brucella abortus* from cattle and *Brucella suis* from pigs. *B. abortus* was eradicated from Australian cattle herds in 1989 and *B. melitensis* has never been reported in Australian sheep or goats. All human cases of *B. abortus* or *B. melitensis* in Australia have been related to overseas travel. Evidence suggests that *B. suis* is primarily confined to some areas of Queensland, where it occurs in feral pigs.

Internationally, brucellosis is mainly an occupational disease of farm workers, abattoir workers and veterinarians, who work with infected animals or their tissues. Feral pig hunting is the most common risk factor for infection. In Australia, 83% of cases since 1991 have been reported from Queensland.

In 2010, there were 21 notified cases of brucellosis reported to the NNDSS; a 49% decline in notifications compared with the 5-year average of 41 cases. Seventy-six per cent of notifications were from Queensland (n = 16). Most cases were in males (81%, n = 17) aged between 15 and 49 years (85%, n = 18). The species of the infecting organism was available for 38% of notifications (n = 8), of which seven were *B. suis* (all from Queensland, and all in males aged between 27 and 43 years). There was one imported case of *B. melitensis,* which was acquired in Iraq.

Leptospirosis

Leptospirosis is caused by spirochaetes of the genus, *Leptospira,* which is found in the genital tract and renal tubules of domestic and wild animals. Exposure to infected urine of domestic and wild animals in affected areas is a risk factor for infection. The disease is recognized as an occupational and recreational hazard (such as certain agricultural sectors and wading or swimming in contaminated water).

In 2010, there were 131 notified cases of leptospirosis reported in Australia; giving a rate of 0.6 per 100 000 population compared with the 5-year mean of 128.0 notifications. Cases were reported in all states and territories, but Queensland accounted for most notifications. Eighty-seven per cent (n = 127) of leptospirosis cases were male and 82% (n = 120) of all cases were aged between 15 and 54 years.

The WHO/FAO/OIE Collaborating Centre for Reference and Research on Leptospirosis provides an annual surveillance report of leptospirosis cases that are sent for typing. In 2010, the reference centre typed 94 cases of leptospirosis. The most frequently identified serovars were Arborea (21% n = 20), Australis (16%, n = 15), Zanoni (15%, n = 14), and Hardjo (15%, n = 14). In 2009, Serovar Arborea was the most frequently reported serovar, accounting for 29% of all notifications. The last reported death in Australia attributed to leptospriosis was in 2002.

Ornithosis

Ornithosis (or psittacosis) is caused by infection with the bacterium *Chlamydophila psittaci* and is transmitted to humans by exposure to waterfowl, shore birds, seabirds, pigeons and doves and many species of parrot. Birds can become carriers of the disease without showing clinical signs. The mode of transmission to humans is by inhaling

bacteria, usually from contaminated dried faeces, dust from infected birds and nasal or eye secretions. Person-to-person transmission is rare.

In 2010, there were 56 notified cases of ornithosis reported; giving a rate of 0.3 per 100,000 population. The number of ornithosis notifications has declined steadily in recent years, and case numbers in 2010 were the lowest since 2001.

Notifications were from all states and territories except the Northern Territory, but the majority of notifications were from Victoria (64%, n = 36). This represents a change from the previous 5 years, where the majority of cases were from New South Wales (53%, 312/589). Sixty-six per cent of cases in 2010 were male (39 cases). All cases were aged 20 years or older and 83% were aged 40 years or older. Cases of ornithosis over the previous 5 years were mainly in adults, with a median age of 54 years.

Individuals at risk of contracting ornithosis include bird owners, veterinarians, poultry-processing workers, pet shop employees, zoo workers and taxidermists. Pregnant women and older adults may experience a more severe illness.

Q fever

Q fever is caused by infection with the bacterium, *Coxiella burnetii.* The primary reservoirs of these bacteria are sheep, goats and cattle. *C. burnetii* is resistant to environmental conditions and many common disinfectants. The organism is carried in dust contaminated with tissue, birth fluids or excreta from infected animals and Q fever is most commonly transmitted via the airborne route. The disease may also be transmitted via direct contact with infected animals and other contaminated material.. Very few organisms may be required to cause infection and human are therefore very susceptible to the disease. Person-to-person transmission is rare. Prior to vaccination programs in Australia, approximately half of all cases in New South Wales, Queensland and Victoria were amongst abattoir workers. The National Q Fever Management Program was funded by the Australian Government between 2001 and 2006 for states and territories to provide free vaccine to at risk groups (such as abattoir workers). The Australian Government has secured the supply of vaccine through to 2016.

In 2010, there were 323 notified cases of Q fever reported to the NNDSS; a rate of 1.4 per 100 000 population. Between 1991 and 2001, and prior to the introduction of the National Q Fever Management Program, Q fever notification rates ranged between 2.5 and 4.9 per 100 000 population.

In 2010, the highest notification rates were from Queensland (151; 3.3 per 100 000 population) and New South Wales (136; 1.9 per 100 000 population). Cases also occurred in Victoria (n = 16), South Australia (10 cases) and Western Australia (n = 8). There was 1 case each in the Australian Capital Territory and the Northern Territory.

Adults at risk of Q fever infection, including abattoir workers, farmers, veterinarians, stockyard workers, shearers and animal transporters should be considered for vaccination. The administration of the vaccine requires pre-vaccination screening test to exclude those recipients with a previous (unrecognized) exposure to the organism. Q fever vaccine may cause an adverse reaction in a person who has already been

exposed to the bacterium. Vaccine is not recommended for children under 15 years of age.

Food-borne Disease[3]

Campylobacter species

Campylobacter infection is notifiable in all Australian states and territories except in New South Wales. In 2012 Campylobacter was the most frequently notified foodborne infection in Australia, with a rate of 102.3 cases per 100 000 population (15 664 cases). This was a decrease from the previous 5 year mean of 112.8 cases per 100 000 population (ranging from 107.4–119.9 cases per 100 000 population per year).

The incidence of Campylobacter infections is known to be associated with seasonal changes in many countries. Campylobacter infection is most prevalent during spring in Australia. *C. jejuni* is one of the most commonly reported agents associated with foodborne illness in many developed countries, including New Zealand, the United Kingdom (UK) and the USA. Foods associated with Campylobacter spp. outbreaks include poultry meat, raw (unpasteurized) milk and milk products, beef, pork and shellfish. Outbreaks of campylobacteriosis linked to consumption of raw milk have been increasingly reported in the USA. Campylobacter infections generally occur sporadically, rather than being associated with outbreaks.

Poultry meat is generally as a primary source of Campylobacter infection in humans. The reported incidence of Campylobacter spp. on raw meat products from other food animal species tends to be lower than those reported for poultry. Chicken and cattle were the principal sources of *C. jejuni* pathogenic to humans, with wild animal and environmental sources responsible for the remaining 3% of human disease.

In an Australian baseline survey carried out during 2007–2008 on the incidence and concentration of Campylobacter and Salmonella in raw chicken, 84.3% of post-processing carcass rinse samples (n=1,104) were positive for Campylobacter spp. These results were similar to those from a retail baseline microbiological survey carried out in 2005–2006 in South Australia and New South Wales, which found that 90.0% of retail poultry samples (n=859) were contaminated with Campylobacter spp.

Hepatitis A virus

In 2010, 55.1% of Hepatitis A virus (HAV) cases reported in Australia were acquired overseas.

HAV has a worldwide distribution; however, the prevalence of infection is related to the quality of the water supply, level of sanitation and the age of the individual when infected. In most developing countries, where HAV infection is endemic, the majority of people are infected in early childhood and virtually all adults are immune. In developed countries, HAV infections are less common due to improved sanitation. As a result very few people are infected in early childhood and the majority of adults remain susceptible

[3] This section of the report draws directly on information and text from the Food Standards Australia New Zealand (FSANZ) 'Agents of Foodborne Illness'. 2nd ed, published in June 2013. (http://preview.tinyurl.com/konlvyw)

to infection. Hence in developed countries the risk of epidemics and the occurrence of severe disease may increase as the majority of people infected during an outbreak would be adults (children are often asymptomatic).

Hepatitis A is a notifiable disease in all Australian states and territories. The incidence of HAV infection notified in Australia in 2012 was 0.7 cases per 100 000 population (164 cases). This was a decrease from the previous 5 year mean of 1.3 cases per 100 000 population per year (ranging from 0.6–2.6 cases per 100 000 population per year). In north Queensland in 1996–1999 the average annual HAV notification rates in Indigenous and non-Indigenous people were 110 and 25 cases per 100 000 population, respectively. In 1999 a HAV vaccination program for Indigenous children in north Queensland was introduced. Consequently, in 2000–2003 the average annual HAV notification rates for Indigenous and non-Indigenous people were 4 and 2.5 cases per 100 000 population, respectively. HAV is now included as part of the National Immunisation Program Schedule for Aboriginal and Torres Strait Islander children younger than 5 years of age living in Queensland, the Northern Territory, Western Australia and South Australia. HAV vaccination is also recommended for travellers to endemic areas and those at increased risk because of lifestyle or occupation.

Foodborne outbreaks of HAV have been recognized for over 40 years, but are infrequently reported. This is because the 2–6 week incubation period for HAV makes it more difficult to associate the source of infection with a particular food.

Cold cuts and sandwiches, fruits and fruit juices, milk and milk products, vegetables, salads, shellfish and iced drinks have been implicated in HAV outbreaks.

Listeria monocytogenes

Listeria monocytogenes is a bacterium that causes listeriosis, a disease that can have severe consequences for particular groups of the population. It can cause miscarriages in pregnant women and be fatal in immunocompromised individuals and the elderly. In healthy people, listeriosis generally only causes a mild form of illness. *L. monocytogenes* can be found throughout the environment. It has been isolated from domestic and wild animals, birds, soil, vegetation, fodder, water and from floors, drains and wet areas of food processing factories.

Listeriosis is a notifiable disease in all Australian states and territories. The incidence of listeriosis notified in Australia in 2012 was 0.4 cases per 100 000 population (93 cases). This is a slight increase from the previous 5 year mean of 0.3 cases per 100 000 population per year (ranging from 0.2–0.4 cases per 100 000 population per year). In Australia the fatality rate in 2010 was 21%, which was an increase from the 14% fatality rate of the previous year.

Invasive *L. monocytogenes* infections can be life threatening, with average fatality rates being 20–30% among hospitalized patients. Most cases of listeriosis are sporadic. Despite this, foodborne outbreaks due to *L. monocytogenes* have been associated with cheese, raw (unpasteurized) milk, deli meats, salad, fish and smoked fish, ice cream and hotdogs.

Salmonella (non-typhoidal)

Salmonella spp. are bacteria that cause salmonellosis, a common form of foodborne illness in humans. Outcomes from exposure to Salmonella spp. can range from mild symptoms to severe disease and can be fatal. Salmonella spp. are carried by a range of domestic and wild animals and birds and have been widely isolated from the environment.

Salmonellosis is one of the most commonly reported enteric illnesses worldwide, being the second most frequently reported cause of enteric illness in Australia (behind campylobacteriosis). It is a notifiable disease in all Australian states and territories, with a notification rate in 2012 of 49.8 cases per 100 000 population (11 273 cases). This was an increase on the previous 5 year mean of 46.9 cases per 100 000 population per year (ranging from 38.6–54.2 cases per 100 000 population per year). The salmonellosis notification rate varied between jurisdictions from 40.5 cases per 100 000 population in New South Wales to 180.1 cases per 100 000 population in the Northern Territory in 2012 (NNDSS 2013). Children between 0–4 years had the highest notification rate, with 218.3 and 160.2 notifications per 100 000 population for males and females, respectively, in 2010.

The distribution of Salmonella serovars in Australia varies geographically, however *S. typhimurium* was the most commonly reported serovar in 2010, representing 44% of all notified Salmonella infections in Australia.

Internationally, *S. enteritidis* is frequently reported as causing human illness; however it is not endemic in Australia. In 2010, 93% of *S. enteritidis* cases reported in Australia were acquired overseas.

Outbreaks attributed to Salmonella spp. have predominantly been associated with animal products such as eggs, poultry, raw meat, milk and dairy products, but also include fresh produce, salad dressing, fruit juice, peanut butter and chocolate.

Shiga toxin-producing Escherichia coli (STEC)

Escherichia coli are bacteria that form part of the normal gut flora of humans and other warm-blooded animals. Although most E. coli are considered harmless, certain strains can cause severe illness in humans, particularly Shiga toxin-producing E. coli (STEC). Infection with STEC is the main cause of haemolytic uraemic syndrome, a condition which can be fatal in humans.

Infection with STEC is a notifiable disease in all Australian states and territories. The incidence of STEC infections notified in Australia in 2012 was 0.5 cases per 100 000 population (112 cases), which includes both foodborne and non-foodborne cases. This is the same as the previous 5 year mean of 0.5 cases per 100 000 population per year (ranging from 0.4–0.6 cases per 100 000 population per year. E. coli O157 was the most common STEC identified in Australia in 2010 (58.8% of cases), the next most common was E. coli O111. There was 1 case of STEC-associated HUS reported in Australia in 2010.

The incidence of STEC infections has a seasonal association, with the number of cases increasing during the warmer months. In Australia STEC is most prevalent from

November to April. Foods associated with outbreaks of STEC include undercooked ground beef, fresh produce, unpasteurized juices, salami, cheese and raw (unpasteurized) milk.

Recently, there was a large outbreak of enterohemorrhagic Shiga toxin-producing E. coli (EHEC) in Brisbane, Queensland. As of the 19 September 2013, 40 people were confirmed to have EHEC (specifically E. coli O157). Five people had been hospitalized and discharged. The outbreak was associated with visits to a large animal nursery (referred to by some as a petting zoo). The outbreak has been reported on ProMED (http://www.promedmail.org/).

Shigella species

Shigella spp. are bacteria that cause shigellosis, also known as bacillary dysentery. They are a highly infectious organism, with foodborne outbreaks often involving infected food handlers. Unlike other common foodborne pathogens, humans are the only natural hosts of Shigella spp.

Shigellosis is a notifiable disease in all Australian states and territories. The incidence of shigellosis in Australia in 2012 was 2.4 cases per 100 000 population (549 cases), which includes both foodborne and non-foodborne cases. This was a decrease from the previous 5 year mean of 2.8 cases per 100 000 population per year (ranging from 2.2–3.9 cases per 100 000 population per year). The Northern Territory had the highest notification rate in 2012 with 46.9 cases per 100 000 population. This was a significant reduction from the 2005–2009 average annual notification rate of 70.1 cases per 100 000 population. The decline in cases may be attributed to a marketing campaign to raise awareness about the importance of hand washing implemented in 2007/2008 targeting both Indigenous and non-Indigenous people, including remote communities. Children between 0–4 years had the highest notification rate in 2010, with 7.5 and 8.3 notifications per 100 000 population for males and females, respectively. The higher rate of notified cases in this age group could be due to increased susceptibility or may be the result of other factors such as reduced personal hygiene practices, an increased likelihood of exposure and increased likelihood to seek medical care.

Foods generally associated with outbreaks of *Shigella spp*. are those that are consumed raw or ready-to-eat foods that have substantial handling during production, such as salads.

Staphylococcus aureus

Staphylococcus aureus is a bacterium that causes staphylococcal food poisoning, a form of gastroenteritis with rapid onset of symptoms. *S. aureus* is commonly found in the environment (soil, water and air) and is also found in the nose and on the skin of humans.

Staphylococcal food poisoning is not a notifiable disease in Australia. There were two reported outbreaks of staphylococcal food poisoning in Australia in 2011 and two outbreaks reported in 2010. It is generally recognized that there may be significant under reporting of staphylococcal food poisoning due to the short duration of illness

and self-limiting symptoms. In Australia it is estimated that *S. aureus* accounts for 1% of foodborne illness caused by known pathogens.

The incidence of staphylococcal food poisoning is seasonal. Most cases occur in the late summer when temperatures are warm and food is stored improperly. Foods associated with outbreaks of staphylococcal food poisoning include meat and meat products, poultry and egg products, milk and dairy products, salads, cream-filled bakery products and sandwich fillings. Foods that require extensive handling during preparation and are kept above refrigeration temperature (4°C) for extended periods after preparation are often involved in staphylococcal food poisoning. Foods high in starch and protein are believed to favour staphylococcal enterotoxin production.

Bacillus cereus

B. cereus related food poisoning is not a notifiable disease in Australia and therefore incidence data is extremely limited. *B. cereus* illness is generally mild, short duration and with self-limiting symptoms, and so it is likely that there is significant underreporting of cases. In Australia there was one reported outbreak of B. cereus foodborne illness in 2011 and one outbreak reported in 2010. It has been estimated that *B. cereus* accounts for 0.5% of foodborne illness caused by known pathogens in Australia.

Toxoplasma gondii

Toxoplasma gondii is a protozoan parasite that causes the disease toxoplasmosis. It is a very common parasitic infection in humans and other warm-blooded animals, with approximately a third of the world's human population estimated to have been exposed to the parasite. Toxoplasmosis can be asymptomatic (no clinical symptoms).

Or can have more severe consequences such as congenital birth defects, eye disease, or potentially fatal toxoplasmic encephalitis in immunocompromised individuals.

Toxoplasmosis is one of the most common parasitic zoonoses worldwide. It is estimated that around a third of the world's population have the parasite, with the majority of cases being asymptomatic. Despite a large proportion of the population being seropositive for *T. gondii*, scientific literature indicates that the seroprevalence is decreasing in several countries including France, Belgium, the United Kingdom and the USA. The incidence and prevalence of toxoplasmosis in Australia is difficult to estimate since toxoplasmosis is not a notifiable disease and most *T. gondii* infections are asymptomatic. Reliable estimates of incidence tend to come from high risk groups such as newborn infants. However, not all new cases can be attributed to foodborne exposure during pregnancy since environmental, water and cat exposure also result in transmission to the mother. Similarly, incidence of toxoplasmosis during pregnancy is not necessarily representative of the wider population. In a small study from south eastern Australia, incidence of congenital toxoplasmosis from 2001–2009 was estimated at 0.17 cases per 10 000 live births. International estimates of incidence or prevalence at birth tend to be higher than Australia, but caution should be exercised in drawing conclusions since many European countries have prenatal screening programs.

