SEEDING THE FUTURE:

Transforming Smallholder Farms for a Sustainable Tomorrow

Centre for Impact Investing and Practices

wavemaker IMPACT

Supported by:

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Executive Summary

Solutions need to be right-sized, right-priced, and targeted well.

Southeast Asia is poised to become the world's fourth-largest economy by 2030, supported by an annual growth rate of 4% over the next decade.[1] As the region's population expects to reach 723 million in the next five years[2], Southeast Asia will experience rapid demographic and economic shifts. With one in six households entering the consuming class and five million people migrating from rural to urban areas in the region each year, both consumption and production dynamics will transform substantially.[3] By 2030, food consumption in Asia is projected to reach $2.4 trillion, driven by a growing population of increasingly affluent and discerning consumers.[4] In Southeast Asia in particular, food consumption is expected to increase by 40% by 2050[5], further intensifying demand for agricultural products.

The agriculture sector faces several systemic barriers impeding land productivity. These include the fragmentation of smallholder farms, outdated farming practices resulting in low yields, and environmental degradation from unsustainable land use and input dependency. Rising temperatures, resource depletion, and extreme weather events will also further reduce crop yields, disrupt livelihoods, and threaten food security, creating an unstable agri-food system.

To solve for this wicked combination of rising population growth, a growing demand for food, low land productivity, and environmental pressures, solutions must be tailor-built and scaled for smallholders in Southeast Asia. **Such solutions do exist, and it is imperative that these are right-sized and right-priced for smallholder farmers.** For meaningful change to be enacted, these solutions must be targeted to have tangible and scaled impact.

Fortunately, many immediate interventions have already been created by forward-thinking practitioners. These have begun making an impact in Southeast Asia's agriculture sector. **Financing is crucial** in helping effective solutions to scale and to prevent the protraction of existing social and environmental challenges. Innovative approaches to deploying philanthropic, blended, and impact capital can pave the way for funding to amplify effective solutions, leading to better outcomes for smallholder farmers and the adoption of sustainable agricultural practices.

Every actor along the spectrum of capital has a role to play. **There is no better time than now to get started.**

1 ASEAN (2023): Investing in ASEAN 2023
2 WEF(2020): Future of Consumption, 2020
3 WEF(2020): Future of Consumption, 2020
4 The Asia Food Challenge, PwC, Rabobank, Temasek (2021): The Asia Food Challenge 2021: Understanding the New Asian Consumer
5 McKinsey (2023): Saving Southeast Asia's crops: Four key steps toward food security

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List of Participants (in alphabetical order)

Investors and Philanthropic Organisations	Ecosystem Enablers	Companies
• ABC Impact • Jollibee Group Foundation • Gates Foundation • Rockefeller Foundation • Silverstrand Capital	• Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT) • CGIAR Sustainable Finance Hub (ImpactSF) • Grow Asia • PRISMA (The Australia-Indonesian Partnership for Promoting Rural Incomes through Support for Markets in Agriculture) • Roundtable on Sustainable Palm Oil (RSPO) • Temasek Foundation • UN Economic and Social Commission for Asia and the Pacific (UNESCAP)	• Agros • CROWDE • eFishery Group • Fairventures Social Forestry • Foodmap • Laconik • Mayani • Proximity Finance • RegenX • Ricult • Rize • Sea6 Energy • Techcoop • Fasal

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The Opportunity in Southeast Asia

The next decade will be a period of decisive growth for Southeast Asia. The region will be facing drastic transformations in consumption and production dynamics, coupled with massive rural-urban migration. One in six households are projected to enter the consuming class and five million people are expected to migrate from rural to urban areas each year.[6] With an annual growth rate of 4% over the next decade, Southeast Asia is poised to become the world's fourth-largest economy by 2030.[7]

This combination of economic momentum, a demographic dividend, and a young and emerging middle class make Southeast Asia a bright spot for investors seeking out impactful opportunities.

6 WEF(2020): Future of Consumption, 2020
7 ASEAN (2023): Investing in ASEAN 2023
8 United Nations Development Programme SDG Investor Maps

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This is amply demonstrated by the Sustainable Development Goals (SDG) Investor Maps, a set of investment materials developed by UNDP Private Finance for the SDGs, with support from the Centre for Impact Investing and Practices. These Maps provide data, information and insights on Investment Opportunity Areas (IOAs) that are **commercially viable and have the potential to contribute to sustainable development.** Across Southeast Asia, more than half of the IOAs identified were in climate; of which more than a third focused on the food and beverages sector.

