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Programme Element of the 13th MSP of GASL in Chiang Mai, Thailand, 30 October – 3 November 2023, with the title:

Multi-stakeholder collaboration to strengthen sustainability and resilience of livestock systems in response to drivers of change.

	Contact person	Title and main driver group	Author(s)	Affiliation and main sustainability domain	Abstract
1	Katrien van't Hooft Natural Livestock Farming Foundation (NLF) katrien@naturallivestockfarming.com +31-616641874 _____ 2 Poster	Remarkable results with the use of herbs as part of an integrated livestock health strategy in smallholder and large scale dairy farming Health and disease drivers Geopolitical and economic drivers	Dr. Katrien vantHooft, Dr. M.N.B.Nair, Dr. M.Groot, Dr. Demesne	MaL 	Anti-Microbial Resistance is on the rise. Recent articles in the Indian Times quote the latest report by the Indian Council of Medical Research: resistance of Coli and Pasteurella superbugs in hospitals is growing: in 2017 80% of the patients with drug resistant Coli responded to last resort antibiotic Carbapenem, in 2022 this dropped to 60%. Similarly UNICEF published The Urgent Threat of Drug-Resistant Infections – highlighting the risk of AMR for child survival, growth and development, and calling for optimal use of antibiotics and increasing awareness. Since 2014 Natural Livestock Farming Foundation (NLF) promotes international collaboration of farmers, veterinarians and researchers in India, Ethiopia, Netherlands and Uganda with the collective aim to improve cattle health and reduce the use of antimicrobials. Use of herbs is a crucial part of the integrated NLF 5-layer strategy, combining animal management, good breeding practices, ethno veterinary medicine, quality control and farm economics. This strategy, with validated use of herbs as crucial element, was picked up in both smallholder and large scale dairy to address critical cattle health challenges, with remarkable results.

2	LAMP (Ulf Magnusson, SLU; Margherita Gomarasca VSF International; Fred Unger, ILRI) ulf.magnusson@slu.se +46709770855 _____ 3 Posters	Antimicrobial use and resistance among livestock in Southeast Asia – a driver that need collaborations and capacity development efforts? Health and disease drivers Geopolitical and economic drivers	LAMP Ulf Magnusson, SLU; Margherita Gomarasca VSF International; Fred Unger, ILRI	Action Network LAMP Health  	Our three organisations have all focused on the use of and access to antimicrobials among livestock producers in the region. At the shairfare we will present and discuss findings from our work in the region. In brief, some of this work comprises the following: **Agronomes et Vétérinaires Sans Frontière (AVSF)** has been working on training and capacity building of village animal health workers (VAHWs) in different provinces of Cambodia to provide animal health services at the community level since early 1991. In a recent impact evaluation of this work focusing on veterinary drug use, it was found that the assessed projects have been successful in changing practices related to changing the way of antimicrobial usage and increasing awareness of antimicrobial resistance of village animal health workers. However, livestock keepers' knowledge on AMU and AMR remains limited, and more efforts are needed in terms of awareness raising. **ILRIs'** research on antimicrobial resistance (AMR) in Vietnam has one of its focuses on fostering One Health collaboration in a dedicated One Health Field Side (Thai Nguyen). Moreover, partnering with the private sector alternative feed supplements such as probiotics or improving biosecurity in pig fattening were piloted (Quang Ninh). Results indicate limited collaboration between relevant sectors, more available resources in the PH sector to monitor AMR, and no advantages in productivity parameters for pig fattening (e.g., average daily weight gain) from the use of antimicrobials. **SLU and partners** have conducted studies on farmers' source of information on how to medicate sick animals and where to access antimicrobials in Thailand, Cambodia and Vietnam. In general, pig and/or poultry small-holders don't have access to affordable veterinary service and do often get advice on how to treat animals from agrochemical shops where they also buy antimicrobials without prescription. Larger pig farms in Thailand connected to feed suppliers do have access to veterinarians who also provide antimicrobials. These studies suggest that agrochemical shops are key players in the ambition towards a reduced and more medically rational use of antimicrobials

3	Rogerio M. Mauricio Closing the efficiency gap rogeriomauricio@ufsj.edu.br +41 31 910 21 05 _____ 1 poster	Economic and environmental analysis of three beef production systems in Brazil Geopolitical and economic drivers Environmental drivers	Katrin Agethen, Rogerio Mauricio, Claus Deblitz, Abilio Pacheco, Mauroni Cangussu, Julian Chara, Ernesto Reyes	AN CEG  	Against the backdrop of changing production conditions and market requirements, it seems time has come to rethink Brazil's beef production systems. We analyse the economic and environmental performance of three beef production systems (classic beef production system (CB), the Integrated Crop-Livestock-Forestry system (ILPF) and the natural regeneration system (NR)) in a comparative case study analysis. We find that, though direct costs for CB beef production systems are the lowest, only the ILPF and NR case studies are generating long-term profits. While GHG emissions per kg live weight added are lowest in ILPF, followed by NR and CB, per hectare (ha) emissions are highest in NR, followed by ILPF and CB. Considering the system's carbon removal, NR and potentially ILPF are sequestering more than releasing. The three production systems perform differently depending on the indicators analysed. How they will reply to future challenges depends on the location and the specific environment.

4	Pedro M. Herrera Fundación Entretantos pedrom@entretantos.org +34 607425024 _____ 2 Posters	A participatory plan for adapting extensive livestock farming to climate change in Spain Environmental drivers	Pedro M. Herrera, Julio Majadas, Mireia Llorente, María Turiño (Fundación Entretantos)	MaL 	The difficulties that pastoral systems have been facing in recent years are exacerbated, with increasing force, by the impacts of climate change. The scenarios foreseen for the immediate future, with rising temperatures, changes in the rainfall regime, extension of aridity periods and an increase in the incidence of extreme weather events, drive the urgency to take strategic measures to adapt the activity and guarantee its sustainability. This situation represents a loss for society in many aspects, such as the reduction of a fundamental food source, the increasing dependence on external inputs, or the loss of adaptation knowledge, which reduces the global capacity to fight land degradation and mainstream sustainable land management. This scenario has guided the co-construction of a participatory **action plan to adapt the extensive livestock sector to climate change in Spain**. Led by Entretantos Foundation, under the support of Life Live-ADAPT project, a participatory methodology, focusing especially on pastoralists and farmers, with a gender approach, has involved more than 120 people in its construction, also including researchers, politicians, technicians and experts. The result is a dialogue between stakeholders involved in the pastoralist sector, which has been essential to legitimize this text. The plan addresses three fundamental challenges, first, establishing the technical bases for the implementation of adaptation and resilience strategies , second identifying barriers and constrains to the implementation of technical solutions and third, the incorporation of pastoralism and extensive livestock farming, neatly differentiated by its specific qualities, to the general climate adaptation strategies that are being developed at different political levels (European, national and regional).

5	Nancy Bourgeois and Rogerio M. Mauricio A&R Cluster Co-Coordinators nancy.bourgeois@bfh.ch, + 41 31 910 21 05 _____ 2 Posters	Role and activities of the Academia and Research Cluster in GASL Geopolitical and economic	Rogerio M. Mauricio Nancy Bourgeois Lüthi	A&R Cluster    	The Global Agenda for Sustainable Livestock (GASL) consists of 7 Clusters and 8 Action Networks. The 7 Clusters ensure that all sectors of society participate in an open and voluntary manner, while Action Networks are thematic groups of technical experts, gathering evidence, designing the tools and guidelines available, enhancing practice change, and providing inputs for policy change. Each Cluster supports the Agenda and Action Networks through various ways related to its nature and role in GASL. The Academia and Research (A&R) Cluster is one of the largest of the 7 Clusters, with appr. 30 institutional members, mainly universities and research institutes. One of the primary roles of the A&R Cluster is to ensure that GASL operates in an inclusive, knowledge-based, scientific, and evidence-based manner. Over the years, the role of the A&R Cluster has evolved to become more operational. The A&R Cluster for instance supports Action Networks through its Editorial Board set-up in XXXX. Board members review and critically appraise publications written by members of Action Networks. Reviewed and approved papers are published on GASL's website. The A&R Cluster also contributes to the organization of regional consultation meetings and the annual multistakeholder partnership meeting. A more recent activity of the A&R Cluster, called by some of its members, is to identify topics generating debates in the society, so-called "hot topics" and to tackle them through webinars. A series of webinars for 2023 and 2024 is currently being planned and can be updated with new topics and ideas.

6	Alexandre Ickowicz AN2 Chair alexandre.ickowicz@cirad.fr +33 615480384 _____ 2 Posters 1 Monitor 19 inch	An analysis and acknowledgment of the multifunctionality of grasslands to manage main drivers of change Technological and innovation drivers Health and disease drivers Environmental drivers Geopolitical and economic drivers	Alexandre Ickowicz, Mariana Quiroga	GASL AN 2 	Throughout the world, livestock grazing systems (LGS) include, and provide livelihoods for, many rural populations. These LGS are represented in a wide variety of agroecological and socioeconomic contexts and offer a huge variety of system organization. Hence they are subject to the impact of many external drivers which may alter or increase their opportunity to adapt to a fast changing world. Indeed, they contribute to sustainable food systems by providing multiple products including low-cost edible proteins and energy, draft power, diverse outputs (carbon and soil nutrient regulation, landscape and biodiversity maintenance), various roles (local development support in harsh environments, contribution to the circular economy) and benefits to populations (food security, revenue, employment, and cultural assets). These multiple functions may be impacted by multiple drivers and their interactions be described through a multifunctional conceptual model specified for LGS. Applied to diverse cases in Africa, Asia, Latin America and Europe, the framework enables the assessment of the multifunctionality of these systems in a holistic manner that includes four dimensions: production, social, environmental and local development. Through these dimensions and associated local indicators, this approach help within multi-stakeholder platforms to facilitate discussion among actors on how to manage and take opportunity of drivers of change and demonstrate the high potential of LGS to contribute to agroecological transition and sustainable food systems. Management of interactions and trade-offs between drivers and functions may be improved using such a model in a multi-stakeholder approach.