A study of birth prevalence in non-immune mothers in Western Australia found 2.3 cases per 10 000 live births. It is widely accepted that outbreaks of toxoplasmosis involving more than a single family or small group are rare and infrequently reported. Globally, water and undercooked meat have been associated in *T. gondii* outbreaks.

Antimicrobial Resistance (AMR)[4]

In Australia, human AMR infection is most common among returning travellers and people who have been in hospital. However, people from community settings, including farmers, also present with AMR infections and the relative contributions of AMR acquired from community settings, food animals and companion animals is not known.

AMR is a bidirectional zoonosis. It also has multidirectional links to other environmental compartments, including aquaculture, food plants and drinking water. The ease with which AMR genetic material can be transferred between organisms means we are 'all swimming in the same gene pool' and all sources of AMR organisms need to be taken seriously.

The evidence

The science of antibiotic selection of AMR organisms, amplification, spread and transfer of genes between organisms is well understood in humans. The same principles apply for antibiotic use in animals. This is supported by case studies published overseas and reported anecdotally in Australia.

There is considerable uncertainty in Australia and elsewhere about what and where the 'hot spots' are for AMR selection, amplification and dissemination. Collection of data is critical to fill this information gap, prioritise risks, target resources, inform policy and focus communications.

The knowledge gaps and data collection requirements

To assess the risks arising from antibiotic use in animals, data is needed on:

- antibiotics — animal species treated, quantity, type (class/mechanism of action), why used and route of administration
- AMR bacteria — species, number, type, location and potential for spread
- AMR resistance genes — properties of gene construct, ability and opportunity to transfer genetic material to other organisms.

To meet these requirements Australia needs reliable baseline and ongoing data on:

- antibiotic use in animals (prescriptions, sales), and pattern of usage (what, where, why, when, how)
- where and how many AMR bacteria there are in food animal and companion animal populations, food products and farm environments.

[4] This section draws directly on text from 'A report of the Australian One Health Antimicrobial Resistance Colloquium' due for release later this year

Australia also needs information on:

- imported AMR bacteria (such as in food, returning travellers, immigrants)
- non-animal sources of AMR (plant foods, wastewater, etc).

Australia needs targeted research to further understand AMR gene transfer, including the potential for genes to be transferred to and from microorganisms of companion animal; and development of new diagnostic tools for AMR bacteria and genes in different laboratory settings and at the point of care.

The data requirements summarized above can be addressed by a broadly based, systematic surveillance program to complement the proposed improved surveillance and monitoring of human use. Ideally, such a program should cover all parts of the food chain: live animals, animal products, other agricultural and environmental products involving live animals Interpretation would be aided by development of a universal measure for antibiotic use in animals (equivalent to a defined daily dose in humans).

To succeed, surveillance and monitoring for AMR need to have:

- clear purpose agreed upon by all parties (based on the One Health program as an 'umbrella')
- clear ownership of data (including the role of regulation to allow access to data)
- meaningful data sets
- robust industry partnership and engagement
- appropriate analysis and interpretation
- timely collection and analysis of data
- cost-effective and sustainable methods
- flexible, agile programs that can adapt to emerging issues
- sustained and reliable funding.

The key priorities for action

The One Health approach to action provides an opportunity to find common ground across sectors and develop a unified management plan guided by '5Rs' (reduce use, refine use, replace antibiotics, regulate, research alternatives) and underpinned by risk assessment and outcome effectiveness measures.

It is vital to harmonise control of use regulation of veterinary medicines across Australian states and territories and develop systems to identify and react to emerging threats, including triggers for review and powers that regulators have to investigate and take corrective action. Critical points for further regulation include: registration, prescription and use of antibiotics (through regulatory agencies, professional boards and state and territory health departments); import of food and medical products such as vaccines (through review and modification of current arrangements to better meet AMR needs); and guidelines for infection control and prudent antibiotic use.

Regulation needs to be supported by targeted education programs, which can also drive action by linking professional development with specific outcomes (e.g. linking prudent-use guidelines with auditing of prescribing and accreditation). Robust, sustainable

research programs are needed across the AMR development and dissemination chain, vaccines, antibiotic alternatives and more rapid and reliable diagnostic methods.

The One Health approach to communication

AMR affects the whole community and audiences include practitioners and professionals, food producers, pharmaceutical and food industries, government, researchers and educators, media and the public. One Health provides a golden opportunity for community and interdisciplinary dialogue to create communications with a consistent approach across all sectors (doctors, vets, farmers, industry, community).

Messages need to stress judicious use of antibiotics, infection prevention, containment and control in animal and human sectors as well as emphasizing the benefits of vaccines and improved diagnostic methods.

In-country actions to address AMR

The Australian Antimicrobial Resistance Prevention and Containment (AMRPC) Steering Group was established in February 2013 to provide high-level governance and leadership on antimicrobial resistance (AMR). The steering group is jointly chaired by the Secretaries of the Department of Health and Ageing (DoHA) and the Department of Agriculture, Fisheries and Forestry (DAFF). The Australian Chief Medical Officer and Chief Veterinary Officer are also members. The group will also oversee the development of a comprehensive National AMR Prevention and Containment Strategy for Australia.

AMR extends across both animal and human health and Australia's response must take a whole-of-system perspective and be joint, coordinated and workable across governments, industries, educators, health and veterinary professionals, and the community. The Australian Government recognises that responding effectively to the challenges of AMR will involve a combination of regulation, monitoring and surveillance, targeted activity on specific organisms, research and education. To this end, the steering group recently endorsed the overarching framework for the development of the AMR prevention and containment strategy. The key elements of the framework are:

- Governance
- Surveillance
- Infection prevention and control
- Regulation
- International engagement
- Communication (which includes Education, Stakeholder engagement and Partnerships)
- Research

To develop the strategy, the steering group will consult widely with stakeholders. In July 2013, the Australian One Health AMR Colloquium was convened by the Australian Commission on Safety Quality in Health Care (ACSQHC) to start this process. The colloquium brought together food animal, animal health and human health experts to discuss key 'One Health' priorities and strategies to address AMR in Australia, with

particular reference to surveillance strategies, regulatory measures and the most significant zoonotic AMR risks. The outcomes of the colloquium are being used to assist DoHA and DAFF to identify gaps and set priorities for action, and to develop advice to the steering group on next steps.

Bangladesh

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Zoonotic Diseases in Bangladesh

Major zoonotic diseases reported in Bangladesh are:

- Anthrax
- Rabies
- HPAI
- NIPAH

Anthrax is sporadic both in animals and human, but only animal mortality is observed in the outbreaks. While human deaths are not reported, human infection always causes a great panic in public due to panic creating news.

Rabies is a silent killer of animal and human both. At least 2000 human death takes place in the country each year, and although animal death is as much as about 10 to 15 thousand.

HPAI is a great public health concern because of its zoonotic nature. The disease is epidemic since April 2007 to till date. Huge damage to poultry has had reported and poultry business was gone under most vulnerable situation, because of stamping out of huge bird to reduce virus concentration in the environment. Six human cases have been reported along with fatality.

NIPAH is a latest public health hazard in Bangladesh, in the last one decade this disease has claimed as much as 133 lives, and children are most affected by exposure.

Food-borne Diseases in Bangladesh

A wide range of food borne diseases (FBD) is reported to occur in the country. Basically those are transmitted through staples and cereal foods, fruits, vegetables, meats, milks, eggs, water and wide range of cooked and non-cooked foods are considered as the major source of food borne diseases. Recently there have been reported six human cases of avian flu in the country with one fatality, but the real cause of human infection with avian flu is not determined through specific research, it might be the contact of infected poultry or through the blood of infected birds or from eating infected eggs or meat might contribute the human flu cases with virus type H5N1. It is presumed, that poultry meat and eggs have the potential to cause human infection. Thus avian flu is considered to be a potential zoonotic disease and also identified as a food borne disease.

Anthrax has both the natures; one way it is zoonotic disease, in the another way it is a good food borne disease, When it transmits through meat, thus it comes as a good food borne disease, when it transmits through blood and air, thus it comes to say a potential

zoonotic disease. In Bangladesh anthrax is epidemic. In 2010, as many as 607 human cases were reported and in 2011, as much as 278 human cases were reported, but no human fatality of anthrax has occurred. As human infection with anthrax was not determined that, whether the cases were food borne or the cases were from contact with the organism, on these considerations anthrax might be considered as a food borne disease, and in the other hand it is also a zoonotic disease in the country.

A good number of NIPAH incidences have been reported in Bangladesh. On a gross view, NIPAH is popularly known as a zoonotic disease; on consideration of pattern of disease transmission, it is best to say a potential food borne disease. Because it is basically transmitted through bat bite fruits and bat sucking palm juice. Thus food plays potential role to transmit this disease. Since 2001 to 2012, a big number of human fatalities have occurred in the country. In this period as much as 171 human cases of NIPAH virus infection have occurred with 133 fatalities.

Diarrhea caused by contamination of water and food by a wide range of bacteria, most commonly *E. coli*, *Salmonella* and other enteric bacteria is another food borne disease. Bacterial toxins also play role in developing diarrhea. This disease is a great concern in the health service system. Govt. surveillance report depicts huge human death of diarrhea especially under five children are the worst victim of the disease. Every year at least 1.7 to 2.0 million people suffer from these major public health diseases and death toll at least 3 to 4 thousand around the year.

Bangladesh is highly epidemic with Salmonella infection in human; it is basically complex syndrome of gastro-enteritis, enteric fever, and bacteremia. Basically eggs, meat, fruits and wide range of foods can carry this infectious causal agent.

Cholera is another major food borne disease caused by *V.cholerae*. Major vector is un-boiled water for the urban areas.

A wide range of food borne diseases is reported from other nature of contamination, basically those are antimicrobial residues, residues of preservatives and highly toxic residues of pesticides.

Antimicrobial Resistance in Bangladesh

Antimicrobial Resistance (AMR) is very upcoming issue not only in Bangladesh but a global scale as well as a consequence of under dosing, frequent, unethical and inadvertent uses of antibiotics against animal and human diseases. This issue has become a growing concern as there is a good linkage between antibiotic residues in food of animal origin and the consumers. Accordingly the antimicrobial resistance problem in human health has been escalated many folds due to indiscriminate uses of antibiotics in animals. In Bangladesh, concerned people are using antibiotic in producing food of animal origin for some common reasons such as:

- animal welfare grounds
- economic grounds in sense of improving growth and productions
- farm hygiene and disease control situation (biosecuritry ground)

- public health grounds to reduce excretion of zoonotic organisms
- therapeutic grounds (in controlling some diseases – necrotic enteritis in chicken, swine dysentery etc.)

Factors contributing to antimicrobial resistance:

- unregulated dispense and manufacture of antimicrobials
- truncated antimicrobial therapy
- inadequate access to effective drugs
- drugs of questionable quality
- over use or frequent use of antibiotics as growth promoter
- lack of purchasing capacity
- overall socio-economic conditions

Antimicrobial resistance in animal isolates of bacteria

There has been little systematic study of resistance in animal isolates of bacteria, except for *Salmonella spp*. and *E. coli*. In spite of that some available information in this regard are furnished here as follows:

- *E. coli*: resistance is seen with tetracycline, aminoglycosides, sulphonamides and ampicillin.
- *Salmonella spp*.: resistant to tetracycline, sulphonamide and streptomycin.
- *Campylobacter*: erythromycin, tetracycline resistant isolates are found.
- *Enterococci*: found to be resistant against vancomycin, macrolide-lincosamide streptogramin group (tylosin)
- *Staphylococci and other non-enteric bacteria*: antibiotic resistance is quite common

Impacts

Under the socio economic perspective of Bangladesh the trio of zoonoses, FBDs and AMR are of greatest value for their negative impact on food safety, food security, animal and public health. The magnitude of loss both in animal and human health sectors, as presumed by the experts, is in alarming situation. Apart from economic loss, there has been a societal impact as well resulting from long-term silent destructive effect and dismay. Some specific consequences are categorically furnished as follows:

Zoonoses

- cause loss of life- human and animal every year.
- squeeze or wind-up of the entrepreneurship.
- diminish production or cause to face challenges.
- increase public health concerns
- ensue societal shock and lower down people's confidence.
- increase consumer hesitation and cause to decline food-intake.
- cause to decline rural health and rural economy.

- cause to dropout or wind-up of traditional small enterprises(e.g. date-sap related business threatened by NIPAH).

Food-borne diseases

- unsafe food and loss of production.
- health hazards (morbidity) and case fatality (mortality).
- infant mortality rate increases.
- nutritional status lowers down.
- food trade –export and import is confronted.
- foreign exchange earning squeezes.
- child's disability develops.
- implementation of sectoral national policy gets slow motion.

Antimicrobial resistance

- infectious diseases do not respond to antibiotics.
- public sufferings and in discrepancy in health management prevail.
- Treatment cost, morbidity and mortality increase.
- food of animal origin treated with antibiotics posing threat to human health via food chain.
- animal and human health concern is increasing alarmingly.
- production level falls and cause to incur huge loss of capital invested.

Interventions

The country is quite well established with its health and livestock services except some limitations. Thus every incidence gets a good address by the efficient hands basically in the government system. A good number of NGOs play vital role in doing applied research and field studies. Major UN bodies are providing their assistance to combat and control the situation. Although Bangladesh enhanced its intervention capacity and tools to address the aforementioned problems there are still some limitations in this context.

Important interventions made by the government so far are:

1. Establishment of an epidemiological unit in DLS.
2. Strengthening support services for disease surveillance and monitoring activities through development projects.
3. Introduction of SMS gateway system for quick reporting and following interventions to limit the disease.
4. Regular and frequent coordination meetings between animal and human health sectors.
5. Coordinated approach in surveillance and monitoring of zoonoses under One-Health concept.
6. Encouragement and support relevant research.

7. Enforcement of food safety act is imminent.
8. Strengthening biosecurity practice in farming, marketing and processing of food of animal origin.
9. Enforcement of animal disease and control act.
10. National response plan for emerging and re-emerging diseases.
11. Up-grading laboratory capacity and disease diagnostic system of CDIL, FDIL and DVH.
12. Setup of national reference laboratory at BLRI (BSL-2 enhanced aiming at BSL-3).
13. Up-gradation of LBM/WBM.
14. Establishment of poultry disease surveillance check-posts at important points of inter district link roads to limit the possible spread of disease through transport of live poultry and its products.
15. Certification system for safe food of animal origin is under way.
16. Awareness building training, workshop and campaigning program through mass media and local traditional system.

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Bhutan

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Introduction

Livestock is crucial for Bhutanese communities and more than 90% of the people practice subsistence farming. Zoonotic diseases like rabies, anthrax, taeniasis, neurocysticercosis hydatidosis, salmonellosis are of public health importance and have been reported in Bhutan. To enhance food security for the population, livestock production activities like intensive livestock farming are initiated across the country and these activites have paradoxically increased the use of antimicrobials either to control infections or as preventive measures against outbreak of diseases. With steady increase of demand for livestock products, role of livestock is getting oriented more towards food functions, thereby, driving livestock farming system from subsistence to intensified system. To enhance internal production more intensification is desired. But, one of the undesirable consequences of intensification is exposure of food animals to antimicrobials for various purposes.

Use of antimicrobials in Bhutan is largely regulated and guided, however, a huge quantity of imported meat to Bhutan comes from an unknown source. Bhutan has imported 10768 metric tons & 10386 metric tons of meat (fresh beef, pork, chicken and fish) in 2011 and 2012 respectively (BAFRA 2012). The extent of use of antimicrobials in the production process of these imported meat is largely unknown. In-house studies on antimicrobial use and its consequences in Bhutan are scant, which perhaps could be due to the lack of appropriate technologies, inadequate infrastructures, and competent human resources to strengthen the national food safety standards and usage of drugs. Study of the prevalence of *Salmonella spp*. and drug resistant in imported chicken carcasses in Bhutan by Dahal, Ellerbroek et al. (2008) shows prevalence of *Salmonella* of 13% with *Salmonella enteritidis* as the most frequently isolated serotype (84.62%) followed by *Salmonella typhimurium* (15.38%). Among the seven antimicrobials tested, resistance for nalidixic acid was highest, followed by amoxicillin and cephalexin.

There is a clear evidence of risk associated with use of antimicrobials in food animals and it is essential to have enabling legal framework and institutions in place to implement the food safety standards and monitor the use of antimicrobials in food animals.

Legal Framework and Institutional Arrangements for AMR in Bhutan

The broad legal framework on antimicrobial use and its resistance is provided by the acts and regulations related to drugs (RGOB 2003 ; RGOB 2012) and food safety (BAFRA 2005 ; BAFRA 2007). Under the framework of Bhutan Medicines Rules and Regulations, National Centre for Animal Health – the apex body for all animal health services in the

country – has developed the approved list of antimicrobials to be used in veterinary sector in the country (NCAH 2013). For each approved antimicrobial, specific guidelines is provided on its use. Regulation on drugs is effectively implemented and monitored spearheaded by Drug Regulatory Authority of Bhutan (DRA). Institutional arrangement on Drug regulation is illustrated in figure 1.