Food consumption in Asia is projected to reach $2.4 trillion by 2030,[9] driven by a growing population of increasingly affluent and discerning consumers. In Southeast Asia, food consumption is expected to increase by 40% by 2050,[10] further intensifying demand for agricultural products.

Food consumption in Asia is projected to reach **$2.4 trillion by 2030**

SDG Investor Maps were created across Southeast Asian countries, including Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand and Vietnam

54%

of the 100 Investment Opportunity Areas identified are related to Climate

37%

Within that, Food & Beverages - which includes Agriculture and F&B Retail - makes up the highest proportion of IOAs identified.

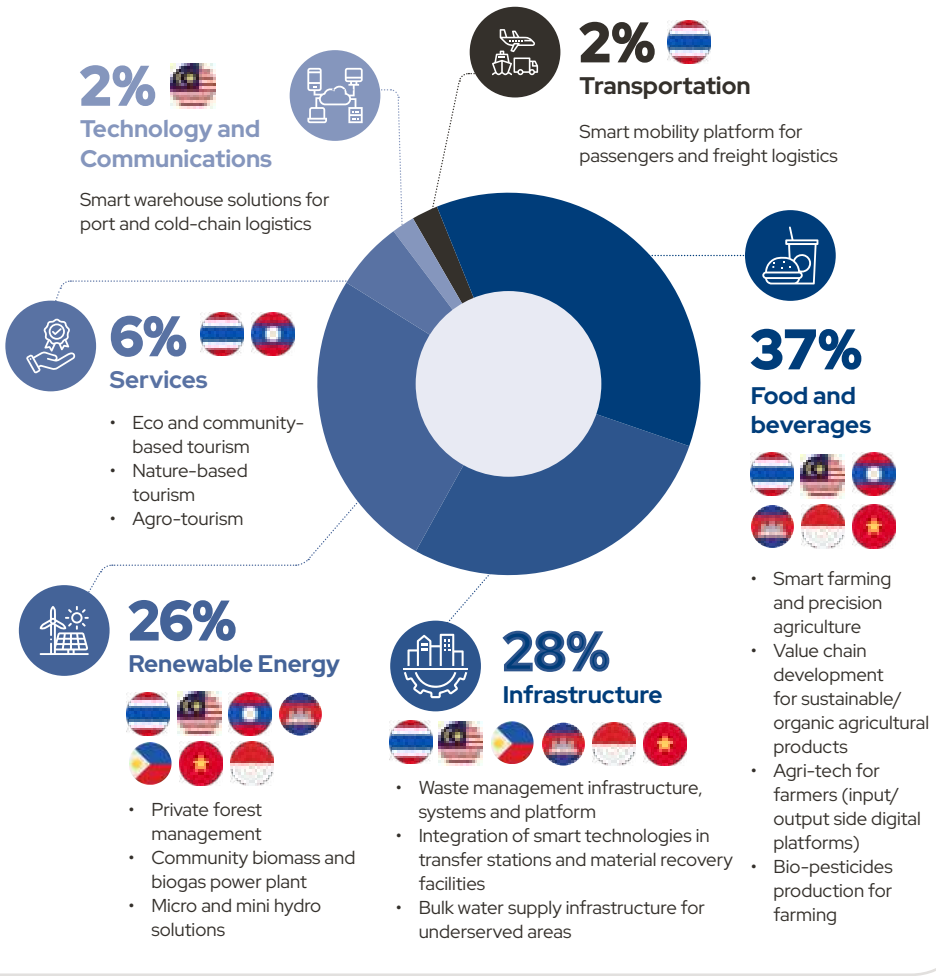

Diagram 1: Overview of the Investment Opportunity Areas (IOAs) related to climate in Southeast Asia

9 The Asia Food Challenge, PwC, Rabobank, Temasek (2021): The Asia Food Challenge 2021: Understanding the New Asian Consumer
10 McKinsey (2023): Saving Southeast Asia's crops: Four key steps toward food security

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The 'Wicked Problem' of Agriculture in Southeast Asia

