Welcome to the second instalment of the Mekong Livestock Research (MLR) newsletter! Our three projects are entering an exciting phase nearly two years after they commenced in Cambodia and Laos. A lot of hard work has gone into getting the projects established, participants recruited, and research initiatives and activities progressed. With abundant information being generated and preliminary analysis leading to important outputs, we are now able to start to review findings to guide future priorities and explore opportunities to achieve additional outcomes. This newsletter contains updates on core project activities, information on new initiatives, and news on activities of students, including new research students commencing masters or PhD degrees. Your feedback, as always, is welcome.

2015–2017: What’s been happening?

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Development of a biosecure market-driven beef production system in Lao PDR (AH/2012/068)

The second year of this project has seen exciting progress. The project has maintained high farmer retention and participation along with high levels of forage adoption. Forage adoption continues to be used as an entry point for vaccination uptake and improved biosecurity measures.

The project has been responsible for the vaccination of just under 1,500 animals from four provinces for foot-and-mouth-disease and haemorrhagic septicaemia.

Fattening trials conducted at the National University of Laos showed the promising results with average daily weight gains of 0.7-0.8 kg/day over an eight-week trial. Price of sale data need to be collected to produce a benefit–cost analysis to promote these fattening activities.

There has been further work to incorporate the medicated molasses blocks into the project locations after the successful pilot trial.

Knowledge, attitude and practices (KAPs) surveys were conducted in a number of commercial slaughter houses in northern Laos. These data is being prepared for manuscript submission by a Masters of Veterinary Public Health Management (MVPHMgt) student.

The ongoing serological survey of bovine reproductive diseases has yielded some interesting preliminary findings, particularly the high prevalence (68.9%) of *Neospora caninum*.
Project AH/2012/068 is nearly half-way through and is still enjoying a high level of village and farmer retention. There has been significant development with project villages in Xieng Khouang and Xayabouli accepting the proposal of implementing a village quarantine holding areas to improve biosecurity.

The project continues to incorporate a multi-species village-level approach. Xayabouli, along with non-project province Savannakhet, has been identified as regions producing poultry and where targeted training in poultry biosecurity and nutrition would be highly beneficial.

Serosurveys for porcine reproductive and respiratory syndrome (PRRS) and FMD are ongoing. Further capacity building and technical training is needed to ensure efficient and standardised testing procedures in-country.

The use of medicated urea molasses blocks has shown promising results, increasing calf survival and adult daily weight gains.

University of Sydney student involvement continues throughout the project. The New Colombo Plan-funded field school occurred in July 2016, involving 15 interdisciplinary students. The school was designed to demonstrate the unique challenges faced when trying to ensure food security within Lao communities.

Enhancing transboundary livestock disease risk management in Lao PDR (AH/2012/067)

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Village-based biosecurity for livestock disease risk management in Cambodia (AH/2011/014)

Year two of project AH/2011/014 built on the initial activities and achieving its scheduled milestones. As in Laos, the uptake and maintenance of forage plots has been encouraging with the total land use increasing to 292,600 m². Ear-tagging was implemented in the first year, after some local resistance, and year two saw a 97% retention rate.

Nutrition training activities continue, focusing on forage cultivation techniques and management, silage production, and the urea treatment of rice straw. These activities experienced increased female participation.

Longitudinal farmer and livestock production surveys continue throughout the project. Preliminary findings are showing increasing average daily weight gains. However, the price of cattle has fallen leading more farmers to expand into poultry and pig production.

A large ruminant reproduction workshop is planned to July 2017.
Reproduction Workshop, Laos 2017

Building the knowledge of people is an important component of development work, particularly in agriculture. Increasing local knowledge and capacity can be a complex process, often involving a variety of communication methods. In February 2017 Dr Syseng Khounsy of the Department of Livestock and Fisheries along with the MLR team and Australian cattle veterinarian and reproduction trainer Dr Peter Alexander, conducted a Large Ruminant Reproduction training workshop in Luang Prabang. It included a tutorial on reproductive physiology, which involved ‘blind’ pregnancy examination of the reproductive tract at varying stages of gestation. This activity focused on participants trying to distinguish reproductive structures by feel, as they would in rectal pregnancy diagnosis. The following day provided the participants with an opportunity to practice pregnancy diagnosis at a buffalo farm. The afternoon session provided discussion on causes of reproductive failure and what interventions can be put in place to rectify these.