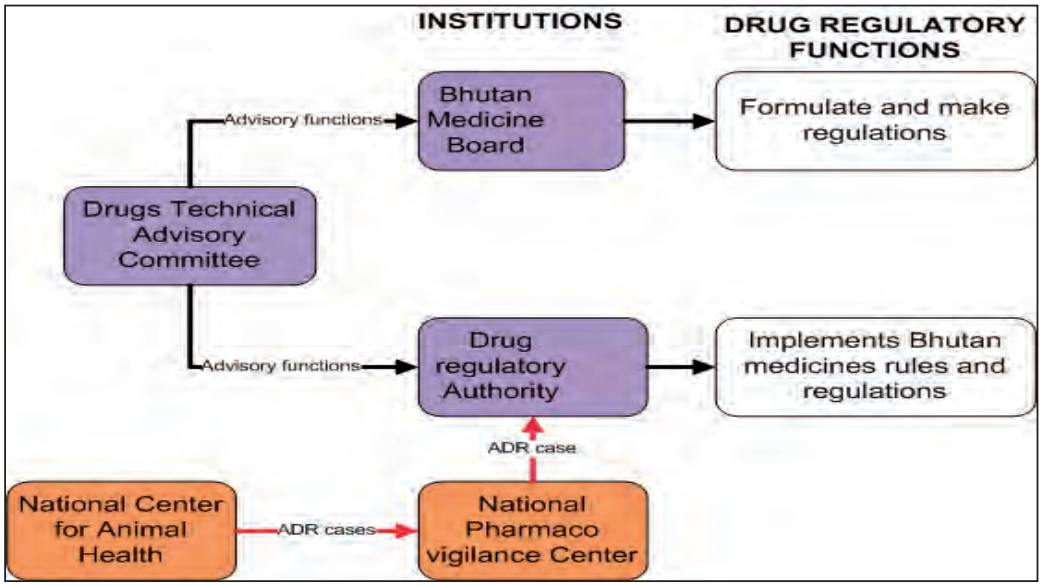

Figure 1. Arrangements for regulation of drugs
*ADR: Adverse Drug Reaction

Similar to drug regulation, there is a sound legislation and institutional arrangement to regulate food safety for the consumers. Food Act of Bhutan (2005) and Food Rules and Regulation of Bhutan (2007) provide the legal basis for implementing food safety standards.

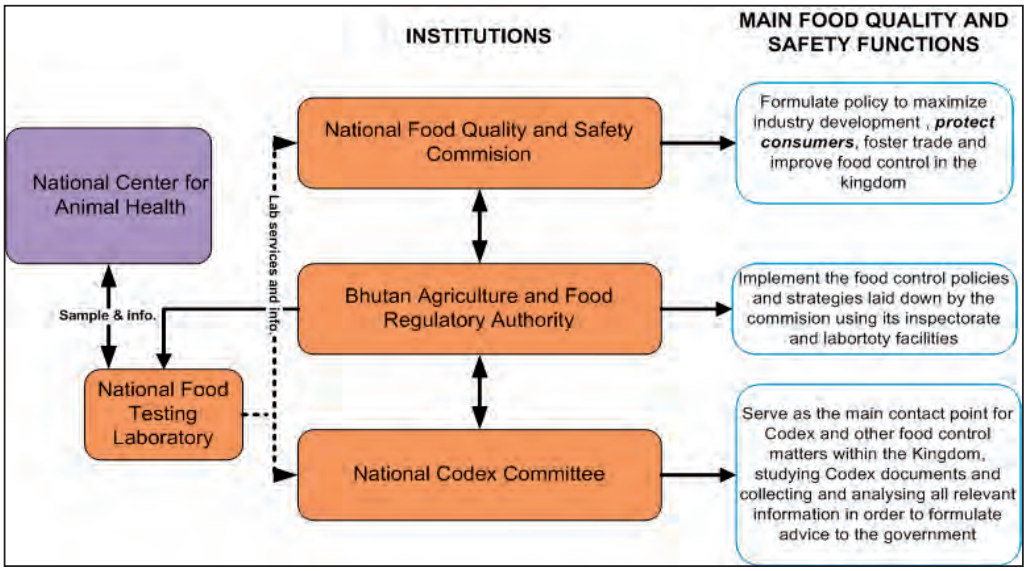

Figure 2. Institutional arrangements and food safety functions

Despite having a good institutional arrangement and strong legal instruments, it is unable to operate and deliver sophisticated and yet important services, such as analysis and monitoring of antimicrobial resistance and prevalence in food animals due to lack of technical capacity, adequate human resources and a guiding framework. National Food Testing Laboratory under BAFRA has to upgrade its capacity to deliver laboratory services to the public.

Monitoring of Antimicrobial Use and Surveillance of AMR in Bhutan

Although it may not suffice complete requirements, Bhutan has developed an interim arrangement for monitoring of antimicrobial use. Reports on drug use and its performance are collected every six months by the Essential Veterinary Drug Program under the National Centre for Animal Heath. Sensitivity tests are conducted to find out the appropriateness of antibiotic usage to pathogen. Type of antimicrobials to be used is broadly guided by Bhutan Medicines Rules and Regulations 2012 and National Veterinary Drug Formulary 2013. Antimicrobial surveillance at national level has never been carried out but there is a system to tackle any adverse drug reactions noted in the field. Adverse drug reactions are reported to National Pharmaco Vigilance Center (NPVC), which forwards the report to Drug Regulatory Authority (DRA) for further actions.

Regulations on the use of drugs are improving under the guidance of DRA, but there is limited capacity to test residues in food products at National Food Testing Laboratory (NFTL), which needs to be improved simultaneously to effectively monitor and analyze antimicrobial use and resistance in pathogens. Besides strengthening the capacity of existing laboratories, there is a need to have additional facilities at different regions in

the country with adequate and competent human resources to conduct sensitivity tests of drugs and residues in food products. In general, awareness on effects of injudicious use of antibiotics is lacking among public and even among the decision makers. Although drugs for animals are procured, distributed and dispensed by professionals, there is still a need to advocate on sensible use of drugs.

Recent Developments in the Use of Antimicrobials and AMR in Bhutan

Establishment of a National Steering Committee on AMR

A high level committee meeting on Antimicrobial Resistance and Antibiotic control in Bhutan was conducted recently. The committee, involving all the relevant stakeholders, developed a consensus that the existing Drug Technical Advisory Committee (DTAC), which acts as an advisory body to the Bhutan Medicine Board, will shoulder the additional responsibilities of National Steering Committee on Antimicrobial Resistance. The respective ministries will nominate additional members in the DTAC as required by the AMR relevancy. The DTAC will include the role of the National steering committee on AMR as one of their mandates. The National Steering Committee on AMR will then take up the responsibilities of developing a national action plan for AMR activities including public awareness and education, information material development and campaigns to improve awareness on AMR.

Review of veterinary antimicrobials and guidelines on AMU in livestock production

The Drugs, Vaccines and Equipment Unit of the National Centre for Animal Health have revised the essential veterinary drugs for use in the country and have produced a National Drug Formulary 2013. This formulary includes necessary guidelines for the users. The unit is also responsible to monitor and evaluate the usage of veterinary drugs in the country including quality control and adverse drug reactions. Further, the unit is drafting standard treatment guidelines for the users.

Improvements of livestock rules and regulations to model veterinary legislation at par with international standards

Based on the evaluation of the performance of veterinary services (PVS) through OIE missions, the Royal Government of Bhutan formed a task force to review the existing livestock legislation vis-à-vis with other closely related legislation such as the Food Act (2005) and its rules and regulations (2007) as well as the Bhutan Medicine Act of 2003. The revised livestock legislation although in draft stage at the moment will address issues such as developing guidelines and regulations to encourage responsible and prudent use of antimicrobials.

Establishment of a Veterinary Statutory Body

Currently Bhutan does not have a veterinary Statutory Body (VSB). Veterinary Council Act is in draft stage and is being pursued strongly by the Department. VSB is foreseen and will be developed using OIE as a relevant guide. The VSB will eventually require a legislative framework giving required authority over all veterinarians; the role of para-

professionals and community animal health workers who will form part of this framework. Thus the development of regulations and guidelines to promote responsible and prudent use of antimicrobials and improvement on policy is expected.

Laboratory capacity development

The National Centre for Animal Health, which is also the National Referral Laboratory currently carries out some of the functions of Antimicrobial Resistance. The unit is equipped to carry out Antimicrobial Sensitivity testing using disc diffusion method utilizing CLSI protocol. However, most of the antimicrobial sensitivity testing performed by the unit is treatment based. Very few planned surveys are carried out for antimicrobial resistance. None of the Regional Veterinary Laboratories in the country are equipped to carry out the AMR functions. Therefore, strengthening of these laboratories in terms of skilled human resources and facilities is proposed in the 11th Five Year Plan, which ends in 2018.

National Currency Fund

As per the financial obligations to Regional Animal Production and Health Commission for Asia and the Pacific, the amount due for Bhutan for the year 2013 is USD 2 128.00. Accordingly, the authorities in the ministry had been appraised and the budget is proposed in the financial year 2013-2014. The budget is under discussion in the current parliament and the payment shall be done once approved.

Bhutan kept a provision of Nu. 1.00 million for APHCA activities for the current fiscal year. An expenditure of Nu. 850 000 is foreseen in the current workshop which leaves a balance of Nu. 150 000 for the remaining APHCA country activities.

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India

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Situational Analysis

The impact of AMR on human health has been recognized by the stakeholders in India. These include Ministry of Health & Family Welfare (Directorate General of Health Services), Ministry of Agriculture (Department of Animal Husbandry, Dairying & Fisheries (DADF), Indian Council of Agricultural Research (ICAR), Council for Scientific and Industrial Research (CSIR), etc, which have initiated programmes considering the relevance of AMR and are motivated to implement projects to address AMR developing very widely amongst microbes isolated from human, livestock, poultry and fishes. Other regulatory bodies responsible for the manufacture, standards and use of antimicrobials are motivated to take up the AMR issues at their levels.

National Task Force

In the National Policy for Containment of Antimicrobial Resistance, India 2011, a multidisciplinary and cross sectoral National Task Force Committee was constituted comprising experts from the following agencies:

a. Central Council for Scientific and Industrial Research (CSIR) (Chairperson: DG, CSIR)
b. Ministry of Health and Family Welfare
c. Ministry of Agriculture
    (i) Indian Council for Agricultural Research
    (ii) Department of Animal Husbandry
d. Food Safety and Standards Authority of India (FSSAI)
e. Agricultural and Processed Food Products Export Development Authority (APEDA)
f. Marine Products Export Development Authority (MPEDA)
g. Drug Controller General of India (Member Secretary)

During the last one year this multidisciplinary committee has met several times to make guidelines on the activities such as review of available data regarding the use of antimicrobials, generation of data by undertaking studies on the use of antimicrobials as animal growth-promoters, specify the antibiotics for use in livestock, review of current laws on use of AGPs in other countries and feasibility of their implementation in India, development of regulations on usage of antimicrobials in poultry and other animals as well as the requisite labeling requirements in food, review of Prevention of Food Adulteration Rules, 1995-part XVIII: Antibiotic and other pharmacologically active substances, if required, to enhance the scope of inclusion of other food products and antimicrobials), etc, which will be finalized very soon.

Raising Awareness

India has a huge network of veterinary institutions, research institutions under Indian Council of Agricultural Research Institute (ICAR, under Ministry of Agriculture), State Veterinary and Agricultural Universities, which would be directed to initiate awareness about threats of misuse and over use of antimicrobials leading to AMR and the impact human health among farmers and farmer organizations; veterinarians, para-veterinarians, veterinary faculty staff members; policy-makers; consumers and civil society. ICAR has a total of 633 Krishi Vigyan Kendras in all districts of the country, which contain multidisciplinary teams that also include animal science, veterinary and fisheries science subject matter specialists, who may initiate awareness programme amongst farmers once the guidelines are finalised.

Practical Regulation and Regulatory Framework including National Policy and Guidelines

In India, Legislation and regulatory frameworks exist in the forms of Central Drug Standards Control Organization (CDSCO) under Drugs and Cosmetics Act of 1940, Food Safety and Standards Authority of India (FSSAI) under the Ministry of Health and Family Welfare wherein Food Safety and Standard Act, 2006 (FSSA, 2006) and its sections (16 (2b), 16 (3b), 21(1), 2.3.2), Export Inspection Council (EIC), and other amendments from time to time for manufacture, standards, use, permissible limits, etc, with respect to antimicrobials.

The Directorate General of Health Services, Ministry of Health & Family Welfare, Govt. of India, New Delhi has already made a National Policy for Containment of Antimicrobial Resistance, India 2011 by constituting a National Task Force Committee. The task force has recommended inter-sectoral coordination committee comprising experts from the several stakeholder agencies as stated at point no. 2. This committee is in the process of finalization of guidelines.

Capacity Building (Human Resources and Infrastructure)

There are 250 state laboratories at district and state levels to look after disease diagnosis and surveillance. In addition the ministry has one Central Disease Diagnosis Referral Laboratory and five Regional Disease Diagnosis Referral Laboratories for Eastern, Western, Northern, Southern and North-eastern regions. All are equipped with BSL 3 level facilities. These facilities are being regularly strengthened by the ministry. The ministry is also establishing and strengthening the existing veterinary hospitals/dispensaries by providing 75% of the total budget. In addition, the Indian Council of Agricultural Research (ICAR), State Veterinary and Agricultural Universities, Research Institutions and National Centers have adequate infrastructure and large numbers of competent human resources to take up various issues relating to AMR.

Monitoring and Surveillance

Studies with regard to data on the use of antimicrobials as well as antibiogram / anti microbial resistance have been undertaken in different institutions throughout the country. The Ministry of Health & Family Welfare is in the process of developing a national programme. There are also mechanisms to send the primary isolates to specialized laboratories for advanced microbiological and molecular work. There is also a mechanism to deposit important characterized cultures at Veterinary Type Culture Collection Centre (VTCC) at Hisar recently established by ICAR.

Studies have been regularly conducted in India that revealed the pattern of antimicrobial use (AMU) for treatment of livestock diseases and antibiogram and antimicrobial resistance (AMR) on the isolates of livestock origins. A few examples are mentioned here for reference. In a study, more than 80% strains of enterococci of equine origin were found resistant to Vancomycin and 99.6% were multiple-drug resistant in Northern India (Singh et al., *J Infect Developing Countries* 2009; 3(7):498-503). In a most recent study, it was observed that a large portion of *Staphylococcus* spp. isolates of pigs, pig handlers and sheep origins were found to be resistant (44-83%) to penicillin in addition to showing variable resistance to other antibiotics (Shome and Shome, 2013, PD-ADMAS Annual report-2012-13, pp31-34).

Alternatives to AMU

India is rich in ethno-veterinary medicine and indigenous traditional knowledge (ITKs) with regard to prevention and cure of human and animal diseases. This knowledge has been documented by ICAR institutions and some of them were also scientifically rationalized. This documentation also contains some antimicrobial preparations that have potential to be used as antimicrobials in animals.

Several herbal preparations are also available. For example a few formulations for the treatment of diarrhea in calves and subclinical mastitis developed by IVRI have shown encouraging results in animals. Such work can be further taken up to develop alternatives to antimicrobials. ICAR has a network project on Ethno-veterinary medicine with several centers in the country. They have reported certain herbs showing strong antimicrobial activities against a few reference bacterial cultures.

In addition, various stakeholders in the country are vigorously taking up improved animal husbandry practices, control programmes and bio-security measures to reduce use of antimicrobials.

Public Awareness

India has a huge network of human resources in the form of extension functionaries to take up the cause of public awareness. Programmes are being arranged to create public awareness as well as awareness amongst physicians, veterinarians, etc. for judicial use of antimicrobials.

Indonesia

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Initiation of AMR Monitoring in Indonesia

An initial pilot AMR monitoring programme was continued in 2012 and 2013, but is still not recognized as programme to monitor antimicrobial resistance in indicator bacteria (*E. coli* & *Salmonella* spp). Bacterial isolates were collected from samples of the National Monitoring Programme for Microbial Contamination of Food of Animal Origin (particularly chicken meats) limited to Java Island area. Isolates identified as *E. coli* and *Salmonella* spp were tested for susceptibility to selected antimicrobial drugs (as recommended by OIE). Laboratory testing was done in the National Quality Control Laboratory for Livestock Products. The results are shown in figures below.

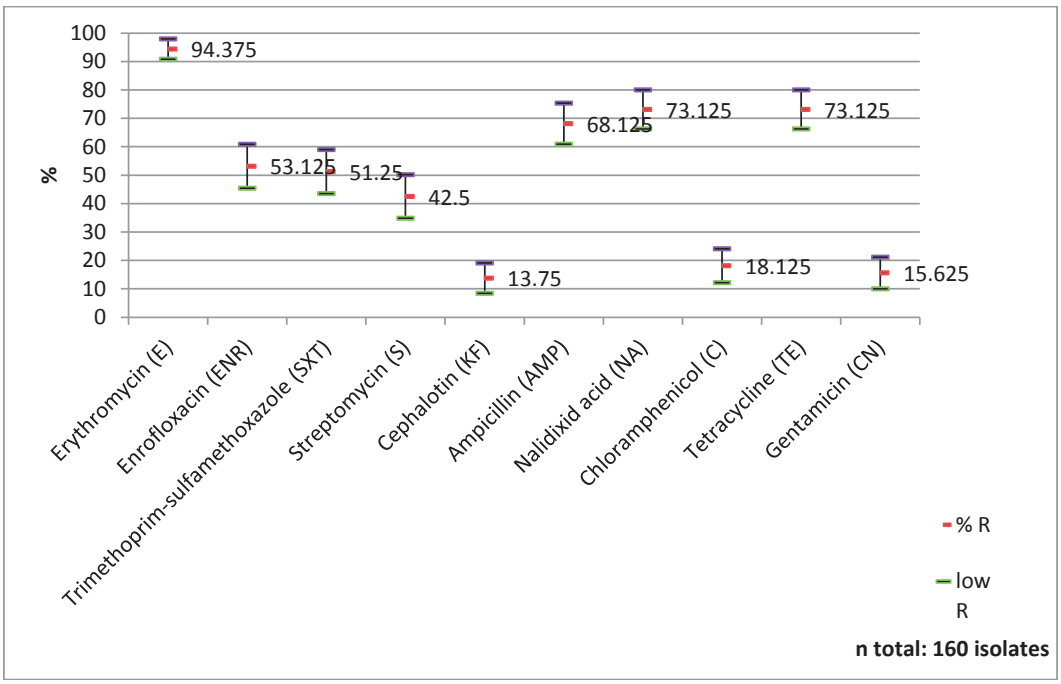

Figure 1. Monitoring of AMR in *E. coli* isolated from chicken meats in Java Island, year 2012.

