



Carbon Trading and Smallholder Rice Farmers in Southeast Asia

DISCUSSION PAPER: OPPORTUNITIES & CHALLENGES OF CARBON
TRADING FOR SMALLHOLDER FARMERS

THE AUTHORS' TAKE RESPONSIBILITY FOR THE VIEWS EXPRESSED HERE, AND NOT ASEAN

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Abbreviations

AMS: ASEAN Member States

ASEAN: Association of Southeast Asian Nations

AWD: Alternate Wetting and Drying

CDM: Clean Development Mechanism

CER: Certified Emissions Reductions

DSR: Directly Seeded Rice

ETS: Emissions Trading Schemes

FAO: Food and Agriculture Organization

GHG: Greenhouse Gas

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH

ICAP: International Carbon Action Partnership

IPCC: Intergovernmental Panel on Climate Change

IRRI: International Rice Research Institute

ITMOs: Internationally Transferred Mitigation Outcomes

JA: Jurisdictional Approaches

JETS: Jakarta Emissions Trading Scheme

NAMA: Nationally Appropriate Mitigation Actions

NDC: Nationally Determined Contributions

UNEP: United Nations Environment Programme

VER/VCC: Verified Emissions Reductions, Verified Carbon Credits

Background and Acknowledgement

The finalization of Article 6 of the Paris Agreement during the 26th Conference of Parties (COP26) has sparked optimism regarding financing opportunities in the carbon market. Recent developments in carbon markets have garnered significant interest among members of the ASEAN-CRN, particularly in their potential benefits for smallholder farmers. To address this interest, **the ASEAN-CRN has undertaken a collaborative effort, convening experts and regional agencies to conduct a comprehensive study.** As the Chair of ASEAN-CRN, the Thai Department of Agriculture has offered initial guidance on the direction of the study. *The primary objective of this study is to explore how carbon markets can positively impact smallholder farmers in the ASEAN region.*

It is worth noting that the paper was not circulated to the ASEAN Member States (AMS) prior to its publication, but benefitted from insights and information gathered during various ASEAN CRN knowledge exchange events from the latter part of 2022 onwards. This paper, however, is available for unrestricted use by various state and non-state actors, including Civil Society Organizations (CSOs), the private sector, research institutes, and individuals, provided appropriate citation is given.

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Several insights and data came from ASEAN CRN workshops especially from the December 2022 event on Low Emissions and Resilient Agriculture in Bangkok, Thailand attended by the wider Asia-Pacific representatives, and was supported largely by FAO Regional Asia Pacific and the ASEAN-EU Enhanced Regional Dialogue Instrument (E-READI) programme.

Executive summary

Rice farming is responsible for 13% of global methane emissions, and smallholder rice farmers in Southeast Asia play a crucial role in the region's agriculture, food security, and rural livelihoods. These farmers face challenges related to limited access to financing, technology, markets, and vulnerability to climate change and natural disasters, making climate change a significant concern for their productivity and profitability.

Various initiatives have been launched in Southeast Asia to support smallholder rice farmers, including extension services, access to credit, market access, and technology to promote sustainable farming practices. Additionally, the implementation of carbon markets, particularly Article 6 of the Paris Agreement, is expected to increase in the region, offering potential benefits for emissions reduction efforts.

Several countries in Southeast Asia have initiated emissions trading schemes, pilot programs, or carbon taxes to address climate change. However, the carbon market systems are still in the early stages, and further policy frameworks and political will are needed to fully integrate them into the region's emissions reduction strategies. The following are select key takeaway messages from this report.

Takeaway 1: *Carbon trading provides smallholder farmers in Southeast Asia the opportunity to earn income by adopting sustainable practices that reduce their carbon footprint, such as agroforestry, improved cookstoves, sustainable rice cultivation, livestock management, and biogas. These practices generate carbon credits that can be sold in carbon markets. Jurisdictional approaches offer a comprehensive strategy for low-emissions development beyond deforestation accounting. However, smallholder farmers face challenges, including a lack of legal framework, limited access to information, poor infrastructure, and financial constraints.*

Takeaway 2: *Uncertainties in carbon trading include unclear regulations, verification and monitoring challenges, voluntary vs mandatory systems, competition with other markets, and economic and political stability. Scaling carbon trading for smallholder farmers requires clear regulations, technical assistance, access to finance, capacity building, collaboration with stakeholders, technological solutions, and jurisdictional approaches.*

Takeaway 3: *Innovations like remote sensing, blockchain technology, machine learning, social and gender-responsive MRV, and community-based approaches enhance the accuracy and transparency of MRV systems. Financial incentives are crucial for farmer engagement, with de-risking insurance and blended finance structures facilitating participation. Climate justice and equity must guide carbon trading programs to ensure fair distribution of benefits and protect farmers' rights. Addressing the issue of ageing farmers is essential for sustainable agricultural production and food security in the region.*

Carbon Trading and Smallholder Rice Farmers in Southeast Asia

Background

Climate Change has prompted large-scale societal, environmental, political, and humanitarian catastrophes globally, especially for people and communities of the Southeast Asia region. These impacts include climate events on a scale never seen before, with far-reaching consequences impacting the vulnerable and poorest regions with devastating consequences.

The IPCC highlights that *'the land forms the principal basis for human livelihoods and well-being through the food, fresh water and essential ecosystem services including biodiversity. This land use accounts for up to a third of the land's potential net primary production in food, fibre, feed, timber, and energy.* (IPCC Working Group III, 2021). Countries in Asia and Southeast Asia rely on subsistence farming and agriculture to support livelihoods and communities. The impact of climate-related/induced disasters threaten people and communities at the heart of smallholder agriculture at a fundamental level.

Greenhouse Gas Emission (GHG) represents one of the key root causes and the largest challenges toward combatting Climate Change. The period between 2010-2019 represented the most significant GHG emissions period in history (IPCC Working Group III, 2021). Concerted efforts by countries worldwide have led to various policy shifts in the transition toward ambitious pathways to reducing their GHG emissions. On a global scale, the agriculture sector contributes considerably to this pathway. Figure 1 highlights the role that agriculture (20%), forestry and land-use change (7%) play in the GHG equation; this graphic is based on global emissions over a twenty-year timescale.

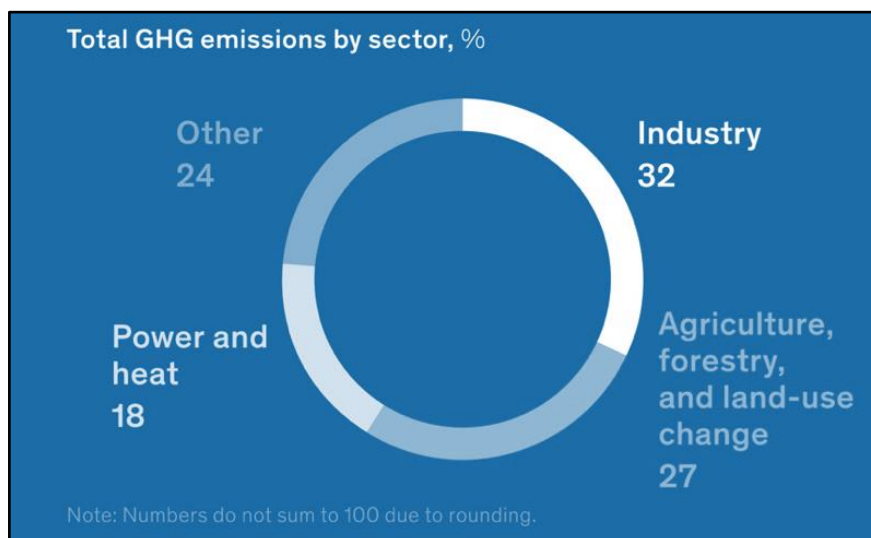


FIGURE 1 GLOBAL EMISSIONS OF TOTAL GHG BY SECTOR¹ (AHMED ET AL., 2020)

GHG emissions and agriculture have a complex relationship; agriculture contributes to GHG emissions and impacts agricultural outputs and activities.

1. **Contributions:** Agricultural practices such as fertiliser use, manure management, and livestock production are significant sources of GHG emissions, including methane, nitrous oxide, and carbon dioxide. Methane emissions from rice cultivation are a significant contributor to global GHG. Methane emissions from rice account for 13% of global agricultural emissions. (Climateworks Foundation & Global Methane Hub, 2023)²
2. **Impacts:** Climate change, in turn, affects agriculture by altering precipitation patterns, temperatures, sea-level rise, saltwater intrusion, sediment depletion, and extreme weather events, leading to soil degradation, crop failure, and reduced yields (estimated to be around 15% globally by 2050³).
3. **Mitigation:** Agricultural practices and technologies that reduce emissions and enhance carbon sequestration can help mitigate the impacts of climate change. Mitigation includes sustainable land use and water management practices, improved fertiliser and soil health management, and reduced deforestation and forest degradation.

¹ <https://www.mckinsey.com/~/media/mckinsey/industries/agriculture/our%20insights/reducing%20agriculture%20emissions%20through%20improved%20farming%20practices/agriculture-and-climate-change.pdf>

² <https://www.climateworks.org/ginas-methane/>

³ <https://earthsecuritygroup.com/wp-content/uploads/2019/11/ESG-Financing-Sustainable-Rice.pdf> or <http://ricepedia.org/challenges/climate-change>

4. **Adaptation:** To adapt to the impacts of climate change, agriculture must also become more resilient and sustainable, including through practices such as improved water and soil management, conservation agriculture, and agroforestry.

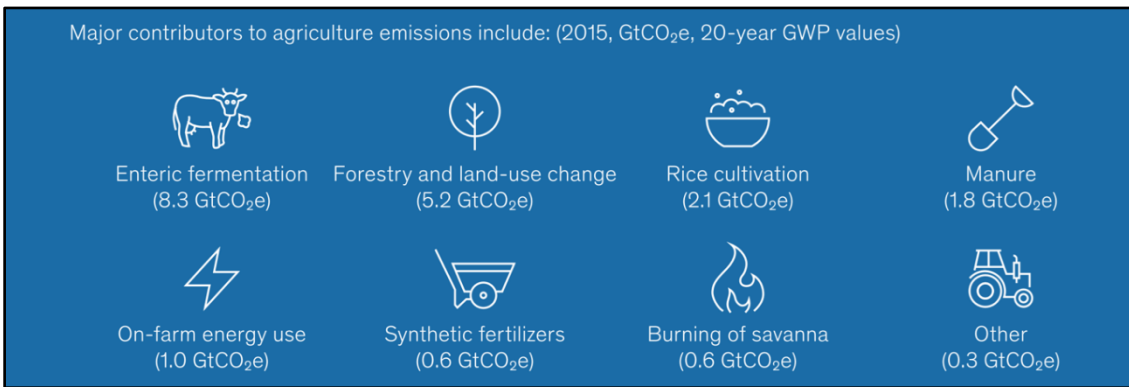


FIGURE 2 CONTRIBUTION TO GHG EMISSIONS IN GIGATONS OF CARBON DIOXIDE EQUIVALENT (AHMED ET AL., 2020)

It is essential to address both the contributions and impacts of agriculture to mitigate and adapt to the effects of climate change and ensure food security for future generations. Figure 2 is a breakdown of the emissions from agriculture over a 20-year time horizon and highlights the importance that future measures in climate action address forestry and land use change as part of the key sectors to focus on.

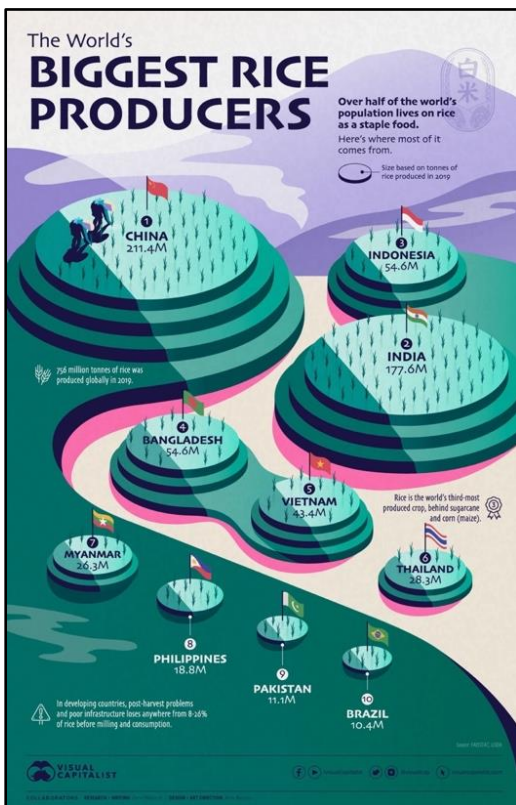


FIGURE 3 WORLDS RICE PRODUCERS RANKING (VISUAL CAPITALIST, 2022)

Given agriculture's role and GHG emissions from Rice, it is crucial to provide some perspective on which countries produce the world's Rice. The graphic below from the World Economic Forum shows Rice's production scale. Figure 3 shows the world's largest rice producers. China and India represent the world's largest rice-producing countries, with Indonesia as the third highest, followed by Bangladesh, Vietnam, Thailand, Myanmar, Philippines, Pakistan, and Brazil. Rice is an important food source and a valuable economic good for ASEAN member states (AMS).

