ASEAN-CGIAR
Innovate for Food and Nutrition Security

Meeting report

Improving the Livestock Greenhouse Gas Inventory in Southeast Asia

Proceedings of a special session held during the International Conference on Sustainable Animal Agriculture for Developing Countries (SAADC) biennial conference.

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IP No.2: Climate Neutrality and Circular Agriculture

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NEW ZEALAND AGRICULTURAL GREENHOUSE GAS Research Centre
GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES
JIRCAS
UPM

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Abbreviations

ACIAR	Australian Centre for International Agricultural Research
ADB	Asia Development Bank
ASEAN	Association of Southeast Asian Nations
BRIN	Badan Riset dan Inovasi Nasional (National Research and Innovation Agency)
CRN	Climate Resilience Network
CSA	Community Supported Agriculture
DLD	Department of Livestock Development
DLF	Department of Livestock and Fisheries
ESG	Environmental, Social and Governance
FAO	Food and Agriculture Organization of the United Nations
GDAHP	General Directorate of Animal Health and Production
GHG	Greenhouse Gas
GLAD	Global Livestock Advocacy for sustainable Development
ILRI	International Livestock Research Institute
JIRCAS	Japan International Research Center for Agricultural Sciences
MARDI	Malaysia Agricultural Research and Development Institute
MRV	Measurement, Reporting and Verification
NDC	Nationally Determined Contribution
NIAS	National Institute of Animal Sciences
GRA	The Global Research Alliance on Agricultural Greenhouse Gases
SAADC	Sustainable Animal Agricultural for Developing Countries
SEARCA	Southeast Asian Regional Center for Graduate Study and Research
UPLB	University of the Philippines, Los Banos

Summary

The workshop 'Improving livestock greenhouse gas (GHG) inventory in Southeast Asia' with approximately 25 participants and organized over 21-22 November 2023 on the sidelines of SAADC, reviewed recent GHG inventory development activity and livestock emission research to identify regional priorities and future short- and long-term opportunities. The short-term activities which could be funded by existing or minor auxiliary support could be largely viewed as tasks suitable for a 'Community of Practice' on livestock GHG emissions, which would promote regional interactions and cross-learning, addressing both inventory and research objectives. Longer-term, the basis for a regional research program that would seek to deliver and capture benefits from mitigation at scale was outlined, with a view to future development into a draft document to bring interested funding agencies into a common conversation.

Participants at the workshop (photo credit: ILRI).

Workshop objectives

The workshop's objectives were to provide opportunities for inventory compilers and researchers to identify:

- priority areas for inventory improvement with multi-country/regional relevance in the Association of Southeast Asian Nations (ASEAN) region.
- research priorities that support inventory improvement and mitigation with multi-country/regional relevance in the ASEAN region.
- potential mechanisms to enable networking for exchange and capacity building in the ASEAN region aligned with priority inventory improvement and research needs.

Workshop context and structure

The Sustainable Animal Agricultural for Developing Countries (SAADC) 2023 occurred at a strategic time for the completion and communication of activities in livestock inventory and livestock GHG research in the ASEAN region. These activities include current New Zealand Government funded and current and past Japan International Research Center for Agricultural Sciences (JIRCAS) investment. In addition, several development partners (i.e. New Zealand government, International Livestock Research Institute (ILRI)-CGIAR, World Bank, Korea) are currently exploring options for work on this topic in the region. The workshop was thus scheduled in two parts: An initial sharing of experiences on progress in national livestock GHG

inventory improvement by six ASEAN countries involved in the New Zealand Global Research Alliance on Agricultural Greenhouse Gases (GRA), as well as a report on the regional livestock emission research, covering the history of JIRCAS investment in the region in four ASEAN countries, and a short overview of the New Zealand GRA Initiative.

The sessions on Day 2 were forward-looking, seeking to identify emerging priorities in inventory improvement and mitigation at scale and what could be contributed in the short and long term.

Day 1:

(1) Sharing experiences of ongoing livestock GHG inventory improvement activities:

Cambodia Dr. Mom Somany, General Directorate of Animal Health and Production (GDAHP): The presentation highlighted the relevance of GHG inventory improvement for enabling Measurement, Reporting and Verification (MRV) of mitigation action in Cambodia's Nationally Determined Contribution (NDC), especially the National Biogas Programme.

Indonesia Dr. Yeni Widiawati, National Research and Innovation Agency (BRIN): The presentation described Indonesia's process of inventory improvement since 2016, which is still ongoing, highlighting that continuous improvement is a long-term activity.

Laos Dr. Thansamay, Department of Livestock and Fisheries (DLF): The presentation stressed the importance of capacity building for staff and stakeholders, and stakeholder coordination in the inventory improvement process.

Malaysia Mr. Azizi Azmin, Malaysia Agricultural Research and Development Institute (MARDI): The presentation described MARDI's efforts to produce country-specific Tier 1 emission factors based on the performance of the dominant beef breeds in the country, and ongoing activities to progress to Tier 2 for beef and dairy.