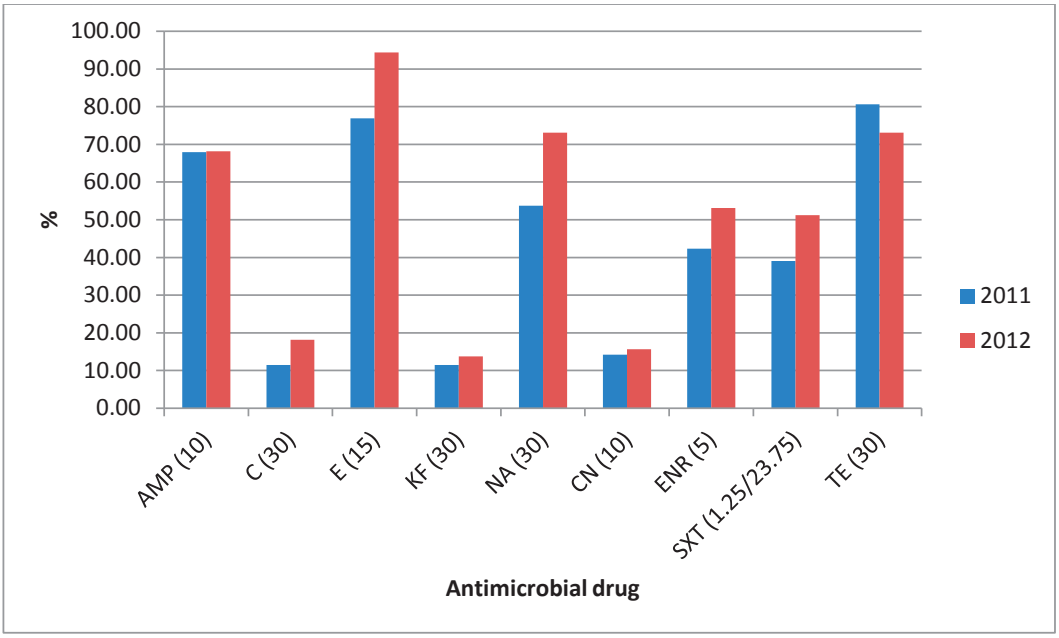

Figure 2. Trend of AMR in *E. coli* isolated in 2011 and 2012.

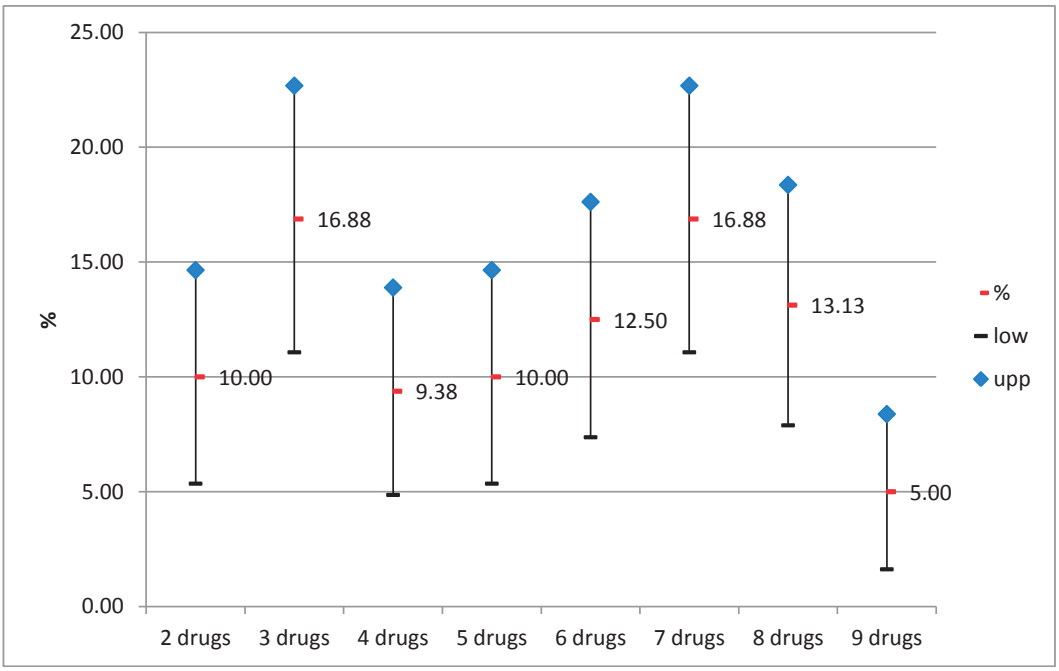

Figure 3. Prevalence of multi drug resistance of in *E. coli* isolated in 2012.

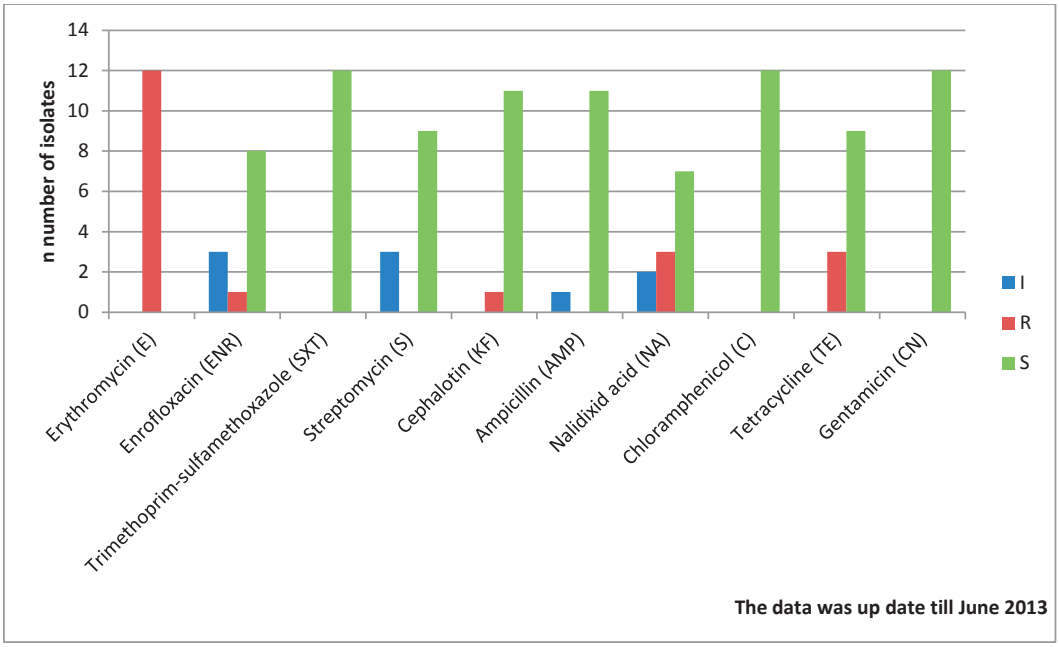

Figure 4. AMR in *Salmonella spp* isolated in 2013 (update to June 2013).

Collaborative Research

A research proposal in eco-health approach to develop a strategy for prudent use of antimicrobials to control antimicrobial resistance in human, animal, and environmental health was developed by a collaborative, multi-disciplinary group of researchers in the Asia region during 2011 to 2012. In 2013, the proposal was approved and funded by IDRC for a three-year research program. The program will start at the end of this year. The collaborative research team, which will be involved in this project consists of veterinarians, medical doctors and socio-economic experts.

This project arose from our understanding that AMR is a complex, multi-dimensional and multi-factorial problem which involves various socio-economical levels of the community from farmers, public and private industries, consumers to decision makers at local, regional, and national levels. Therefore, a trans-disciplinary approach and a wide range of stakeholders must be involved to solve this problem. The integration of veterinary science and human public health, epidemiology and socioeconomics are important elements to develop and recommend solutions and strategies.

The objectives want to achieve through the project are:

a. To describe and assess the current AMR situation and antibiotic usage in veterinary and human medicine;
b. To gather/assess evidence on antimicrobial resistance at study sites (animal, human, and environment);

c. To compare the costs of livestock raising by traditional methods using antimicrobials and by prudent use of antimicrobials (as a baseline economic assessment of the costs and benefits of the use of antimicrobials) in layer farms and pig farms;
d. To identify the factors that influence decision making on using or not using antimicrobial agents on farms and the general public;
e. To identify and develop a potential intervention strategy; and
f. To demonstrate to policy makers the results of reduction in use of antimicrobials (total and individual agents) over time in the selected communities in both humans and animals.

From our perspective, this project could be a recommendation to encourage the decision makers to set up necessary action to control the development of AMR in Indonesia.

Coordination between Veterinarians and Medical Doctors

Communication with regard to AMR between veterinarians in the Ministry of Agriculture and medical doctors from Ministry of Health is being initiated under the Indonesia Antimicrobial Watch program.

National Currency Fund

Indonesia has not established a specific National Currency Fund in support of APHCA activities. However, in 2014 we have Rp. 65.000.000 for the establishment of the sampling plan for the Monitoring Program of Microbiological Contamination and Antibiotic Residues in Food of Animal Origin.

Lao PDR

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General Information

Lao People's Democratic Republic (Lao PDR) is a land-locked Least Developed Country (LDC) in the center of Indochina, with a human population of about 6 million. Lao PDR shares borders with China to the North, Myanmar to the North-West, Thailand to the West, Cambodia to the south and Vietnam to the east with 5 083 km land boundaries (Myanmar 235 km, Cambodia 541 km, China 423 km, Thailand 1,754 km, and Vietnam 2 130 km. With a total land area of 236 800 km^2, Lao PDR is one of the least densely populated Asian countries (23.3 people km^2). Climate: tropical monsoon; rainy season (May to November); dry season (December to April).

The country is administratively subdivided into 16 provinces, the Capital City and one Special Zone. It counts 142 districts and 12 466 villages. Geographically, the country is divided into three zones namely lowland, highland and plateau. 70% of the terrain is mountainous and water (the Mekong Rivers, dams) covers about 6 000 $km^{2.}$

Lao PDR is a multi-ethnic country. The diversity of people is represented by 68 ethnic groups, which can be divided into four major categories (linguistic groups):

- Lao Loum (Tai Kadai), occupying the lowland plains and the Mekong river valley, comprise 68% of the population
- Lao Theung (Mon Khmer), occupying the mountain slopes, comprise 22%
- Lao Soung including Hmong (Meo), Yao (Mien), Black Thai, Dao, Shan and Tibeto-Burman (Akha), settling on the mountain tops over 1 000 m, claim about 9% of the population
- Vietnamese/Chinese (1%)

It is a predominantly rural society with over 70 % of the population living in rural areas and 76.5% of the population depending on agriculture for their livelihood. Subsistence farming is common and 94 % of households produce food mainly for their own consumption. 51% of the population is female, 49% male; in particular in rural areas women outnumber men.

With a GDP per capita of 455 US dollar Lao PDR is among the poorest countries in Asia (40% of the population live below the poverty line). According to the United Nations, in 2003, Lao PDR ranked 135th out of 175 LDCs in the UNDP Human Development Index (HDI), making it one of the poorest countries in Asia.

Though less than 10% of the land is suitable for agriculture, agriculture contributes for about 47% of GDP. Livestock and fisheries contribute 16% of the agricultural GDP.

The Role of Livestock Production

Livestock are an important component of smallholder farms in the Lao PDR with sales of livestock accounting for more than 50% of cash income in many upland areas. Over 95% of all livestock is produced by smallholders. Commercial pig and poultry operations are found near population centres such as Vientiane, and are mostly small cottage industries with few employees. Livestock provide direct benefits on farms such as draft power for land cultivation and transport, manure for agriculture crop production and constitute an important source of food. Livestock are also an important means of accumulating wealth and are regarded as a safety net for the family, which can be liquidated when cash is needed. Livestock are considered a crucial steppingstone for sustainable development, particularly in the uplands. Livestock are found on most farms in Lao PDR with 89% of all farm households raising one or more livestock types. The Livestock population in 2012 was 1.18 million buffaloes, 1,6 million cattle, 2.8 million pigs and 26 millions of poultry. Estimated average meat and fish consumption is 50.4 kg per person per year.

Livestock production systems are mostly smallholder farms, accounting for over 95 % of all animals raised, mainly operate mixed farming systems, growing crops and at the same time rearing animals. The 'typical' Lao smallholder farmer has 0-4 large ruminants, 2-4 pigs and 20-30 chickens. Large ruminants are grazed and crop by-products are only rarely used as animal feed. In rice growing areas animals are grazed on the vacant cropping area, utilizing rice stubble, re-growth of rice after harvest and grasses and weeds. The management system is extensive with animals grazing in large herds. During the rice growing season animals are grazed in smaller groups in upland and forest areas with minimal management inputs.

Animal Health Issues

The main constraint to livestock production is animal disease. Annually, a large proportion of all poultry die in disease epidemics. In upland villages, farmers reported that more than 80% of all chicken die every year. Similarly, pig diseases often occur as epidemics, killing many / most pigs in a village in a single outbreak. The incidence of mortality caused by diseases is lower in cattle and buffalo, except for a high mortality of buffalo calves (30-40%) due to internal parasites.

- Lao PDR has limited qualified staff; most specialized in animal husbandry either livestock husbandry or veterinarians.
- 881 people from government staff are involved in animal production and disease control services at central, provincial and district level.
- 8 468 village veterinary workers (VVWs) distributed in over than 2 000 villages throughout the country.
- VVWs work as the coordinators for the district staff.
- The main duty of the VVWs is field vaccination and surveillance as well as working closely with the head of the village to look after animal health status at grass roots level

Table 1. Importance of livestock diseases in Lao PDR

Disease	Rank in Southeast Asia	Importance in Lao PDR	Impact		
			Lost Production	Mortality	Trade barrier
Ectoparasites	High	Medium	✶	-	-
Foot and Mouth Disease	High	Medium	✶	-	✶
Gastrointestinal helminthes	High	Medium	✶	✶	-
Newcastle Disease	High	High	✶	✶✶✶	-
Toxacariasis	High	High	✶	✶✶✶	-
Haemorrhagic Septicaemia	High	High	✶✶	✶✶	-
Duck Virus Enteritis	High	Medium	✶✶	✶✶	-
Fowl Cholera	High	Medium	✶	✶✶✶	-
Fowl Pox	High	Medium	✶✶	✶✶	-
Classical Swine Fever	High	High	✶	✶✶✶	✶

Zoonoses

In Lao PDR, human disease and livestock disease are linked in three ways: a) transmission of infection between humans and livestock; b) poor human health caused indirectly by poor livestock performance and c) better control of both human disease and livestock disease by increased understanding by communities of how infectious diseases are caused and transmitted. There are many zoonoses in Lao PDR. An example, which may be of significance in the uplands, is cysticercosis. Consumption of undercooked beef and pork allows the cysts of tapeworms to establish in the human intestine. These tapeworms rarely cause serious illness. However, the eggs of the tapeworm (*Taenia solium*), acquired from pigs by eating undercooked pork, when ingested, can form cysts, especially in the brain, causing a range of serious disorders. One abattoir survey in the Lao PDR detected this parasite in 1.5% of pig carcasses. The prevalence of this parasite in humans and pigs has not been studied but the free-range management of pigs and poor sanitation seem to provide ideal conditions for transmission.

Zoonoses have also been considered and ranked for their impact on poor livestock keepers in Southeast Asia (Perry et al., 2002). The status of several of these diseases is unknown in Lao PDR but it is likely that diseases more closely associated with dairy production are of low importance. The top 10 zoonotic diseases, ranked by their impact in Southeast Asia with their status in the Lao PDR are shown in the below table.

Zoonotic Disease	Rank in Southeast Asia	Status in the Lao PDR
Anthrax	High	Frequent small outbreaks
Bovine tuberculosis	High	Unknown but usually associated with dairy production
Brucella abortus	High	Unknown but usually associated with dairy production
Brucella melitensis	High	Unknown
Buffalo Pox	High	Unknown
Cysticercosis	High	Present but importance unknown
Leptospirosis	High	Associated with rat populations, more likely in lowlands
Brucella suis	High	Unknown
Japanese B encephalitis	High	Unknown
Trichinellosis	High	Unknown

Antimicrobial Resistance

Livestock producers in Lao PDR use antibiotics in their practice and antimicrobial agents are essential tools for protecting animal health. However it is recognized that antimicrobial resistance is a global human and animal health concern that it is influenced by both human and non-human usages of antimicrobial agents. Lao PDR considers this new issue as important and sees the need to revise the implemented measures to improve good governance practices including national legislation and regulatory frameworks for import, marketing, production, distribution (including transport and storage) and use of quality veterinary medicinal products.

Currently, Lao PDR has the laws and regulations that relate to the pharmaceutical drug and veterinary drug control such as:

1. Drug and Medical Products Law (effective as of 21 Dec. 2011)
2. Livestock and Veterinary Law (effective as of 18 Aug. 2008)
3. National Medicine Policy (effective as of 13 Aug. 2003)
4. Manual of Drug Therapeutic Indicator (effective as of 1 Oct. 2008)
5. Ministerial Decision on Management Animal Clinics and Veterinary Products Shops.

These five legal documents contain comprehensive provisions that focus on control in production, importation, exportation, distribution and use but lack a statement for implementing AMR monitoring and control as recommended by international organizations. Lao PDR has also established a food and drug committee, which consists of multi-sectoral agencies including representatives from human and animal health sector since 2003. However this committee was not well functioning and this year its role is under revision.