Climate Change and Agriculture in Southeast Asia

Agriculture plays a vital role in the economies of Southeast Asia, and its benefits extend far beyond just food production. Some of the economic benefits from agriculture on the economies of Southeast Asia are summarised in Figure 4 below.

KEY ECONOMIC BENEFITS FROM AGRICULTURE IN SOUTHEAST ASIA

1. Employment

Agriculture is a major employer in Southeast Asia. It provides jobs for millions of people, particularly in rural areas, and contributes significantly to reducing poverty and inequality. Agriculture-related activities also provide employment opportunities in downstream industries, such as food processing and manufacturing.



2. Export earnings

Agriculture is a major source of export earnings for many Southeast Asian countries. Countries such as Thailand, Vietnam, and Indonesia have large agricultural sectors that produce commodities such as rice, rubber, palm oil, and coffee that are in demand globally. The export of these commodities generates significant foreign exchange earnings for the countries, which can be used to finance imports, pay off debt, and invest in development projects.



3. Food security

Agriculture is crucial to ensuring food security in Southeast Asia, where the population is rapidly growing. By producing food locally, countries can reduce their dependence on food imports and ensure that their citizens have access to sufficient and nutritious food.



4. Rural Development

Agriculture is a key driver of rural development in Southeast Asia. By providing employment opportunities and income, agriculture can help to reduce poverty and stimulate economic growth in rural areas. This, in turn, can help to reduce migration to urban areas, ease pressure on cities, and promote balanced regional development.



5. Environmental benefits

Agriculture can also provide important environmental benefits, such as preserving biodiversity, protecting soil and water resources, and reducing greenhouse gas emissions. Sustainable agricultural practices can help to mitigate the impacts of climate change and promote long-term economic and environmental sustainability.



FIGURE 4 ECONOMIC BENEFITS FROM AGRICULTURE (SOURCE: AUTHOR)

Climate change has the potential significance on agricultural productivity, food security, and rural livelihood in Southeast Asia. Some of the reasons mitigating and adapting to climate change is vital to rice agriculture in the region include:

Dependence on agriculture: Many countries in Southeast Asia are heavily dependent on agriculture for food security and as a significant source of livelihood, particularly in rural areas. Climate change can negatively impact crop yields, reduce soil fertility, and increase the risk of pests and diseases, leading to significant economic losses and threatening food security.

Vulnerability to extreme weather events: Southeast Asia is particularly vulnerable to extreme weather events such as floods, droughts, and typhoons, which can significantly impact agricultural production and livelihoods. For example, floods can cause crop damage, soil erosion, and loss of livestock, while droughts can reduce crop yields and water availability.

Dependence on fisheries: In addition to agriculture, many countries in Southeast Asia also rely on fisheries as a significant source of income and food. Climate change can negatively impact fish stocks through ocean acidification and changes in sea-level and ocean currents and temperatures, leading to substantial economic losses.

Biodiversity: Southeast Asia is one of the most biodiverse regions in the world, and many agricultural practices are closely tied to local ecosystems and biodiversity. Climate change can threaten biodiversity through habitat loss, shifts in species distribution, and loss of pollinators, which can significantly impact agricultural productivity.

These impacts threaten food security, poverty reduction, and rural livelihoods and may lead to increased migration and social unrest. Many factors contribute to mitigating the impacts of climate change on smallholder rice farmers in Southeast Asia. Amongst these are promoting sustainable, adaptive agricultural practices, developing resilient communities and infrastructure, and enhancing Governance and regulatory systems at regional and country level policy. One such policy mechanism

This report focuses on the role of rice cultivation in Southeast Asia in GHG reduction and the challenges and opportunities available through carbon market systems and emissions trading schemes. This report is intended for policy makers, development practitioners working with smallholder farmers in the Southeast Asia region.

Regional experts were consulted in a series of interviews with the following guiding questions:

- How can smallholder farmers in Southeast Asia and Asia leverage carbon markets through Emissions Trading Schemes (ETS)⁴ mechanisms to benefit livelihoods in a just, fair, transparent, and sensitive manner to the communities of farmers it serves?
- What are some examples of best practices working with smallholder farmers applicable in Southeast Asia?
- What role do Governance, transparency, environmental integrity, and equity play in typically competitive and market-force-driven ecosystems such as Carbon Markets?

⁴ In an Emissions Trading Scheme (ETS), a governing body establishes a maximum amount (cap) of greenhouse gas (GHG) emissions that can be released within specific sectors of an economy (scope and coverage). The ETS grants or sells emission permits or allowances to the participating entities, [ICAP 2023](#).

Smallholder Rice Farmers in Southeast Asia

Rice farming currently accounts for 13% of the global emissions of methane, a key greenhouse gas⁵. Smallholder rice farmers in Southeast Asia cultivate rice on small plots of land, typically less than 2 hectares. These farmers are a significant portion of the agricultural sector in Southeast Asia and play an essential role in food security and rural livelihoods in the region. Table 1 highlights the representation of smallholder farmers in Southeast Asia and India to highlight the size of smallholder farmers in each country.

TABLE 1 REPRESENTATION OF SMALLHOLDER FARMERS IN SOUTHEAST ASIA COUNTRIES (MIKOLAJCZYK ET AL., 2021)

| Country | Number of smallholder farmers (million) | Portion of smallholders in total population (%) |
|--------------------------|---|---|
| Cambodia | 3.7 | 22 |
| Indonesia | 38.9 | 14 |
| Malaysia | 1.6 | 5 |
| Philippines | 11.8 | 10 |
| Thailand | 12.7 | 18 |
| Viet Nam | 24.4 | 25 |
| India⁶ | 126 | ≈ 9% |

Smallholder rice farmers in Southeast Asia often need help with several challenges, including limited access to financing, technology, markets, and vulnerability to climate change and natural disasters. Climate change is a significant concern for smallholder rice farmers in Southeast Asia as it affects the productivity and profitability of their farms. Rice is a susceptible crop to changes in temperature, water availability, and extreme weather events, which are projected to become more frequent and intense in Southeast Asia due to climate change.

Additionally, smallholder rice farmers in Southeast Asia face challenges related to access to markets, information, and technology. Many smallholder rice farmers need access to markets, and as a result, they are often forced to sell their crops at low prices to intermediaries. They also often need access to information about new technologies and farming practices that could improve their productivity and profitability. The impact of high production and transaction costs from fragmented and smaller field sizes pose even further challenges to farmers.

Various initiatives have been launched in Southeast Asia to address these challenges to support smallholder rice farmers. These initiatives include providing extension services, access to credit, market access, and technology. Initiatives to promote sustainable rice farming practices that can help farmers adapt to the effects of climate change are becoming increasingly important. Governments and the private sector also encourage precision agriculture technology, such as drones and satellite imagery, to inform farmers about crop growth and soil moisture to help them optimise crop yields and reduce water usage.

⁵ <https://www.wbcsd.org/Pathways/Food-Agriculture/Resources/SRLI-Scaling-private-sector-investment-in-sustainable-rice>

⁶ <https://www.mdpi.com/2071-1050/12/9/3751>

This interrelationship for example, between climate change and smallholder rice farmers is even further exacerbated locally through the following direct impacts. Figure 5 explores some of the key impacts at the local scale affecting smallholder rice farmers.

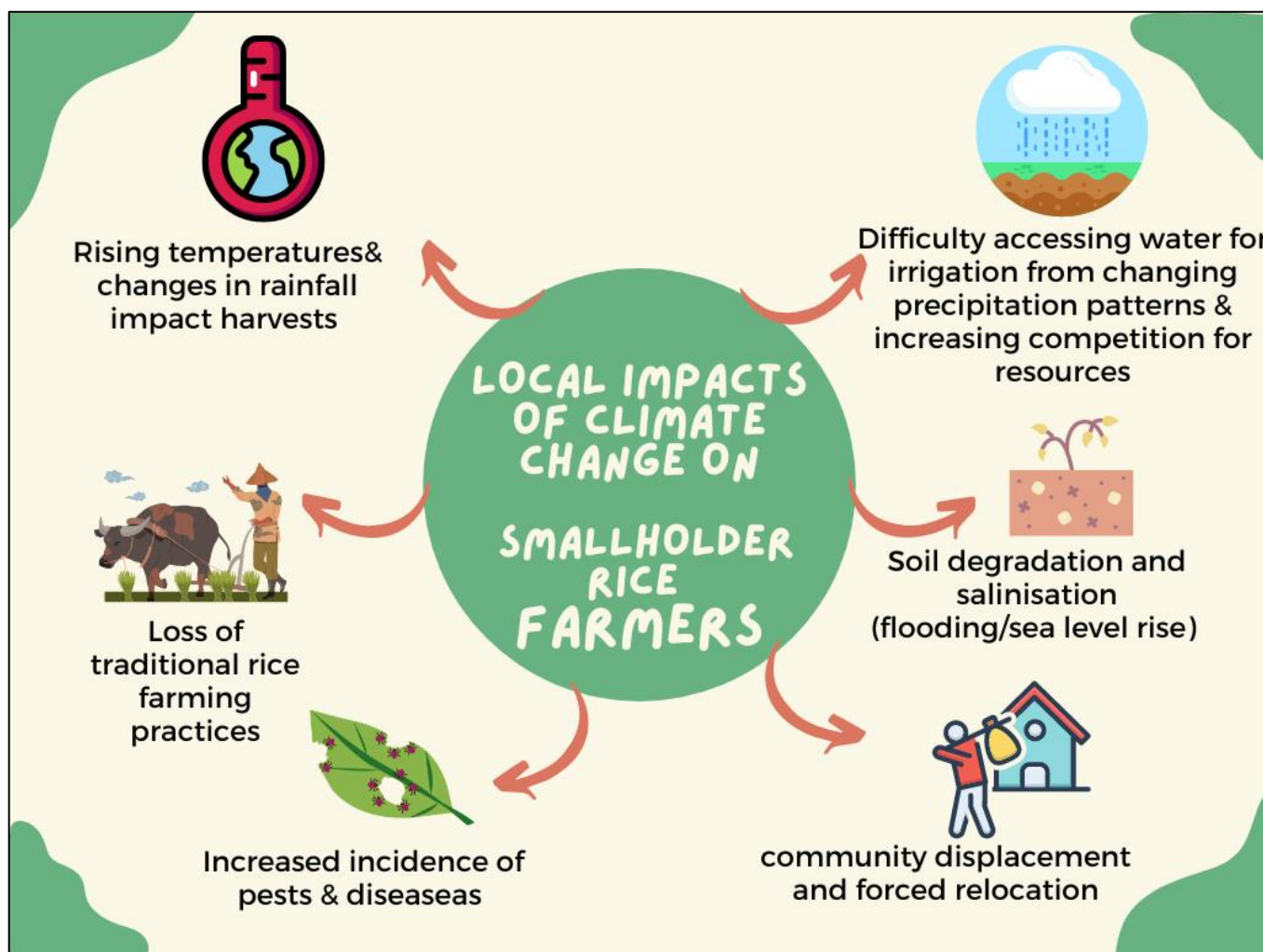


Figure 5 Localised impacts of climate change on smallholder rice farmers. (Source: Author)

Smallholder rice farmers in Southeast Asia are essential to the region's food security and rural livelihoods. However, they face significant challenges, including climate change, market access, and access to information and technology. Addressing these challenges is critical to ensuring the long-term sustainability of the rice sector and the livelihoods of smallholder farmers in Southeast Asia.

Carbon Markets and Article 6

Carbon markets are economic systems that allow buying and selling of carbon credits, representing reducing or removing greenhouse gas emissions. Carbon markets have been around since the late 1990s with the inception of the Kyoto protocol. Carbon markets consist of two types: compliance markets and voluntary markets. Mandatory national, regional, or international carbon reduction regimes create and regulate compliance markets. While voluntary markets work outside these boundaries and enable companies and individuals to purchase carbon offsets voluntarily without any intention of compliance. Carbon markets refer to a system of trading and purchasing carbon credits. Each credit represents a verifiable unit of 'a tonne of carbon dioxide or the equivalent amount of different greenhouse gas reduced, sequestered or avoided'. (UNDP, 2022). Emissions Trading Schemes (ETS) represent one of the principal mechanisms for strengthening net zero pathways and ambitions for countries in the Southeast Asia region.

Carbon market systems and related ETS are set to increase in the coming years as Article 6 of the Paris agreement builds momentum and the article translates into implementation at the global and national levels. There is growing consensus on how countries respond and shape policy towards net zero ambitions. These markets can achieve emissions reduction targets set by international agreements such as the Paris Agreement.