Keeping messages clear and simple, complemented with interactive activities, proved a successful way of developing relationships and building capacity of the in-country staff.

The team hopes a similar workshop to be held in Cambodia will experience the same level of success.

Pathology Training, Laos 2017

Continuing with the ethos of building skills and knowledge within our Lao colleagues Professor Peter Windsor and Dr Sonevilay Nampanya conducted the first of three planned pathology workshops at NUOL. The workshop was attended by 18 students and staff, including nine females. The workshop was conducted over two days and included class room discussions of the 5 principles of pathological processes, identifying gross lesions and learning how to present a morphological diagnosis. The each day was concluded with a post mortem or examination of specimens. As in the reproduction workshop, these practical components are an excellent way to allow the staff and students to put their theory into practice. They also go a long way to breaking down barriers and encouraging discussion and interaction with our Australian team members.

This initial workshop covered the cardiovascular and respiratory systems and we hope to conduct two more workshops in order to cover remaining body systems and re-enforce the learning process.
Conference and meeting attendance

The MLR team has been busy with conference presentations and participation in regional meetings.


Team Member Updates

Sonevilay Nampanya PhD awarded

Sonevilay Nampanya successfully completed and graduated with his PhD ‘Progressing large ruminant productivity and transboundary disease risk management for smallholder poverty reduction in northern Lao PDR’ in 2016. Throughout his PhD, Sonevilay attained a very high success rate of producing quality peer reviewed publications which now make up a substantial and much needed database contributing to the understanding FMD economics, epidemiology, biosecurity and transboundary and emerging disease control and animal production in Laos. Sonevilay has been appointed an honorary associate of the University of Sydney and has formally joined the MLR team as Project Officer, Laos, and continues to play an important and senior project management role in both Lao projects.

James Young, former Project Officer, PhD submitted

Jim has had a busy time since the last issue of the newsletter. He and his wife welcomed young Henry into the world and Jim stepped down as project officer, to dedicate his time into finalising his PhD ‘Change management for sustainable foot-and-mouth disease control in Cambodia’ for submission in June 2017. Jim has also attained a high success rate of publishing quality peer reviewed papers and has complemented...
the work Sonevilay has conducted by producing an equally valuable database on the economics, epidemiology and biosecurity of FMD and transboundary emerging diseases and animal production in Cambodia. Jim has also been appointed as an honorary associate of the University of Sydney and will remain an integral part of the team!

The team looks forward to ongoing collaboration with Sonevilay and Jim as they progress through their careers!

**Katherine Ashley, PhD student, Cambodia**

Kath has made great progress on her PhD in 2016, with one highlight including the publication of her paper entitled 'Socioeconomic impact of forage technology adoption by smallholder cattle farmers in Cambodia'. This paper was accepted for publication in *Animal Production Science* on 20 August 2016, after a rigorous review. Kath's work supports the Cambodian project by identifying socioeconomic effects of both traditional and novel agricultural practices, including assessing who is affected. In late 2016, Kath undertook her second major study investigating the drivers of, challenges to, and opportunities for adoption of forage technology. She is currently analysing data on a socioeconomic impact assessment to determine the impact of project involvement on champion farmer households, and preparing to report results. Kath also attended the 17th Asian and Australasian Animal Production (AAAP) Congress held in Fukuoka, Japan, in August and was awarded the Young Scientist Award for her presentation entitled 'The role of forages in reducing household labour demands of cattle feeding during the dry season in Cambodia'. She spent the summer with friends and family in Australia and returned to Cambodia in January 2017.

**Luisa Olmo, PhD student, Cambodia and Laos**

Luisa joined the MRL team as a full-time PhD student in 2016 following her BAnVetBioSc (hons) research in Cambodia. Luisa is a very promising young scientist and brings a strong statistical background to the team and we have already put her to work on a number of big ‘data jobs’. Luisa’s research focuses on investigation of reproductive performance in cattle and buffalo in Cambodia and Laos. In a short period, she has already had a large impact, with her investigation of methods to improve smallholder cattle reproductive efficiency in Cambodia already leading to one publication (see new publications below). Luisa is a strong advocate that improving farmer knowledge is a valuable tool to prevent unnecessary reproductive loss.