Lao PDR understands the recommendation of OIE, WHO and FAO that AMR is a global issue and that there is a need to increase the capacity to conduct surveillance of antimicrobial resistance and monitoring of quantities of antimicrobial agents used in food producing animals. Moreover, we need to harmonise standards and guidelines in

accordance with international regulations (e.g. Codex Alimentarius). Therefore we would like request to international agencies to help us to develop a good model for the implementation of measures for responsible and prudent use of antimicrobial agents in animals in Lao PDR.

With OIE, Lao PDR has assigned National Focal Points for Veterinary Products. However to enhance cooperation with OIE we are still facing many constraints, such as: lack of capacity and facilities as well as the internal translation of OIE guidelines to the local level. The coordination and networking on this at ministerial level are also weak.

In practical every day circumstances we still use both narrow and broad spectrum antibiotics namely: Penicillin, Ampicillin, Streptomycin, Oxytetracyclin, Gentamycin, Kanamycin, Neomycin, Lincomycin, Erythromycin, Terramycin, Trimethoprim, Niacin, Tylosin, Colistin, Enrofoxacin, Thiamphenicol, Sulphonamide, Dexamethasone, etc. Most of these products are imported form Thailand and Vietnam at an estimated cost of about US$500 000 per year.

For combating AMR Lao PDR still lacks:

- Microbiology laboratory facilities
- Competency of human resources (lab technician, clinical microbiologist)
- Sufficient budget for AMR monitoring/surveillance
- Coordination between parties (government, hospitals, research institutions and clinicians) to develop an integrated system of AMR management

Our overall expectation is to develop our system that can survey and collect the data on antimicrobial resistance in relevant animal pathogens and quantities of antimicrobial agents used in food producing animals at the national level according to the OIE standards. We also need to provide data to the global database hosted by the OIE.

Livestock projects related to AMR in Lao PDR

Lao PDR has several projects, which are active in the livestock sector. However specific projects dealing with AMR study or control are very limited. Currently we have two projects:

- Improved Sanitary and Phytosanitary (SPS) Handling in the Greater Mekong Subregion (GMS) Trade (2012 to 2016).
- Study on prudent use of antimicrobials to control AMR in human, animal and environment in the region (6 countries: Thailand, Indonesia, Vietnam, China, Lao PDR and Cambodia**.**

This first project aims to:

- Improve the control of veterinary drugs,
- Conduct a baseline survey on the quality and use of veterinary drugs,
- Support the implementation of regulations,
- Provide test kits,
- Upgrade animal feed laboratory facilities,
- Improve food safety by testing of animal products.

National Currency Fund

Lao PDR recognises that a NCF is very important source of funding for technical cooperation in combating disease or any risk nationally. However, to date Lao PDR has not established this specific fund. In order to set up this fund, the department of livestock and fisheries or ministry of agriculture and forestry would need to convince the government as every establishment of a national fund in Lao PDR requires endorsement from the national parliament. The conclusion is, we need more time to convince higher agencies to set up this fund.

Conclusion

- Livestock is very important for the livelihood of Lao people.
- Infectious diseases are the main problem in livestock production in Lao PDR.
- Antimicrobial agents are essential tools for protecting animal health, welfare and increasing food in the country.
- Antimicrobial resistance has become a global human and animal health concern that is influenced by both human and non-human usage of antimicrobial agents.
- Lao PDR needs to develop systematic monitoring and surveillance on AMR and effectiveness of antibiotics.

Lao PDR is highly committed to AMR risk management and requests FAO, APHCA, OIE, WHO to search for opportunities to assist Lao PDR to develop AMR monitoring system meeting international requirements.

Malaysia

Dr Maswati Binti Mat Amin
Director, Regional Veterinary Laboratory

NATIONAL ACTION PLAN FOR AMR IN MALAYSIA

Thimphu, Bhutan
22-26 September 2013

IMPLEMENTATION OF ACTION PLAN

Action Plan	Target	Achievement
1. Establishment of awareness campaigns on AMR	3-4 campaigns / year	Two awareness campaigns conducted: 1. Current veterinary public health issue 2013 – 19 Mar 2013 (public and the people in the industry) 2. Preparation of biologic control and veterinary drugs (DVS personnel)- 14-16 May 2013. 3. Awareness campaign in Oct -AMU and AMR -Target groups: farmers / public / DVS personnel

IMPLEMENTATION OF ACTION PLAN

Action Plan	Target	Achievement
2. Establishment of AMR test method	December 2013	To establish MIC method at laboratory level- Oct 2013- a workshop on Minimal Inhibitory Concentration (MIC) for all the lab personnel from respective laboratories
3. Establishment of info-sharing on AMR (published through website)	2013/2014	To be initiated

IMPLEMENTATION OF ACTION PLAN

Action Plan	Target	Achievement
4. Research collaboration on AMR ▪ To establish steering committee between DVS, MOH and University.	2013 to 2014	To be initiated
5. Capacity building – ▪ Lab method harmonization ▪ AMR risk analysis ▪ AMR risk assessment	2013 to 2014	Harmonization of lab testing (Disk Diffusion Agar method) To establish Minimal Inhibitory Concentration method (MIC)

IMPLEMENTATION OF ACTION PLAN

Action Plan	Target	Achievement
6. Develop National AMR monitoring/surveillance plans poultry- a. Farms b. Processing plant /abattoirs	Year 2013	a. (Preparation stage) incorporate in the current National Disease Monitoring and Surveillance Program) b. Established in National Food Safety Program.
7. Establishment of TWG between DVS and MOH	1-2 meeting/year	Until Jun 2013- One meeting was held between DVS and MOH on AMR- Outcome: to start collaboration on AMR between the antimicrobial used in both animals and humans.

LEGAL BASIS FOR AMR ACTIVITIES

- Poison Act 1952 (revision 2006)
- Animal Feed Act 2009
- Animal Act 1953 (revision 2006)
- Standard Operating Procedure (SOP)
  - Veterinary Drug Prescription (APTVM 15(b):1/2011)
  - Monitoring of Veterinary Drug & Biologic Products (APTVM 23(d):1/2011
  - Veterinary Medicine (APTVM 22(c):1/2010
- Veterinary Surgeon Act (1954)
- Food Act 1985

TARGETED SAMPLES & PATHOGENS

Sample	Species	Pathogen
1. Food Animals	Poultry	*Salmonella spp*, *E. coli*
2. Foods	Chicken/Duck	*Salmonella spp*, *E. coli*, *Campylobacter*
	Cattle/Buffalo	*Salmonella spp*, *E. coli* *E. coli O157*
	Sheep/Goat	*Salmonella spp*, *E. coli* *E. coli O157*
	Pig	*Salmonella spp*, *E. coli*

SOURCE OF SAMPLES

Sample	Source/Programme
Food Animals	National Monitoring and Surveillance Disease Programme
Foods / end products	National Food Safety Programme Manual*

*already established

FOOD ANIMALS

- **National AMR monitoring/surveillance plan**
- Currently, source of samples are based on National Disease Monitoring and Surveillance programme - HPAI/ ND/Salmonella (chicken)
- Improving the monitoring/surveillance plan by revising the list of commercial poultry farms from the State Veterinary Department

FOOD PRODUCTS

Type of meat	Source
Chicken/duck	Processing Plant (22)
Cattle/buffalo	Slaughterhouse (30)
Sheep/goat	Slaughterhouse (30)
Pig	Slaughterhouse (6)

( ) no. of processing plants/slaughterhouses

LIST OF ANTIBIOTIC DISK & METHOD

ANTIBIOTIC DISK

- 47 different types of disk
- Both gram negative & positive bacteria

METHOD

- Disk Diffusion Agar / Minimal Inhibitory Concentration (MIC)

NATIONAL CURRENCY FUND

- Not implemented in Malaysia
- Expenses of AMR and Zoonoses based on Management Budget
- (RM- Malaysian Ringgit) (Budget of Disease Control Division, DVS Malaysia)

Activities	Year 2011	Year 2012	Year 2013
Compensation	470,000.00	400,000.00	500,000.00
Rabies vaccines	50,000.00	50,000.00	50,000.00
Dog licensing	50,000.00	50,000.00	50,000.00
World Rabies Day	10,000.00	15,000.00	15,000.00
Training	-	-	130,000.00
Awareness campaign		80,000.00	60,000.00

Myanmar

Dr Maung MAUNG
Regional Veterinary Officer
Livestock Breeding and Veterinary Department

Introduction

Upgrading livestock production in Myanmar is a major concern of the new government and it is a basic step to develop the country. Estimation of cattle, pig and poultry population was 14.02, 10.30 and 172.61 million, respectively, in the year 2011-2012 (LBVD Reports 2012). The use of antimicrobials in livestock production is still an important issue for appropriate care of food animals in Myanmar. In food-producing animals, the main reasons of antimicrobial use include treatment of diseases, prevention of infections and promotion of growth. While most antimicrobial agents are generally mixed into feed or water, some are also administered to individual animals. It has been well known that imprudent and overuse of antimicrobial substances is responsible for widespread of multiple drug resistance among bacteria of animal origins.

Legal Framework

Although Food and Drug Authority (FDA) has been founded in Myanmar, a legal framework and institutional arrangements for regulating antimicrobial use in livestock production and instruments for enforcement still need to be established. Up to date, therefore, antimicrobials have been broadly used in livestock production by consulting veterinarians and according to the experience of livestock farmers.

Antimicrobial Use in Livestock Production

Most of antimicrobials used in livestock production are imported from Asian and European countries. The major classes of antimicrobials used in livestock production in Myanmar are Beta-Lactams, Tetracycline, Fluoroquinolone, Aminoglycoside, Macrolides and Sulphonamides. Major sources of the antimicrobials are China, Thailand (Neo, Otta), Korea (Choong Ang Biotech, Samyang Anipharm), India (Cipla, Agio Pharmaceuticals), Bangladesh, Spain (Invesa, Dex Iberica), Belgium (VMD), and Germany (Bremer Pharma, Bayer).

The major antibiotics used in poultry production are oxytetracycline, doxycycline, chlortetracycline, enrofloxacin, amoxacillin, colistin, erythromycin, sulphadiazine, trimethoprim and neomycin. While enrofloxacin is particularly used for prevention and treatment of bacterial diseases of the respiratory tract, amoxicillin and colistin are mainly used for prevention and treatment of bacterial diseases of gastro-intestinal tract. Most antimicrobials are given in drinking water.

Anybody can buy antimicrobials freely in Myanmar. Therefore, the major existing problem, leading to inappropriate use of antimicrobials, is that most poultry farmers use

antimicrobials without any consultation from veterinarians. Most poultry producers use antimicrobials as preventive measures for bacterial diseases. Nobody considers withdrawal periods of antibiotics, which they use in their food animals. Therefore, antibiotic residues are frequently encountered in poultry meat and eggs. Chlortetracycline is still used as feed additive for growth promotion by some poultry feed producers.

The pattern of antimicrobials used in cattle and pig production are quite similar. In cattle and pig production, penicillin, streptomycin, lincomycin, enrofloxacin, gentamycin and kanamycin are the major antibiotics used for parenteral administration. Some in feed antibiotics are still used as growth promoter in fattening pig production.

Studies of AMR, Drug Residues and Microbial Contamination

Since there is only one University of Veterinary Science in Myanmar, most of the research such as monitoring of antimicrobial use in livestock, antimicrobial residues in livestock products and surveillance for antimicrobial resistance (AMR) in animal pathogens was conducted by the University of Veterinary Science, Yezin, Myanmar. Since poultry meat is consumed by the majority of people, irrespective of race and religion in Myanmar, most of the studies were conducted with poultry and poultry products.

Different species of Salmonella were isolated from poultry meat from retail poultry meat market. Among 36 *Salmonella* suspected isolates from different specimens of poultry, six isolates were identified as *Salmonella* by biochemical tests and serotype was confirmed by agglutination test with the specific antisera. The isolated *Salmonella* serovars were *Salmonella pullorum* (1), *Salmonella enteritidis* (2), *Salmonella senftenberg* (1), *Salmonella newport* (1) and one unknown serotype. The isolated *Salmonella* serovars were tested for susceptibility to five antimicrobial agents; Chloramphenicol (30 mcg), Neomycin (30 mcg), Norfloxacin (10 mcg), Tetracycline (30 mcg) and Streptomycin (10 mcg). All of the tested *Salmonella* serovars were most susceptible to Chloramphenicol (100%) and resistant to Tetracycline (100%). The degree of resistance to antibiotics varied with the tested *Salmonella* serovars (Su Su Khin, 2005). Another study investigated antibiotic resistance to 6 antimicrobials with *Salmonella* isolates from chicken meat. Resistance percentage of *Salmonella* isolates were 79.5, 82.1, 87.2, 74.4, 33.3 and 100 to ampicillin (10 µg), chloramphenicol (30 µg), ciprofloxacin (5 µg), cotrimoxazole (25 µg), gentamycin (10 µg) and tetracycline (30 µg), respectively. Among the six antimicrobial drugs, tetracycline was found highly resistance by *Salmonella* species. Gentamycin showed the lowest resistance by *Salmonella* isolates from chicken meat.

According to a study with *Escherichia coli* isolates from poultry meat, the isolated *E. coli* were resistant to chloramphenicol (30µg), ciprofloxacin (5µg), neomycin (30µg) and tetracycline (30µg). In this study, *E. coli* isolates were found to be the most susceptible to gentamycin and resistant to chloramphenicol. The degree of resistance to antibiotics varied with the tested *E. coli* serovars (Khin Nge Aung, 2005). In another study, thirteen

strains of *Escherichia coli* were isolated from broilers with typical post-mortem lesions of colibacillosis from commercial broiler farms in Mandalay region. Serological typing by rapid slide agglutination test indicated 4 serotypes namely O44:K74, O26:K60, O124:K72, and O55:K59. Antibiotic resistance pattern of 13 isolates showed the highest resistance frequencies with ampicillin, chloramphenicol, oxytetracycline, and neomycin (69.23 to 61.53%). Moderate resistance frequencies to antibiotics were observed with ciprofloxacin (46.15%). Gentamycin showed the lowest resistance frequencies (7.6%) (Khine Thwe Latt, 2005).

Since antibiotic residues in food animals always threaten to consumers' food safety, Fluoroquinolone residues in chicken muscle were screened using microbial inhibition test. According to the survey data, 6.67% of poultry meats from retail markets were positive for antibiotic residues (Khin Thida San, 2005). In another study, the presence of antibiotic residues in chicken muscle, liver and kidney purchased from three retail markets from central Myanmar were also investigated by using microbial inhibition test, Swab Test on Animal Food. Antibiotic residue positive samples were observed as 6/72 (8.3%), 7/72 (9.7%) and 0/72 (0%) in liver, kidney and muscle samples, respectively, from all locations (Ohnmar Hnin, 2009).

The common pathogens of clinical and subclinical mastitis cases in crossbred and local cows were also investigated in the Mandalay region. The major isolates were *Staphylococcus aureus* (25%), *Staphylococcus epidermidis* (2.5%), *Streptococcus* spp (22.5%), *Aerococcus* spp (32.5%), *Corynebacterium* spp (7.5%), and *Bacillus* spp (10%). The frequency of isolations of genus *Staphylococcus, Streptococcus* and *Aerococcus* is significantly higher (*P<0.05*) than *Corynebacterium* and *Bacillus*. There is no significant difference among genus *Staphylococcus*, *Streptococcus* and *Aerococcus.* Sensitivity to the most commonly used antibiotics was also tested in this study. Among 6 different antibiotics, Norfloxacin and Streptomycin have a significantly wider range of spectrum (*P<0.05*) than Penicillin G, Oxytetracycline, Chloramphenicol, and Cephalexin based on the efficiency of antibiotic sensitivity to 13 different bacteria species (Aye San May, 2008).

Isolation of *E. coli* from fresh beef samples of retail market was carried out in the central parts of Myanmar. *E. coli* were isolated from 93.33% of fresh beef samples. Serotyping of *E. coli* by rapid slide agglutination test revealed that 37 out of 120 isolates (30.83 %) were *E. coli* O157. Resistance to three commonly used antimicrobials was tested with isolated *E. coli* O157. Resistance of *E. coli* O157 isolates to ciprofloxacin (5µg), gentamycin (10 µg), and trimethoprime-sulfamethoazole (25 µg), were 25%, 87.5% and 12.5%, respectively (Yin Yin Kyawt, 2008).

Antibiotic resistance of *E. coli* isolated from rectal swab samples of piglets was also investigated in Nay Pyi Taw region, administrative city of Myanmar. *E. coli* isolates resistant to Ampicillin and Oxytetracycline was 100% constantly throughout the experimental period, while *E. coli* isolates resistant to Chloramphenicol, Ciprofloxacin, Gentamycin and Sulfamethoxazole/ Trimethoprim were 75%, 75%, 83.3% and 91.6%, respectively (Min Maung Cho, 2008).

AMR In-Country Actions

Research on AMR has been ongoing at the University of Veterinary sciences but not much has been done to undertake a nationwide situational analysis. A National Task Force has not yet been established within the country and its establishment is still in the organizing phase. Nevertheless, a few activities have been carried out for the improvement of good husbandry practice and farm bio-security at some poultry industrial zones such as in Monywar, Shwe Bo and Nyaung Hnin Pin townships of Sagaing and Yangon Regions respectively. The development and implementation of communication and public awareness on AMU and AMR is under negotiation within the department. In addition, the review and development of improved practical legislation and regulatory framework are in process. However, although the legislation has not yet been updated, the national assay laboratory has been upgraded by increasing staff and providing training and other facilities have been equipped for the detection of AMR. Systematic monitoring and surveillance of AMU and AMR is under discussion within the department.

Conclusions

For many decades, antibiotic resistance has been recognized as a global health problem. It has now been escalated by major world health organizations to one of the top health challenges faced in the 21st century. The use of antimicrobials in livestock production is thought to significantly contribute to this phenomenon, but little is known about the true causes of antimicrobial resistance. Some of its causes are widely accepted, for example, the overuse and inappropriate use of antibiotics for nonbacterial infections and inadequate antibiotic stewardship in the clinical arena. The lack of relevant scientific data means that risk managers must take precautionary measures, even though the underlying causes of public health risks associated with resistant bacteria may not have been adequately identified. However, it has been widely accepted that resistant bacteria in animals are one source of antimicrobial resistance in human pathogens.