Article 6 of the Paris Agreement, adopted in 2015, deals with the cooperation between Parties in implementing the Agreement, including using markets and other approaches. It establishes a framework for Parties to cooperate in implementing their Nationally Determined Contributions (NDCs) using market and non-market mechanisms, such as joint projects and other forms of cooperation. The goal of Article 6 is to enhance the Agreement's implementation and achieve more efficient use of resources while promoting sustainable development. The article also establishes a mechanism to account for Parties' mitigation and adaptation

efforts in a transparent, robust, and accurate manner. Article 6 specifically provides the setup and coordination framework for establishing an international carbon market. According to leading researchers, Article 6 estimates to save around \$250 million/per year for climate action by 2030 (IETA, 2021). Articles 6.2 and 6.4 were the key takeaway components finalised in Glasgow 2021.

Article 6.2 of the rulebook states, "*Parties shall, where engaging voluntarily in cooperative approaches that involve the use of internationally transferred mitigation outcomes (ITMOs) towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement.*" This allows for carbon credits to be traded between countries, which can be used to help countries achieve their emissions reduction targets more efficiently and cost-effectively. Within this ITMO ecosystem are built-in safeguards known as corresponding adjustments, where double counting by a host country is eliminated through clearly defined carbon accounting rules/mechanisms. (ERCST, 2021). The article calls for the transparency of action and support, including providing information necessary for the transparency framework.

Article 6 includes a market mechanism that enables trading in emissions reductions between countries to achieve their NDCs. The article aims to enhance the ability of Parties to implement and enhance their NDCs, and to promote sustainable development and environmental integrity. Article 6 also establishes a "Sustainable Development Mechanism" (SDM), which is a mechanism to contribute to mitigating greenhouse gases and supporting sustainable development. The SDM allows Parties to generate and transfer ITMOs from projects with sustainable development co-benefits.

Article 6.4 from the rulebook is "a mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development is hereby established under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Agreement for use by Parties voluntarily. It shall be supervised by a body designated by the Conference of the Parties serving as the meeting of the Parties to this Agreement and shall aim:

1. *"To promote the mitigation of greenhouse gas emissions while fostering sustainable development.*
2. *To incentivise and facilitate participation in mitigating greenhouse gas emissions by public and private entities authorised by a party.*
3. *To contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its nationally determined contribution; and*
4. *To deliver an overall mitigation in global emissions."*

Article 6.4 forms the crediting system; this has raised concerns over the Clean Development Mechanism (CDM) and Kyoto agreements and existing strategies for carbon credits. It will supersede the CDM with a few nuanced approaches, such as a more decentralised governance approach with countries able to determine the use of Certified Emission Reduction (CERs) credits (ERCST, 2021). Article 6 is a critical global policy driver for all countries seeking to engage in the carbon market and organise their ambitions to net zero pathways.

Southeast Asia and Carbon Markets

Emissions trading has yet to be widely implemented in Southeast Asia, but there are a few notable examples of emissions trading schemes or pilot programs in the region.

Indonesia: The Jakarta Emissions Trading Scheme (JETS) in Indonesia, a pilot program launched in 2017 to reduce greenhouse gas emissions from the transportation sector in Jakarta. The program is voluntary and uses a cap-and-trade system. Companies that emit less than their allotted emissions receive credits to sell to companies that emit more.

Thailand: Another example is the Partnership for Clean Fuels and Vehicles (PCFV) in Thailand, a voluntary program launched in 2010 to reduce emissions from vehicles and fuel. The program uses a credit trading system, with companies that produce or import cleaner fuels or vehicles receiving credits that they can sell to companies that produce or import less clean fuels or vehicles.

Singapore: Singapore has launched a Carbon Tax, which levies on large emitters of greenhouse gases; this began in 2019. This taxing system is designed to gradually transition companies and stakeholders between 2019- 2023, with the tax starting at S\$5/tCO₂e. The transition will see this cost structure increase in the coming years.

Vietnam: Vietnam has had an active history with the voluntary carbon market, the country has been working with Gold Standard and Verra, who are important global entities that independently verify and issue carbon credits based on information provided by programs and projects on the ground. In November of 2022, Vietnam had been working on 32 carbon credit projects. A Biogas program founded in 2003 has seen millions of carbon credits issued by Gold Standard⁷ totalling 3.39 million Verifiable Emission Reductions (VERs) in 2018 and over 700 000 VERs were issued in May 2020.

Status of Emissions Trading Schemes in Southeast Asia

The agriculture sector represents approximately 27% of the global GHG footprint (Figure 1), therefore considering the impact of agriculture and the rice sub-sector in mitigation and adaptation efforts of climate change, it remains vital that current and emergent

⁷ <https://www.nccs.gov.sg/singapores-climate-action/carbon-tax/>

⁸ <https://www.snv.org/update/over-700000-gold-standard-carbon-credits-issued-vietnam-biogas-programme>

methodologies, Knowledge, and concerns over Carbon Markets are considered as potential national ambitions for countries working towards net zero emissions. ASEAN⁹ Member States (AMS) are important in mitigating climate change through GHG abatement within the rice sub-sector. From the total of 10 ASEAN nations **Indonesia, Vietnam, Thailand, Myanmar, and the Philippines** all play an important part in GHG abatement. South Asia- Bangladesh, India and China are equally important countries in the rice cultivation subsector at the global level.

Southeast Asia has five countries with ongoing and current ETS regimes: **Indonesia, Malaysia, Vietnam, Thailand**, and the **Philippines** (ICAP, 2022a), during the research on this paper carbon projects related to Agriculture were not included within these ETS regimes. These ETS systems are essentially Voluntary Carbon Market systems, these VCMs are currently at different formative stages, from early ideation to more experienced systems with streamlined policy frameworks. For VCMs to function at scale, each system is usually embedded within a broader integrated enabling environment; this is normally signalled by the political will to enact stronger supportive policy that lays out strategic frameworks for action and implementing the carbon market agenda. Policies and regulations for example often form the bedrock of such an enabling environment amongst other tools and guidance measures.

⁹ Association of Southeast Asian Nations (ASEAN)

Policy and Regulatory Frameworks

Policy and regulatory frameworks are vital aspects of managing and implementing complex market mechanisms; the following table is compiled from data gathered and published via the International Carbon Action Partnership, which updates and publishes data on ETS systems annually (ICAP, 2022). Table 2 highlights regulatory and policy instruments at the country level engaged in emissions trading schemes and briefly provides the status of each ETS regime in the country. The countries profiled in Table 2 represent the five ASEAN nations that have active ETS systems currently being developed and implemented at the time of completing this research.

TABLE 2 SELECT GOVERNANCE COUNTRY PROFILES OF SOUTHEAST ASIAN COUNTRIES SOURCE: (ICAP, 2022)

| Country (x ¹⁰) | Institutions engaged in emissions trading schemes | National policy/ Governance frameworks |
|----------------------------|---|--|
| Indonesia (10) | <ul style="list-style-type: none"> • Coordinating Ministry for Economic Affairs • Coordinating Ministry for Maritime and Investment Affairs • Ministry of Environment and Forestry • Ministry of Energy and Mineral Resources • Ministry of Industry • Ministry of Finance • Environment Fund Agency • National Development Planning Agency • PMR Indonesia Secretariat • UNDP Indonesia | <ul style="list-style-type: none"> • GR 46/2017 Government Regulation on Environmental Economic Instruments • Act No. 32/2009 on Environmental Conservation and Management • Law No.7/2021 Concerning Harmonization of Tax Regulations • Presidential Regulation No. 98/2021 on the Instrument for the Economic Value of Carbon for Achievement of the NDC and Control of Carbon Emissions in Development. |
| | <p>NOTE: The Indonesian government is supported by four policy and regulatory instruments. The Ministry of Agriculture, Forestry and Land is not engaged in this capacity. The ETS status for Indonesia is currently under development and will be released as a hybrid "cap, trade and tax" system.¹¹ The Ministry of Environment and Forestry of Indonesia has as of 2022 recently released the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia, Number 21 of 2022 the Procedure for the implementation of Carbon Pricing. Under the newly released regulation climate change mitigation actions are carried out under the <i>Nilai Ekonomi Karbon- (NEK)</i> which also encompasses energy, waste, and agriculture sectors amongst others. The NEK also explicitly highlights the rice sub sector as part of its implementation scope, leaving opportunity for potential projects with respect to carbon trading and carbon markets in the near future. This regulation introduces Carbon Trading Roadmap(s) for related sectors and subsectors, the roadmap captures the NEK implementation through the following mechanisms: carbon trading, results-based payments, carbon levy and others determined as appropriate in line with global science and technology standards.¹²</p> | |
| Malaysia (1) | <ul style="list-style-type: none"> • Ministry of Environment and Water (KASA) | <ul style="list-style-type: none"> • National Guidance on Voluntary Carbon Market Mechanisms |
| | <p>NOTE: Malaysia has plans to start a voluntary carbon market trading platform in 2022. The Malaysian government is in the early stages of development for its ETS systems and processes. Since 2021 recently rolled out the National Guidance on Voluntary Carbon Market Mechanisms, this document provides guidance and a pathway for all interested stakeholders to engage with the voluntary carbon market.¹³ The government is currently exploring ETS design frameworks, registration, and alignment to international standards (ICAP, 2022a)</p> | |

¹⁰ Number of national institutions engaged.

¹¹ https://icapcarbonaction.com/system/files/ets_pdfs/icap-etsmap-factsheet-104.pdf

¹² https://idih.menlhk.go.id/new/uploads/files/english/english_version_idih-KLHK_1131-21-2022.pdf

¹³ https://icapcarbonaction.com/system/files/ets_pdfs/icap-etsmap-factsheet-119.pdf

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|--|---|---|
| Philippines (3) | <ul style="list-style-type: none"> • Department of Environment and Natural Resources • Department of Trade and Industry • House of Representatives Committee on Climate Change | <ul style="list-style-type: none"> • <i>Low Carbon Economy Act' House Bill (HB) No. 2184¹⁴</i> |
| <p>NOTE: A 2020 'Low Carbon Economy Act' House Bill (HB) No. 2184 was established and approved. Its progress has been conditionally approved with a technical working group attached to provide review and recommendations for the bill. This policy aims to regulate a cap-and-trade program between industrial and commercial sectors. The bill and reporting from the technical working group remain ongoing.</p> | | |
| Thailand (1) | <ul style="list-style-type: none"> • Thailand Greenhouse Gas Management Organization (Public Organization)¹⁵ | <ul style="list-style-type: none"> • National Reform Plan (2018) • National Adaptation Plan. • Supportive Action Plan for Mitigation Roadmap. • Climate Change Master Plan. • Climate Change Act *in draft for review in 2023* |
| <p>NOTE: The government of Thailand in 2018 created the National Reform Plan, which became the principal means by which the government aimed to reduce GHG emissions; this also led to the "Climate Change Act". The Thailand Greenhouse Gas Management Organization (TGO) is an autonomous public body established in 2007 responsible for developing and promoting greenhouse gas reduction tools and mechanisms, certifying the number of greenhouse gases, tracking GHG reduction, supporting national policies and developing carbon business, carbon pricing instruments, and carbon market to support greenhouse gas reduction¹⁶. Thailand, since 2013 has actively engaged in an MRV system and basic trading infrastructure for the Thailand Voluntary Emissions Trading Scheme (Thailand V-ETS); these efforts are spearheaded by the Thailand Greenhouse Gas Management Organization – a public entity. Since COP26, Thailand has been developing carbon trading guidelines, which is expected to be completed in 2022. Thailand, like Malaysia, in collaboration with the Federation of Thai Industries (FTI) has developed and launched a carbon credit trading platform in 2023.¹⁷</p> | | |
| Vietnam (2) | <ul style="list-style-type: none"> • Ministry of Natural Resources and Environment • Ministry of Finance • Ministry of Planning and Investment • Ministry of Industry and Trade • Ministry of Construction | <ul style="list-style-type: none"> • Law No. 72/2020 QH14 on Environmental Protection 133-139'20/OG • Decree 06/2022/ND-CP • Decision 01/2022/QD-TTg |
| <p>NOTE: The policy landscape for Vietnam shows linkages between the Ministry of Finance and the Ministry of Natural Resources and Environment. There is an opportunity to engage the Ministry of Agriculture as appropriate and needed concerning carbon trading and markets. More than 600 waste stakeholders from 39 provinces have received training in carbon pricing. The World Bank has since 2016 provided support to Vietnam through the Partnership for Market Readiness (PMR) program and the Scaling Climate Action by Lowering Emissions (SCALE)¹⁸ program, which is described as a multi partner trust fund to fund programs focused on climate action that contribute to national efforts within NDCs.¹⁹ A World Bank report from 2022²⁰ identifies; strengthening environmental regulations, land ownership and management, enhancing efficiency through economic instruments and coordinated and convergent actions by millions of stakeholders as crucial to ensuring policy coherence specific to the rice industry in Vietnam.</p> | | |