The agriculture sector in Southeast Asia faces a complex combination of issues. Farms are small and fragmented, farmer populations are shrinking due to ageing farmers, and young people are unwilling to take up the trade. Furthermore, farmlands are degrading due to poor practices, and farmers are unable to access traditional financing. These farmers, who dominate the region's agriculture, are also extremely vulnerable to the growing impacts of climate change. Addressing these challenges **requires solutions tailored to the unique characteristics of Southeast Asia's agricultural landscape.**

I. Fragmented Small Farms

Smallholder farmers form the backbone of Southeast Asia's agricultural landscape, with an estimated 100 million managing farms that average just two hectares.[11] This is on the lower end of Food and Agriculture Organization (FAO)'s definition of one to ten hectares.[12] Small farm sizes make it challenging for smallholders to exploit the efficiency that comes with scale. In the 1980s, smallholder farms were more viable on a relative basis. Many rural communities were heavily agriculture-based, and urbanisation pressures were significantly lower. However, over the past 30 years, rapid urbanisation has pulled younger generations away from rural areas, raising labour costs for smallholders. Meanwhile, agricultural costs have risen more rapidly than the selling prices of farm yields, which erode farm profitability. For instance, while the cost of inputs like seeds and agrochemicals has grown by approximately 30 to 40% over the last two decades,[13] yield prices have stagnated, causing farmer margins to be tightly squeezed.

II. Degraded Farmlands

Poor yields force farmers to rely heavily on agrochemicals and antimicrobials to make up for the nutrient loss taken up by crops previously harvested. Since 1990, agrochemical use has surged by 67%, with pesticide imports increasing nearly sevenfold between 1990 and 2010.[14] This over-reliance degrades soil health, contaminates water sources, and even causes widespread issues like algae blooms that choke waterways. Additionally, the dependence on agrochemicals contributes to soil acidification and further degradation of farmlands. For instance, it has been found that a leading contributor to soil acidification in Vietnam is the unbalanced and unsuitable application of chemical fertilisers. In Indonesia, traditional practices such as the application of acidifying fertilisers like ammonium sulphate also continue to aggravate this problem.[15]

Such impact is not just environmental - between 54% and 66% of farmers in the region suffer from accidental pesticide poisoning each year, affecting both health and long-term land productivity.[16] Short-term yield gains come at a high cost - weakened soil and polluted water resources force farmers into a cycle of unsustainable practices just to keep up with production demands.

Some farmers have also resorted to deforestation and have encroached into adjacent forest lands in a bid to find more fertile farmlands and maximise yields. Native forests are cleared through methods like slash-and-burn, releasing vast amounts of

100 million
managing farms that average just two hectares

Cost of inputs like seeds and agrochemicals has grown by approximately **30 to 40%** over the last two decades

Since 1990, agrochemical use has surged by **67%**

>50% of farmers in the region suffer from accidental poisoning each year

11 World Wildlife Fund (2021): Unlocking Smallholder Finance for Sustainable Agriculture in Southeast Asia
12 Food and Agriculture Organization of the United Nations (2013): Smallholder and Family Farmers Factsheet
13 McKinsey (2023): Trends driving automation on the farm
14 Food and Agriculture Organization of the United Nations (2023): Pesticides use and trade, 1990–2021
15 Food and Agriculture Organization of the United Nations (2015): Status of the World's Soil Resources
16 Annual Review (2022): Annual Review of Environment and Resources: Agrochemicals, Environment, and Human Health

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stored carbon and destroying natural habitats. This loss of forests removes critical barriers that once protected fields from flooding and erosion, leaving lands increasingly vulnerable. In this cycle of deforestation, pollution, and soil exhaustion, vast soil erosion is occurring across Southeast Asia, leading to a general decrease in soil and water quality. Extreme weather events, such as intensifying storms and floods, have also hastened topsoil loss; while soil fertility is under threat due to salinisation from rising sea levels, sea storm surges, droughts, and landslides.[17] This puts the region's food security on increasingly unstable ground.