Pakistan

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Introduction

Pakistan is endowed with a large livestock population well adapted to the local environmental conditions. The national herd (2009-10) consists of 34.3 million cattle, 30.8 million buffaloes, 27.8 million sheep, 59.9 million goats and 1.0 million camels. In addition, there is a vibrant poultry sector in the country with more than 942 million birds produced annually. These domestic farm animals produce 45 million tons of milk, (making Pakistan 4th largest producer of milk in the world after India, USA, and China), 1.6 million tons of beef, 0.6 million tons of mutton, 0.7 million tons of poultry meat and 11.84 billion eggs. Other valuable livestock products include wool, hair, skins and hides.

From animal health and disease control point of view, the major issues and challenges consist of high incidence of infectious diseases (HS, FMD, PPR, ND, HPAI, etc); weak system of disease surveillance, monitoring and reporting; insufficient institutional capacity and delivery of veterinary extension services to farmers; outdated regulatory framework for the control of trans-boundary and zoonotic diseases and lack of National Contingency Plans for control of animal diseases.

Diseases are one of the important factors causing low productivity of livestock in Pakistan. Treatment and control of diseases still remains the most crucial point for the success of any livestock productivity enhancement initiative or application of an improved production technology. Diseases with high mortality deprive the farmers from their livelihood whereas those with high morbidity cause huge economic losses to the farmers.

Common diseases of livestock in Pakistan can be classified into bacterial, viral, parasitic/ protozoan and metabolic. The bacterial diseases having considerable economic importance include Haemorrhagic Septicemia (HS), Brucellosis, Black Quarter (BQ), Enterotoxaemia (ET), Contagious Caprine Pleuropneumonia (CCPP) and Mastitis. The important viral diseases include Foot & Mouth Disease (FMD), Pest de Petits Ruminants (PPR), Avian Influenza (AI) and Newcastle Disease (ND). A fatal viral disease of livestock i.e Rinderpest has been eradicated from Pakistan since 2007.

Zoonoses

Zoonosis is the phenomenon of mutual transmission of infectious diseases between animals and humans. The term “emerging zoonotic diseases’’ is used for those diseases which are caused by a totally or partially new agents i.e. unknown or less-known micro-organisms. Re-emerging zoonotic diseases are those, which are caused by previously known micro-organisms but now occurring at new places and in new species. It is

generally agreed that 60% of known human pathogens are zoonotic, 80% of known animal pathogens have multiple hosts, 75% of all emerging infectious diseases are zoonotic and nearly all emerging diseases of humans originate from animal reservoirs.

The common zoonotic diseases include Brucellosis, Bovine Tuberculosis, Anthrax, Rabies and Highly Pathogenic Avian Influenza. The diseases important from the point of view of international trade (Trans-boundary Animal Diseases-TAD) include FMD, PPR, CCP, HPAI and ND. Presently, the control strategy for almost all animal diseases is based on vaccination. There are four Veterinary Research Institutes (VRI) established by the provincial livestock departments which produce vaccines against most of the animal diseases. However, because of limited capacity of the VRIs, vaccine supply is far below the requirements and the vaccination cover remains only 20-25%. Moreover, the quality of locally produced vaccines is also sometimes questioned.

Effective control of zoonotic diseases can be achieved through ''One Health" approach. One Health is a contemporary term describing the collaboration of various scientific disciplines in the pursuit of better health for all i.e. humans, animals, and the interlinked ecosystems. The history of the One Health concept dates back to the 19th century when Rudolf Virchow, a German physician and pathologist, formally recognized the connection between human and animal health and stated *"Between animal and human medicine there is no dividing line, nor should there be. The object is different, but the experience obtained constitutes the basis of all medicine."* In the early 20th century Canadian physician William Osler became the first practitioner of this collaborative-medicine concept. An American Veterinarian, Calvin Schwabe, first time coined the term "One Medicine" in his 1984 book *Veterinary Medicine and Human Health.* The One Health Concept was revitalized in the 21st century. In 2004, a meeting of health experts in USA formulated its guiding principles. Later, One Health Symposia were held in Thailand (2004), China (2005) and Brazil (2007) in order to develop strategy and implementation mechanisms for the One Health approach.

By most measures, the condition of many of our ecosystems is changing dramatically. Over time, the wildlife-livestock-human interface is increasing. One Health seeks to shift the paradigm from the current "individual" or "disease centered," approach to a "system" or "community based," approach. It is a creative way to view human, animal, and ecosystem health as a cooperative endeavor between health practitioners and environmental scientists in a collaborative and synergistic effort. Coordination of wildlife, environmental, human, and domestic health sectors improves our ability to *prevent* disease events rather than simply reacting to them.

Implementation of the One Health approach is still at the infancy stage in Pakistan and the major challenges faced by it include (i) devolution of human health and animal health functions to provinces, (ii) poor coordination between human health and animal health departments and lack of SOPs for joint epidemiological investigations, (iii) difficulties in the adoption of biosafety and biosecurity measures in research and diagnostic labs, (iv) evolution of mutant pathogens under the vaccination pressure and difficulty in developing specific diagnostics and vaccines, (v) shortage of trained

epidemiologists, virologists and vaccinologists, and (vi) shortage of resources and expertise in controlling diseases of animal and/or public health significance.

Control of Zoonoses Through One Health Approach in Pakistan

The first initiative under the One Health approach was taken by the Government of Pakistan in 2006 for the control and prevention of HPAI (H5N1) or bird flu. This program was implemented by the federal ministry of Food, Agriculture & Livestock in collaboration with National Reference Laboratory for Poultry Diseases (NRLPD) of NARC, twelve satellite Provincial Veterinary Diagnostic Laboratories and National Institute of Health (NIH) of the federal ministry of Health. Forty (40) Regional Surveillance Units (RSU) were established throughout the country, which collected and tested more than 400 000 samples of blood, tissue & swab. Sixty-six (66) Rapid Response Teams were constituted, which successfully handled 26 outbreaks of bird flu in 2006, 59 outbreaks in 2007 and 9 outbreaks in 2008. As a result of this collaborative effort, HPAI was successfully contained and no H5N1 outbreak has been reported in Pakistan since June 2008.

At present, four research projects using the One Health approach are being implemented in Pakistan. The first project focuses on the "Surveillance, Pathogenesis and Management Strategies against Major Emerging Avian Diseases". This project is implemented by NRLPD of NARC in collaboration with international institutions (SEPRIL, GA, USA and IAH Campton UK) and eight provincial veterinary diagnostic laboratories in Pakistan.

The second project is a part of the SAARC/FAO Regional Cooperation Program on HPED in South Asia. Its objective is to enhance capacity and capabilities of SAARC to prevent, control and eradicate HPED including HPAI through improved veterinary and public health services and inter-sectoral collaboration at regional level.

The third project is supported by FELTP/CDC USA. NRLPD of NARC and NIH are jointly implementing this project in collaboration with six provincial public and animal health institutions. Its objectives are (i) to strengthen zoonotic animal health status by employing specific surveillance system, laboratory diagnostics and data management, (ii) to train the veterinarians, para vets, farmers in basic applied epidemiology, disease surveillance, bio-security, outbreak response and animal health management and (iii) to enhance institutional capacity for conducting zoonotic health investigation, for devising animal-human interface interventions and for supporting existing disease prevention/detection and control efforts.

The fourth initiative using the One Health approach, is the establishment of a One Health Hub in Pakistan. This is a part of Massey University New Zealand Regional Project with a focus on the control of brucellosis and Congo-Crimean Haemorrhagic Fever (CCHF). Under this project, three Medical and five Veterinary Doctors from Pakistan have completed MS degree training in epidemiology from Massey University, New Zealand; four sentinel sites in Khyber Pakhtoon Khwa and Balochistan have been set-up and joint training sessions of veterinarians and medical officers are being organized.

A meaningful outcome of the abovementioned One Health initiatives in Pakistan greatly depends on a well thought out strategy for inter-sectoral cooperation to control zoonotic diseases. Following are some of the recommendations for incorporation in this strategy:

1. Establishment of disease reporting and early warning systems by public health authorities and sharing of disease status with animal health authorities.
2. Setting up a joint Task Force to coordinate between human and animal health sectors for developing joint response strategy against zoonotic disease outbreaks.
3. Development of coordination mechanism between two sectors for sharing data of disease prevalence in different parts of the country.
4. Undertaking joint efforts for launching disease awareness campaign through national and international agencies.
5. Developing SOPs of a rapid response mechanism and organizing joint training for the professionals and field staff of both sectors for sharing in handling of zoonotic disease outbreaks.

Food and Waterborne Diseases

The food and water borne diseases recorded in Pakistan are described below:

Hepatitis A

A viral disease, that interferes with the functioning of the liver. It is spread through consumption of food or water contaminated with fecal matter, principally in areas of poor sanitation. The victims exhibit fever, jaundice, and diarrhea. About 15% of victims will experience prolonged symptoms over 6-9 months; vaccine available.

Hepatitis E

A water-borne viral disease, that interferes with the functioning of the liver. It is most commonly spread through fecal contamination of drinking water. The victims exhibit jaundice, fatigue, abdominal pain, and dark coloured urine.

Typhoid fever

A bacterial disease, that spreads through contact with food or water contaminated by fecal matter or sewage. The victims exhibit sustained high fevers. If left untreated, mortality rates can reach 20%.

Leptospirosis

A bacterial disease, that affects animals and humans. The infection occurs through contact with water, food, or soil contaminated by animal urine. The symptoms include high fever, severe headache, vomiting, jaundice, and diarrhea. If untreated, the disease can result in kidney damage, liver failure, meningitis, or respiratory distress. Fatality rates are low but left untreated recovery can take months.

Antimicrobial Resistance

There is a long history of use of antibiotics for treatment of bacterial infections in animals and human beings in Pakistan. With the passage of time, their use has become more frequent and they are given to even those animals which might not be suffering from any bacterial infection. In addition, the antibiotics are also used as feed additives and growth promoters. Under the current practices, there is no or little control on the type and quantity of antibiotics to be used. This results in frequent over-dosing of the animals.

Because of the irrational and non-judicial use of antibiotics, there has been a gradual development of drug resistance in various pathogens of livestock and poultry. The phenomenon of anti-microbial resistance (AMR) is transferable from animal to human infecting bacteria through the contamination of human food chain at the animal-human interface.

AMR is currently not recognized as a major issue in Pakistan. Some recent reports have, however, indicated that a number of pathogens are becoming resistant to drugs used in animal production. The development of AMR has been observed specifically for the treatment and recovery time of the animal diseases like mastitis, staphylococcal and streptococcal infections, foot rot, navel illness, pneumonia, uro-genital tract infections, etc. Such pathogens have developed resistance even to third generation antibiotics. The situation has become more complicated because some zoonotic pathogens originating from animals have also acquired resistance against several drugs used for their treatment in human patients.

Papua New Guinea

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Chief Veterinary Officer & Chief Quarantine Officer
National Agriculture Quarantine and Inspection Authority

Incidence of Zoonoses

An accurate and objective record of incidences of zoonotic diseases in PNG is not available due mainly to the inefficiencies of proper surveillance and coordination between the animal and public health authorities partly stemming from out-dated legislative and structural alignments.

From the animal health perspective, parasitic (trichinellosis, porcine cysticercosis) and bacterial (leptospirosis, brucellosis, tetanus, ringworm) zoonoses occur in wild and domestic animals. Hence, it is believed that some of these zoonoses occur in humans where the respective pathogens are prevalent in animals. Lack of proper diagnostic capacity in isolated regions may lead to tentative diagnosis and treatment of symptoms. Japanese encephalitis has also been recorded in certain parts of PNG. Hospitals and health centres do treat humans for tetanus, ringworm and JE.

Food-borne Diseases

Typhoid fever has been endemic in PNG for a while and is associated with poor sanitation and the growth and sustenance of the informal sector, whereby food safety standards may not be applied by with food stalls operating under informal sector arrangements.

Cholera was detected for the first time in 2009 and has spread to most population centres

Antimicrobial Resistance

Incidence: The incidence of antimicrobial resistance is not quantifiable in PNG, given that both the public health and animal health sectors are not properly resourced and empowered to address the problem. However since AMR is a global issue, there is momentum in PNG currently to address this through policy developments such as the National Medicines Policy, the Food Safety Policy and the Public Health Act review that are currently underway. The animal health sector is fully engaged in these developments to ensure that issues of AMR are properly addressed.

In-country actions to reduce the risks of AMR (as agreed at 36th Session): The 73rd Executive Committee reviewed and adopted the agenda of the 36th Session and associated workshop on antimicrobial use (AMU) and resistance (AMR) in the Asia-Pacific Region. Further Delegates endorsed certain in-country action plans. As reported above, certain policy developments are actually conducive for PNG to address the issues of AMU and AMR discussed by APHCA. At this stage, PNG would report the positive

development in policy, which will form the basis for further actions to address AMU/AMR.

APHCA National Currency Fund

The 73rd Executive Committee meeting discussed the issue of National Currency Funds (NCF) which in the past have been very useful for financing in-county activities in support of APHCA activities and suggested that member countries investigate and report on the status of their NCFs at the next Session. Further, Delegates endorsed that Member countries replenish / establish the respective NCFs and report on the status at the next Session.

Unfortunately, PNG has no established NCF and would explore the concept further and its potential use to support national initiatives on relevant APHCA-related activities. Given current experience in securing funding for other pertinent activities, e.g. emergency disease response funds, the difficulty in securing a specific NCF for APHCA as a separate and readily available funding is acknowledged. However, as and when required, funding can be sought through normal government submissions.

Philippines

Dr Rubina O. CRESENCIO
Director, Bureau of Animal Industry

Zoonotic Diseases

Rabies

Rabies is considered as the major zoonotic and public health concern in the country. The disease is highly which fatal affects the nervous system. It is transmitted mainly through the bite of infected animal and is characterized by muscle paralysis, hydrophobia and aerophobia.

Rabies in the Philippines: Human cases of rabies occur in the Philippines and are caused principally by dogs through bites. Based on records, there was an average of 236 human cases and deaths from 2008 to 2011 (Infectious Disease Office, National Center for Disease and Control, WHO Philippines). In 2012, 213 human rabies cases and 414 553 animal bites were recorded. Most of the bite victims were observed to be below 15 years old.

The dog population was estimated at 9 million for the entire country. Animal rabies cases were reported in most of the regions of the country. The highest dog rabies cases were recorded in 2001 with 2 550 cases. A decreasing trend was noted with a total of 475 cases diagnosed in 2012.

Most of the cases in 2012 were reported in dogs (98.3%), followed by cats (1.5%) and cattle (0.2%). National Capital Region (NCR) had the highest number of cases (15.6%) followed by Region IV–A (14.5%), Region X (11.6%) and Region VII (8.6). Majority of the rabies positive cases affected household dogs (76.5%) followed by stray dogs (19.8%) and neighborhood dogs (3.7%).

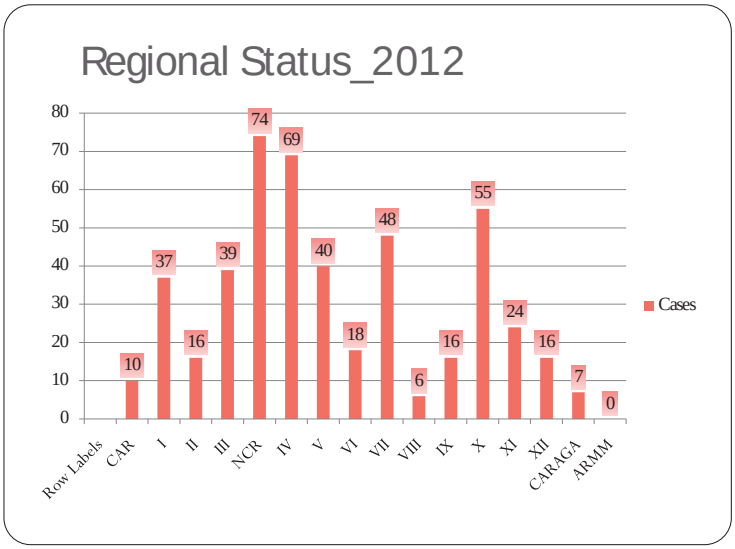

Chart 1. Animal Rabies Cases in 2012

For 2013 (as of September), there were 357 animal rabies cases reported which occurred in 15 of the 17 regions of the country. NCR (17.4%) had the highest number of cases followed by Region III (14.3%) and Region IV-A (11.5%).

Policies and Program to Control Rabies: Realizing the loss of lives due to this deadly disease, the Anti-Rabies Act (Republic Act 9482) was passed in 2007. The primary objective of the law was to protect and promote the right to health of the people. The law prescribed for a system for the control, prevention of the spread, and eventual eradication of human and animal rabies and the need for responsible ownership.

Drawing the mandate from the law, a National Rabies Prevention and Control Program (NRPCP) was established. The program is implemented by a multi-agency /multi-sectoral committee chaired by the Bureau of Animal Industry (BAI) of the Department of Agriculture (DA) together with the Department of Health (DOH), Department of Interior and Local Government (DILG), Department of Education (Dep Ed), Local Government Units with the assistance of the Department of Environment and Natural Resources (DENR), Non-Governmental organizations (NGOs) and People's Organizations (Pos).

Activities include the following:

1. Mass vaccination of dogs;
2. Establishment of a central database system for registered and vaccinated dogs;
3. Impounding, field control and disposition of unregistered, stray and unvaccinated dogs;
4. Conduct of information and education campaign on the prevention and control of rabies;

5. Provision of pre-exposure vaccination treatment to high risk personnel and post-exposure treatment to animal bite victims;
6. Provision of free routine immunization or Pre-Exposure Prophylaxis (PEP) of schoolchildren aged five to fourteen in areas with a high incidence of rabies;
7. Encouragement of responsible pet ownership.