7	Dilip Bhandari Senior Director Programs Heifer International Dilip.bhandar@heifer.org _____ 2 Posters	Advancing Sustainable Livestock Development Strategies to benefit small Farmers Technological and innovation	Dilip Bhandari, Rabin Raj Niraula, Fabrice Carbonne, Peter Goldstein, Oscar Castaneda, Mark Chandler, Mark Tsoxo	NGO Cluster Livelihoods and economic growth	An estimated 600 million of the world's low-income smallholder farming households earn their livelihoods primarily from raising livestock, while the livestock sector provides employment for more than 1.3 billion people worldwide. In recent years, particular focus on the contribution of livestock and consumption of animal proteins to the current climate crisis has further challenged proponents of sustainable livestock development. Heifer International (www.heifer.org) has worked with more than 46 million smallholder farming households across the globe to address hunger and poverty. Heifer emphasizes community mobilization and agri-livestock value chain development, with an emphasis on women, youth, and indigenous populations; facilitation of market linkages by strengthening farmer-owned agribusiness; and access to innovative finance and technologies. Heifer's strategies for sustainable livestock include i) holistic, sustainable, and safe livestock production standards, ii) social capital development, iii) inclusive participation, iv) collaborative marketing, and v) ecosystem health. Applying these strategies has helped communities to address nutritional deficiencies, boost local incomes, reduce greenhouse gas emissions, regenerate degraded landscapes, and improve animal health and well-being. Using these strategies, in Uganda 36,000 dairy farmers have adopted climate-resilient practices while doubling milk productivity. In Nepal, using climate-smart interventions, farmers have reduced their land use intensity by 74 to 85 percent, water use intensity by 87 to 98 percent, and greenhouse gas (GHG) emissions intensity by 74 to 91 percent. In Honduras, 90,000 dairy farmers are benefitting from the transformation of the dairy sector through the inclusive and resilient market system. Adoption of sustainable livestock strategies has helped smallholder farmers by strengthening four thematic areas: i) One Health and Animal Well-being – by prioritizing the well-being of animals and promoting sustainable production systems; ii) Social Inclusion and Justice – by promoting equitable participation and benefits for all stakeholders in the livestock value chain, emphasizing the inclusion of women and youth; iii) Economic Viability – by generating sustainable income for all involved, ensuring long-term viability; and iv) Climate and Environmental Care – by reducing the carbon footprint of livestock and its adverse effects on ecosystems, biodiversity, and the planet.

8	Ernesto Reyes Designation: AN - coordinator ernesto.reyes@agribenchmark.net + 34 600531081 _____ No poster Video _____ 1 Monitor	Providing new scientific evidence demonstrating the socioeconomic impact of dairy Technological and innovation drivers	Institutional approach: FAO/IFAD/GDP/IFCN/GASL	AN Livestock For social development 	**The Dairy Impact Methodology - Assessing how the dairy sector benefits society** There is evidence that the dairy sector provides multiple benefits to society and can greatly contribute to the achievement of the Sustainable Development Goals (SDGs). In any country, hundreds or thousands of dairy farmers, including women, get direct access to high-quality protein for their families and the much- needed cash to purchase dozens of goods and services. A multitude of businesses thrives along the dairy value chains, from small traders to milk collection centres, from processing plants to retailers. These businesses create a variety of jobs, thereby supporting thousands of households. Millions of consumers, and children in particular, benefit from the regular intake of milk and other dairy products, which are an essential component in the dietary guidelines of both developed and developing countries. There are also indirect benefits the dairy sector provides to society, from creating induced employment, for example in the feed and animal health industries, through generating revenue for the government to supporting economic growth and development. The available evidence on the benefits the dairy sector generate for society, however, is scattered and unsystematic. Decision makers do not have at their fingertips data and information to show how the dairy sector is good for social development and how investments in the sector would facilitate achieving the SDGs. As a result, existing policies and investments often neglect the dairy sector and, in the worst case, even hamper its sustainable development. With the objective to allow stakeholders systematically assessing the benefits the dairy sector generates to society and feeding with evidence any relevant policy dialogue, the Food and Agriculture Organization (FAO) and the International Food Comparison Network (IFCN) have joined forces with the Global Dairy Platform (GDP) and the International Fund for Agricultural Development (IFAD) to develop the so-called “Dairy Impact Methodology” (DIM).

9	Scott Newman Milo Bystricky FAO RAP Milo.Bystricky@fao.org; Scott.Newman@fao.org +66 839309567 2 Posters Monitor	The FAO Regional Office for Asia & the Pacific - Enhancing sustainable livestock production Technological and innovation drivers	Scott Newman (Senior Animal Health and Production Officer) and Milo Bystricky (Food Safety / Private Sector Specialist) FAO RAP	MaL 	The triple planetary crisis is increasingly demanding effective solutions for enhancing sustainable livestock production that improve the efficiency of livestock systems while minimizing environmental impacts. The increases in livestock productivity in Asia are thanks largely to recent innovations in breeding and genetics, nutritional management, and the integration of technology in the production systems. However, changes in livestock production systems, due to rising demand for livestock products, routine overuse of antimicrobials, large-scale deforestation, climate change and loss of biodiversity threaten the integrity of ecosystems and increase disease threats at the animal-human-environment interface. FAO's Regional Office for Asia and the Pacific, and specifically the Animal Health & Production module as well as the Animal Production and Health Commission for Asia and the Pacific (APHCA) have been working with countries by supporting governments, farmers, producers and other stakeholders along the animal production value chains to improve animal health management, develop climate-resilient livestock systems and adopt sustainable options for minimizing antimicrobial use. These include policy guidance on climate smart livestock production, awareness raising on cost-effective alternatives to antimicrobials, capacity development to implement good practices and adoption of vaccination programs and disease monitoring to prevent outbreaks and reduce the need for to reduce the need for antimicrobials.

10	Nancy Bourgeois Lecturer in international livestock systems, BFH-HAFL, Switzerland nancy.bourgeois@bfh.ch +41 31 910 21 05 --- 1 Poster	Emma's farm journey: a students' project bridging the gap between producers and consumers Technological and innovation drivers	Micha Fournier and Nancy Bourgeois	A&R Cluster 	Since 2014, the School of Agriculture, Forest and Food Science of Bern University of Applied Sciences in Switzerland has implemented a students' project called **Emma's farm journey**. **Emma's farm journey** is a yearly event gathering up to 5000 people (children from 4 years onwards and their families). It takes place during the last week-end of April on farms in the vicinity of Bern, Switzerland's capital city and at the premises of the School of Agricultural, Forest and Food sciences. The project has two main goals: it is a module in which students learn to plan a large event and it is also an educational project for young children and their parents to learn about agriculture. The goal of the project is to bridge the gap between rural producers and urban consumers. This project is a compulsory module which takes place in the 2nd year of BSc studies in agriculture. Over 8 months, students learn how to plan and implement a large event destined to a specific audience, (mostly) urban young children and their families. In the planning phase, students work in a specific project sub-component, for example looking for sponsors, liaising with the farmers, organizing service providers (transport, food, security, etc.), elaborating specific content for children and their families visiting the farms (posters, games, demonstrations, etc.). In the implementing phase, students put planned activities in practice, at the University premises and on the involved farms. Students not only develop planning and technical skills and competencies, but also social and communication skills, creativity, and ability to deal with various audiences. The specific topic of the event changes every year. It ranges from production of specific livestock species or crops to new technologies in agriculture. Source: https://emmashoftour.bfh.ch/was-ist-die-hoftour/

11	Dr.Attawit Kovitvadhi Designation: Head of Center for Veterinary Research and Innovation, Faculty of Veterinary Medicine, Kasetsart University, Bangkok, Thailand. fvetawk@ku.ac.th attawit.ko@ku.th +6689-2022-677 --- 2 Posters 1 Monitor (19 inch)	Sustainability on livestock production by using insect as alternative protein sources, swine management program and upcycling by-product from crocodile cultivation Technological and innovation drivers	Assoc.Prof.Dr.Attawit Kovitvadhi, Dr.Sathita Areerat and Mr.Wongvit Charoenphol	MaL  	The Center for Veterinary Research and Innovation serves as a collaborative platform for research and innovation initiatives involving the Faculty of Veterinary Medicine at Kasetsart University, among others. Among the seven focused research clusters, one cluster is dedicated to research related to human and environmental safety, with a particular emphasis on the sustainability of livestock production. Our success story highlights three notable research endeavors from this collaborative effort: 1. Our research focuses on finding alternative protein sources for sustainable livestock production, with a particular emphasis on using black soldier flies (*Hermetia illucens*). Protein is a costly but vital component in animal diets. Traditional sources like industrial and animal by-products are insufficient and may carry disease risks. Black soldier flies offer an eco-friendly alternative due to their easy cultivation and efficient protein conversion. We've studied their cultivation, use in livestock feed, and extraction of valuable products like oils and antimicrobial peptides. We've also introduced BSF cultivation and feeding practices to local farmers in Bang Krachao, Bangkok, a hub for sustainable agriculture due to its organic waste resources. Here, BSF helps recycle waste and provides a sustainable protein source for chickens. 2. Our collaborative effort involving researchers and scientists is dedicated to implementing disease prevention and management programs in small to medium-sized swine farms. The objective is to assist local farmers in establishing sustainable pig production businesses. Given the prevalence of various endemic diseases in swine populations and the limited knowledge among farmers regarding disease control and prevention, our teams are working together to consult, test, and devise scientifically based protocols tailored to local farms. These protocols aim to minimize losses and enhance profitability by adopting scientifically informed practices. 3. Collaborative efforts between researchers and farmers have been undertaken to enhance the value of by-products derived from freshwater crocodile (*Crocodylus siamensis*) cultivation. Traditionally, blood from crocodiles has been considered a waste product during the slaughtering process. However, through our research and collaboration, we have explored ways to repurpose this blood as a supplement for human consumption. This approach not only reduces waste but also adds significant value, resulting in increased profits for farmers. This strategy effectively addresses waste reduction while concurrently boosting income for farmers, contributing to the development of a sustainable agricultural system.

12	Juthamanee Areeya Southeast Asia One Health University Network (SEAOHUN) juthamanee@seaohun.org + 62 5424149 --- 1 Poster 5 roll Ups 1 Monitor	Building Health Systems Resilience Through One Health Workforce Development Author: Southeast Asia One Health University Network (SEAOHUN) Health and disease drivers	Juthamanee Areeya	MaL 	**Health University Network (SEAOHUN)** connects over 102 universities across 8 countries to support governments in building a One Health workforce with the right skillset and mindset to solve complex health challenges by leveraging education, research, and training excellence of our member universities. SEAOHUN has an established track record of success in managing direct funding from USAID and other funders to deliver in-service training workshops, One Health research and training awards, experiential learning, and pre-service educational programs that tackle specific country needs related to infectious diseases and public health threats. SEAOHUN has also demonstrated value addition in facilitating knowledge exchanges in the region and promoting One Health education for all as a member of Global Health Security Agenda, an affiliate member of Southeast Asian Ministers of Education Organization, and a dialogue partner of ASEAN+3 Field Epidemiology Training Network and Regional Public Health Laboratory. SEAOHUN works to develop a resilient and competent One Health workforce to effectively prevent, detect and respond to infectious disease threats by leveraging education, research, and training excellence.