¹⁴ Currently under consideration- source (ICAP, 2022)

¹⁵ [TGO Strategic Action Plan 2018- 2037](https://www.tgo.or.th/2020/index.php/en)

¹⁶ <http://www.tgo.or.th/2020/index.php/en>

¹⁷ <https://icapcarbonaction.com/en/ets/thailand>

¹⁸ <https://thedocs.worldbank.org/en/doc/c3f6d19a03ae74b86d311a8dc8dd26a2-0020072022/original/SCALE-2-Pager-Final-Oct22.pdf>

¹⁹ <https://www.worldbank.org/en/news/feature/2021/11/11/carbon-pricing-aids-vietnam-s-efforts-towards-decarbonization>

²⁰ <https://documents1.worldbank.org/curated/en/09973510922222315/pdf/P17448205335130730bb7e0a6e231e1f667.pdf>

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| India (1) | <ul style="list-style-type: none"> Ministry of Power; Bureau of Energy Efficiency (BEE) | <ul style="list-style-type: none"> <i>Amendment Bill to the Energy Conservation Act 2001 (passed as of December 2022)</i> |
| <p>NOTE: The commencement and investment of India's first ETS were introduced as a "Draft blueprint for stakeholder consultation". This was introduced in the lower house for consideration in August and passed as of December 2022. This Act is the formation of India's first carbon credit trading scheme. However, significant discussion remains over jurisdictions between the Ministry of Power and other traditional line agencies such as the Ministry of Environment, Forest, and Climate Change. Ongoing issues include business allocation rules, regulatory policy, and various trading structures to manage carbon trading.²¹</p> <p>The Carbon Offsetting Rice Emissions (CORE) project is administered by Olam Agri in India. The project partners include GIZ, IRRI, and UN Women in an ongoing project supporting 18,000 low-income smallholder rice farmers in India to adopt carbon reducing methodologies at the farm level whilst reducing post-harvest losses in rice production.²²</p> | | |

²¹ <https://prsindia.org/billtrack/the-energy-conservation-amendment-bill-2022>

²² <https://www.olamgroup.com/sustainability/priority-areas/climate-action.html>

Global Partnerships on Carbon Markets

Architecture for REDD+ Transactions

The Architecture for REDD+ (Reducing Emissions from Deforestation and Forest Degradation) refers to the framework developed to support implementing REDD+ activities in developing countries.²³

REDD+ is an international program that aims to reduce greenhouse gas emissions from deforestation and forest degradation in developing countries while promoting sustainable forest management and the conservation of forest carbon stocks. The program provides financial incentives to developing countries to reduce emissions from deforestation and forest degradation, which can be achieved through activities such as forest conservation, reforestation, and sustainable forest management.

The Architecture for REDD+ includes the institutional, policy, legal, and technical frameworks needed to implement REDD+ activities. It also includes the systems and tools needed for measuring, reporting, and verifying emissions reductions, as well as the monitoring and evaluation of the social and environmental impacts of REDD+ activities.

The Architecture for REDD+ involves collaboration between governments, civil society, indigenous peoples, and other stakeholders to ensure the effective implementation of REDD+ activities, considering the social, environmental, and economic context of each country.

The Architecture for REDD+ has been developed through a range of international processes and initiatives, including the United Nations Framework Convention on Climate Change (UNFCCC) and the World Bank's Forest Carbon Partnership Facility (FCPF). The framework has been designed to ensure that REDD+ activities are implemented in a transparent, equitable, and sustainable manner while also contributing to the broader goals of climate change mitigation and sustainable development.

The Sustainable Rice Landscapes Initiative (SRLI)

The Sustainable Rice Landscapes Initiative (SRLI) is a global partnership that was launched in 2018 to transform the rice sector into a more sustainable and climate-resilient system. The SRLI is a consortium of six partners working together to meet the growing global demand for sustainable rice: the World Business Council for Sustainable Development (WBCSD), the Sustainable Rice Platform (SRP), the Food and Agriculture Organization of the United Nations (FAO), the International Rice Research Institute (IRRI), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, and the United Nations Environment Programme (UNEP).

The SRLI aims to promote sustainable rice production by integrating environmental, social, and economic considerations in rice farming practices. It aims to increase resource-use efficiency, reduce the environmental and climate impacts of rice production, and maximize the role of rice-growing landscapes as carbon sinks, biodiversity habitats and sources of ecosystem services.

The initiative also aims to reduce greenhouse gas emissions associated with rice production, which is a significant contributor to global emissions. This is achieved through the adoption of more sustainable and low-emissions practices, including alternate wetting and drying (AWD) practices, which can reduce methane emissions from rice fields by up to 50%.

The SRLI brings together key partners to scale capacity for landscape-based food system transformation, harnessing public-private partnerships for sustainable rice value-chains and finance and integrating next-generation knowledge management for rice and agricultural systems, in the South and Southeast Asia regions. By focusing on levers such as policy support, finance, knowledge, and the use of technology, SRLI reduces GHG emissions from rice production, restores degraded land and conserves biodiversity, while increasing food security for local populations and building global rice supply chain resilience.

The Sustainable Rice Landscapes Initiative (SRLI) and carbon markets are linked through their efforts to reduce greenhouse gas emissions from rice production. By promoting sustainable rice production, the SRLI contributes to reducing greenhouse gas emissions, which is a key objective of carbon markets.

Carbon markets, on the other hand, are systems designed to put a price on carbon emissions to incentivise individuals and organisations to reduce their carbon footprint. Carbon credits can be earned by farmers that have reduced their emissions, which can then be sold to other buyers (organisations/individuals/companies) to offset their emissions.

In some cases, carbon credits can be earned by farmers who adopt sustainable rice production practices that reduce greenhouse gas emissions, such as those promoted by the SRLI. These credits can then be sold on carbon markets, providing additional income to farmers, and incentivising the adoption of sustainable practices. The SRLI and carbon markets are working towards the common goal of reducing greenhouse gas emissions, with the SRLI focusing on sustainable rice production practices and carbon markets providing financial incentives for emissions reductions in various sectors, including rice agriculture. SRLI is currently

²³ <https://www.artredd.org>

working on a new accelerator for nature-based rice solutions that will leverage carbon markets and climate finance to increase private-sector funding to enable sustainable rice production.²⁴

ICAP and Governance of ETS

The International Carbon Action Partnership (ICAP) is a global partnership comprising of countries with functional ETS systems triggered as policy responses to curb GHG emissions. ICAP aims to "facilitate cooperation between countries, sub-national jurisdictions, and supranational institutions that have established or are actively pursuing carbon markets through mandatory cap and trade systems".

ICAP has formulated fundamental policy guidance and experience-based knowledge products for countries and stakeholders pursuing interest and participation in carbon market regimes.

The role that structured and focused Governance plays in the broader application and utilisation of Carbon Market systems is crucial to the success of a country's emissions reduction journey. ICAP presents a good overview of Governance as it relates to carbon markets. The quote below shows the importance and challenges of Governance within the context of any ETS and the important caveats implicit within such a scheme.

"Successful Governance tends to be characterised by a high level of participation, transparency, and accountability, adherence to the rule of law, efficiency, and fairness... Premised on an artificially constrained supply of emission units created via policy decisions, ETSs pose unique governance challenges at every stage of their design and implementation. With an incentive structure that differs from more traditional markets and with traded units that are intangible and instantly transferable in significant quantities, ETSs can be susceptible to strategic and fraudulent market behaviour. Sound Governance of an ETS and the market it engenders is therefore key to managing and preventing such risks."

(World Bank, 2022)

In addition to comprehensive policy regulatory frameworks, important steps include behind-the-scenes engagement between stakeholder consultation, support, and participation. Participation is an important aspect of carbon markets especially with smallholder farmers.

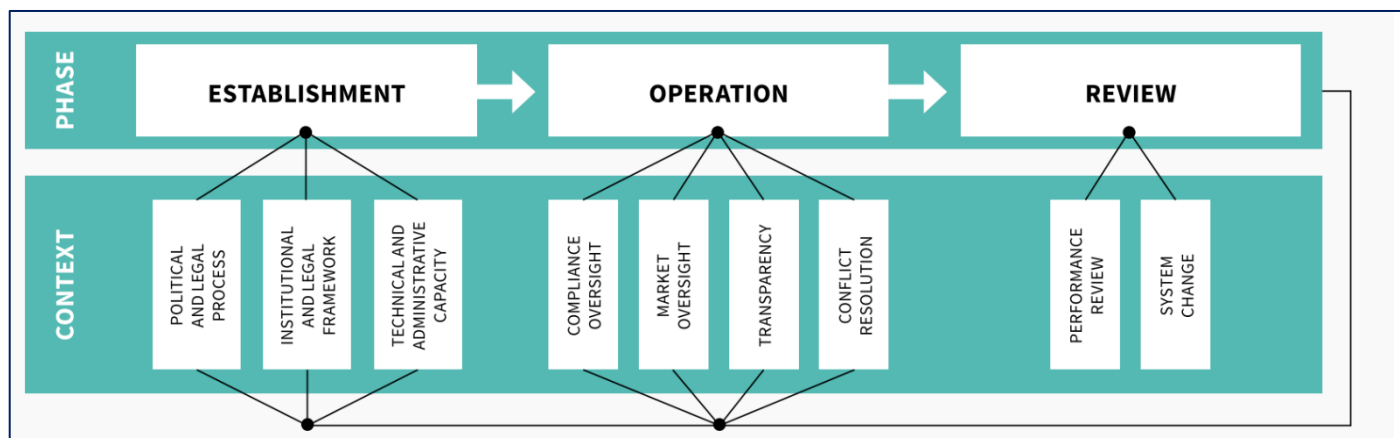


FIGURE 6 GOVERNANCE PHASES AND KEY IMPLEMENTATION PHASES OF AN EMISSIONS TRADING SCHEME (ICAP, 2022A)

The schematic provided in Figure 6 highlights the three key phases in the setup of an ETS; under each phase is a collection of contextual elements and administrative functions. The establishment, operation and review phases offer governments and practitioners insight into key processes that should be engaged in formulating, operating, and monitoring an ETS.

In the establishment phase, the key political and legal processes could be the institution of various policy and legal frameworks which bind how carbon market systems may be organised and implemented and the subsequent linkages with existing policy and regulating bodies. The establishment phase also recognises the technical and administrative capacity as a leading principle toward concretely rolling out an ETS.

The operation phase emphasises the practical implications of a carbon market system or ETS. Compliance oversight and market oversight will need institutional anchors within most government systems; in doing so, governments can show that the highest standards are applied in the creation, issuance, and quality of carbon credits and in benchmarking governments concerning industry best practices. Transparency and conflict resolution are inevitable aspects of operationalising a system of credits that are both intangible and transferrable; the quality and accountability of all users must be anchored in a manner that fosters fair and just industry practices.

²⁴ <https://www.wbcsd.org/Pathways/Food-Agriculture/Resources/SRLI-Scaling-private-sector-investment-in-sustainable-rice>

Based on the interviews conducted and information collected as part of this research, existing carbon markets did not clearly address smallholder farmers engagement; rather, the focus is on heavier industries such as Energy and Industrial Processes. These industries have established infrastructure and policy frameworks that can engage ETS systems more readily and efficiently. Systems such as robust monitoring, reporting and verification systems are pre-built into larger industrial and energy systems with clearly established industry benchmarks. This, however, is not the case with smallholder farmers who are highly fragmented but collectively make up a large proportion of the global agriculture picture.

Carbon Trading and Smallholder Farmers

Smallholder farmers in Southeast Asia can participate in carbon trading by implementing practices that reduce their carbon footprint, such as:

- **Agroforestry:** Planting trees and crops together can sequester carbon in the soil and biomass while also providing income and food security. Farmers in Indonesia and the Philippines are encouraged to plant trees on their farmlands as part of agroforestry systems, which can sequester carbon and provide other benefits, such as improved soil fertility and increased fertility and biodiversity. In Southeast Asia approximately 835 mega tonnes of carbon dioxide could be avoided through financially viable carbon projects.²⁵
- **Improved Cookstoves:** Switching from traditional cookstoves to improved cookstoves can reduce emissions of black carbon, a potent contributor to global warming.
- **Rice Cultivation:** Implementing sustainable rice cultivation practices, such as alternate wetting and drying, can reduce methane emissions from flooded rice fields. There are some active projects underway in the region - countries such as Vietnam are exploring scaling-up low emission rice practices for the explicit purpose of mitigating emissions from rice.²⁶
- **Livestock Management:** Improving livestock management practices, such as reducing herd size and improving feed management, can reduce methane emissions and other greenhouse gases from manure.
- **Biogas:** Farmers in Cambodia, Laos can install biogas systems to capture methane from livestock waste and use it as an energy source, providing possible solutions in reducing emissions and improving livelihoods through energy saving costs. Vietnam for example has installed over 500,000 biogas digesters.²⁷

These activities can generate carbon credits, which can then be sold in carbon markets to entities looking to offset their own emissions; credits can provide a source of income for smallholder farmers and incentivise adopting sustainable land-use practices. The key is to provide farmers with the resources and incentives to adopt sustainable farming practices that reduce greenhouse gas emissions.