The law also defines the various responsibilities of the different organizations identified including the responsibilities of pet owners. Other responsibilities assigned to the DA-BAI include:

1. Improve and upgrade existing animal rabies laboratory diagnostic capabilities to ensure better services to the people
2. Ensure the availability and adequate supply of animal anti-rabies vaccine;
3. Undertake free anti-rabies vaccination of dogs giving priority to high risk depressed areas
4. Maintain and improve animal rabies surveillance system
5. Establish and maintain rabies free zone in coordination with the LGUs
6. Immediately facilitate for the approval of the sale and use of veterinary and human barbiturate drugs and veterinary euthanasia drugs by the DOH and the Philippine Drug Enforcement Agency (PDEA)
7. Strengthen the training of field personnel and the Information Education and Communication (IEC) activities on Rabies prevention and control, and responsible pet ownership.
8. Conduct research on Rabies and its control in coordination with other agencies
9. Formulate minimum standards and monitor the effective implementation of this Act.
10. Encourage collaborative activities with the DOH, DepEd, DILG, DENR ,NGOs, Pos and other concerned sectors.

Rabies Free Areas/Free Zones: Using a set of guideline and mechanics, the BAI and the DOH declared several areas in the country as Rabies Free. For this year, six additional areas will be declared as rabies free. These are the province of Guimaras; islands of Coron, Busuanga and Culion in Palawan; Olympia Island in Bais City Negros Oriental; and Boracay Island in Malay, Aklan. It is being envisioned that the Philippines will be completely free from rabies in 2020.

Leptospirosis

As of 7 September 2013, 1 174 human leptospirosis cases have been reported nationwide, which was 78.7% lower compared to the same period last year (5 522). Majority of the cases were reported in the National Capital Region (17.8%), Region VI (17.7%), Region III (15.2 %), Region XI (11.41%) and Region II (8.94%).

Reported cases are between the ages of 2-83 years old with a median of 30 years of age. Most of cases occur in males (86.1%) and those in the age group greater than 40 years

old (27.2%). There were 86 deaths with a case fatality rate of 7.3%. In 2013, upsurge in cases are reported from June-August which is the rainy season. This period accounts for 53.2% of all the reported cases.

The National Epidemiology Center (NEC) of the Department of Health provides weekly updates online regarding the disease.

Food-borne Diseases

In June 2012, the Province of Catanduanes was placed under the state of calamity due to the significant increase of diarrhea cases which affected all eleven municipalities of the province. There were 1 730 cases reported and 14 deaths. Of the 250 samples tested, 31 tested positive for *vibrio cholerae*. The suspected source of contamination was an improvised spring near a river which was used as a drinking water. The Center for Health Development of DOH worked with the local government in providing potable water as well as community education for proper hand washing and other control/prevention measures.

The Food and Waterborne Diseases Prevention and Control Program of the Department of Health focuses on prevention and control parasitic, fungal, viral and bacterial diseases acquired through ingestion of contaminated drinking water or food. In the Philippines, the most common cause of major outbreaks for the past two years are bacterial diseases such typhoid fever and cholera.

Parasitic organisms are also part of the program such as capillariasis, heterophydiasis and paragonimiasis which are still endemic in the country. Another major problem is cysticercosis due to its neurological effects.

The program provides support to the local government units through the provision of water purification tablets and solutions; stockpile of medical supplies and medicines in the event of outbreaks; information campaign in prevention of food-borne illnesses (such as capillariasis due to unsafe cultural practice of eating raw aquatic products); and improved technical coordination between the national and regional epidemiology surveillance units.

Antimicrobial Resistance (AMR)

Addressing the issue of AMR is a collaboration between DOH and DA which is based on the mandates and existing policies of both agencies. The following are the existing policies of DOH on AMR: Food, Drugs, Devices and Cosmetic Act (Republic Act 3720); Food and Drug Administration Act of 2009 (Republic Act 9711); Universally Accessible Cheaper and Quality Medicines Act of 2008 (Republic Act 9502); and Generics Act of 1988 (Republic Act of 6675)

For DA, the AMR is anchored in the Livestock and Poultry Feeds Act of 1956 and DA Administrative Order No. 24, Series of 2009 (Implementing Guidelines of the National Veterinary Drug Residues Control Program). The recently passed Food Safety Act of 2013 (Republic Act 10611) also further strengthen the current efforts of the national government agencies and other stakeholders regarding AMR.

As an off-shoot of the Nengombo Meeting in 2012, DOH and DA drafted a Presidential Executive Order (Developing a Comprehensive and Sustainable National Plan to Combat Antimicrobial Resistance in the Philippines). The drafted policy aims to provide an integrated, collaborative, and directed action against AMR in humans and animals.

An Inter-agency Committee on AMR (ICAMR) was also established to develop a national plan to prevent, control and eliminate AMR in the country. Aside from DA and DOH, members also include the Department of Interior and Local Government (DILG) and The Department of Science and Technology (DOST). The following were the offices involved in ICAMR in the different national agencies.

National Agency	Offices
Department of Health	National Center for Pharmaceutical Access and Management (NCPAM)
	National Center for Diseases Prevention and Control (NCDPC)
	National Epidemiology Center (NEC)
	National Center for Health Facilities Development (NCHFD)
	Health Policy Development and Planning Bureau (HPDPB)
	National Center for Health Promotions (NCHP)
	Research Institute for Tropical Medicine (RITM)
	Food and Drug Administration (FDA)
	Philippine Health Insurance Corporation (PHIC)
Department of Agriculture	Bureau of Animal Industry (BAI)
	Policy and Planning Service (PPS)
	National Meat Inspection Service (NMIS)
	National Dairy Authority (NDA)
	Bureau of Fisheries and Aquatic Resources (BFAR)
	Food Development Center (FDC)
	Bureau of Agriculture and Fisheries Products Standards (BAFPS)
	Livestock Development Council (LDC)
Department of Science and Technology	Philippine Council for Health Research and Development (PCHRD)
Department of Interior and Local Government	Local Government Units (LGU)

Existing field activities in BAI regarding AMR include the promotion of risk and HACCP based inspection for feeds; strengthening of regulatory activities such as on feed registration, laboratory analysis and inspection; and conduct of seminars regarding AMR to veterinary drug and feed suppliers.

NMIS conducts antimicrobial residue testing of meat while BFAR has a surveillance program on antimicrobial use in aquaculture. NDA, on the other hand implements mandatory pasteurization of milk before sale and distribution. Organic agriculture is another major thrust of DA and provides alternative farming system for livestock raising.

Funds to support the activities related to AMR have already been allocated for BAI as well in other DA agencies. The National Currency Fund is a possibility that can be further explored for future implementation of a national AMR program.

Samoa

Dr Agnes T. MEREDITH
Principal Animal Health Officer, Animal Production and Health Division

Existing Problems in Animal Health

The main problems within the Ministry as well as Samoa as a country, is the extensive lack of manpower to implement effective surveillance programs. Additionally there is also another island (i.e. Savaii) to consider for surveillance but there is a limited amount of resources to be able to carry this out effectively. At the moment, disease surveillance is carried out and funded by the Secretariat of the Pacific Community (SPC) or Food and Agriculture Organization (FAO). One of the major obstacles in trying to acquire the resources is the lack of technical capacity to run and maintain the facilities in the long run. Samoa has the potential to improve and function independently but the main issue is the lack of qualified personnel to facilitate the surveillance programs and operate the veterinary laboratory in terms of serology and microbiology testing. Samoa needs to focus on improving public awareness about the opportunities available within the agriculture sector to improve; whether that be crops, fisheries, livestock. There is an alarming lack of graduates for Agricultural Science as there is a growing culture for office jobs instead of field and laboratory work. However, I recognize that our current para-vets need to be trained on how to diagnose certain diseases so through this training course I hope to achieve a better understanding of practical methods to be able to educate my animal health team.

In terms of monitoring zoonotic diseases, there is a chronic and severe lack of veterinarians employed in Samoa (both private and public sectors) to assist in this aspect of public health surveillance. Once again, the main obstacle is the lack of qualified personnel. Samoa would need to outsource a qualified veterinarian to assist the Ministry of Health with their surveillance efforts in addition to helping run the Veterinary Program already in place within AH&R of APHD. If this was achieved, surveillance would be labor efficient and collaboration between two critical Ministries would be established.

Lastly, there is a poor collaboration between the Health sector and the Agriculture sector in terms of public health management. This results in situations where the surveillance efforts of one Ministry are doubled up by another resulting in an inefficient vehicle for disease monitoring and analysis. An example of surveillance MAF currently carries out is meat inspection of carcasses before they are sold to butcheries and retail supermarkets. The limitation with this process is that visual inspection of carcasses does not guarantee hygienic slaughter and quality meat being produced and sold to butchers or supermarkets. The only accredited laboratory in Samoa that can carry out microbiology testing of any meat sampled is an independent organization that charges for testing. The charges incurred are not so affordable. On the other hand, there is a

severe lack of policies to engage the public into adopting hygienic slaughter methods. In addition to this, there is also a lack of education programs in place to inform the public about the issues of current bush slaughter methods. This in turn perpetuates the problem of consuming low quality meat with a high risk of food poisoning and zoonotic disease transmission. The Ministry of Health does not carry out targeted surveillance for food poisoning from salmonella spp., coliforms and campylobacter spp. due to a lack of technical capacity and available resources. So in turn, there is a vicious cycle in this set up which can be broken by an improved legal framework and an increased awareness campaign of public health issues related to unhygienic slaughtering. This is only one example but it reflects the general way with which many Ministries work; often parallel but not in a mutual or collaborative manner.

In-Country Actions to address Antimicrobial Resistance

The Ministry of Agriculture and Fisheries is undertaking a project funded by the World Bank that aims to establish an abattoir in the next 5 years. One of the main objectives of this project component is to address public health via ensuring food safety and public health surveillance. In the interim, this project will introduce mobile slaughter units that comply with minimum HACCP regulations to carry out slaughter and inspection of meat. The government is in the final stages of introducing relevant legislation to regulate these facilities, which will come into enforcement sometime in 2014. Through this new slaughter and inspection system, the Government is able to carry out better surveillance of meat going into the retail chain. For example, all animals that are to be slaughtered are accompanied by food chain information, which ensures that all animals receiving treatment with any antibiotics or drugs do not get slaughtered until the WHP are met. Secondly, all offal and meat carcasses are subject to post mortem inspection before they are approved for retail.

Secondly, a key recommendation that was raised in the 36th APHCA Session highlighted the need to introduce AMR as a technical issue for public awareness into existing mandatory food regulated authorities and committees. To date, there has been no effort by MAF to see this through. However over the last year, the Animal Production and Health Division, MAF, has made several attempts to link up with the Ministry of Health, particularly the Public Health Division. Unfortunately, there has been very poor feedback from MOH and a lack of willingness to share information and collaborate. The Ministry of Health would have received some training on the rational use and advocacy of AMR sometime in the last 3 years from WHO/IHR initiatives. An APSED workshop was held in 2012 of which several key activities involved linking up the animal health laboratory and the public health laboratory. To date, this has not been successful.

Samoa is very fortunate to be free of many notifiable diseases including rabies. The last national surveillance was carried out in 1999 and the Ministry recognizes that updating this information is one of its key activities over the next financial year.

Lastly, APHD is currently looking into developing a central database that links all information from Animal Health, Research and Animal Production sections. This will aim

to improve policy development as well as training for farmers especially concerning animal nutrition and record keeping.

There are three main sources of veterinary drugs in Samoa, which include the Ministry of Agriculture and Fisheries, Animal Protection Society (APS) and Agricultural Store. MAF uses veterinary medicines to treat sick or injured livestock at the discretion of the Government Veterinarian and trained para-veterinarians. The medicines include 5 main groups of antibiotics, which all require that individual cases complete the recommended course of antibiotics. The Agriculture Store only dispenses anthelmintics and vitamins. This has a low risk implication for AMR development, but instead implicate anthelmintic resistance, which is a separate yet common problem in the livestock industry in Samoa now. The APS deals mainly with small animals and also administers and dispenses antibiotics at the discretion of their veterinarian.

APHD aims to collect information from the latter two organizations on their dispensary of veterinary drugs and integrate this information into the Ministry's Animal health database.

There is currently no formal legislation to regulate the use and dispensation of veterinary medicines, which will be one of the key activities in APHD's annual work plan for 2013 – 2014.

Sri Lanka

Dr Weligodage K. DE SILVA
Director General, Dpt. of Animal Production and Health

SRI LANKA

The use of Antimicrobials in Livestock Production and Antimicrobial Resistance in Pathogens from Livestock

Dr. W K de Silva
Director General
Department of Animal Production and Health

SRI LANKA

SRI LANKA

Main Livestock Production

Product	2011	2012
Milk (million litres)	286.7	336.2
Eggs (million eggs)	1,917.9	2,278.7
Chicken (million kg)	116.8	137.4

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Main Livestock Populations (in Millions)

Animal type		2012	2013
Cattle		1.191	1.250
Buffalo		0.475	0.478
Goat		0.396	0.397
Swine		0.085	0.089
Parent poultry	Grand	0.002	0.002
	Layer	0.110	0.130
	Broiler	0.880	0.910
Commercial	Broiler	7.080	7.190
	Layer	6.070	6.180

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Legal Framework

- Key legal instrument - Animal Diseases Act No 59 of 1992
- Antimicrobials have been categorized under pharmaceuticals
- Director General - empowered officer for the general administration of this Act

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Legal Framework cont.

- **Section 17** – Prohibits manufacture without proper authorization
- **Section 21** – Prohibits import without proper approval
- **Section 31** – No import without valid certificate from CVO at origin
- **Section 32** – Appoints Veterinary Drug Control Authority (VDCA)

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Institutional Arrangements

- Veterinary Drug Control Authority (VDCA) (9 members)
  - **Chairman** - DG/DAPH
  - **Registrar** - Veterinarian employed under DAPH
- **Specialist Committee**
  (*clinical practice in State & Private Sectors, microbiology and immunology, Parasitology, pharmacology, nutrition, reproductive physiology and endocrinology)*
- **Representative** for pharmaceutical industry

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Institutional Arrangements cont.

Functions of VDCA

- Exercise control over the manufacture, import, export, sale and use
- Ensure the efficient and safe use of veterinary drugs
- Determine whether licenses shall be granted for the manufacture or importation
- Advise the Minister on any matter he may refer
- Promote field trials
- Disseminate information relating to the safe and efficient use

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Institutional Arrangements cont.

Animal Feeds: Animal Feed Act No 15 of 1986

Regulate, supervise and control the manufacture, sale and distribution of animal feeds

Animal Feed Advisory Committee has been established (6 Members)

Registrar - Veterinarian employed under DAPH

Director General functions as the Chairman

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Antimicrobial Use in Livestock Production

Poultry sector main user - antimicrobials, anthelmintics, anti-coccidials - oral powder/liquid

Dairy sector - mainly udder infusions and anthelmintics

Swine sector - antimicrobials - parenteral, oral anthelmintics

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Imports 2012

Active Ingredient	2012		Up to Aug 2013
Enrofloxacin	2,696		38
Amoxycillin	6,130		4,532
Tylosine	3,026	(Mycoplasma outbreak)	30,995
Sulphadiazine	5,264		0.02
Trimethoprim	1,300		110
Oxytetracycline	1,032		34
Chlortetracycline	900		9,443
Neomycin	808		1,331
Bacterim	710		0
Doxycycline	658		1,260
Flumequine	560		541
Penicilin	76		88
Ceftifor	8		0
Total	23,168		48,266

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Current (and planned) arrangements

- DAPH has well recognized the importance of issue of AMR and residues in animal derived food
- Updating process of regulations of the Act launched – regulate use, storage, sales
- Food safety has been identified as a discipline under veterinary public health program
- Education enhanced - prudent use, developing professionals for pharmaceutical vending

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Patterns and Extent of AMR Animal Pathogens

Studies on antimicrobial resistance and sensitivity are largely limited to testing of milk samples taken from mastitis cases using ABST

VICs performed, in 2012, 1 609 and 1st half of 2013, 1 234 ABST

In 2012 - 790 milk samples & 819 other laboratory samples

In 2013 - 588 milk samples & 646 other laboratory samples

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Thimphu, Bhutan, Sept 2013

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Antimicrobial Agent	2012	
	Total resistant (of 576)	% Shown resistance
Amoxycillin	101	17.53
Enrofloxacin	97	16.84
Gentamycin	18	3.13
Oxytetracycline	142	24.65
Cephalexin	143	24.83
Cloxacillin	161	27.95
Penicillin	205	35.59
Sulpha+Trimethoprim	27	4.69
Neomycin	8	1.39
Doxycycline	10	1.74
Ampicillin	59	10.24
Streptomycin	12	2.08
Sulphamethoxazole	10	1.74
Chloramphenicol	15	2.6
Tetracycline	4	0.69
Erythromycin	4	0.69

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Actions taken in 2013 in parallel to the APHCA 36

1. Continuous screening of organisms, evaluate, implement proper therapeutic regime to minimize AMR.
2. Surveillance for AMR in targeted poultry pathogens (E. coli, campylobacter, C. perfringens)
3. Control of illegal free sales of antibiotics.
4. Animal Disease Act & Animal Feed Act amended (control of imports & feed additives)

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Actions taken in 2013 cont …

5. Prohibit use of therapeutic antibiotics in feed
6. Control of illegal free sales of antibiotics
7. National disease control programs launched (Salmonella - Poultry, TB)
8. One Health program – World Bank funded (leptospirosis, brucellosis)
9. Improve bio-security measures in livestock production value chain

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Status of National Currency Fund

- Govt of Sri Lanka plan on AAA Economic development (Agriculture+Aquaculture+Animal Production)
- Finances allocated for residues, AMR, awareness
- Planned to develop people for pharmaceutical industry - diploma level
- Agree with APHCA, FAO, OIE in appropriate plans falls under National Development Agenda

37th APHCA Session
Thimphu, Bhutan, Sept 2013

THANK YOU

Thailand

Dr Pennapa MATAYOMPONG
Department of Livestock Development (DLD)

National Task Force on Antimicrobials

Sub-committee on prevention, control and resolution of antimicrobial-resistant pathogens

The threat of infection with antimicrobial-resistant pathogens is one of the major concerns on emerging infectious diseases. Therefore, in May 2013, the National Committee on Preparedness, Prevention and Resolution of Emerging Infectious Diseases appointed by Prime Minister in July 2012 and chaired by Deputy Prime Minister had established the Sub-Committee on Prevention, Control and Resolution of Antimicrobial-Resistant Pathogens. The Sub-Committee composes of relevant personnel working on animal health and public health from public, private and academic sectors. It is chaired by the permanent secretary of the Ministry of Public Health with the secretary team composed of the Directors General from Department of Disease Control, Department of Medical Services, Department of Medical Sciences and Department of Livestock Development and the Dean of Faculty of Medicine Siriraj Hospital. The responsibilities of the Sub-Committee include:

(i) Recommendation on the development of monitoring and surveillance system for the antimicrobial-resistant pathogens in humans and animals;
(ii) Coordination with the relevant agencies in implementing the monitoring and surveillance system for the antimicrobial-resistant pathogens in humans and animals;
(iii) Recommendation on the development of control and prevention system for infection and spreading of antimicrobial-resistant pathogens in hospitals and communities;
(iv) Coordination with the relevant agencies in implementing the control and prevention system for infection and spreading of antimicrobial-resistant pathogens;
(v) Recommendation on the implementation following the related National Strategic Plan for Preparedness, Prevention and Resolution of Emerging Infectious Diseases (2013-2016);
(vi) Establishment of working groups for specific task as necessary;
(vii) Other duties as assigned.