13	Vuttichai Ladkruea, Chiang Mai Livestock Product Research and Development center chalee29@gmail.com cc: amphon_ans@yahoo.com , auengploy@gmail.com , kanyawich112@gmail.com --- 2 Posters	Goat Meat Jerky : The right product for culled goat and meat scraps Crickets: The Alternative Ingredient for Dog Biscuits and the extension of commercial products for the Ban Mae Tad Organic Agriculture Community Enterprise. Technological and innovation drivers	Dr. Amphon Waritthitham, Dr. Auengploy Chailangka, Mr. Vuttichai Ladkruea, Mr. Kanyawich Kajina	MaL Food and nutrition security	The study on drying condition of goat meat jerky aims to study on the most suitable processing condition for goat meat jerky. Factorial 3x3 in CRD is used for this experiment, vary by drying temperature (100 – 120 °C) and time (10 – 15 minutes). Then analyses physical and sensory properties. After studied, the result show that increasing the drying temperature and time lead to changing product colour (become red – brown and darker). For the jerky texture, the result show that high temperature with long time cause tough texture. In sensory part by use hedonic 9 points scales method, drying at 120 °C for 10 minutes give the result in like extremely level for taste part and like moderately to like slightly for color, flavor and texture parts. So, drying at 120 °C for 10 minutes is the most suitable processing condition. For the study on storage time, the result shows that goat meat jerky product can storage at 35 °C for 45 days. Goat meat jerky cost can calculate by summary raw material cost, ingredients cost and utility cost and plus 30 percent of total cost (for labour cost, depreciation cost and management cost). The selling price for 10 grams is 14.03 baht (1,403 baht for 1 kilogram) that can increase profit to 400 percent. Goat meat jerky processing is good choice to increase the value of discharge goat meat that can extend the shelf life to 45 days without keep in refrigerator. Based on the findings from this study, we can apply similar principles to other kinds of meat such as pork, beef or poultry as well as meat scraps, This can help to a wider range of consumer preferences and to create value-added products. Crickets are a promising and eco-friendly source of protein due to their high nutritional value, low environmental impact, and efficient feed conversion into edible protein. This study evaluates the nutritional composition of cricket-based dog biscuits and assesses their physical-chemical characteristic and overall acceptance among dog owners. Furthermore, this research emphasizes the importance of the Ban Mae Tad Organic Agriculture Community Enterprise as an ideal platform for the expansion of innovative, sustainable products. The community's commitment to organic farming, biodiversity conservation, and local empowerment provides a strong foundation for incorporating cricket farming and pet food production into their activities. This booth shows the result and suitable formula of cricket biscuits for dogs, and ways to transfer knowledge to the Ban Mae Tad organic agriculture community enterprise. This information will be disseminated via posters, food mock-ups, and printed materials.

14	Dr. Prapawan Krommarin and Dr. Santi Pangmao; Bureau of Animal Husbandry and Genetic Improvement, DLD Thailand ppwan23@gmail.com santipangmao@hotmail.com +66 996108596 +66 990898694 1 Poster	Sustainability of Smallholders in Local Green Market: A study of Livestock Farms in Surin Province, Northeast Thailand Technological and innovation drivers	Prapawan Krommarin (Animal Husbandry Technical Officer; Professional level) and Santi Pangmao (Animal Husbandry Technical Officer; Practitioner level) DLD BAHGI	MaL 	In the quest for sustainable and resilient food systems, smallholder farmers play a pivotal role that with their intimate knowledge of the farm management and their deep connection to communities are at the forefront of transforming food systems. They do face unique challenges but hold a tremendous potential to drive positive change. The Department of Livestock Development explored the viability and sustainable practices of the farms included organic pig and layers farming, traditional rice farming, production practices, feed management, manure management, the distribution of farm products to the local green market and the support of local consumers. This study discovered the vital role these smallholder farmers play in reshaping food systems. Their contributions, the solutions required to empower them in this transformative journey. Additionally, we discovered the power of smallholder farmers in transforming food systems. Explored sustainable agriculture, empowerment, and community resilience to join the movement towards a more inclusive and sustainable future.

15	Vuttichai Ladkruea, Chiang Mai Livestock Product Research and Development center chalee29@gmail.com ; cc: amphon_ans@yahoo.com , auengploy@gmail.com +66 613955663 2 Posters	Livestock Product Value Creation and Extension for Sustainability Food Loss and Food Waste: Case Study of Livestock MSME in Chiang Mai, Thailand Technological and innovation drivers	Dr. Amphon Waritttham, Dr. Auengploy Chailangka, Mr. Vuttichai Ladkruea	MaL Food and nutrition security	Livestock product value creation refers to the transformation of raw animal products into higher-value forms through various food processing methods such as curing, smoking, fermenting, and packaging. These value-added products not only extend the shelf life of perishable items but also enhance their marketability, thereby reducing food waste and improving economic returns for farmers. Chiang Mai Livestock Product Research and Development Center, Division of Livestock Products is focused on the livestock product value-added and the way to enhance the livestock farmer and entrepreneur income. The center's responsibility is to encompass the facilitation of knowledge dissemination about the processing and enhancement of value in livestock products among livestock farmers and entrepreneurs within Northern part of Thailand and neighboring regions. These goals are achieved through rigorous research endeavors, comprehensive training programs, and effective knowledge dissemination in the fields of animal science, food science, and product development. Moreover, the center aims to catalyze innovation adoption, thereby augmenting the value of livestock products in the market and reaching sustainability. The booth delves into various aspects of livestock product value creation, ways to transfer knowledge to farmers and entrepreneurs, and various livestock processing training courses through posters, livestock product sensory testing, and printed materials. Food loss and food waste pose significant challenges to global food security, environmental sustainability, and economic stability. Research in South and Southeast Asian nations show 5- 15% food loss at processing and distribution stages, tied to specific categories. However, many small businesses in these regions lack awareness of food waste's severity, hindering effective mitigation efforts. The Livestock product division, DLD, Thailand corporated with researchers from the Institute of Nutrition, Mahidol University (INMU), which FAO supported, improved understanding of where and why food waste takes place at different stages of the middle- and downstream of food value chain by survey and Food waste assessment in meat and dairy micro-, small- and medium enterprises (MSMEs) in Chiang Mai, Thailand. This booth delves into the factors contributing to Food loss and food waste within the context of MSMEs in the livestock processing of Chiang Mai, Thailand. Through a comprehensive case study, this exhibition sheds light on the critical issues faced by livestock MSMEs in the region, examining the various supply chain stages where losses occur and defining the good practices in the operations of MSMEs and their management of food waste. This information will be disseminated via posters, food mock-ups, and printed materials.

16	Vuttichai Ladkruea, Chiang Mai Livestock Product Research and Development center chalee29@gmail.com ; cc: amphon_ans@yahoo.com , auengploy@gmail.com +66 613955663 --- 2 Posters	Transforming Local Coffee Ground Waste into Sustainable Goat Leather Production Revolutionizing Sustainability: Transforming Meat Co-Products into Nutrient-Rich Bone Broth Powder Technological and innovation drivers	Miss.Jarassri Kaewfun Mr. Vuttichai Ladkruea	MaL Food and nutrition security	Goats are the easiest to raise, fast-growing, and Low-cost. Therefore, it is widely grown for consumption all over the world. However, the remainder of the consumption of goat skin is still underutilized. The leather industry for tanning, is highly cost and uses highly toxic chemicals. Traditional tanning methods result in low-quality goat leather. This research therefore compares the coffee grounds for goat tanning method. The methods are as follows: Remove goat hair, tissue, and fat of the goat skin by Calcium hydroxide ($Ca(OH)_2$) 20% in water for 1 week and then off the goat hair. Compare the amount of coffee grounds concentration used in tanning at concentrations of 10%, 20%, and 30% and the tanning times at 1, 2, and 3 days. Wash the leather with water. Stretch it taut on the frame and air dry it. The results show Goat leather tanned using 20% concentrated coffee grounds for 2 days had the best test results. And there are physical test results, namely the percentage of surface area recovery = 86.34% and thickness = 49.97%, with color quality L*= 28.52, a*= 6.57, b*=8.60 and tensile strength = 47.55 N/mm2. And has been accepted by the most experts in leather products. The cost of goat leather tanning by this method is 250 baht per piece. This process is also an easy way to tanning goat leather. Use environmentally friendly tanning ingredients. get quality goat leather suitable for making handmade products, is also the use of leftovers from goat consumption (goat leather), and coffee grounds are used to reduce the amount of waste as well. In 2020, Thailand produced 48,950,000 kilograms of beef, so there would be 20,980,000 kilograms of by-products, of which approximately 10,490,000 kilograms are cattle bones. If the bones of cattle can be developed into high value products It will be a good opportunity for the beef production industry in Thailand. This study aimed to examine the use of foaming additives for product development of bone broth powder by foam-mat drying technique using four types of additives, i.e. egg white powder, pasteurized egg white, whey protein and Gum Arabic (24%). CRD and RCBD experimental designs (sensory test) were implemented for comparison of difference between means using Duncan's New Multiple Range Tests ($P<0.05$). The findings revealed that the use of pasteurized egg white as an additive in the product resulted in the best foam expansion and yield but it had the least solubility value (difficult to dissolve), while the use of whey protein resulted in denser and more stable foam, and had high solubility value, followed by the use of egg white powder as an additive. Sensory evaluation results showed that most panelists gave the product added with whey protein with most liking rating (like slightly), followed by the product added with pasteurized egg white and Gum Arabic. Therefore, whey protein and egg white powder were selected and used in foam-mat drying technique, and the appropriate ratio was 9% whey protein and 3% egg white powder.