Jurisdictional approaches

²⁸A burgeoning field of land management, known as Jurisdictional Approaches (JA), presents a promising opportunity to enhance support for initiatives like greenhouse gas (GHG) reduction in agriculture. Jurisdictional approaches represent a comprehensive approach to promoting low-emissions development that surpasses the scope of jurisdictional-scale accounting for REDD+ (Reducing Emissions from Deforestation and Forest Degradation). By addressing the challenges faced in early attempts to implement deforestation-free supply chains, jurisdictional approaches strives to harmonize government-led, multi-stakeholder processes at the provincial and district levels with potential external incentives for achieving jurisdictional-scale performance. This alignment between government-led processes and external incentives can effectively encourage the adoption of sustainable and low-emissions agricultural practices. Jurisdictional approaches have consistently fostered robust multi-stakeholder processes, directly linked to the implementation of policies that reduce emissions. This approach has been widely applied with success in subnational networks promoting jurisdictional approaches, such as the Green districts in Indonesia, specifically Sumatra, Kalimantan, and Sulawesi (Boyd et al., 2018).

Challenges of Smallholder Farmers and Carbon Markets

Smallholder farmers, by nature, pose specific challenges which can be difficult to navigate participation and engagement on any scale of sustainable development practices. This may be so when engaging smallholder farmers in carbon markets and trading. Carbon markets, which allow for the buying and selling carbon credits to offset greenhouse gas emissions, can present several challenges for smallholder farmers. Some of these challenges include:

- **Lack of legal and regulatory framework:** The lack of a legal and regulatory framework for carbon markets in many Southeast Asian countries can make it difficult for smallholder farmers to participate in these markets. To date, existing regulatory frameworks typically tend to focus on climate-smart practices. Taking these a step further to engage carbon credits on a viable and useful scale is mostly in its early to middle stages in most countries. Table 2 provides a short summary of current ETS systems in Southeast Asian Countries and the associated legal and regulatory instruments in place.
- **Access to information and technical assistance:** Smallholder farmers in Southeast Asia may need more information and technical assistance for carbon market participation, making it difficult for them to benefit from these markets. Specific and targeted assistance/ awareness of carbon markets is needed as most stakeholders tend to have limited Knowledge and capacity to engage with carbon markets regionally and internationally.

²⁵ <https://www.nature.com/articles/s41893-022-00849-0>

²⁶ <https://english.news.cn/asiapacific/20230424/a4ff6a4fa8a9471db3534498862523c9/c.html>

²⁷ (Dr. Tran Dai Nghia, personal communication, May 2023)

²⁸ <https://files.wri.org/d8/s3fs-public/ending-tropical-deforestation-jurisdictional-approaches-redd.pdf>

- **Poor infrastructure:** Poor infrastructure in many rural areas of Southeast Asia can make it difficult for smallholder farmers to implement practices (e.g., irrigation infrastructure for AWD practices for rice) and to participate in carbon markets. They may need access to agricultural infrastructure to improve practices, and to the transportation and communication infrastructure needed to connect with buyers and sellers of carbon credits.
- **Limited market access:** Smallholder farmers in Southeast Asia may need help accessing carbon markets, such as limited infrastructure and a lack of buyer networks. The state of market access is indeed in its infancy in the region, but there is hope as larger fields, such as energy and industrial processes, establish functional ETS systems.
- **Access to finance:** Smallholder farmers in Southeast Asia may need more access to finance needed to invest in projects that generate carbon credits, such as reforestation or sustainable agriculture practices.
- **The complexity of the carbon market:** The carbon market can be complex and difficult for smallholder farmers to navigate, making it challenging for them to participate and benefit from carbon credit generation. The endorsement of article 6 in 2021 is a clear signal for the carbon market on the international stage. However, anticipation needs to be improved as state and non-state actors question previous international treaties such as the Kyoto protocol and the CDM.
- **Lack of ownership of carbon credits:** Smallholder farmers in Southeast Asia are challenged by land ownership issues; therefore, the ownership and financial benefits from carbon credits generated on smallholder farms is an issue of contention. This challenge is universal and must be addressed in a manner that is culturally sensitive that protects the rights of farmers.
- **Carbon offset projects may not align with local livelihoods and sustainability:** Carbon offset projects may not align with local livelihoods and sustainable development goals, leading to negative impacts on local communities. This concern was highlighted by multiple experts who urge that carbon offset projects do not create a social class of farmers who benefit over others, creating upheaval in the social and community structures that are vital to many Southeast Asia smallholder farming communities.
- **Climate change, extreme weather events, and natural disasters:** Southeast Asia is particularly vulnerable to climate change and extreme weather events, which can negatively impact smallholder farmers, making it more difficult for them to participate in carbon markets. There is an important need in addressing these climate and extreme weather phenomena over the long term as the disruption caused also impact farming practices, and the adaptive behaviours adopted by farmers in the long term.

Uncertainties in Carbon Trading in Southeast Asia

Carbon markets have been around since the early nineties and can be considered in their infancy in Southeast Asia. The complexity and nature of its development in the region are issues that all AMS must inevitably deal with. There are several key uncertainties in carbon trading in Southeast Asia, including:

- **Lack of clear regulations:** Many Southeast Asian countries have yet to establish clear rules and policies for carbon trading, making it difficult for companies to participate in these markets. Nonregulated market activity would mean less protections and safeguards for buyers and sellers.
- **Verification and monitoring:** Verifying and monitoring carbon emissions in developing countries can be challenging, creating uncertainty in the carbon market. The level of uncertainty with generating, monitoring, and verifying carbon credit systems across many stakeholders is an ongoing challenge. Verification and monitoring represent one of the largest uncertainties especially for smallholder farmers who by nature face fundamental challenges of their own.
- **Voluntary vs mandatory systems:** Some Southeast Asian countries have voluntary carbon trading systems, while others have mandatory plans. The effectiveness and participation of these systems can vary, leading to uncertainty in the carbon market. Unconditional and conditional commitments under the NDC should also be addressed as countries attempt to meet emission targets and honour commitments.
- **Competition with other markets:** Southeast Asia's carbon markets face competition with other established carbon markets, such as the European Union's ETS, which can create uncertainty for market participants. Historically established and developed ETS systems have the advantage of sharing lessons and guidance for economies seeking to establish and implement their carbon markets.
- **Economic and political stability:** Economic and political instability in Southeast Asian countries can also create uncertainty in the carbon market, as it can affect the demand for carbon credits and the stability of carbon markets and pricing instruments.

These uncertainties represent potential areas for development and opportunities for ASEAN countries to collaborate on knowledge sharing, best practice development, and strengthening industry standards for securing future investments in carbon markets and working with smallholder farmers.

Scalability

Smallholder farmers, by nature, are challenged by various factors (size, risk, capital, land tenure, attitudes and perceptions, community cohesion and cultural expectations). These constraints are also amplified by the difficulties faced by the sheer number of smallholder farmers in Southeast Asia. Carbon trading can be scaled for smallholder farmers in Southeast Asia through some of the following:

- **Clear regulations:** Establishing clear and comprehensive regulations for carbon trading in Southeast Asia will provide a stable framework for the development of the market and the participation of smallholder farmers.
- **Technical assistance:** Providing technical assistance to smallholder farmers on carbon trading and sustainable agriculture practices will help them to participate effectively in the market.
- **Access to finance:** Ensuring access to finance for smallholder farmers to implement sustainable agriculture practices and participate in carbon trading initiatives.

- **Capacity building:** Building the capacity of smallholder farmers to understand and participate in carbon trading initiatives, including training on monitoring, reporting, and verifying emissions reductions. An important aspect of raising awareness and trainings is to help smallholder farmers understand low carbon production and how benefit sharing works in practice distilled to farmers at the local level.
- **Collaboration with stakeholders:** Facilitating cooperation between government, private sector, and NGOs to support the participation of smallholder farmers in carbon trading initiatives.
- **Technological solutions:** Adopting technical solutions, such as satellite imagery and remote sensing, to monitor and verify emissions reductions from smallholder farmers.
- **Jurisdictional approaches:** To achieve necessary scale for carbon finance in smallholder-dominated rice production landscapes and to enable effective governmental support, jurisdictional approaches are likely to be important.

Practice and Experience

Practical experiences around the establishment, implementation and knowledge building for carbon markets are vital for countries discussing and proposing engagement with carbon markets as part of their higher ambitions to reach net zero carbon emissions. The following section outlines ongoing and emergent issues engaging smallholder farmers in carbon markets.

The following sections are thematic analyses based on nine expert interviews conducted over four months through online interviews with regional and national agriculture and climate change experts. These experts represent critical networks collaborating with smallholder farmers in policy, scientific research, government departments, business partnerships and agriculture expert communities in the ASEAN region. A list of all experts consulted is provided in Table 3 in the Annex of this report.

Awareness & Knowledge

Awareness and Knowledge about sustainable farming practices are vital for smallholder farmers in understanding the basic concepts of carbon markets and carbon credits. Participation in carbon markets can lead to improved livelihoods and increased farmer income. This can support adopting more sustainable agricultural practices that reduce greenhouse gas emissions and enhance carbon sequestration, thereby contributing to climate change mitigation, along with co-benefits such as benefits for biodiversity and ecosystem services. Awareness and knowledge however are multi-tiered and exist across all stakeholder groups- from primary users such as farmers to policymakers and government led organisations.

Awareness and Knowledge are recurring themes within expert interviews. A detailed map of the themed analysis is available in [Annex 1](#). The findings below represent the three key expert messages on the topic.

Key expert messages; Awareness and Knowledge

- Awareness and Knowledge of smallholder farmers is not a one size fits all idea; instead, it is a more nuanced idea linked to key broader concepts like **Governance, Climate Justice, Holistic support for farmers, Shared experiences, and sustainability**. Unpacking awareness and Knowledge for smallholder farmers in Southeast Asia means that practitioners and policymakers should consider a broader picture considering these other concepts.
- The **bottom line for farmers** underscores the importance of direct financial benefits to the farmer. This is linked to low awareness levels. Promoting soft benefits such as doing good for the environment is not a driver for engagement; instead, income generated at the farm level because of changed practices influences Knowledge and awareness.
- **Shared experiences** within farming communities are essential for raising awareness and building Knowledge in carbon markets. Shared knowledge-building experiences between farmers, technical partnerships, and field researchers are aspects of co-learning that are important to strengthening engagement that can also be capitalised on to foster increased awareness and knowledge-building. Maintaining a **farmer-centric approach is critical**.

Overall, increased awareness and Knowledge play a vital role in creating mutually beneficial relationships between smallholder farmers, policymakers, and regulators in Southeast Asia.

Monitoring, Reporting and Verification (MRV)

Carbon market projects and ETS activities will rely on a robust and efficient accounting system built on solid MRV systems. MRV stands for "Monitoring, Reporting, and Verification" systems, which track and verify the emissions reductions or removals that are the basis for carbon credits in a carbon market. MRV systems are essential for ensuring the integrity and transparency of carbon markets by providing a way to accurately measure, report, and verify the emissions reductions or removals being traded as carbon credits. An MRV system typically includes the following components:

- **Monitoring:** Typically involves measuring and collecting data on emissions reductions or removals from a project or activity. This data calculates the number of carbon credits that can be generated.
- **Reporting:** This involves submitting the data on emissions reductions or removals to a designated authority or registry. The data is usually submitted in the form of a report that follows a specific format and includes information on the project or activity, the emissions reductions or removals achieved, and the calculation of the carbon credits.
- **Verification:** The process of independently assessing the data submitted in the report to confirm that it is accurate and complete. Verification is usually conducted by a third-party auditor who checks the data, the methods used to collect it, and the calculations to ensure that they meet the requirements of the carbon market.

MRV systems are critical for ensuring that carbon markets function effectively by providing that emissions reductions or removals are accurately measured, reported, and verified. This helps to build trust in the carbon credits and the carbon market and allows companies and organisations to make informed decisions about buying and selling carbon credits.

A detailed map of the themed analysis is found in [Annex 2](#). The insights from the expert show a high interest and concern for the topic of MRV as it relates to smallholder farmers in Southeast Asia; the findings below represent the four key expert messages on the topic.