DLD working group on antimicrobial-resistant organisms and genetics in animals, animal products and farm environment

The DLD is amending the existing DLD Working Group on Antimicrobial-Resistant Organisms and Genetics in Animals, Animal Products and Farm Environment which was established in 2011 to include more relevant private and academic sectors in order to

support and put into practice the action plan of the Sub-Committee on Prevention, Control and Resolution of Antimicrobial-Resistant Pathogens in the field of animals. The working group performs the analysis of the data on antimicrobial-resistant organisms and genetics detected from animals, animal products and farm environment, the establishment and revision of standards relevant to antimicrobial-resistant organisms and genetics in animals, animal products and farm environment and provision of planning, evaluation, management of antimicrobial-resistant organisms and genetics in the field of animals including communication for public awareness.

Capacity Building of the DLD Laboratories for AMR Testing

The DLD in collaboration with the Center for Antimicrobial Resistance Monitoring in Foodborne Pathogens (in cooperation with WHO), Faculty of Veterinary Science, Chulalongkorn University organized a workshop to harmonize the laboratory techniques for AMR testing of the 9 DLD laboratories. The AMR tests conducted in the DLD laboratories are for the treatment of diseased animals, the surveillance of antimicrobial-resistant pathogens in animals and animal products (meat, milk and eggs)

Improvement of Legislation for AMU

Meanwhile, Ministry of Agriculture and Cooperatives is going to issue a Notification under the Feed Quality Control Act to prohibit mixing of animal feed with pharma chemicals, salt of pharma chemicals and semi-processed pharma chemicals which are used for manufacturing of medicines for treatment, relief, cure or prevention of human and animal disease or illness. The draft notification has already passed the public hearing. The rationale of the notification is that there is evidence of animal feed mixed with inappropriate and unnecessary pharma chemicals and semi-processed pharma chemicals, which pose a threat of chemical residues, drug resistance and unsafe food for human consumption.

Communication and public awareness on AMU and AMR

- Training on antimicrobial resistance in foodborne pathogens for ASEAN universities, 26-30 Aug 2013 by the Faculty of Veterinary Science, Chulalongkorn University
- International seminar “Strides on antimicrobial resistance in livestock” in Thailand Lab 2013 exhibition, 29 Aug 2013 at BITEC Bangna, Bangkok

National Currency Fund

The Thai National Currency Fund allocated to support APHCA activities in country currently amounts to THB 1 294 453.50 (app. US$43 000).

Speeches

Welcome by Offg. Director, Department of Livestock

Dr Tashi DORJI

Your Excellency, Lyonpo Yeshey Dorji, Hon'ble Minister, Ministry of Agriculture and Forest, Royal Government of Bhutan;

Dr de Silva, Director General, Department of Animal Production and Health, Government of Sri Lanka and Current Chair of Asia Pacific Commission for Animal Production and Health (APHCA) ;

Dr Martin Joachim Otte, Senior Animal Production and Health Officer/ Secretary APHCA;

Dr Hirofumi Kugita, OIE Regional Representative for Asia and the Pacific;

Mr Chadho Tenzin, Assistant Resident Representative, FAO Bhutan Office;

Mr Tenzin Dhendup, Director General, Department of Agriculture / Former Director General, Department of Livestock, Bhutan;

Mr Karma Dukpa, Chief Executive Office, Natural Resources Development Corporation/ Former Director General, Department of Livestock, Bhutan;

Dr Tashi Samdrup, Director, Council for Renewable Natural Resources Research of Bhutan (CoRRB);

Mr Dorji Dhradhul, Director, Department of Agriculture Marketing and Co-operatives (DAMC);

Distinguished Delegates from APHCA member countries;

Representatives from OIE, WHO, CIRAD, FAO, ILRI.

Ladies and Gentlemen! A very Good Morning!

Today, on this auspicious 19th day of the 8th Bhutanese Month, in the Bhutanese calendar; we are gathered here in Thimphu, to grace the start of three important events:

- The 74th Executive Committee Meeting of the Asia Pacific Animal Production and Health Commission;
- The 37th Session of APHCA;

- The Technical Workshop on "Zoonoses, Food Borne Diseases and Anti-Microbial Resistance"

It is for the first time that Bhutan is hosting the APHCA Session, and we are delighted to be associated with this event.

On behalf of the Organizing Committee and Department of Livestock, Bhutan; I wish to extend a warm welcome to all the distinguished delegates and participants to Bhutan and to this event.

In particular, it is my honor to welcome His Excellency, Minister, Ministry of Agriculture and Forests, Bhutan as a Chief Guest to this occasion. We know that His Excellency is currently busy with the on-going Parliament in Session. Lyonpo's presence here this morning with us is an indication of your strong support and commitment in dealing with Livestock Production and Health issues. Indeed, we are grateful for kindly sparing your valuable time with us today.

This year we have representation from 14 member countries and more than 5 International Organizations. It is an excellent representation, and we wish to extend a Special Welcome once again to all our distinguished country delegates, observers and experts representing various regional / international agencies.

With your gracious presence and blessings, we are optimistic that that the event held here in Thimphu will be a big success.

It is also my privilege to welcome two former Director General's of the Department of Livestock, Director DAMC/CoRRB and other heads of agencies to this opening session.

Let me once again extend hearty welcome to our chief guest, His Excellency and to all the distinguished delegates and guests.

Thank you and Tashi Delek

Welcome Address by FAO

Hiroyuki KONUMA, FAO ADG and RR Asia-Pacific, delivered by Joachim OTTE

Your Excellency, Lyonpo Yeshey Dorji, Minister, Ministry for Agriculture and Forests, Royal Government of Bhutan

Director Generals, Directors, Senior Officials;

Dear colleagues;

Ladies and Gentlemen,

It is my honour and pleasure to speak some words of welcome on behalf of Dr Hiroyuki Konuma, FAO Assistant Director General and Regional Representative for Asia and the Pacific.

APHCA is one of five regional technical commissions hosted by FAO's Regional office for Asia and the Pacific. These commissions, Forestry, Fisheries, Plant Protection, Statistics and APHCA, were established upon the request from member countries to have an enabling platform, at which to discuss and find solutions to technical matters of common concern.

Establishment of these regional commissions goes back a long way, to the 1960s and 70s, and they have survived many changes in FAO, some of which have been to the better, some to the worse. Similarly, the Commissions have had highs and lows, but they have worked steadily over more than 40 years under at times adverse conditions establishing a track record of continuity and partnership.

Globally, but particularly in Asia, dramatic changes have taken place over the past decades: technological advances and investments have been tremendous, take the internet and mobile phones, human and animal populations have grown considerably, movements of people, animals and animal products have increased exponentially, public institutions have in many instances weakened and the climate is getting rougher.

The Commissions thus have to adapt and take on new challenges. Unfortunately many of the old challenges still persist. In the livestock world, in addition to the 'classical' infectious diseases that occupied much of the agendas of previous Sessions, we now face 'new' diseases that seem to be emerging ever more rapidly, many of them being of zoonotic nature. Undoubtedly this is a consequence of increased animal populations and changed husbandry systems. Antimicrobial resistance, propelled by imprudent use of antimicrobials, both in humans and animals, is another looming threat, which urgently needs to be addressed if we do not want to run the risk of succumbing to what

used to be 'simple' infections. Excessive livestock populations furthermore contribute to pollution, land degradation and climate change.

These challenges come along with an institutional environment that is gaining in complexity. Bi-, tri- and multilateral free trade agreements, overlapping regional economic communities, multinational corporate businesses, international NGOs and NGO alliances, a proliferation of international agencies, etc. make our work more difficult still, not to mention the ever-present crises demanding an immediate response.

Against this background, I believe, a level-headed APHCA, whose members are committed to the original ideal of collaboration and mutual assistance, can be of great benefit to the region. The vision of the founder fathers of this Commission as a platform for coordination of self-determined collective action, financed mainly by the countries themselves through national funds, is as valid today as it was 40 years ago.

My hope is that APHCA can expand its membership and coverage and deepen collaboration with other international and intergovernmental Organizations relevant to livestock sector development. I am therefore very pleased that we can welcome Drs Kugita and Ishibashi from OIE and Dr Cokanasiga from the Secretariat of the Pacific Community as observers to the Session.

At this point I should mention that within FAO, the regional technical commissions have become the priority setting bodies in the areas of their technical expertise for FAO's regional conferences and that the recommendations from this and the previous Session will be presented at the next Regional Conference for Asia and the Pacific to be held in Ulaanbaatar, Mongolia, in March 2014.

To end, I would like to express my personal appreciation to GoB for hosting this Session and I look forward to fruitful deliberations.

Thank you

Opening Address by the Guest of Honour

H.E., Lyonpo Yeshey DORJI, Minister, Ministry for Agriculture and Forests, Royal Government of Bhutan

Chairperson of APHCA, Dr W.K. de Silva,

Secretary of APHCA, Dr Joachim Otte,

Representatives of FAO & OIE

Delegates, Participants,

Ladies and Gentlemen

Kuzuzangpo, "good morning", a very warm welcome to Bhutan and the "37th Session and 74th Executive Committee meeting of APHCA and the technical workshop on zoonoses, food borne diseases and antimicrobial resistance"

We are indeed delighted and honored to host this important event in Bhutan with funding support from OIE, FAO and APHCA.

Of the 18 member countries of APHCA, 15 countries are able to participate in this session. This is an indication of solidarity among member countries. I, on behalf of the Royal Government of Bhutan, would like to thank the delegates for their participation.

The Asia – Pacific region is home to more than two-thirds of the global livestock population and is also one of the major producers of global livestock products. Intensive farming is evolving in the region, along with increasing trade and mobility of goods and services to fulfill the growing demand for food. Along with intensive farming and trading, there is growing possibility for emergence of new pathogens and development of AMR, requiring concerted efforts to frame up appropriate preventive and remedial measures. This technical workshop is, therefore, organized at the right moment.

The role of APHCA is more crucial now than ever before to enable developing suitable measures in combating zoonosis, food-borne diseases and AMR. Of late, APHCA has notably facilitated strengthened collaboration among member countries through Livestock Policy Networking, Asian Dairy Networking and formulation of National Feed Assessment Systems. Besides, it has provided an avenue to enhance the technical capacity of individuals through technical collaboration and information sharing among member countries to tackle zoonotic diseases such as brucellosis, tuberculosis, rabies etc.

APHCA, as one of the leading regional bodies, has also enabled liaising with International organizations such as FAO, OIE and WHO, which are instrumental in initiating "One Health"; a holistic and collaborative approach to mitigate and counter

the emergence of zoonoses and other diseases. APHCA and its members are fortunate to be the part of reputed organizations in pursuing this holistic approach.

In Bhutan, we have been in pursuit of a holistic approach on all development aspects guided by the principles of GNH for almost four decades. But we are yet to grasp comprehensive solutions to deal with complexities of development and its needs.

Over the next three and half days of your deliberations, I expect that you would not only gain comprehensive understanding on the prevalence of zoonoses, food-borne pathogens and antimicrobial resistance in the region; but also come up with an effective framework to collectively tackle those risings threats that impact the public in general and livestock farmers in particular.

We are also confident that this gathering would enable strengthening of collaboration between research institutions in the region and international organizations and universities to enhance the technical capacity of stakeholders.

Through the merit of this congregation and deliberations, it is my wish and prayer that APHCA strengthen collaboration among countries in Asia and the Pacific Region and it becomes one of the premier organizations to deliver holistic development.

I wish all the delegates and participants a fruitful discussion on the issues and wish to all present at this important event a happy stay in Bhutan.

Thank you and Tashi Delek

Vote of thanks

Dr Vinod AHUJA, FAO-RAP Livestock Policy Officer

Kuzu zangpo la.

Honorable Mr Chairman, invited guests, ladies and gentlemen!

On behalf of Animal Production and Health Commission for Asia and the Pacific and on behalf of FAO, it is my privilege to propose a vote of thanks on this occasion.

At the outset, I would like to express our profound gratitude to His Excellency, the Guest of Honour, Lyonpo Yeshi Dorji, Minister for Agriculture and Forests for sparing his valuable time to address the delegates, and for highlighting the challenges ahead, the unique solutions we need to find, the partnerships we need to forge and also recognizing the leadership role APHCA can play in this process. I'm sure delegates will take these words into account during their deliberations in the next few days.

I take this opportunity to express our sincere thanks to Dr de Silva, APHCA Chairperson for his presence today and for his guidance and support throughout the previous year.

I wish to place on record our most sincere thanks and appreciation for Dr Tashi Dorji, officiating Director General, Department of Livestock, Ministry of Agriculture and Forests for his leadership and personal attention in organizing this 37th APHCA Session.

I also wish to express our gratitude to Dasho Tenzin Dhendup and Dasho Karma Dukpa the former director generals, Department of Livestock, Royal Bhutan Government and other heads of department for their gracious presence this morning. Their presence is a source of encouragement and I thank them sincerely on behalf of all the delegates.

I would like to take this opportunity to place on record our heartiest thanks to Mr Naiten Wangchuk and all his team members for the perfect organizational support. Many of the team members have taken on the tasks beyond their comfort zones. It is a true team work and it shows. Thank you to the whole team.

Finally, I would like to thank all the delegates and invited guests for having travelled from near and afar to grace the occasion and to contribute to the discussions that will follow.

Kadrinchey and Tashi Delek.

Closing Remarks

Dr Tashi DORJI, Offtg Director General and Chief Veterinary Officer

Distinguished delegates, ladies and gentlemen

Today, after four days of hard work, we have finally come to an end of the APHCA meeting and workshop 2013.

For small country like Bhutan, it has been our true honor and privilege to host this event. Thank you all for APHCA member countries and the Secretariat for giving this opportunity to host this august gathering.

Over the last few days, I guess we have successfully achieved our intended objectives of the meeting. At the APHCA business session, we have reviewed our past activities, and we noted with satisfaction the progress we made so far. For this we appreciate the most efficient secretarial services provided by Dr Joachim, Dr Vishnu, Dr Vinod and their team members at RAP, Bangkok for their dedication and commitment.

I understand that Dr Vishnu in particular has been associated with APHCA for many years, and has been instrumental in bringing APHCA to this level. We hope that you will continue to remain with us and help us shape the future of APHCA.

Let me also acknowledge the delegates from APHCA member countries for making it to Bhutan, and providing your valuable inputs to this Session. All of you have given Bhutan and me in particular the chair of our organization for the next one year. For me it is a singular honour to take up such position, and I thank you for this opportunity.

In my capacity as a new Chair, I wish to solicit support of my new Executive Committee members and focal points of all the member countries in strengthening our organization. During my brief exposure to APHCA in this Session I get the feeling that we need to better own APHCA as our own organization; unless we take ownership in APHCA affairs, I am afraid that it will be difficult to keep this platform relevant and purposeful.

In order to this, I believe that we need to engage our member countries meaningfully in APHCA activities; and let us hope that over the next few years, we will able to engage our member countries more proactively in a systematic manner. It is only through working hand in hand that we can begin to appreciate our collaborative efforts. It can then help build solidarity and positive energy among member countries, which should further strengthen this regional Commission as platform for raising our concerns in the global forums.

Also, it is through such unity that we can attract new family members. And over the next few years, let us also endeavour through various means to bring additional members to our APHCA family. On this note, we are happy and honored by the interest shown by

SPC to join us. We welcome SPC members to join us and I am thankful to all member countries for kindly endorsing the application favorably.

Let me also appreciate international agencies (OIE, ILRI, CIRAD, WHO, FAO) and universities for making efforts to travel such long distances to participate in this APHCA Session and workshop here in Bhutan. I thank you for your wholehearted support and contribution in making this meeting a big success. I must say that we are truly honored by the presence of such large numbers of experts and professors at this forum. Indeed, it has given a good opportunity for me and all my staff sitting around in this hall to interact, discuss and share experiences. Thank you for giving us your precious time, and we hope that this would not be your last visit to Bhutan.

In particular, we are truly grateful to OIE for co-funding the back to back workshop for this year on "zoonoses, food borne diseases and AMR", and we hope that OIE will continue to closely work with APHCA and in its member countries.

Finally, let me wish all of you a very safe journey back home. With a heavy heart, we would like to say good bye and *Tashi DELEK*.

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