17	Dr. Orranee Srinual, Department of Animal and Aquatic Sciences, Faculty of Agriculture, Chiang Mai University orranee.s@cmu.ac.th +66 885474214 2 posters	Innovation and Development of Crossbred Native Chicken (CMU Model) for Upgrading to Commercial Livestock and Sustainable Income Distribution to Farmers Technological and innovation drivers	Orranee Srinual, Montri Punyatong, Wanaporn Tapingkae, and Tossapol Moonmanee (Department of Animal and Aquatic Sciences, Faculty of Agriculture, Chiang Mai University, Thailand)	MaL 	The objective of this research study is to enhance the Thai indigenous chicken crossbred (Pradu Hang Dam chicken) production process to elevate it to the status of an economic livestock and income distribution vehicle for farmers in a sustainable manner. Starting from the upstream phase, which involves problem-solving and management, progressing to the midstream phase focused on creating added value and product development, and finally reaching the downstream phase aimed at forming farmer groups and promoting knowledge dissemination. Subsequently, a risk assessment of Salmonella infection in Pradu Hang Dam chicken production was conducted. Salmonella is a serious pathogen in indigenous chicken farming in Thailand. Researchers studied the distribution of Salmonella in the northern region of the country, providing valuable insights that can serve as references for the establishment of standards, guidelines, or policies aimed at controlling and preventing Salmonella contamination within the Pradu Hang Dam chicken production system. Additionally, a study was conducted to increase production and add value to indigenous chickens by investigating the technique of castration indigenous chickens to obtain meat that more closely matches consumer desires. The laparoscopic vacuum test ectomy technique for castration was employed to achieve tender meat quality. Furthermore, efforts were made to develop the identity and recognition of indigenous chicken products. This involved knowledge and skill development in processing and seasoning to enhance the value of indigenous chicken products such as ready to eat and emergency food development (MRE). The opportunity to create perspective with "taste" from the value impact. As well as creating career opportunities for farmers who raise chickens with supplied chain to production, product development and distribution for sustainable good quality protein. From the knowledge base, it is possible to establish groups of indigenous chicken farmers more than 50 groups in Thailand, particularly in the northern regions of the country, who can register for the Good Farming Management (GFM) standard for disease prevention and appropriate animal husbandry. Through an estimated Social Return on Investment (SROI) assessment of approximately 3.5 times the budgetary support from the government, it was determined that this project has the potential to make a significant impact. Furthermore, it was found that when the project disseminates information and knowledge to user groups, especially indigenous chicken farmers, it can effectively address several Sustainable Development Goals (SDGs), including SDGs 2 (Zero hunger), 3 (Good health and well-being), 4 (Quality education), 8 (economic growth), 12 (Responsible consumption and production), and 13 (Climate action). These SDGs represent crucial global challenges that can be evaluated in terms of the sustainable benefits provided to indigenous chicken farmers and consumers alike.

18	Asst.Prof.Worasin Malaithong, Maejo University, Prae Campus worasin@mju.ac.th +66 9 9619 6951 --- 1 Poster	Pilot Project on Small-Scale Organic Egg Production Technological and innovation drivers	Assistant Professor Dr.Worasin Malaithong (Animal Production Technology Division) and Theerapat Jakngern (Accounting Division), Maejo University, Phrae Campus, Thailand	MaL 	This study assessed the production performance, cost and returns on investment in small-scale organic egg production involving a flock of 100 birds, in accordance with the Thai Agricultural Standards Part 2: Organic Livestock (TAS Part 2-2018). The research project was conducted at Maejo University's organic chicken farm, located within Phrae Campus, Rong Kwang District, Phrae Province, during May 2020 to June 2021. The birds were raised in a 40-square-meter house with a 750-square-meter outdoor area. Throughout the 52-week production cycle, from 18 to 70 weeks of age, all birds were fed an organic diet. The study's results indicated that the average egg production per bird during the laying period was 246.73 eggs, with a mortality rate of 13.00%. The total production cost per bird amounted to 1,494.80 Baht. The variable costs accounted for 1,437.50 Baht, comprising genetic expenses (laying hen) of 180.72 Baht (12.09%), organic diet costs of 837.26 Baht (56.01%), labour costs of 373.04 Baht (24.96%), facilities expenses of 31.33 Baht (2.10%), supplies costs of 1.99 Baht (0.19%), and selling and administrative expenses of 13.16 Baht (0.88%). The fixed costs amounted to 57.31 Baht, encompassing depreciation of plant assets at 36.56 Baht (2.44%) and depreciation of equipment at 20.75 Baht (1.39%). The mean selling price per egg was 7.00 Baht, resulting in a calculated net income per bird of 320.01 Baht. The cost-benefit analysis revealed a payback period of 2 years, 8 months, and 12 days, a break-even point of 4,066 eggs in units, and a rate of return on investment of 21.59 percent. These findings demonstrate that the small-scale organic egg production is a profitable enterprise.

19	Thinnakorn Sriyab Dairy Promotion Organization of Thailand thinnakorn.s@dpo.go.th nadwadee.j@dpo.go.th +66 943652251 2 Poster	History of Dairy Promotion Organization of Thailand (D.P.O.) Thai-Denmark U.H.T. Milk for exportation production by D.P.O. Pranburi Branch Technological and innovation drivers	Thinnakorn Sriyab (Head of Sales and Marketing division) Dairy farming Promotion Organization of Thailand, Chiangmai Branch.	MaL Livelihoods and economic growth	In 1960, His Majesty King Bhumibol Adulyadej and Her Majesty Queen Sirikit visited Denmark and were very interested in their dairy farming. Then, the Danish government and the Danish Dairy Farming Association together offered a promotion project on the raising of dairy cows. They coordinated with the Thai government to establish the Thai-Danish Dairy Farm (TDDF) and a training centre in Muak Lek District, Saraburi. King Bhumibol and King Federik IX of Denmark together inaugurated the farm on 16 January, 1962. All business was later transferred to the Royal Thai Government and became the Dairy Farming Promotion Organisation of Thailand, (DFPO), with an aim to promote the occupation of conducting dairy farms and to purchase raw milk from the farmers to further transform into dairy products.

20	Asst.Prof.Dr.Suntorn Wittayakun, Faculty of Science and Agricultural Technology, Rajamangala University of Technology Lanna w_suntorn@rmutl.ac.th Suntorn +66 979180357 --- 2 Poster	Invasive Alien Species: Mimosa pigra as alternative feed source Technological and innovation drivers	Suntorn Wittayakun Professor (Associate): Faculty of Science and Agricultural Technology, Rajamangala University of Technology Lanna, Thailand	MaL 	The inadequacy and high cost of livestock feed, particularly dietary protein, are significant constraints affecting livestock production of smallholder farms in many parts of the world, especially during the dry season in the tropics. Under these circumstances, there is an increasing demand to find practical solutions to maintain or enhance the efficiency of livestock production. The leaves of locally available legume trees have been targeted as the top priority for smallholder farms, particularly in some areas, due to their ability of biological nitrogen fixation, resulting in high crude protein content in leaves. Mimosa pigra, known as the giant sensitive tree, is a leguminous shrub that originated from tropical South America and is presently known as an invasive woody weed or invasive alien species due to its severe and widespread weed, especially in wet and moist areas such as rivers banks, flood plains, abandon paddy fields throughout the tropical regions. This plant has been overlooked as livestock feed because its morphology is rich in broad-based prickles on its stem and rachis. However, this plant has a few advantages: high crude protein content and fragrant leaves. Literature on the effectiveness of using the leaves of Mimosa pigra as feedstuffs is scarce. In Thailand, little research was conducted based on Mimosa pigra from a livestock feed perspective, focusing primarily on using the leaves. This booth will provide information, feature approaches, and research concerning the utilization of Mimosa pigra as a feed perspective that may take part in sustainable livestock production and be beneficial for controlling its invasion.

21	Asst.Prof.Kecha Kuha Faculty of Science and Agricultural Technology, Rajamangala University of Technology Lanna kkuha@rmutl.ac.th Phone: Kecha Kuha +66 87912 8915 --- 1 Poster 1 Monitor	The development of black pigs for serving the local economy in Nan province by improving productivity and carcass quality Technological and innovation drivers		MaL 	Black pigs were developed to serve the local economy on sustainability in Nan province. The black pig was created using a cross-breeding and selection system from Duroc Jersey (D) x Pietrain (P) x Large White (Y) x Meishan (M). The DPYM piglets were selected based on the black-coated color of both males and females, and inter-se mating was introduced in the breeding system for three generations. The black-coated pig was selected for extension to community enterprises and villagers. The DPYM female crossed with the male of Duroc-Meishan (DM or Chiang Mai black pig) to generate piglets was chosen for this study's test on growth performance and carcass quality. The piglets were a fractional breed of DPYM, with roughly 50%: 12.5: 12.5%: 25%, respectively. The result showed that the final body weight was 99.75±4.70 kg, the average daily gain (ADG) was 0.76±0.03 kg/day, and the feed conversion ratio (FCR) was 2.56±0.11 kg. The total feed cost was 3,345.57±268.40 baht/head and the feed cost per gain was 39.20±1.73 baht/kg. Hot carcass percentage (HCP), backfat thickness, the LSQ index, marbling score, drip loss, and L*, a*, and b* color were some of the carcass quality indicators examined. These measurements yielded the following results: 77.10±1.70 %, 2.50±0.60 cm, 0.30±0.10, 2.68±0.47, 3.20±1.26%, 60.18±4.92, 6.60±1.46, and 15.29±1.07, respectively. The productivity of black pigs in community enterprises determined the number of piglets born alive to be 12.00±3.61 head/sow. The ADG, FCR, and HCP were 0.60±0.06 kg, 3.42±0.32 kg, and 77.10±1.80%, respectively.

22	Sukeep Chaimanee Highland Research and Development Institute sukeep436@gmail.com ; cc: narissara.gk@gmail.com ; jukkrapatmalamaneerat@gmail.com Phone: Sukeep Chatmanee +66 869215665 1 Poster	Black bone chicken on highland Technological and innovation drivers	Sukeep Chaimanee, Narissara Gerdsook and Jukkrapat Malamaneerat (Agricultural Extension Officer Organization) Highland Research and Development Institute (Public Organization)	MaL 	The purpose of raising animals in the highlands is mainly for family consumption. foruse in rituals according to beliefs and rearing for sale. The most popular animals raised in the highlands are chickens and pigs. Which is required in rituals according to various beliefs. The Chinese Yunnan or Haw and Hmong believe that the black-bone chicken is food that nourishes the body. This makes the price higher than other types of local chicken. The important characteristic of black-bone chicken is that the skin, meat, and bones must be black. In the Highland area are raised at 7 Royal Project Development Center, including Mok Cham, Nong Khiaw, Khun Wang, Huai Nam Khun, Sa Ngo, Pha Tang, Sa Ngo and Angkang. And 5 Roral Project expansion Area, including Mae Salong, Wawee, Pang Hin Fon, Huai Pao and Khun Sathan. But nowadays farmers still have free-range farming. This allows black-bone chicken to be crossed with other chicken breeds. Causing some of the breed's characteristics to disappear. Highland and Research and Development Institute (Public Organization) has selected and improved the first to third generation of purebred black-bone chicken (2014-2016) that have good characteristics consistent with the breed. It grows well in high areas. And meets the needs of the market. The average body weight in 2014-2016 were 1.51, 1.61 and 1.63 kg, respectively. The improvement of black-bond chicken performances was conducted 3 different altitudes above sea level including Haui Pao (mean sea level: MSL 400-800 m.), Pang Da (MSL 800-1,000 m.) and Wat Jan (MSL > 1,000 m.). Six lines of parent stock of F3 black-bond chicken, 1:5 of cock to hen ratio, were raised at the Royal Project Foundation breeding farm. Growth performance and egg production was collected. It was found that accumulates egg production, 1 October 2016 to 31 May 2017, in this trial was 697 which as highest in line 5. Chickens in line 2 had highest fertility eggs (83.17%) and hatchability rate (67.38%) when compared with other lines. Average body weight of chicken at 16 weeks of age was 1.68 kg. which was highest in line 2 at 1.79 kg. Feed conversion ratio (FCR) was highest in chicken in line 2 (3.26).