Key expert messages; MRV systems in Carbon Markets

- MRV systems face vital **methodological challenges** in various country contexts, exacerbated by **uncertainty and poor benchmarking for available methodologies**. This includes issues with permanence, additionality, and double counting of carbon sequestration.
- **Hybrid approaches in MRV systems** offer potential insight into designing, implementing, and monitoring systems for MRV that are useful and manageable by its users. Hybrid systems in MRV (Measurement, Reporting, and Verification) refer to a combination of different methods or approaches used to assess and quantify greenhouse gas emissions or reductions. These systems combine multiple data sources, measurement techniques, and estimation methodologies to enhance the accuracy, reliability, and comprehensiveness of MRV processes.
- **Sustainability and long-term staggered approaches for certification and management of carbon credits** are vital concepts that will require significant attention to create equitable systems and proactively protect smallholder farmers' vulnerability.
- **Awareness and knowledge co-creation is essential to building robust MRV systems that** provide equal and just outcomes for smallholder farmers.
- **Governance and policy** play a vital role in the quality assurance, implementation, and regulation of MRV systems for carbon markets. Policymakers have an important role to play here for example in designing policy that incorporates digitalization of MRV coupled with traceability aspects of commodities such as rice for example. Broadly these systems can also be linked to certification criteria and standards for carbon footprints of commodities and goods.

Innovation and MRV for carbon markets

Innovative MRV systems refer to new and advanced methods for monitoring, reporting, and verifying emissions reductions or removals in carbon markets. These systems may use new technologies or methodologies to improve the accuracy, efficiency, and transparency of the MRV process. Some examples of innovative MRV systems include:

Remote Sensing: This technology uses satellite imagery and other remote sensing techniques to measure and monitor land use changes and other activities that affect emissions. This can be particularly useful for projects such as afforestation, reforestation, and soil carbon sequestration.

Blockchain technology is a decentralised digital ledger system that allows for secure and transparent tracking of transactions. In MRV systems, blockchain technology can track and verify carbon credits in a carbon market. A blockchain-based MRV system would work by creating a digital record of each carbon credit on a blockchain. This record would include information such as the origin of the credit, the emissions reductions, or removals that it represents, and the transactions it has been involved in. Using blockchain technology, an MRV system can provide a tamper-proof record of carbon credits that can be easily accessed and verified by all parties involved in the carbon market. This can increase transparency and trust in the carbon market by providing an immutable record of emissions reductions or removals that can be independently verified. Additionally, blockchain technology can increase the speed and efficiency of carbon credit transactions by eliminating the need for intermediaries and reducing the risk of fraud.

Blockchain technology is still relatively new, and ongoing research on how it can be effectively used in MRV systems in the future is an important caveat. It is important to note that challenges, such as privacy and scalability concerns and regulatory and legal issues still need to be overcome.

Machine Learning: This technology uses algorithms to process large amounts of data and identify patterns, which can be used to improve the accuracy and efficiency of monitoring and reporting.

Social and Gender-responsive MRV: These systems consider the social and gender dimensions of carbon projects to ensure that MRV systems consider the potential impacts on marginalised communities. Social and gender responsive MRV systems are MRV systems that consider the social and gender dimensions of carbon projects. This approach aims to ensure that carbon projects do not negatively impact marginalised communities, are inclusive, and benefit everyone involved. It is worth noting that the inclusion of social and gender considerations in carbon projects is relatively new. There is ongoing discussion and research on the best ways of integrating these considerations in MRV systems. (DT Global, 2022)

Community-based MRV: This approach involves engaging local communities in monitoring, reporting, and verifying emissions reductions or removals, which can help to build trust and ensure that the MRV process is transparent and inclusive.

MRV in rice farming in Southeast Asia: Agrig8 is a fintech company based in Singapore that is working with rice farmers to provide more direct access to sustainable financing that can support low-carbon rice farming efforts. Key to these approaches is innovating the ways in which farmers capture field data using mobile technology. Agrig8 works through different processes of an MRV system, from determining baselines to achieving certification. Implementing gamification principles through accessible technological platforms has future potential to influence changes in rice farming management practices.²⁹ This work is currently being examined by Fintech collaborating with IRRI to better understand farmer engagement through technology.

²⁹ <https://www.agrig8.com>

Innovative MRV systems can improve the accuracy, efficiency, and transparency of the MRV process, which can help to build trust in carbon markets and support the development of sustainable projects. An MRV system represents the backbone of a well-designed ETS; many experts have agreed that there remains a lot of Knowledge and learning to be gained from trialling various MRV systems in different country contexts to find a tailored approach toward establishing and maintaining carbon market-based projects and an ETS.

Financial incentives

One of the most important aspects of engaging smallholder farmers in carbon trading projects is the theme of financial incentives for farmers. A detailed map of the themed analysis is found in [Annex 3](#). The insights from the expert show a high interest and concern on financial incentives as it relates to smallholder farmers in Southeast Asia; the findings below represent the four key expert messages on the topic.

Key expert messages; Financial incentives- Farmers

- The **distributional impacts and transactional costs** associated with carbon trading are essential and often critical factors impacting farmers' engagement in carbon trading projects.
- Ensuring **revenue streams are consistent** through premium pricing will impact which farmers are willing to change land management practices.
- **Basic economic literacy** is often overlooked when it comes to smallholder farmers. This limited access to information, Knowledge and networks deters participation and lowers interest in carbon trading programs.
- **Insurance programs to de-risk investments** are a crucial component of the future of smallholder farmer engagement in carbon trading programs.
- **Blended Finance Structures** Blended finance arrangements provide comprehensive financial solutions that incorporate multiple benefits and safeguards to mitigate costs and financial risks for smallholder farmers and other stakeholders. These structures can encompass various elements such as financing for operational expenses, technical assistance, and capacity building for farmers and local financial institutions. Blended finance offers a valuable approach to involving smallholder farmers in adopting alternative land management practices, particularly when immediate costs and equity are critical factors influencing their engagement.(WBCSD, 2022)

The financial basis for farmer engagement and participation in carbon trading programs is one piece of the puzzle. The broader landscape of financial investment and backstopping required to implement carbon trading is equally important. De-risking insurance in carbon trading programs for smallholder farmers refers to reducing the risk associated with participating in carbon trading for smallholder farmers, typically through insurance. Insurance helps mitigate the potential financial losses that smallholder farmers may face due to participating in carbon trading, such as fluctuations in carbon prices or the costs associated with implementing carbon-reducing practices. By reducing the risks involved, de-risking insurance can help encourage more smallholder farmers to participate in carbon trading programs and benefit from the financial incentives they provide while contributing to the global effort to reduce greenhouse gas emissions.

Climate Justice and Equity

Climate justice refers to the principle that the impacts of climate change and the efforts to address it should be distributed fairly and equitably among all people, regardless of their race, gender, economic status, or geographical location. Concerning carbon trading and smallholder farmers in Southeast Asia, climate justice means ensuring that these farmers have equal access to opportunities and benefits from carbon trading programs and that their rights and livelihoods are protected.

Smallholder farmers in Southeast Asia are often among the most vulnerable to the impacts of climate change, such as increased frequency and severity of extreme weather events, declining crop yields, and reduced access to water. Carbon trading programs can provide an essential source of revenue for these farmers and help them adopt sustainable farming practices that reduce greenhouse gas emissions and improve their livelihoods.

However, carbon trading programs must be designed and implemented in a way that is fair and equitable to smallholder farmers and that these programs do not negatively impact them. This means ensuring that smallholder farmers have access to the training and support they need to participate in these programs, that they receive a fair price for their carbon credits, and that they are not forced to adopt unsustainable practices that harm their livelihoods or the environment.

Climate justice principles require that carbon trading programs with smallholder farmers are designed and implemented to support sustainable development, protect farmers' rights and livelihoods, and contribute to the global effort to address climate change fairly and equitably.

Ageing Farmers in Southeast Asia

Ageing farmers in Southeast Asia are becoming an increasingly important issue. Many smallholder farmers in Southeast Asia are ageing, and as they reach retirement age, they face several challenges in passing on their farms to the next generation. These challenges include a lack of interest among younger people in pursuing careers in agriculture, limited access to training and support for new farmers, and the increasing costs of farm inputs and labour.

As a result, many ageing farmers need help finding successors for their farms, which can lead to the consolidation of farmland, the abandonment of farmland, and a decline in agricultural production in the region. This has important implications for food security, rural livelihoods, and the ability of Southeast Asia to meet its growing demand for food and agricultural products (Rigg et al., 2020).

To address this issue, policymakers and practitioners in Southeast Asia need to develop programs and initiatives that encourage younger people to pursue careers in agriculture and provide them with the training and support they need to succeed. This includes promoting sustainable agriculture, improving access to financing and investment, and providing technical assistance and training to new farmers. The issue of ageing farmers in Southeast Asia will require a comprehensive and multi-faceted approach involving a range of stakeholders and drawing on the expertise and resources of the public and private sectors.

Case study 1- India Rice Carbon Farming Project

In 2021, Bayer initiated its rice carbon farming pilot in India, aimed at enhancing the productivity and sustainability of rice production in the country. Rice cultivation spans approximately 44 million hectares in India and stands as the primary contributor to methane emissions within the agricultural sector. Given the labour-intensive nature of rice farming, coupled with water scarcity and labour shortages, growers encounter significant challenges in achieving efficient resource utilization and productivity.

To address these issues and combat climate change, the Bayer project was launched, offering recommendations and training to farmers on implementing resource-efficient techniques such as Direct Seeded Rice (DSR) and Alternate Wetting and Drying (AWD). These techniques aim to reduce greenhouse gas (GHG) emissions and water consumption while also providing additional income through carbon credits. The pilot project successfully enrolled approximately 1,500 rice growers, covering nearly 3,000 hectares across 10 states. Participating farmers received comprehensive training on adopting practices such as Alternate Wetting & Drying, Direct Seeded Rice, reduced tillage, and integrated weed management. The adoption of these practices has led to the following benefits for the farmer and the environment.

Adopting these practices has led to a 25%, saving on labour cost and additional 30-50% less water usage than transplanted rice and more importantly a 30-50% reduction in methane emissions.

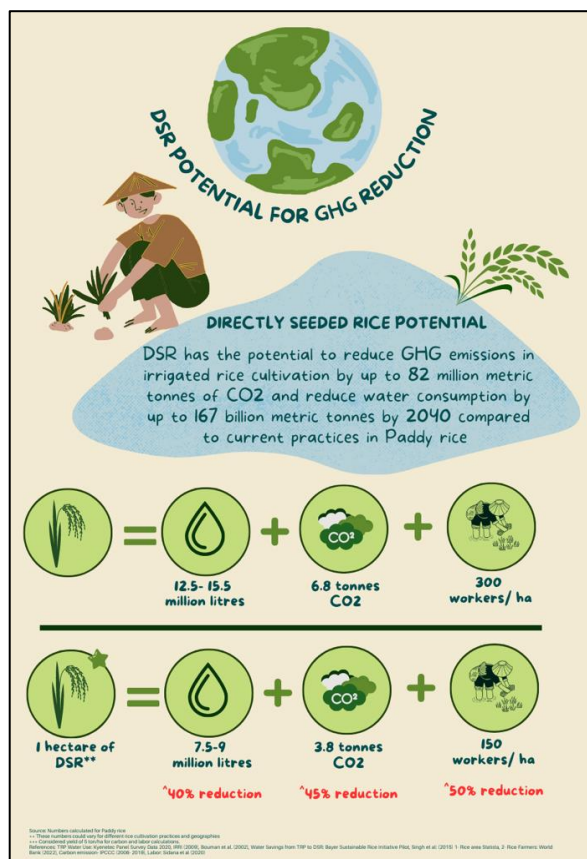


FIGURE 7 ADVANTAGES OF DIRECTLY SEEDED RICE PRACTICES IN PADDY RICE FIELDS³⁰

The project involved collaborations with partners such as the International Rice Research Institute (IRRI), which played a crucial role in training farmers to adopt novel agricultural practices. The implementation of these practices was closely monitored, and data regarding their efficacy was systematically collected. In the initial year, farmers demonstrated noteworthy achievements in terms of reduced water consumption, methane emissions, labour hours, and safeguarded crop yields. However, the outcomes varied significantly across different practices and geographical regions.

The decrease in greenhouse gas (GHG) emissions also serves as a motivating factor for farmers to modify their cultivation techniques. By converting these reductions into carbon credits, which are transparently priced incentives for emission reduction,

³⁰ Source: <https://www.phytojournal.com/archives/2020/vol9issue6S/PartA/S-9-6-10-865.pdf>

farmers can participate in the voluntary carbon market platform and generate additional income. This incentive structure offers a potential avenue for compensating carbon and methane avoidance.