III. Shrinking Farmer Populations

At the same time, Southeast Asia's agricultural workforce continues to shrink as farmers in the region get steadily older and fewer youth see farming as a desirable career. In Asia, 12.1% of farmers are above the age of 55, with countries like Indonesia, Thailand, and Vietnam experiencing the threat of ageing farmer population most acutely.[18] The Ministry of National Development Planning of the Republic of Indonesia (Bappenas) has even projected that there will be no professional farmers left in the country by 2063.[19]

On top of these demographic challenges, younger generations continue to leave farmlands and farming communities for urban areas in search of other opportunities. Higher-paying manufacturing and service jobs in the cities draw workers out of the rural areas, which has led to an erosion of the share of the rural population from 80% in 1970 to 52% in 2020. This is expected to decrease to 38% by 2050.[20]

It is unclear who will continue the agricultural trade, with farming being seen as an unprofitable and labour-intensive occupation. According to a study published in the Philippine Journal of Science, 65% of farmers in the Philippines do not want their children to become farmers, a sentiment shared by their counterparts across the region.[21]

Shrinking farmer populations and a decrease in available manpower mean that agricultural productivity will have to be enhanced through the adoption of innovative technologies and practices. However, given that most smallholders in the region live on less than US $2 a day,[22] farming communities will remain hard-pressed to invest in new capabilities.

IV. Inability to Access Traditional Financing

Given the volatile faming income and small land plots, smallholder farmers have always had issues accessing traditional financing. Climate change intensifies these challenges with increasing crop failures, income volatility, and a deepening reliance on unsustainable practices. It is increasingly difficult for farmers to assure financiers of stable repayment ability, and for financiers to be able to assess farmers' risk profiles accurately. With the cost of customer acquisition outweighing the projected returns, many financing institutions are unable to overcome the bottleneck to deploy funds to smallholder farmers.

All the above factors trap the farmers in a vicious cycle, as illustrated in Diagram 2 in the next page.

12.1%
of farmers are above the age of 55 in Asia

Most smallholders in the region live on **less than US $2 a day**

17 Fulcrum (2023): Leveraging Dirt: Soil as Southeast Asia's Under-explored Solution for Carbon Mitigation and Food Security
18 HelpAge International (2014): The ageing of rural populations: evidence on older farmers in low and middle-income countries
19 Kompas (2021): Bappenas: Tak Ada Lagi Profesi Petani pada 2063
20 Asian Development Bank (2021): Asian Development Outlook 2021 Update - Theme Chapter: Transforming Agriculture in Asia
21 Fulcrum (2024): Cultivating the Future: Empowering Young Farmers in Southeast Asia
22 World Bank Group (2016): A Year in the Lives of Smallholder Farmers