23	Asst.Prof.Dr.Niraporn Chaiwang and Dr. Nuttawut Krutthai Faculty of Agricultural Technology, Chiangmai Rajabhat University E-mail: yho_009@hotmail.com +66 858708784 --- 2 Posters	Bring local to global: Maehongson Native Chicken Deep Bedding Pig Production for Sustainable Development in Northern Thailand Technological and innovation drivers	Niraporn Chaiwang[1], Nuttawut Krutthai[1], Chaiwat Arjinc[2], Korawan Sringarm[2], Kulisara Marupanthorn[1] and Watcharapong Wattanakula[1] [1] Faculty of Agricultural Technology, Chiang Mai Rajabhat University, Chiang Mai, Thailand. [2] Faculty of Agriculture, Chiang Mai University, Chiang Mai, Thailand.	MaL 	Functional foods are innovative products that hold health-enhancing potential. They are contributing to changing trends in both consumer behavior and the market. This study was conducted to investigate the effects of breed on the nucleic acid content, amino acid profile, carcass, and meat quality of different breeds of chickens. The outcomes of which could lead to the production of functional chicken meat. In this experiment, 4 genotypes of chicken, namely commercial broilers (CBR), Thai native chickens (Mae Hong Son; MHS), Thai native chickens (Pradu Hang Dam; PHD), and male layer chickens (MLC), were fed commercial feed and reared under identical conditions. All chickens were slaughtered at the market age, whereas the breasts and thighs were separated from the carcasses to determine chemical composition and meat quality. The results indicated that carcass and meat quality traits were significantly different ($P < 0.05$) among chicken breeds and meat parts. Notably, commercial breeds (CBR and MLC) were superior in performance and carcass quality when compared with the Thai native chickens (MHS and PHD). CBR had the highest growth performance and carcass quality traits ($P < 0.01$), whereas MHS exhibited the lowest weight gain ($P < 0.05$). However, Thai native chickens were lower in fat, cholesterol, triglycerides, purine, and uric acid ($P < 0.05$) contents than the commercial breeds. Interestingly, MHS contained the lowest purine and malondialdehyde levels when compared with the other breeds ($P < 0.01$). Moreover, MHS contained the highest amounts of glutamic acid in both the breasts and thighs ($P < 0.05$). Therefore, the meat of MHS may be classified as a functional chicken meat, as it was found to have a pleasant meaty taste and hold nutritional value, which positively influences consumers' health. This study determined the effects of deep bedding floor and fermented feed supplement on the growth performance, carcase, meat quality, and fatty acid profile of crossbred pigs. Thirtytwo ((Thai native x Meishan) x Duroc) crossbreds were organised in a 2x2 factorial arrangement in a completely randomised design. Factor A was a deep bedding floor (DB) or solid bedding of concrete floor (SB). Factor B was a feed type of concentrate feed supplemented with a fresh banana stem (BF+CON) or fermented banana stem (FF+CON). Growth performance, carcase traits, chemical composition, meat quality, and fatty acid profile were determined. The final weight, average daily gain, and feed conversion ratio of pigs reared on SB were significantly higher than those of pigs raised on DB. The backfat thickness and loin eye area of SB pork were also higher than those of DB pork ($p<.05$). Feed type had an effect on the percentage of rib, fat content, and TBARS on days 0, 1, and 3. FF+CON feed were lower, but shear force value and a grilling loss percentage of FF+CON were higher than those of BF+CON. The effect of the interaction between floor and feed types was found in the belly of four lean cut and rib percentage, fat content, and pH value in the longissimus dorsi muscle at 24 h and TBARS on Days 0, 1, 3, and 7 ($p<.05$). Pigs on the DB floor showed inferior carcase composition but slightly better meat quality than pigs raised on SB.

24	Asst.Prof.Dr. Suwit Chotinan Faculty of Veterinary Medicine, Chiang Mai University Thailand E-mail: suwit.c@cmu.ac.th +66 987926269 1 Poster	Innovative and Integrative Approaches to Farmer Group Capacity Building and Enhancing Indigenous Chicken Productivity Across the Production and Value Chains for Smart Farming, Economic Value Addition to Indigenous Chickens, and Income Redistribution Among Farmers in Northern Thailand Technological and innovation drivers	Assistant Professor Dr. Suwit Chotinan1, Panomsak Promburom2, and Teeka Yothapakdee3: 1Faculty of Veterinary Medicine, Chiang Mai University Thailand, 2Faculty of Agriculture, Chiang Mai University, Thailand, 3Faculty of Economics, Maejo University, Thailand	MaL Livelihoods and economic growth	The study aimed to promote the commercial production of Thai indigenous chickens (Pradu-Hangdum and Phayao yellow chicken breeds) in northern Thailand by improving farmer group management, production systems, and standards throughout the supply chain and value chain. The study was conducted during 2020-2022. A total of 10 farmer groups, comprising 151 farmers, participated in this study. Coaching teams were developed for each farmer group. Capacity-building activities were conducted through on-the-job training, along with supply chain and value chain analysis, encompassing indigenous chicken farming and health management, farm, slaughterhouse, and meat shop improvements to meet standard regulations, and food product development. Knowledge on indigenous chicken farming and support systems from farming to marketing were developed. Consumer perception of indigenous chicken was generated through gastronomy tourism, including the creation of recipes and gastronomy tourism events. The results of the study revealed that many farmers improved their skills and became smart farmers. Some farmer groups transformed into local enterprises. The Northern Farmer Group network was established. For chicken production standard improvement, a total of 25 farms and 29 farms achieved GFM and GAP certification, respectively. One fresh meat product and one fresh meat shop received certification with the Livestock OK logo. Consumer creation results showed that 8 restaurants in Nan had their indigenous chicken food recipes. A total of 1,230,000 fattening chickens were produced during the study period. Phayao yellow chicken was identified as the local identity chicken of Phayao province, and Pradu-Hangdum chicken was also recognized as a local product of Nan province. The household income of the farmers increased to 1,500-30,000 Baht per month. Moreover, the results of this study, especially the integrative and participatory approaches to promoting Thai indigenous farming for commercial production, were adopted by other organizations.

25	Jeerasak Chobtang, Bureau of Animal Nutrition Development, DLD Thailand Jeerasak_lim@hotmail.com +66 959636627 1 Poster 1 Monitor	Strengthening supply chain of fodder feed to support sustainability of dairy farming in Thailand: Drivers and Challenges Technological and innovation drivers	Jeerasak Chobtang, Bureau of Animal Nutrition Development, DLD Thailand	MaL 	Dairy farming is mostly small-holders, and they usually are lacking associated knowledge, technologies, and resources. In addition, in the changing world, they are facing many challenges stemming from a variety of changes, i.e., economic, societal perception, and environment. A change in economic systems is driving an increase in the costs of farm inputs, e.g., feed. Measures to reduce feed costs are being researched. Furthermore, consumers demand higher standards of food safety and animal welfare. Therefore, many standards and protocols are being issued to safeguard and ensure the social acceptability of dairy products. Also, more environmentally friendly dairy products are being requested by consumers globally. Today, consumers are seeking not only a low carbon footprint certification, but they would also love to see other environmental perspectives, e.g., a non-forest devastative certification, etc. In Thailand, the motor pool project is one of the most effective government-supporting measures being implemented. A group of farmers can borrow the heavy machines and their associates for use in a maize crop (and grass) growing process. With the support of mechanics and livestock experts, farmers can produce high-quality silage with acceptable production costs. It is noteworthy that this measure sometimes requires additional players such as the crop collectors to play a vital role in cash buffering. This is because the crop farmers usually need cash right after the finish of the harvesting process meanwhile dairy farmers (buyers) normally get money from milk collectors/processors fortnightly. Besides, the feed center project is also being implemented to support dairy farmers in producing high-quality total mixed rations (TMR) with acceptable costs. Both individual farmers and dairy cooperatives are invited to use a set of TMR-producing machines provided by the DLD organization. It is important to note that all associated processes/actors starting from crop growers through to dairy farmers are under consultations/recommendations of the associated experts from both DLD and associated organizations.

26	Asst.Prof.Suban Foiklang Faculty of Animal Science and Technology, Maejo University E-mail: bungung@hotmail.com +66 868579234 --- 1 Poster Self print	Potential local feed resources and high-nutrients feed block for ruminant production in Thailand Technological and innovation drivers	Asst. Prof. Dr. Suban Foiklang, Miss Chutikan Sonthongdaeng, Mr.Duangchane Sombathebphaly and Mr. Khaophone Saphungthong (Faculty of Animal Science and Technology, Maejo University, Thailand)	MaL Livelihoods and economic growth	There is increasing interest in exploiting natural products as feed additives as well as search the alternative feed resources to solve problems in animal nutrition and livestock production. Recently, small holder cattle farmers in Thailand are facing the high production feed cost leading to stop their farm business. However, aviability of plant leaves as well as agricultural by-products may be the strategic way to help the farmers reducing their production cost. The use of tropical plant and agricultural by-products containing secondary compound such as condensed tannins and saponins have resulted in improving rumen fermentation by enhancing the efficiency of utilization of feed energy. High-nutrients feed block has been used as strategic supplements for ruminants in the tropics, especially when fed with rice straw and other low-quality roughages-based diets in dry season. Supplementation of high-nutrients feed block as for swamp buffaloes, beef cattle and dairy cows could improve feed intake, nutrient digestibility, and rumen fermentation efficiency. Keywords: Feed resources, agricultural by-products, high-nutrients feed block

27	Fred Unger Regional Rep ILRI East and SE Asia F.Unger@cgiar.org +84 243237 3995 _____ 2 Posters 1 Monitor Self print	Risk management and low-cost interventions to reduce food safety risk in traditional animal sourced food chains in Vietnam and Cambodia. Health and disease drivers Technological and innovation drivers	Fred Unger, Hung Nguyen, Sinh Dang Xuan, ILRI; Delia Grace, ILRI/NRI; Phuc Pham Duc, IEHSD; Rortana Chea, NAHPRI; Le Thi Thanh Huyen, NIAS; Pham Thi Ngoc, NIVR.	MaL   	Food, including livestock derived, should be nutritious and safe. With a burden comparable to Malaria or Tuberculosis foodborne diseases are a major concern globally including Southeast Asia. Various approaches such as Good Agriculture Practices, and certification have been tried with limited uptake. Research conducted by a one health team in Cambodia (USAID) and Vietnam (ACIAR & BMZ) identified food safety challenges in livestock derived food (LDF). To address this simple, low-cost interventions have been designed using a 3-leg approach (training, incentives, and supportive local policy environment) in slaughter (only Vietnam) and retail**.** A **Food Safety Performance Tool (FSPT)** was used to assess food safety outcomes in LDF retail types, identify points for interventions, evaluate scalability while considering societal aspects such as gender roles in food safety. Interventions were tested using a robust design (RCT or baseline/endline). Supportive activities included the use of behavioral nudges, developing a brand to promote market access (indigenous pork), risk communication campaigns, and a food auction experiment. Food safety challenges were found in all retail types (modern and traditional). **Interventions proved its effectiveness** in both countries in reducing Salmonella prevalence in retail pork. A food auction experiment revealed that consumers were willing to pay a 20% premium for such pork. A pork brand supported local pig breed cooperatives and created new market linkages. Risk communication efforts through community loudspeakers proved to be effective and reached tens of thousands of consumers (Vietnam). Avenues to align interventions with policy included a Food Safety Technical Working Group and/or taskforce. The piloted **approach is currently scaled** in larger initiatives (CGIAR Initiative for One Health and ASEAN CGIAR Food Innovation Program).