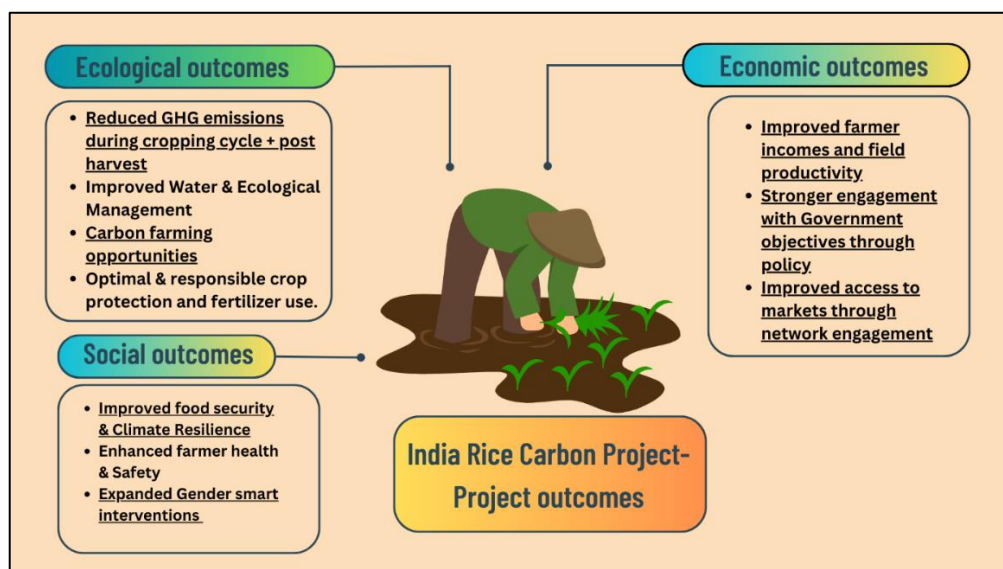


FIGURE 8 INDIA RICE CARBON FARMING KEY PROJECT OUTCOMES (SOURCE: AUTHOR)

Building upon the successes of the pilot phase, Bayer expedited the project's progress in 2022 by extending its scope to include an additional 6,000 hectares. Furthermore, in 2023, the company plans to expand the project further, aiming to encompass 25,000 hectares of rice-producing areas throughout India. Figure 8 highlights the key lessons and field knowledge co-created as part of the project implementation. These outcomes form the key basis for the project interventions and activities implemented with farmers and implementation partners

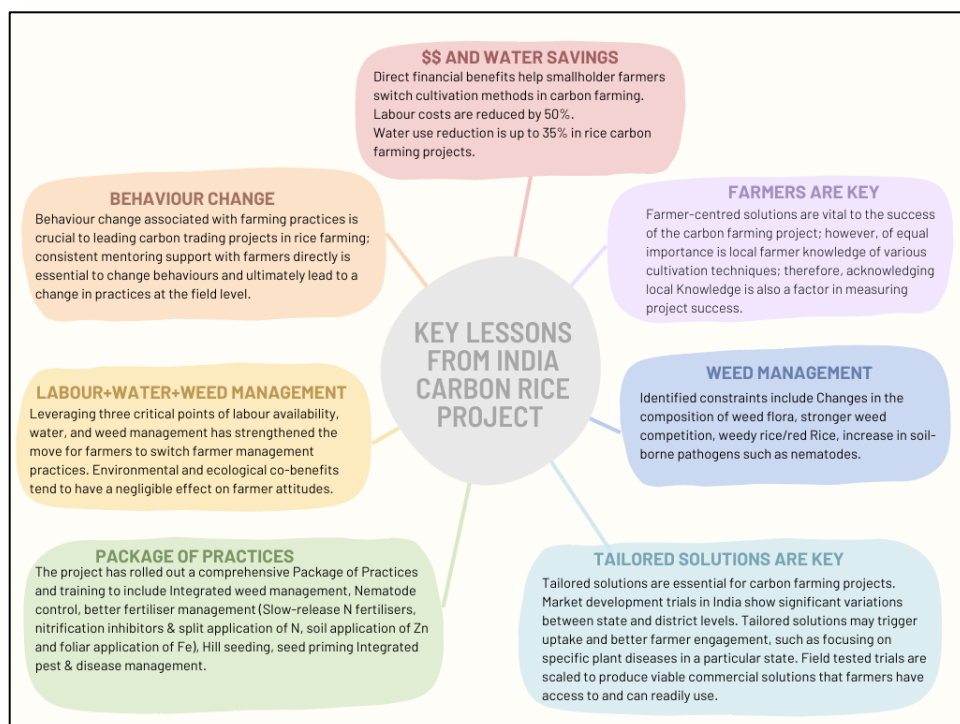


FIGURE 9 KEY LESSONS GENERATED FROM INDIA CARBON RICE FARMING PROJECT (SOURCE: AUTHOR)

The key lessons distilled from the India Carbon Rice Farming project are multi layered and provide important insight for future projects seeking to integrate low carbon rice in the Southeast Asia region. Since the development of this case study for the Carbon rice arming project there are also additional companies working on voluntary carbon markets including Olam Agri.

Case study 2- Regenerative Agriculture in Indonesia

Regenerative agriculture is a farming practice that aims to restore and enhance soil health, biodiversity, and ecosystem services while also providing economic benefits to farmers. One example of regenerative agriculture in Southeast Asia that can generate carbon credits is agroforestry.

Agroforestry is a land-use system that combines the cultivation of trees with crops and/or livestock. In Southeast Asia, agroforestry has been practiced for centuries in traditional farming systems, such as shifting cultivation and home gardens. However, agroforestry has recently gained attention as a climate-smart farming practice that can help mitigate greenhouse gas emissions while also providing multiple benefits, such as soil conservation, water retention, and biodiversity conservation.

Agroforestry systems can generate carbon credits through carbon sequestration in trees and soil. Trees are excellent carbon sinks, as they absorb carbon dioxide from the atmosphere and store it in their biomass and soil. Agroforestry systems can also enhance soil carbon storage by promoting the build-up of organic matter through the incorporation of crop residues, animal manure, and tree litter. The carbon sequestered in agroforestry systems can be quantified and verified through standardized carbon accounting methodologies, such as the Verified Carbon Standard (VCS) and the Climate, Community and Biodiversity Standards (CCBS).

An example of a regenerative agriculture project in Southeast Asia that generates carbon credits through agroforestry is the Katingan Mentaya Project in Central Kalimantan, Indonesia. The project is a collaboration between the local communities, the provincial government, and the private sector, aimed at restoring degraded peatland and promoting sustainable livelihoods through agroforestry.

The Katingan Mentaya Project³¹ covers an area of 110,000 hectares of degraded peatland that was previously used for logging and burning. The project uses a mix of agroforestry, reforestation, and peatland rewetting techniques to restore the degraded land and enhance carbon sequestration. The project involves the planting of native tree species, such as meranti, jelutong, and kapur, along with food crops, such as cassava, chili, and corn, in an agroforestry system. Livestock grazing is also incorporated into the system, with the use of rotational grazing to avoid overgrazing and soil erosion.

The Katingan Mentaya Project is expected to generate over 14 million carbon credits over a 30-year period, which will be sold in the voluntary carbon market to companies and individuals interested in offsetting their carbon footprint. The project also provides multiple co-benefits, such as the restoration of ecosystem services, the promotion of sustainable livelihoods for local communities, and the conservation of biodiversity.

Regenerative agriculture practices such as agroforestry can provide an effective and sustainable solution to mitigate climate change and enhance food security and livelihoods in Southeast Asia. By generating carbon credits through carbon sequestration in trees and soil, these practices can also provide economic incentives for farmers and landowners to adopt climate-smart practices and contribute to a low-carbon economy.

Insights on carbon trading and smallholder farmers

Notes for Policymakers

Policymakers in Southeast Asia on carbon trading programs with smallholder farmers:

- **Engage with smallholder farmers:** Policymakers should engage with smallholder farmers and understand their needs, capacity, and willingness to participate in carbon trading programs. This will help design programs that are effective, accessible, and sustainable.
- **Ensure transparency and accountability:** Policymakers should establish clear, transparent, and accountable rules and procedures for carbon trading programs to ensure the integrity and quality of the carbon credits generated. In this respect the application and clarification of Article 6 of the Paris Agreement from the international stage to national and local is an important milestone for policymakers. A stronger sense of these implications for voluntary and compliance markets is an important pathway for many countries in Southeast Asia.
- **Build capacity:** Policymakers should provide training and technical assistance to smallholder farmers to help them understand the requirements of carbon trading programs and improve their ability to participate effectively.
- **Foster partnerships:** Policymakers should encourage partnerships between governments, the private sector, NGOs, and international organisations to support the development and implementation of carbon trading programs with smallholder farmers.
- **Encourage innovation:** Policymakers should encourage innovation in carbon trading programs to explore new and effective ways of reducing greenhouse gas emissions from smallholder farms. Projects currently underway sampling MRV methods to verify climate-smart agriculture methods in field plots are some ways innovation is presently practised.
- **Provide incentives:** Policymakers should provide financial and non-financial incentives to smallholder farmers to encourage their participation in carbon trading programs and support adopting sustainable farming practices. Incentives such as de-risking insurance could provide a financial buffer for smallholder farmers.³²
- **Establish and evaluate programs:** government and policymakers need to provide clear regulatory support through the establishment of registries for carbon credits and to focus capacity and awareness building across farmers and key stakeholders.
- **Systematic review and alignment:** government agencies need to review policy and regulatory structures that impact the generation of carbon credits, as misaligned incentives and policy instruments could be detrimental to carbon credit generation and the validity of such credits.

³¹ <https://www.katinganproject.com>

³² Mikolajczyk, S., Mikulcak, F., Thompson, A., Long, I., (2021) *Unlocking smallholder finance for sustainable agriculture in Southeast Asia. Climate Focus and WWF*

By considering these recommendations, policymakers in Southeast Asia can design and implement effective and sustainable carbon trading programs with smallholder farmers that support the transition to a low-carbon future. Policymakers in Southeast Asia can help create a supportive and practical framework for carbon trading programs with smallholder farmers, which can help reduce greenhouse gas emissions, improve rural livelihoods, and contribute to sustainable development in the region.

Notes for Practitioners

In the context of carbon trading programs, the involvement of practitioners plays a pivotal role in facilitating the participation of smallholder farmers in Southeast Asia. These practitioners encompass a diverse range of stakeholders, including smallholder associations, organizations, small businesses, development partners, and agencies that directly engage with farmers. They also involve entities with business interests, non-governmental organizations (NGOs), farmer unions, and cooperatives. Moreover, institutional support and strengthening efforts contribute to their broad engagement with smallholder farmers.

This report highlights key areas where practitioners can effectively engage with smallholder farmers, enabling them to be better informed, advocating for their interests, and fostering collaboration in carbon market processes. By focusing on these aspects, practitioners can enhance the capacity of smallholder farmers to actively participate in and benefit from carbon trading initiatives.

- **Provide training and education:** Provide training and education to smallholder farmers on the basics of carbon trading, including the carbon credits market, sustainable farming practices, and the certification process. This can help farmers make informed decisions about whether to participate. Policymakers and government institutions can establish local registries and provide support through capacity & awareness building.
- **Assist with the carbon credit certification process:** Assist smallholder farmers with the certification process towards being able to generate viable carbon credits, including the development of farm management plans, the preparation of reports. Assistance to farmers on how carbon credit certification systems work.
- **Foster stakeholder engagement:** Foster collaboration between government agencies, NGOs, and private sector entities to promote the development and implementation of carbon trading programs with smallholder farmers.
- **Provide technical assistance:** Provide technical assistance to smallholder farmers, including agronomic advice, soil and water management, and the use of appropriate technologies, to support the adoption of sustainable farming practices that reduce greenhouse gas emissions.
- **Support financing and investment:** Support the provision of funding and acquisition to smallholder farmers, including grants, loans, and other forms of financial assistance, to help them adopt sustainable farming practices and participate in carbon trading programs.
- **Monitor and evaluate programs:** Regularly monitor and evaluate the effectiveness of carbon trading programs with smallholder farmers to ensure that they deliver accurate and sustained reductions in greenhouse gas emissions and improve farmers' livelihoods.
- **Repackaging the carbon trading within broader ecosystem services and livelihoods approaches:** Ecosystem services are defined as the goods and services provided by ecosystems to humans, such as air and water purification, nutrient cycling, pollination of crops, and climate regulation. The importance of ecosystem services and carbon credit programs is inherent within the ecosystem services that nature provides, such as carbon sequestration by forests. The sequestration process can generate carbon credits that can be bought and sold in the carbon market. In this way, carbon credit programs can provide an economic incentive for preserving and restoring ecosystems that also provide valuable ecosystem services, including carbon sequestration. Practitioners can consider the potential for co-benefits inherent by exploring carbon credit programs within broader projects and initiatives. Therefore, practitioners can show the importance of deriving co-benefits through carbon credits and ecosystem services.³³
- **Collaborative de-risking opportunities;** An important aspect of carbon markets is the opportunity to leverage different financial mechanisms to strengthen support toward smallholder farmers. Collaboration between policy makers, practitioners and micro finance offers the opportunity to explore innovative agricultural insurance products and schemes.

By taking these steps, practitioners can help create a supportive and effective environment for smallholder farmers to participate in carbon trading programs in Southeast Asia, which can help reduce greenhouse gas emissions along with other ecological co-benefits, improve rural livelihoods and food security, and contribute to sustainable development.