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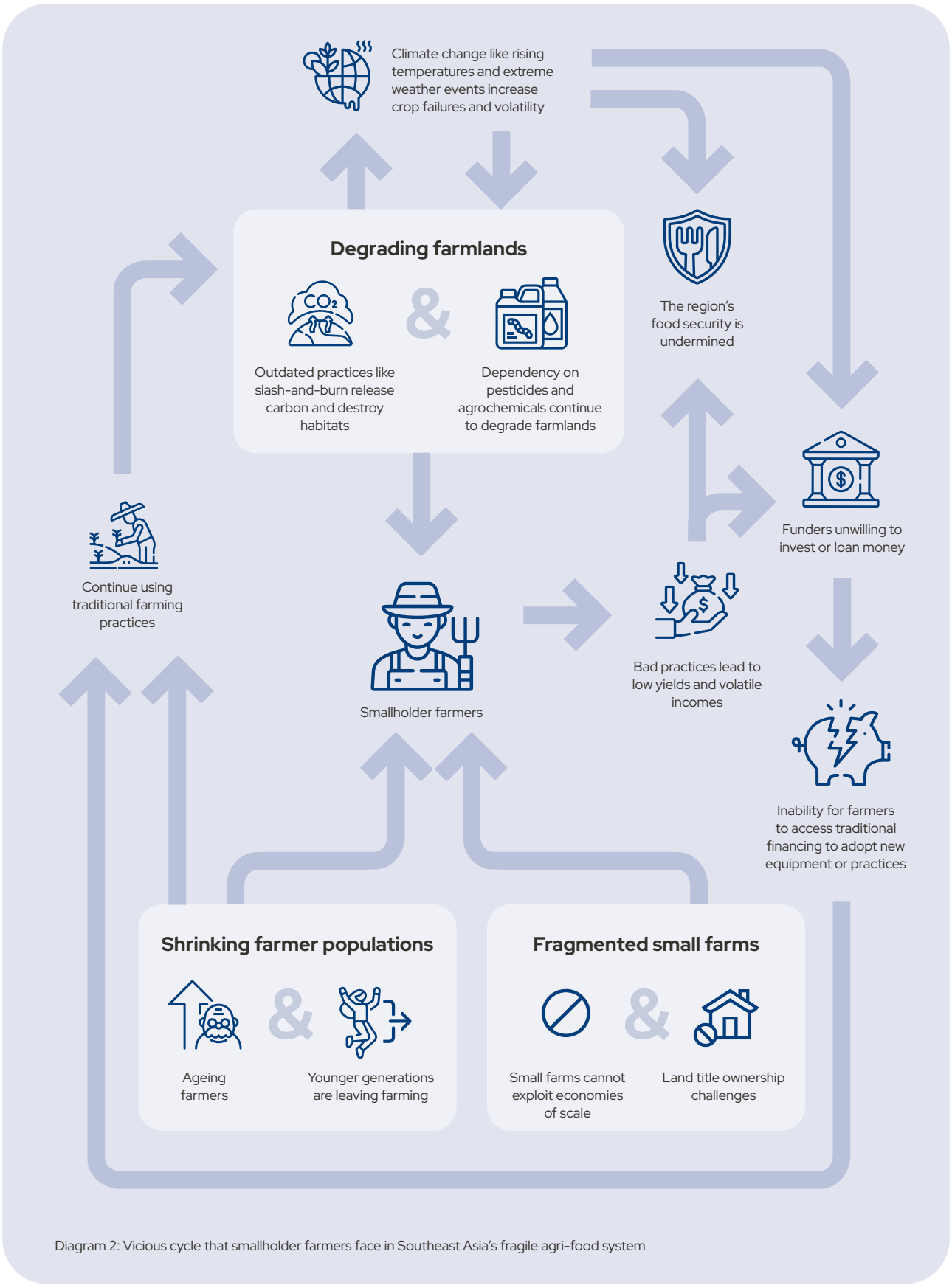

Diagram 2: Vicious cycle that smallholder farmers face in Southeast Asia's fragile agri-food system

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Seeding Solutions to Address Food Security Amidst Climate Change

The growth in population sizes, coupled with an ever-growing middle-class demographic, cause demand for diverse food options to rise. The region's agricultural system - already stretched thin - is struggling to keep pace. With only 0.4 hectares of agricultural land per person - compared to 0.6 in the EU, 1.3 in the U.S., and 9.0 in Oceania[23] - **Asia's agricultural productivity must increase quickly to meet demand and reduce excessive dependency on imported food.**

The growth rate of the top five major food commodities in Southeast Asia, namely rice, maize, soybean, sugarcane, cassava - is inconsistent, with all crops experiencing dips in growth over the past decade.

The **COVID-19 pandemic further exposed this fragility**, disrupting both domestic and international supply chains and highlighting vulnerabilities in food distribution. According to the Asian Development Bank, the number of food-insecure people in the region has tripled since pre-pandemic levels. Food prices surged in 2020 as much as they had over the preceding five years, and by 2022, inflation had more than doubled in several countries, with Lao PDR and Myanmar among those most affected.[25]

While these problems seem difficult, there are ways we can start to unravel these complexities and convert challenges into opportunities, with the aim of creating a more sustainable and more stable agri-food system. To achieve this, there is a **need to consider and effectively address the needs of smallholder farmers in Southeast Asia**. Solutions will also need to be customised to local needs and ground realities. For the adoption of good practices to be scalable and sustainable in the long term, the role of market mechanisms will also be crucial for the implementation of these solutions. These solutions need to **be right-sized and right-priced** for the farmers in the context of Southeast Asia's unique agricultural landscape.