28	Anna Marry Senior External Affairs Advisor, Brooke/ interim representative of the Animal Issues Thematic Cluster anna.marry@thebrooke.org +44 07729776146 _____ 2 Posters,1 missing 1 Monitor	Cumulative welfare – Harnessing, Handling and Hooves Health and disease drivers	Anna Marry, Sheraton, Amy Barstow, Brooke Contributions from SPANA, The Donkey Sanctuary and World Horse Welfare (partners in the International Coalition for Working Equids).	AN AWAN 	Globally, more than 100 million working horses, donkeys and mules are essential to the livelihoods of some of the poorest and most vulnerable people in society. In West Africa, working equids are vital to agricultural production and food security, through their work in soil tillage and transport of water, feed, seeds, livestock, produce and people, and the use of their manure as fertiliser. It is essential that they are in good health and welfare in order to work. Cumulative welfare describes the total effect of the interactions an animal has with their environment on their overall welfare over time. For example, an ill-fitting harness causes discomfort, which is exacerbated by improper handling by humans, which is made worse through poor hoof care. In Senegal, 68% of working equids have hoof abnormalities and there is a lack of trained professional farriers to treat and prevent these painful conditions. Acknowledging this, Brooke West Africa, part of the International Coalition for Working Equids, has championed welfare improvements in harnessing, handling and farriery to allow these animals to enhance the quality of life for equids and boost their ability to work and support livelihoods.

29	Gantuya Jargalsaihan Mongolian University of Life Sciences, Ulaanbaatar, Mongolia gantuya416@gmail.com 976+88893459. 1 Poster	The size, structure and efficiency of Mongolian flocks and herds on degraded grasslands Environmental drivers	Gantuya Jargalsaihan Research Institute for Animal Husbandry, Mongolian University of Life Sciences, Ulaanbaatar, Mongolia Udval Gombosuren David R. Kemp Karl Behrendt Davaasambuu Lkhagvasuren Luvsan Gankhuyg Colin G. Brown	MaL 	Since 1990, the number of livestock in Mongolia has more than doubled. In large areas of Mongolia, grassland degradation is now a problem of national concern. A survey was done of 10 herders in two Soums (Altanbulag and Khashaat; heavily and moderately degraded, respectively) to measure the animals (sheep, goats, cattle and horse numbers, sex and weights) and grasslands (species and biomass) every 3 months from April 2017 to December 2018. Rainfall is mostly in summer and mean monthly temperatures vary from –20 to 28C. Throughout the study, the grassland herbage mass in summer was less than 0.5 t dry matter/ha, below that considered sustainable for the steppe. Herders had 200–1000 sheep equivalents (SE, 50 kg base weight), moved camps 2–4 times each year and stocking rates varied from 0.5–1 SE/ha. Female animals reached their mature weights by 4 years of age (sheep 50 kg, goats 40 kg, cattle 350 kg, horses 300 kg). Animals only grew over summer, but a significant part of that was compensatory gain in animals.1 year old. Over winter, sheep and goats lost 21–29% of their liveweight, cattle and horses 15–30%. The weaning rate was 43–48% across species. The male:female ratio (.2 years old) was sheep 63%, goats 72%, cattle 27% and horses 106%. All animals are managed in common mobs with no particular control of breeding. Areas where the efficiency of livestock production and grassland productivity could be improved are discussed.

30	Michael Victor Head, Communications and knowledge management m.victor@cgiar.org +254 795567554 --- No poster Break out room	Solutions with Legs: strengthening climate financing investments and the global narrative around sustainable Livestock Environmental **drivers**	Michael Victor, Cynthia Mugo and Laura Cramer	Multilateral Cluster 	During the past decade, the narrative that meat and milk are bad for the planet has been vigorously promoted by a range of campaigning groups, government agencies and the media. The narrative is based, among other things, on the contention that greenhouse gas (GHG) emissions from livestock farming are a significant cause of climate change. This widely-promoted but simplistic anti-livestock narrative is misleading, not least because it lumps livestock farmers in the developing world, most of whom practice low-input systems of production, with the heavily capitalised, high input–high output industrial farming systems of the North. Asking, or compelling, them to reduce or abandon their livestock would be a great injustice. At the same time another challenge is brewing - livestock is the fastest growing agriculture sector and demand from milk, meat and eggs is expected to grow exponentially. How can we increase access to livestock derived foods while not destroying the planet. The window of opportunity for guiding these (largely) smallholder livestock systems toward greater equity and sustainability as well as profitability will not last long. While this window of opportunity remains open, we need to find and implement ways to meet the rising demand for livestock sourced foods without compromising the many roles livestock play in development or exacerbating the risks livestock can present to environment and human health. At COP 28 in Sharmel Sheik - a coalition of livestock champions banded together to improve how livestock is perceived and discussed in climate related discussions. This got the "Cow in the Room" and allowed for a more nuanced discussion. This year the group is focusing on providing evidence and solutions for how sustainable livestock can contribute positively to climate mitigation and adaption. This session will focus on developing messages and joint action at COP 28 and beyond. From this we expect to have more clarity on messages that can be shared and events we can engage in related to climate and sustainable livestock. This session is sponsored by the Global sustainable Livestock For Advocacy in Development project which is implemented by ILRI and aims to improve investments, policies and the discourse around sustainable livestock in Low and middle income countries.

31	Dr. Astasit KAEWNANUER Fly Lab Tech Co., Ltd berm@flylabfeed.com +66 925164253 1 poster Self print 1 Monitor	Effect of Substituting Fishmeal with FLMeal, Black Soldier Fly Larvae meal, on the Growth Performance of Pacific White Shrimp (*Litopenaeus vannamei*) Technological and innovation drivers	Asst. Prof. Dr. Orapint Jintasataporn, (Department of Aquaculture Faculty of Fisheries, Kasetsart University, Thailand), Dr. Astasit Kaewnanuer (Flylab Tech, Thailand)		The white leg shrimp *Litopenaeus vannamei* is the most important penaeid shrimp species farmed and is widely established in several countries in East, Southeast and South Asia including is playing a major significant role in shrimp aquaculture production. The recent trends in shrimp culture shows a considerable increase of farming of *L. vannamei* replacing *P. monodon* culture. Shrimp feed contained high protein from marine protein especially fishmeal and some plant protein. Fish meal has been used as a primary protein source for shrimp because of its high nutritional value. Due to increasing demand, limited supply and a dramatic increase in fishmeal prices, suitable alternative protein sources for shrimp have investigated. Insect meal is the most used as alternative protein feed in the production of animal feeds. This study was conducted to investigate the effect of replacing fishmeal with insect meal in diets with different levels of dietary protein on shrimp growth performance. Conclusion: Shrimp diets composed of FLMeal, defatted black soldier fly larvae meal, substituting for 0-60% fish meal (0-9% FL meal) can promote the growth performance and feed utilization of pacific white shrimp including enhance the red colour of cooked shrimp. At least level of FLMeal substitute for fishmeal 10% can exhibit better performance ($p<0.05$) than control. The high level of FLMeal (1.5-9%) showed the better performance base on increasing fish oil when reducing fishmeal from the diets. Keywords: Alternative protein, Black Soldier Fly (BSF), insect-based feed, high-nutrients feedstock, functional ingredient

32	Fagouri Said WAMIP North Africa World Alliance of Mobile Indigenous People fagouris@gmail.com +212 661 751 752 1 Poster	The Arab Amazigh tent of Moroccan Nomads Technological **and innovation** drivers	Fagouri Sahid		Arab-Amazigh Moroccan Nomads' tent is a mobile dwelling suitable for populations on the move, it is made of camelid and goat hair, it is removable, foldable and easy to transport on the camel's hump to the next place. camp. **Methodology / Approach:** The Tent/Akham, I lived there for a large part of my youth. The tent is considered a very ancient Arab-Amazigh cultural institution, and it goes well beyond the meanings of housing, residence and refuge; the tent is a symbol of nomadic life and a symbol of several Amazigh and Arab cultures. In addition to my knowledge of this institution, I did some internet research on its history and how the Tent is regarded. **Results:** The tent is a pyramid-shaped accommodation made from goat hair, sheep or camel wool. Sheep or Dromedary Wool and Goat Hair are transformed into threads, the threads are woven into long '' Flige '' strips. Each '' Flige '' strip measures 7 to 8 m in length and 50 to 100 cm in width; Flige '' strips are then glued together to form the canvas of the Tent the ''Velum' ' (rectangular piece); The Velum is made up of 7 to 10 strips which are gathered and sewn using a large needle locally called '' Isgni ''. The Velum has an area of approximately 30 to 45 m2. Tirsale '' wooden pillars , positioned vertically and whose uprights fit into the cavities of an '' Ahamar '' bent wooden beam. The Velum is stretched using braided wool and hair ropes, attached to the wooden ' Ikhrib ' hooks , the Ropes are attached to the strips on the edge of the velum. The tent ropes are attached to the ground to wooden or iron stakes called '' Tigwas. The tent has wings called '' Isglaf ''. These wings allow you to regulate the flow of air entering and the evacuation of cooking smoke. The tent is divided into two parts by means of a structure, one part for men and another for women. The middle Structure which separates the Tent in two is the most protected part of the Tent against the rain, is made up of boxes with legs.The Middle Structure is used to store Mats, store clothes and store food. The women's side overlooks the kitchen and the men's side overlooks the newborn animal playpen. **Conclusion:** The Arab-Amazigh Moroccan Nomads tent offers Housing, Accommodation and Prestige to Nomadic and Semi-Nomadic populations on the move**.** Among the Tuareg, the tent is called Ahin ⴰⵀⴻⵍ , and “Tin- Hinan ” means the Woman who has tents. The Amazigh Queen Tinhinan ⵜⵉⵏⵀⵉⵏⴰⵍ is the grandmother of the Tuareg and the tent, among the Amazigh peoples, has a particular sacred character, because it symbolizes the mother, the wife and the family. Unfortunately, Traditional Nomad Tents are decreasing more and more from 220,000 around 1922 to 40,000 in 2022. However, the Tent as architecture, it invades the whole world, from Eskimo Igloos , Mongolian tents, from large party tents to small beach tents. **References**https://ar.wikipedia.org/wiki/الخيمة_التقليدية_في_الصحراء https://fr.wikipedia.org/wiki/Tin_Hinan, https://www.hesperis-tamuda.com/Downloads/2010-2019/201 7 /fascicule-3/2.pdf