Philippines Prof. Amado Angeles, University of the Philippines, Los Banos (UPLB): The presentation highlighted the country's diverse geography and the need to collaborate with different data providers in the country and to improve overall data management.

Thailand Dr. Jeerasak Chobtang, Department of Livestock Development (DLD): The presentation introduced institutional arrangements in Thailand and country-specific measurements as well as challenges and highlighted strong interest in regional collaboration and exchange.

Vietnam Dr. Tran Thi Bich Ngoc, National Institute of Animal Sciences (NIAS): The presentation highlighted the need for GHG inventory improvement in light of national GHG mitigation objectives and policy decisions by the Government of Vietnam.

(2) Sharing on research activities:

JIRCAS' research activities in the region (Dr. Koki Maeda, JIRCAS): The presentation summarized the JIRCAS past investments and available head-cage chambers in the region. It also proposed the potential use of cashew nutshell liquid as a feed additive to mitigate enteric methane in the region, and use of sniffer-based measurement as an alternative option for efficient measurement.

Indonesia (Prof. Agung Purnomoadi, Universitas Diponegoro): The presentation highlighted research on early off-take of goats in response to recent changes in farming practices

Malaysia (Dr. SCL Candyrine, Universiti Malaysia Sabah): The presentation introduced the facilities available for further enteric emission measurement in Malaysia.

Thailand (Dr. Kamphayae, DLD): The presentation introduced research conducted on cattle nutrient requirements, enteric emissions and the effects of different feeds.

Vietnam (Prof. Nguyen Van Thu, Can Tho University): The presentation introduced facilities constructed with support from Japan at Can Tho University.

Discussion session at the workshop (photo credit: ILRI).

Discussion results

Regional inventory improvement priorities and how to address them

Group discussions highlighted that there exists large variation in the institutional arrangements of GHG inventory setups amongst the ASEAN countries, that climate policies were changing rapidly. Thailand and Indonesia had relatively more advanced livestock inventories compared to the other countries.

Priority issues or needs:

Categorisation	• How to define production systems? • How to define categories by farm size and/or farm type and/or production system? • How to account for changing production systems? • How to account for regional variation/diversity? • How to account for breed differences?
Data collection	• Lack of farm records • Population data accuracy • Population of animal sub-categories • Collating historical data for a consistent time series • How to collect nationally representative data (e.g. on live weight, pasture quality)

	• How to build data collection for inventory on existing data management systems? • Templates for data collection and database management
Other information issues	• How to align country-specific manure management practices with IPCC definitions • How to calculate the proportion of manure managed in different manure management systems
Uncertainty analysis	• How to do uncertainty analysis – there is no example yet in the region

How to address priority issues or needs? Discussion already identified some experience with addressing some priority issues (e.g. Indonesia's experience with data animal sub-categories and production systems). The following types of activity could provide further support:

Activities	Examples
Share case studies	Case studies of how countries define inventory categories / sub-categories Case studies on data collection methods, institutional roles, and how improvements are made over time
Workshops/webinars	e.g. to share and discuss case studies
Methodological guidance	e.g. on manure management definitions and data collection tools
Data sharing	Share activity data inputs to Tier 2 emission factors; countries could use data from similar production systems in other countries or use data from other countries to verify their own data
Inventory reviews	Share the formal reviews of inventories so that other countries can learn what to look out for; informal peer reviews within the region so countries get feedback and reviewers learn from other countries' methods

Regional priorities for research for mitigation and how to address them

Aim of the discussion was to develop a vision for a unified future ASEAN Livestock GHG Research capability, an ASEAN Framework for Cooperation

Support: Success in multi-donor funding or providing strong financial support will need a clearly stated vision/need for a new initiative. i.e. a vision to deliver essential outcomes for countries & funders. This could be a numerical target, for example, by 2030, lowering emission intensities by 20%) as well as delivering to identified government needs, like enabling NDC ambitions to be met. Or focus on pathway to carbon neutrality in livestock food systems. Must link to circular economy & food-secure supply chain targets, plus national livestock development plans, all of which provide context/justification.

Sources Scope: To include manure and enteric. Ruminants and monogastric animals

Delivery scope: To span across inventory / gap-filling & mitigation research / delivery at scale / MRV & inventory capture of benefits.

Four proposed work programs

1. *Capacity development:* (include, inventory, measurement, solutions, statistics). *Idea to develop on-going regional leadership teams in these expert areas, as a resource to serve the region, with external experts as needed).*
2. *Measuring Emissions:* Sharing methods, protocols & undertaking validation and continuous improvement of measurement capability
3. *Solutions:* Discovering, developing and recognising regionally relevant mitigation strategies
    a. Mitigation discovery
        i. Farm system strategies (productivity/intensity focus). Include "Byproducts' program.
        ii. Technology innovation (GHG focused)
    b. Benefit capture through responsive inventory and MRV systems, C credit schemes
4. *Delivery:* Vision is regional roll out of scalable solutions.
    - Best practice for multiple outcomes.
    - Need education of smallholders
    - Need to foster this extension program through national and regional planning and policy
    - Environmental, Social and Governance (ESG) and NDC compliance
    - Are ASEAN Climate Resilience Network (ASEAN CRN) a useful link for on-farm change?
    - Put in context of supply chains