**Joanne Thomas, MVPHMgt**

Joanne undertook her MVPHMgt Research Project with the MLR team in late 2015 and her thesis involved investigating operator capacity of red meat slaughter and directions for development in Laos. Joanne was awarded a high distinction for her project and graduated with her MVPHMgt in December 2016. Her study investigated operator KAPs in red meat slaughter premises in northern Laos, as well as comparing practices with international best practice to inform future industry development. The survey interviewed 68 employees from all ten commercial slaughter premises in six districts in three northern Lao provinces. This study provides baseline information that can be used to support the design of training programs on disease risks and prevention that will help to facilitate development of the red meat industry. This work is currently being finalised for submission for peer review and publication.

**Corissa Miller, MVPHMgt student, Laos**

Corissa travelled to Laos in October 2016 to investigate an outbreak of FMD that reported-
ly commenced in 2015 and identified a strain of FMD serotype O that had previously not been identified in South-East Asia. Her investigation involved travelling to two villages where FMD had been reported and to nearby villages where no outbreak was reported, and interviewing farmers and collecting samples from cattle and buffalo. In total, she visited 10 villages and obtained samples from 160 large ruminants. The survey data will be analysed and used to try to identify significant risk factors for the introduction of FMD into smallholder communities. Despite FMD being endemic throughout the region, very few risk factor studies are available in the scientific literature. Corissa has built collaborative partnerships with the CSIRO Australian Animal Health Laboratory and the World Organisation for Animal Health (OIE), which provided laboratory kits and personnel to assist with the diagnostic testing of samples.

**Nichola Calvani, PhD student, Cambodia**

Nichola joined the MLR team as a full-time PhD student at the completion of her BAnVet-BioSci degree in the middle of 2016. She initially became interested in the project through her honours work on the prevalence of liver fluke (Fasciola spp.) in selected Cambodian villages in January 2016. Nichola’s PhD will focus on the control of fasciolosis in cattle and buffalo in Cambodia and Laos. In particular she will be investigating the effectiveness of medicated feed supplement blocks in smallholder systems through a trial she has planned for the middle of 2017.

Most recently Nichola has been busy in the laboratory comparing the sensitivity and specificity of several diagnostic techniques to determine the best method for use in the field. In doing so she has been developing a real-time quantitative polymerase chain reaction (qPCR) protocol for eggs in faecal samples. It is hoped that this technique will lead to the definitive identification of fluke species in this area. Nichola is looking forward to sharing her laboratory skills with other scientists and technicians through local training sessions and seminars.

**Isabel MacPhillamy, Project Officer**

Isabel recently joined the MLR team as its new Project Officer, taking over from Jim Young who is dedicating his time to finalising his PhD. Isabel graduated with a BVSc degree in 2015 after completing a BSc(Vet) in 2013 in which she conducted a research project on ‘Improving smallholder farmer biosecurity education in Lao PDR to enhance large ruminant marketing’. She spent considerable time in Laos collecting data, along with a final year placement in Indonesia, and leisure travel throughout South-East Asia. She is excited to be back on board with these and future ACIAR projects.
New Publications


Student Contributions

New Colombo Plan Field School

In July 2016 the MLR team, in conjunction with the University of Sydney, conducted an interdisciplinary field school involving 15 University of Sydney students to introduce them to the unique challenges facing rural communities in Laos when ensuring sustainable food security. The field school was held on 10–19 July 2016 at the Nabong Campus, of the National University of Laos (NUOL), Vientiane. The fieldwork involved farmer interviews and students were also tasked with investigating threats to food security in smallholder communities. The Ambassador John Williams hosted the students for a
BBQ at the embassy grounds and the students were updated on recent ACIAR activities in Laos.

Student Research Projects

This year we have a number of BAnVetBioSci, BSc (Vet) and BVSc students conducting research projects with travel and project costs for all the Australian students supported by the NCP student mobility grants.

The potential of introduced breeding management in improving calf survival and growth in Cambodian smallholder systems

Rhiannon Phillips (BAnVetBioSci student) is undertaking a project in Cambodia to identify management strategies that will improve reproductive performance through increased pregnancies across the lifetime of a cow and improved calf survival of cattle and buffalo calves. Field work will include surveys of 15–25 study sites (smallholder cattle farms) from provinces including Takeo, Kampong Cham, Tbong Khmum, Siem Reap and Battambang. Study sites will be chosen depending on participation of staff and farmers and productivity of cattle. Upon assessment of the data, a calving calendar will be developed that could be implemented to increase calf survivability and number of pregnancies and thus increase meat production and farmer income. The project compliments the overall aims and objectives of the major ACIAR reproductive projects that aim to improve cattle reproduction and ultimately increase animal value, farmer income and meat supply. Rhiannon is excited to be immersed in the Cambodian farming culture and begins data collection in July!