33	Margherita Gomarasca Vétérinaires Sans Frontières International coordinator@vsf-international.org +3222404960 Ellie Paravanni (Brooke & Action for Animal Health coalition) _____ 2 Posters	The case for investing in animal health to support One Health Health and disease drivers Geopolitical and economic drivers	Margherita Gomarasca (VSF International); Ellie Paravanni (Brooke & Action for Animal Health coalition)		Action for Animal Health (A4AH) is a coalition of 12 organisations – multilateral organisations, NGOs, research institutes and others with expertise in animal health, human health, environmental health and related fields – who advocate for more investment in strong and resilient animal health systems. The coalition identified five pillars of action to achieve improved animal health and welfare and leading to a secure income, food security and improved health and wellbeing of people: community engagement, workforce, surveillance, access to medicines and vaccines, and One Health collaboration. As part of the evidence-building for its advocacy actions, the coalition recently published the report "The Case for Investing in Animal Health to Support One Health", which presents key messages and recommendations related to the state of animal health systems in lower- and middle-income contexts (LMIC). The VSF International network, member of the A4AH coalition, is working since over 30 years to support small-scale farmers, livestock keepers and local animal health and welfare initiatives through the implementation of the One Health approach. Its actions focus on establishing transdisciplinary and multi-sectoral collaborations through bottom-up participatory approaches that involve local communities and service providers. In the sharefair, we will present some of the materials and tools produced by the A4AH coalition, and we will showcase some practical experience from VSF International and partners about the strengthening of animal health services in the Global South through a One Health approach.

35	Dr. Chea Rotana rortanachea@gmail.com +855 92 554 996 1 poster	Antimicrobial resistance in Escherichia Coli isolated from healthy slaughtered pigs from three provinces in Cambodia Health and disease drivers	Chea Rortana[1]*, Tum Sothyra[1], Sok Koam[1], Hak Makara[2], Mary Joy Gordoncillo[2], Mong Vorleak[1], Loek Sochariya[1], Kristina Osbjer[4], Agnes Agunos[5] National Animal Health and Production Research Institute	MaL 	National AMR surveillance and capacity strengthening is one of the key objectives indicated in the global and Cambodian AMR action plans. This study aims to determine the feasibility and robustness of the national AMR surveillance plan in food animals in Cambodia using *Escherichia coli* in healthy pigs at slaughter. Isolates of *E. coli* were recovered from cecal pig samples (n = 504) collected from 7 nationally inspected slaughterhouses in 6 districts within 3 major pig producing provinces in Cambodia. Minimum inhibition concentration per gram was measure by utilized the regionally customized commercial broth microdilution plates which included: azithromycin, cefotaxime, ceftazidime, nalidixic acid, ciprofloxacin, colistin, gentamicin, streptomycin, meropenem, ampicillin, chloramphenicol, sulfamethoxaxole, tripmethoprim and tetracycline. Results were interpreted using both clinical breakpoints and epidemiological cut-off values, to determine the percentage or resistant and non-wild type isolates, respectively. Among the *E.coli* isolated the result detected resistance to the HPCIAs: cefotaxime (25%) and ceftazidime (10%) and high-level resistance to ciprofloxacin/nalidixic acid (both 42%). High levels of non-wild type ceftiofur (30%), cefotaxime (31%), ceftazidime (26%), enrofloxacin (67%) and ciprofloxacin (81%) pig *E. coli* were detected. In both studies, the vast majority of isolates exhibited resistance to ≥ 3 antimicrobial classes (Study 1 = 74%; Study 2 = 95%). This first round of national AMR surveillance conducted on commensal *E. coli* from pigs in Cambodia serves as a baseline for monitoring the national strategy to mitigate AMR in the animal sector in the country. It also serves as a proof of concept for the Cambodia National AMR surveillance plan for food animals, which can be further enhanced, expanded, and sustained as resources become available **Keywords:** Antimicrobial, antimicrobial resistance, foodborne bacteria, and pig slaughterhouse.

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<td>36</td>
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2 posters</td>
<td>Dairy Asia partnership & Mongolian Bactrian Camel sector

Dairy Asia dialogue: goat husbandry and milk production

Geopolitical and economic drivers

Environmental drivers</td>
<td>Batbaatar Bayarmagnai</td>
<td>Action Network

 
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<td>Dairy Asia was established in 2014 by the FAO through the Animal Production and Health Commission for Asia and the Pacific (APHCA). It is a multi-stakeholder partnership with a vision to build a sustainable dairy sector in Asia and the Pacific region. The partnership is voluntary and its functions are based on consensus and mutual respect. Dairy Asia is one of the action networks of the Global Agenda for Sustainable Livestock. As a knowledge partner, Dairy Asia also collaborates with the International Dairy Federation, Dairy Sustainability Framework, ILRI, and the IFCN-dairy network.In 2020, the Dairy Asia secretariat office was established in Ulaanbaatar, Mongolia supported by the Government of Mongolia and FAO. (Government Resolution of Mongolia, №11, 08 January 2020) Its objective is to strengthen Dairy Asia as a sustainable regional institution for the dairy sector. Dairy Asia’s membership has reached 13 countries, namely Afghanistan, Bangladesh, Bhutan, China, India, Indonesia, Mongolia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, and Vietnam. The partnership is prospectively aiming to be expanded to North-East Asia, Central Asia, South-East Asia, West Asia and the Middle East.Dairy Asia was legally registered in Mongolia as an intergovernmental organization (legal entity) on 22 April 2022 (Government Resolution of Mongolia, №82, 23 February 2022). Dairy Asia’s proposed initiatives: Asian Milk Week, dedicated to World Milk Day, World Milk Map, Dairy Asia: bilateral cooperation of member countries, strengthening the cooperation and partnership of countries in the region through establishing World Yak Association, World Yak Day, and World Bactrian Camel Association in Ulaanbaatar, Mongolia. Asia is a largest and most populous continent. The continent’s milk production growth that estimated at 4.5 percent in 2022. (International Dairy Federation) Asia accounts for ~40 percent of world milk production, but the region’s self-sufficient rate is 90 percent. Cow milk accounts for 81% of world milk production followed by buffalo milk with 15%, goat milk with 2%, sheep milk with 1%, camel milk with 0.5%, and other dairy species (yak milk, mare milk, etc.) with 0.5% (FAO). Based on its milk production growth and livestock diversification, Asia has the great opportunities to sustainably develop both cow and non-cow milk sector. Dairy Asia is highly focused on both cow milk and non-cow milk production and hosts a series of Dairy Asia dialogues in the region. Strengthening the cooperation of partnership Dairy Asia member countries, sharing the knowledge, best experiences, and good practices, defining the common facing challenges, discussing the related solutions, further actions are key functions and aims of Dairy Asia dialogues.
<table>
<tr><td>Dairy Asia dialogue: yak milk production</td><td>2021.11.19</td></tr>
<tr><td>Dairy Asia dialogue: camel milk production</td><td>2022.05.26</td></tr>
<tr><td>Dairy Asia dialogue: goat milk production</td><td>2023.05.30</td></tr>
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Dairy Asia dialogue: buffalo milk, sheep milk, and mare milk will be proposed as further activities in the region for the next years.</td>
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37	Siripol Pengchom Wasin Wongwilai Ban Mae Tad organic farming community enterprise merukfarm@gmail.com wasin.w@cmu.ac.th +66 642546239 1 Poster	Economic insects and organic farming from traditional culture to sustainable communities based on the BCG Model Geopolitical and economic drivers	Siripol Pengchom Baan Mae Tad community enterprise Wasin Wongwilai Baan Mae Tad community enterprise	MaL 	Crickets are edible insects that are rich in protein and have outstanding production efficiency. According to the EU's new food regulations (Novel Food), the consumption of insects presents one of the most sustainable modes of meeting the world's rising food consumption levels. The value of edible insect market worldwide is estimated to be 400 million US dollars (12,800 million baht). Globally, the share of Asian market is around 30-40 percent. By 2023, the Food and Agriculture Organization of the United Nations (FAO) has estimated that the value of the edible insect market worldwide will reach to 1.5 billion US dollars. As "insects" are a source of high-quality protein, FAO promotes the edible insects as an alternative food for ensuring food security. By supporting edible insect farming, Ban Mae Tad Organic Farming Community Enterprise Group in Chiang Mai province received funding from the Fund for Equality in 2019 in order to create a project for raising high-quality crickets. There are approximately 80 participating members including elderly people, farmers, and workers to produce organic crickets as well as organic vegetables for family members' consumption. There are approximately 200 cricket ponds under the group's supervision distributed in Huai Sai Subdistrict, Rong Wua Daeng Subdistrict, and Mae Pong Subdistrict in Chiang Mai Province. It has created sustainable careers and income circulation in the community with approximately 200 to 1000 baht per person. Currently, the production volume of crickets per month is approximately 400 kilograms. The large cricket pond is located in Huai Sai Subdistrict. This has led the group to develop crickets in various processed products, such as food products in the future food group (Future Food), dietary supplement products, and cosmeceutical products supported by innovation and technology through collaboration with universities and research institutes including the National Research Council of Thailand, National Innovation Agency (Public Organization), Chiang Mai University, Maejo University, Chiang Mai Rajabhat University, and Rajamangala University of Technology Lanna. Ban Mae Tad organic farming community enterprise has raised the quality of their products to meet market needs. It acts as a role model in the community in terms of knowledge transfer and collaboration with the policy maker such as the Provincial Agriculture Office. Their work has demonstrated economy upgrading by adding value to people lives and increasing income in the community, consistent with the Bio-Circular-Green (BCG) Economy Model.