³³ The Climate Community and Biodiversity (CCB) standard under [Verra](https://verra.org/programs/ccbs/#program-overview) is one such example of a systematic approach which incorporates accounting methodologies with the standard within a registry system to ensure better land management outcomes are achieved in various projects and activities.

Conclusion

The objective of this report was to explore pathways that smallholder farmers could benefit from carbon trading, understand some best practice ideas from the Southeast Asia region and shed some light on issues of Governance and equity. The future of carbon trading with smallholder farmers in Southeast Asia is likely to be shaped by several factors, including global trends in climate policy, technological advancements, and changes in the economic and political landscape of the region.

- **Increased demand for carbon credits:** The global demand for carbon credits is expected to grow as countries implement their climate commitments under the Paris Agreement and seek to transition to low-carbon economies. The endorsement and gradual rollout of Article 6 of the Paris Agreement are expected to shape the voluntary carbon market in the coming years.
- **Technological advancements:** Advances in technology, such as precision agriculture, big data, and remote sensing, are expected to play a significant role in the future of carbon trading with smallholder farmers in Southeast Asia by helping farmers to monitor and track their carbon sequestration and emissions reduction activities more effectively.
- **Greater investment in rural areas:** more significant investment in rural areas to support the development of carbon trading programs with smallholder farmers as governments and private sector entities seek to promote sustainable development is needed.
- **More robust regulatory frameworks:** Strong regulatory frameworks to govern carbon trading programs with smallholder farmers in Southeast Asia are quintessential to future success. Programs need to be transparent, effective, equitable and transformative for the communities they engage with.
- **Context matters:** AMS have diverse policy landscapes and therefore the implementation of carbon market led programmes and projects with smallholder farmers function within country contexts. Important lessons learned and programme delivery mechanisms should be shared as widely as possible. What works in each country can be adapted to suit different country contexts.
- **Jurisdictional approaches:** The use of jurisdictional approaches in the future to balance comprehensive policy objectives in land management that include and promote climate smart agriculture methods in rice farming such as DSR is crucial and potentially game changing to enabling smallholder farmers engagement and protection within emergent carbon market systems in Southeast Asia (WBCSD, 2022)

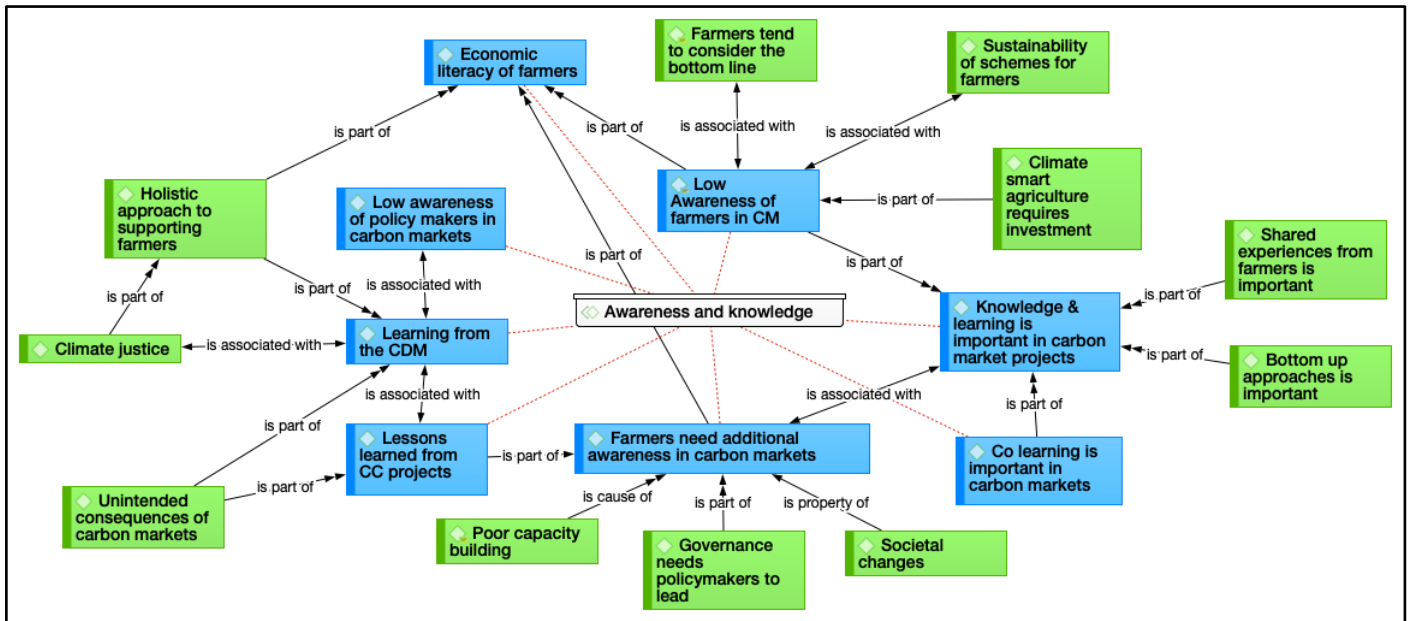
Overall, the future of carbon trading with smallholder farmers in Southeast Asia is likely to be characterised by continued growth and increasing opportunities for farmers to participate in initiatives that reduce greenhouse gas emissions and improve their livelihoods. However, this will also require ongoing effort by policymakers to create supportive policies, by business (finance and insurance) for investment in technology and infrastructure and insurance, and continued engagement between farmers, practitioners, and governments to ensure initiatives are smallholder farmer led and sustainable in the long term.

Literature

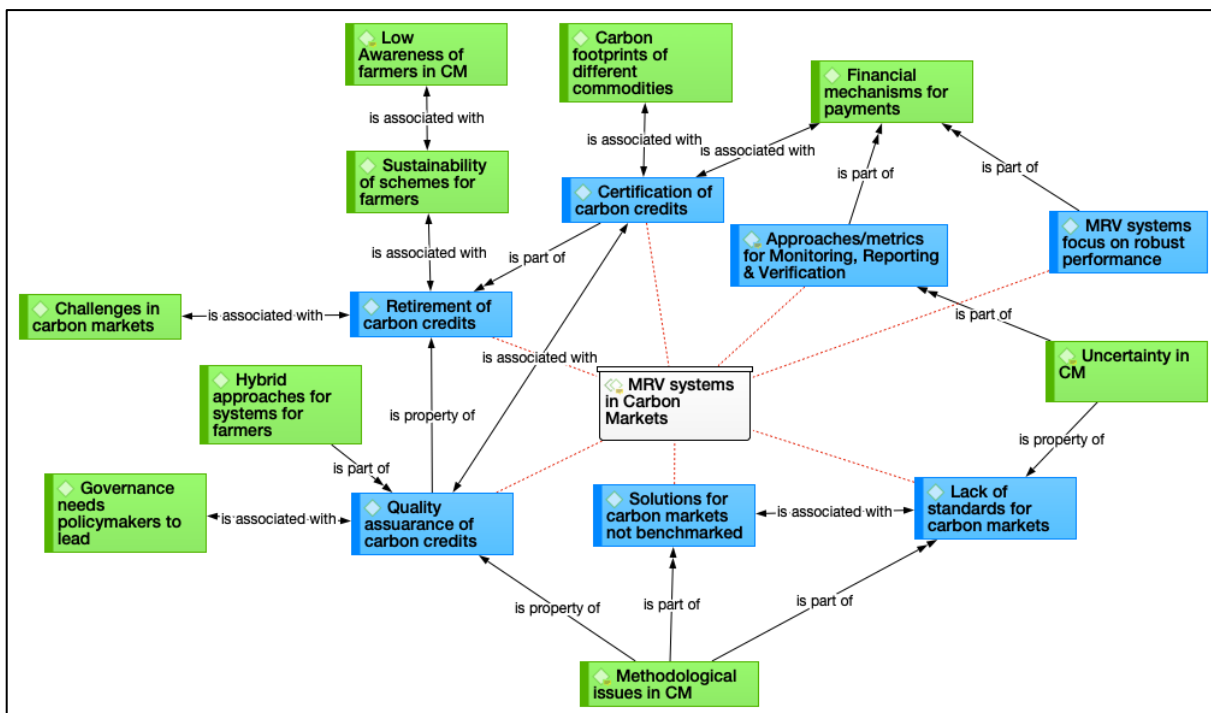
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Annex 1 Thematic Analysis Maps

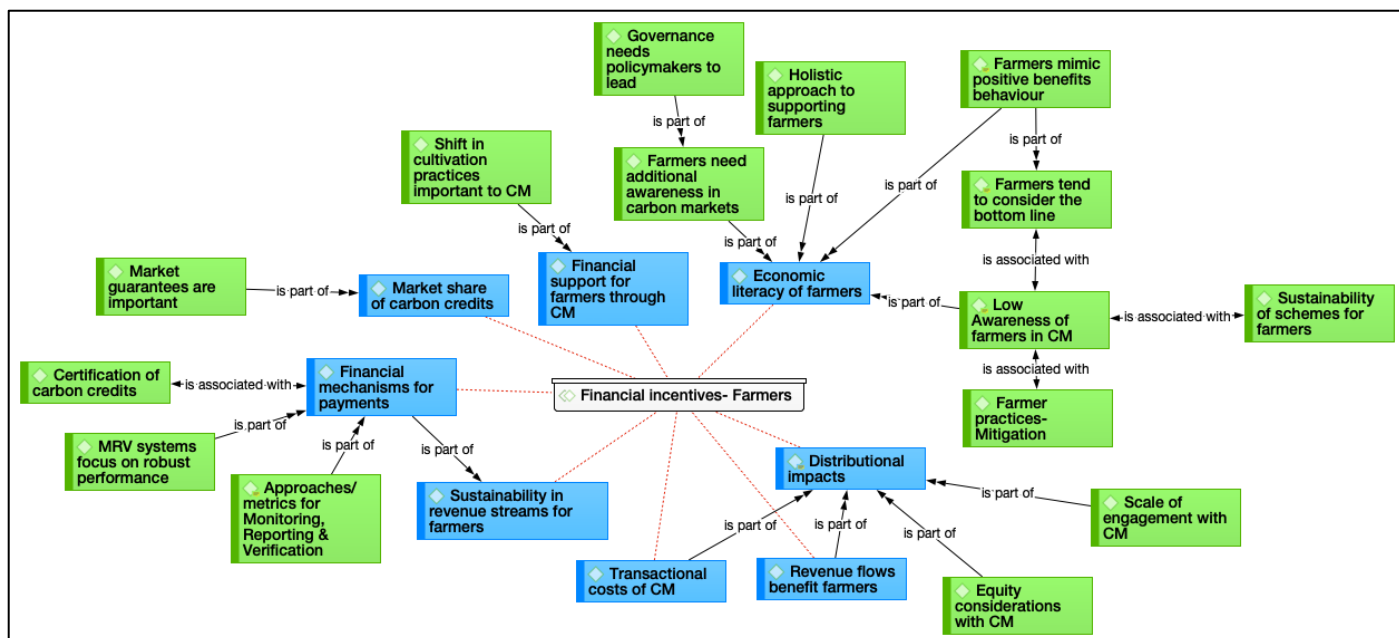
The following analysis maps were created using qualitative data analysis software to analyse and map key messages and themes from expert interviews. These maps were used as the basis for analysing the concepts behind specific thematic categories. Each thematic category was constructed through text analysis and classifying interview data based on responses from interviewed experts.



ANNEXE 1 THEMATIC ANALYSIS OF EXPERT INTERVIEWS- AWARENESS & KNOWLEDGE



ANNEXE 2 THEMATIC ANALYSIS OF EXPERT INTERVIEWS- MRV SYSTEMS IN CARBON MARKETS



ANNEX 3 THEMATIC ANALYSES OF EXPERT INTERVIEWS- FINANCIAL INCENTIVES- FARMERS

TABLE 3 LIST OF EXPERTS CONSULTED

| Name | Organisation |
|-----------------------------------|---|
| 1. David Chen | Agrig8 |
| 2. Victoria Crawford | World Business Council for Sustainable Development |
| 3. Evelyn Frischknect | World Business Council for Sustainable Development |
| 4. Priya Kath | Bayer |
| 5. Suhasr Joshi 6. S. Kamath | Carbon Rice Project- India (Bayer) |
| 7. Dr. Wyn Ellis | Sustainable Rice Platform (SRP) |
| 8. Dr. Rathana Peou Norbert Munns | Climate Foresight (FAO) |
| 9. Dr. Ngia Tran Dai | Institute for Policy and Strategy for Agriculture and Rural Development- Viet Nam |
| 10. Dr. Setiari Marwanto | Badan Riset dan Inovasi Nasional, BRIN – Indonesia (National Research and Innovation Agency) |
| 11. Deviah Aiama | World Business Council for Sustainable Development |