Networking exchange and capacity building for Inventory and mitigation

All workshop participants discussed together the way forward on inventory and research needs. This focused on what can be done in the:

1. Short-term (time horizon 1 - 2 years), largely with existing resources or with small additional funds available to kick-start small regional partnership tasks. Ideas were collected on this. While there was talk of something formal with a 'secretariat' to facilitate a 'community of practice' (for example, Livestock Community of Practice in Southern Africa), those with interest may just start and serve informally as 'coordinators' to get the collaborative tasks underway.
2. Long-term. The vision was to build a larger multi-funder regional program based on ideas developed by the research subgroup (see previous section) and enrich this to properly cover the inventory, NDC and carbon market opportunities.
3.

Short-term	**Medium-term**	**Longer-term**
• Address some regional priorities • Using existing resources or small additional resources	A 'Community of Practice' on livestock GHG in the ASEAN Region to facilitate exchange and collaboration	An ASEAN framework for cooperation, country-funding and multiple donors can align to a common regional programme

Short-term: What could we be doing with existing resources and do now to make a start on regional collaboration?

- Current projects mentioned that may (no commitments !!) be able to support action on the listed tasks (advice/platforms/info/seed money) include:
    - New Zealand Climate Smart Ag Initiative (Andreas & Roger, NZAGRC)
    - JIRCAS & current Dataman project (Koki, JIRCAS)
    - CGIAR Work package 2.1 ('ASEAN' initiative with possible link to Asia Development Bank (ADB)) (Anthony, ILRI)
- Potential 'instant collaborations'
    - Nominate country focal points and ensure continuity in who participates in discussions
    - Webinar series
    - Digital /on-line training
    - Headbox user group
    - Evaluation of sniffers using current studies/data
    - Sharing inventory data
    - Sharing inventory data collection templates
    - Inventory advisory team (regional team to help each other & meet other government inquiries)
- All of these tasks could be managed under a "Community of Practice". If funded, ideally there would be a regional secretariat and enough resources to support exchange activities, bilateral exchanges, focused studies etc. ASEAN CRN and Southeast Asian Regional Center for Graduate Study and Research (SEARCA) mentioned as possible links/platforms/secretariats.

Longer-term: This would be a condensation of the planning by the inventory and research sub-group discussions summarised above. We did not do this combination during the workshop but we did discuss what sort of supporters were needed to engage to get the multiple streams of the program funded for a large long-term project. This list included the following but is not exhaustive as others are known to be interested in livestock GHG investment in the region (e.g., World Bank):

- The Global Livestock Advocacy for sustainable Development (GLAD) established by ILRI
- ADB ~ interest if there was obvious feed-forward to benefit society; existing biogas interest
- Australian Centre for International Agricultural Research (ACIAR) ~ could engage with Program Manager for Livestock Systems and country representatives
- Mekong Institute
- SEARCA
- The Food and Agriculture Organization of the United Nations (FAO)

Participants list

List of invited speakers and organisers

Prof. Agung Purnomoadi	Animal and Agricultural Sciences, Universitas Dipinegoro, Semarang, Indonesia
Prof. Nguyen Van Thu	Faculty of Agriculture and Applied Biology, Can Tho University, Vietnam
Ms Wanna Angthong	Bureau of Animal Nutrition Development, Thailand
Mohd Huzairi Mohd Zainudin	Universiti Putra Malaysia
Candyrine Su Chui Len	Universiti Putra Malaysia
Norhasimah Sulaiman	Universiti Putra Malaysia
Dr. Mam Somony	Animal Production Department, Cambodia
Dr. Yeni Widiawati	National Research and Innovation Agency (BRIN), Indonesia
Dr. Thansamay Vorlaphim	Department of Livestock and Fisheries, Laos
Mr Azizi Azmin	Malaysia Agricultural Research and Development Institute
Prof. Dr. Amado Angeles	University of the Philippines, Los Banos
Dr. Tran Thi Bich Ngoc	National Institute of Animal Science, Vietnam
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Dr. Nor Dini Rusli	Universiti Putra Malaysia
Prof. Roger Hegarty	New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC)
Dr. Andreas Wilkes	NZAGRC
Dr. Koki Maeda	JIRCAS
Dr Anthony Whitbread	ILRI

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The **ASEAN-CGIAR Innovate for Food and Nutrition Security Regional Program** is a research collaboration among the ASEAN Member States, ASEAN Secretariat, and CGIAR Centers, with funding support from the government of Australia and the United Kingdom. The program's vision for the next 10 years is to scale up and out bold integrated innovations that will enhance the resilience of ASEAN's agri-food systems to climate change. This ambitious endeavor aims to deliver better livelihoods for food producers and other stakeholders along the value chain. It also seeks to ensure more affordable, nutritious, and healthy food for consumers while fostering a healthier natural environment for all.

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