Urea supplementation using molasses blocks to improve cattle production in Cambodia

Amy Graetz (BAnVetBioSci student) is conducting research to identify the current use of nutritional supplements by smallholder Cambodian farmers and assess the potential benefits of introducing urea molasses blocks to minimise nutritional deficiencies in cattle. Amy visited project villages in Tbong Khmum and Takeo provinces and observed cattle production and gauged farmer acceptance to feed supplementation for improving the use of readily available rice straw during the dry season. Amy hopes to combine her results with liveweight data in Laos to investigate the potential use of urea molasses block in Cambodia.

Gross margin analysis comparison of smallholder livestock and cropping systems in Cambodia

Holly Harrison (BAnVetBioSci student) is conducting research on production and socioeconomics in Cambodia. The project is exploring the profitability of cropping and livestock production systems. Holly will travel to Cambodia from in June–July 2017 to visit project villages and obtain financial information to develop gross margin analyses of individual cropping and livestock enterprises. Holly hopes that the project will compare the gross margins of smallholder cropping and livestock farmers and determine which enterprises provide the best use of the resources that these farmers have available.

Climate changes and drought impacts: smallholder preparedness

Isabella Uechtritz (BAnVetBioSci student) is investigating the effects of drought in rural Cambodian communities, and how drought affects livestock production by smallholder farmers. She aims to develop a set of risk management guidelines that will enable smallholder livestock producers to prepare better for drought through improved risk mitigat-
tions measures in production, nutrition and water allocation. She has conducted surveys in Tbong Khmu and Takeo provinces, gathering information on farmer history, perceptions and knowledge of drought.

**Champion livestock farmers: a case study**

**Madison Hickey** (BAnVetBioSci student) is conducting research on champion livestock farmers to improve and promote livestock production and health in Cambodia. She conducted interviews in Tbong Khmum and Takeo provinces to identify the champion farmers’ approaches and their effects on farmer livelihoods. Madi hopes to develop extension strategies and messages that can then be promoted to other Cambodian farmers.

**Availability and use of vaccines to prevent livestock disease in rural Cambodia**

**Holly Laurence** (BAnVetBioSci student) is investigating the availability, storage and use of vaccines following a reported outbreak of foot-and-mouth disease. She aims to determine the potential causes of breakdown of protection such as the uses of inappropriate vaccines, ineffective transport and storage, poor administration, and poor manufacture. Holly hopes that her project will be able to provide information that ensures disease prevention gaps are identified and remedied.

**Investigations into goat zoonosis in Lao PDR**

**Rebekah Burns** (BSc(Vet) BVSc student) had the opportunity this year to collaborate with Mahidol Oxford Tropical Medicine Research Unit (MORU) on a project in Laos under the supervision of Professor Stuart Blacksell. The project aims to understand the prevalence in the Lao goat population of zoonotic diseases, particularly Q-fever and brucellosis, which are present in other countries in the region. A farmer survey has also been constructed to understand goat farming practices in Laos and to identify risk factors for the spread of zoonoses. To date, Rebekah and the Lao team at the National Animal Health Laboratory have collected samples from the provinces of Vientiane, Xayabouli, Xiangkuang, and Savanneket, with future trips to Attapeu and Champasak also planned. Serology and PCR will be performed to determine the prevalence and strains of Q-fever and brucellosis in the Lao goat herd. This information will be used to influence public health policy in Laos, and assist health professionals to diagnose and treat undifferentiated fevers. This project is funded by the Defense Threat Reduction Agency, with support from the Department of Agriculture, Forestry and Fisheries, Lao PDR, MORU and the MLR team. Rebekah is a New Colombo Plan scholar and has been living in Vientiane since January 2017 and plans to stay until mid-August.
Over the last two years the Queensland-based animal nutrition manufacturer 4 Season Company Pty Ltd, have donated supplies of anthelmintic medicated molasses blocks for use in our current projects. Preliminary trials indicate this may be an efficacious approach for delivery of anthelmintics for control of internal parasites in large ruminants. We are very excited about developing the future relationship in Cambodia and Laos.

We are very grateful for this ongoing support!