40	Rima Mekdaschi Studer, World Overview of Conservation Approaches and Technologies (WOCAT), Center for Development and Environment (CDE), University of Bern, Switzerland Rima.Mekdaschi-Studer@unibe.ch 2 posters	Sustainable rangeland management in Sub-Saharan Africa. Guidelines to good practice https://www.wocat.net/library/media/174/ Environmental drivers Restoring Life to the land. The role of sustainable land management in ecosystem restoration https://www.wocat.net/library/media/251/ Environmental drivers	Liniger, Hanspeter and Mekdaschi Studer, Rima William Critchley, Nicole Harari and Rima Mekdaschi Studer	NGO Cluster MaL  	The overall goal of the guidelines is to contribute to improved rangeland management by better understanding and differentiation of rangeland use systems, and their specific challenges and solutions. This is achieved by illustrating a wide range of proven and innovative rangeland management practices, grouping them, clarifying their characteristics and requirements, and by illustrating their impacts on ecosystem services and human wellbeing. The ultimate aim is to demonstrate – through this unique set of convincing case studies and their analysis as well as the development of guiding principles– the value and potential of investment in rangelands. Despite very real constraints, there are multiple messages of hope in this collection of cases studies. The UN Decade on Ecosystem Restoration (UNDER) 2021-2030 aims to massively scale up the restoration of degraded ecosystems as a proven measure to fight climate change, enhance food security, water supply and biodiversity, and manage associated risks of conflict and migration. Sustainable land management (SLM) is key to restoration of terrestrial ecosystems: it is at the core of maintaining, or re-establishing, life in the land. Through SLM, land degradation can be avoided, reduced and/or reversed. It helps land degradation neutrality targets to be met. SLM can only have a significant impact on ecosystem restoration, however, when it spreads widely, covering a critical mass of land and people, and when maintained and adapted over time. A combination of SLM practices is required to benefit ecosystems as a whole.

42	Thitinan Sukniwatchai DLD Thailand dcontrol_hhu@dld.go.th dhidhinan@hotmail.com +66 836465453 1 poster	Good farming management (GFM) Geopolitical and economic drivers	Thitinun Sukniwatchai Veterinatrian, Professional level DLD Thailand	MaL 	Most livestock farms in Thailand operating on a small-scale. Small farmers, due to their limited resources and infrastructure, often face higher risks when it comes to disease epidemics that can spread to neighboring farms and even large farms and causing economic damage and affect the overall stability of the livestock industry. Practicing good biosecurity is an important part of animal health management and can reduce the risk of disease introduction and disease spread. The Department of Livestock Development has established policies to promote Good Farming Management (GFM) with a focus on improving disease prevention and appropriate animal husbandry in small-scale livestock farms. GFM consists of 9 biosecurity measures; Farm location and layout, Housing management, Human management, Vehicle management, Animal health management, Food, water and medicine management, Environment management, Milking management, Data management. The measures are supported by the regulation Animal epidemic act. B.E.2558 (2015) Chapter 1 Section 7: disease prevention and control. Which is used for the preparation for implementing Good Agricultural Practice (GAP) farming. Absolutely, implementing biosecurity measures on small-scale livestock farms is a necessary step in reducing the risk of disease epidemics and their economic impact on farms and the livestock industry. These measures not only protect the health and welfare of the animals but also contribute to the safety and quality of livestock products for consumers

43	Dr. Rocío Santos Gally Instituto de Ecologia. UNAM (ReGASo) rsantos@iecologia.unam.mx +52 5563 167274 1 poster	Socio-ecological innovation networks for sustainable livestock farming in Mexico Environmental drivers	Rocío Santos-Gally, Karina Boege Antonio Carrillo Félix Lopez Susanna Rocha	Global Network on Silvopastoral Systems  	Extensive cattle farming causes high rates of deforestation, resulting in environmental damages that directly impact livestock productivity. The Sustainable Livestock Network, known as ReGaSo in Spanish, is actively promoting social learning communities. These communities aim to facilitate the exchange of knowledge and practices related to the adoption of silvopastoral systems and multifunctional landscapes, collaborative consensus-building, collective skill enhancement, and the inclusion of various social sectors, genders, and generations.

44	Mr. Ekachai Laiya PODD Centre, Chiang Mai University, Thailand poddcentre@cmu.ac.th +66 53 948075 1 poster	PODD Global Health Health and disease drivers	Dr. Nattakarn Awaiwanont Asst. Prof. Dr. Warangkhana Chaisowwong Asst. Prof. Dr. Terdsak Yano Mr. Ekachai Laiya Dr. Pruet Boonma Assoc. Prof. Dr. Lertrak Srikitjakarn	MaL 	The PODD One-Health surveillance system plays a critical role in facilitating early detection and rapid response to disease outbreaks in both animals and humans. It offers real-time alerts to community leaders and health authorities, empowering them to effectively manage and control incidents at their source. PODD Global Health is dedicated to addressing the global readiness gap for future pandemics by providing open-source PODD software as a part of the One-Health initiative. The ongoing success of the PODD surveillance system in Thailand serves as a model for regional expansion. This comprehensive system encompasses 20 key features that address major One Health issues at the community level. It has been implemented in 400 local governments, benefiting over 2 million people. Over the past six months, this system has been instrumental in controlling various disease outbreaks, including 10 episodes of Covid-19, 55 episodes of dengue fever, 96 instances of abnormal animal deaths, and the issuance of more than 40,000 PM 2.5 hazard notifications. Furthermore, the PODD Global Health was introduced to ASEAN country representatives during an animal health ASEAN meeting by the Department of Livestock Development, Ministry of Agriculture, Thailand. The system is now being adopted by the Department of Livestock and Fisheries in the Lao People's Democratic Republic, with an initial rollout in 10 cities across 5 provinces. Currently, PODD PGS and the PODD Happy Farm Application features have been introduced to promote organic and sustainable livestock farming in backyard production systems. The global communication access to the PODD open software is available in multiple languages, including Lao, Myanmar, English, French, and Spanish, through the website www.onehealthtoolkit.org. Keywords: One-Health, Surveillance, Digital, Community

45	Nattanicha Prayoonwiwat Wanwisa Yaemmeeklin Designation: Bureau of Livestock Standards and Certification, Department of Livestock Development (DLD) nattanicha.p@dld.go.th wisa087@gmail.com +66 860157006 1 Poster	A case study of promoting green energy to solve community complaints from pig farms Technological and innovation drivers Environmental drivers	Nattanicha Prayoonwiwat (Veterinary Officer Professional Level) Wanwisa Yaemmeeklin (Animal Husbandry Technical Officer, Professional Level) BLSC DLD	MaL 	Despite pig farms earning income for the local economy, very often cause pollution that affects health and environmental issues such as bad odour, polluted water, and flies. This results in significant surrounding pig farm area complaints and disputes. Department of Livestock Development (DLD) is responsible for animal health, animal production and livestock extension, food safety of animal-derived products, veterinary public health, animal welfare, international animal health matters and the environmental impact of livestock farms. DLD has a mission to solve environmental problems in small to medium-scale pig farms that do not have enough budget to develop waste management systems. DLD has a project to solve the problem by encouraging the owner of the pig farm to construct a “biogas system” to manage waste. This project cooperation of the pig farm owner in Chiang Mai, Local Administrative Organization, other related organizations. Resulting in Wastewater and manure are treated, produce biogas as renewable energy such as electricity, fuel and LPG and reduce energy costs and corporate social responsibility (CSR). This booth will provide information and feature approaches and success stories featured from promoting green energy to solve community complaints from pig farms. This will be delivered through posters and videos.

46	Avalos Ileana Sepulveda Claudia Tropical Agricultural Research and Higher Education Center Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Costa Rica 1 poster	Fostering Sustainable Livestock: Insights from Institutional Arrangements in Beef and Dairy Production Chains Across Mexican States Environmental drivers Technological and innovation drivers	Avalos Ileana Sepulveda Claudia Jimenez Antonio Betanzos Juan Perez Edwin Escobedo Adriana. Tropical Agricultural Research and Higher Education Center CATIE	Mal  	Beef and dairy production in Mexico plays a vital role in the nation's economy but poses significant environmental and social challenges. To mitigate these issues, there's a pressing need to adopt sustainable livestock practices, requiring robust institutional arrangements to enforce positive changes in production. These arrangements are crucial as they define incentives, responsibilities, and relationships among stakeholders, influencing decision-making and the success of sustainable practices. The BioPaSOS project has been instrumental in examining institutional arrangements in beef and dairy production in Jalisco, Chiapas, and Campeche, providing insights into how stakeholder relationships impact sustainable farming promotion. Institutional arrangements vary widely, from hierarchical and market-based to community-based and collaborative models, each having distinct implications for sustainability. Tailoring strategies to specific contexts and bolstering effective institutional frameworks is imperative for advancing sustainable livestock practices and addressing environmental challenges in this vital industry.

47	Pulido-Herrera ,LA Sepulveda, C Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Costa Rica 1 poster	An Initial Approximation to Tree Cover Dynamics in Mexican Cattle Ranching Areas: A Multitemporal Analysis Environmental drivers Technological and innovation drivers	Pulido-Herrera, LA Sepulveda, C Jiménez, JA; Betanzos, JE; Pérez, E Niño, L Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Costa Rica	Mal  	Deforestation is a significant global environmental concern, with repercussions spanning multiple ecological and socioeconomic dimensions. In regions like Mexico, cattle ranching has emerged as one of the primary drivers of deforestation. This reduction in tree cover not only jeopardizes biodiversity but also disrupts vegetation dynamics and the overall health of ecosystems. Vegetation is pivotal to ecological stability and serves as a crucial indicator of ecosystem health. In areas dominated by livestock activities, comprehending the interplay between cattle ranching and vegetation becomes imperative. Spectral indices, derived from remote sensing techniques, provide an invaluable means to gauge this impact, with proxy indicators like vegetation vigor playing a central role. Among these, the Enhanced Vegetation Index (EVI) Is particularly notable for its capacity to measure vegetation vigor and its temporal shifts, especially in regions with significant livestock presence. As part of the Bio Pa SOS project, states including Jalisco, Chiapas, and Campeche were scrutinized. Here, notable fluctuations in vegetation vigor were detected, potentially signaling the effects of de forestation and prevailing livestock practices. The aim of this study was to assess the influence of livestock activities on tree cover dynamics across three Mexican states, employing a multitemporal analysis of vegetation using a proxy indicator to capture the observed changes