3x
The number of food-insecure people in the region has tripled since pre-pandemic levels

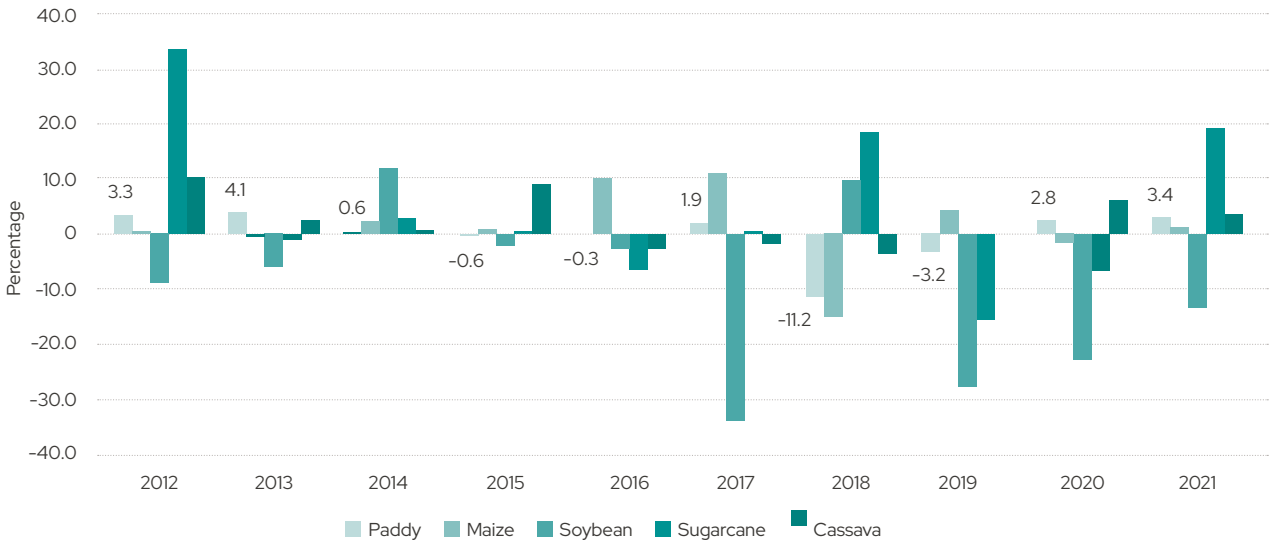

Diagram 3: Growth Rate of ASEAN Five Major Food Commodities, 2012-2021[24]

23 Temasek (2023): The Asia Food Challenge – Decarbonising the Agri-Food Value Chain in Asia
24 ASEANstats (2022): ASEAN Statistical Yearbook 2022
25 Studies in Agricultural Economics (2023): Food Price Inflation in East and Southeast Asia: Situation, Driving Forces, and the Outlook

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For example, smallholder farmers have proven able to implement quick and easy solutions that can work in their small farms. For example, the International Rice and Research Institute has identified the Alternate Wetting and Drying (AWD) technique as a simple and inexpensive way of reducing water consumption in rice production by 30%, helping farmers to cut down on production costs without compromising on yield.[26] Farmers would use a perforated tube to monitor the water level below soil surface to determine when to irrigate and implement period draining of the field to a certain threshold. AWD has been proven to reduce methane emission by 30 to 70% and contribute to the mitigation of climate change.[27] It is important to therefore identify solutions like these across different crops and communities, lower barriers for adoption, and empower smallholder farmers to come onboard the transition toward sustainable agriculture.

I. Direct engagement and building trust with smallholders

Given the growing demand for food and the needs of the agri-community, the opportunity for companies who can tailor and deliver solutions at scale is significant. Financial service providers or investors who can help mitigate the unique risks in agriculture, lower transaction and service the costs of onboarding smallholder farmers, and provide targeted financial products with repayment structures that are tailored to farmers are crucial. To mitigate the agricultural challenge in Southeast Asia, **'local-for-local' solutions are vital to improve yield and increase margins**, as well as to improve the incomes and livelihoods of smallholders overall. Structuring financing with instalments to match farmer incomes and crop cycles for example, enables farmers, who might otherwise not be able to take the upfront risks in adopting newer practices, to access such solutions.

Roundtable on Sustainable Palm Oil (RSPO) – Uplifting capabilities

As one of the implementors of global standards for sustainable palm oil, the RSPO provides capacity building in sustainable agriculture practices for smallholder farmers with the objective of improving their livelihoods with better market access through certification. Recognising that not all farmers are structurally bound by contracts, credit agreements or planning to a particular processing mill, RSPO provides certification to both independent and scheme or plasma smallholder farmers. With the RSPO certification, smallholder farmers are able to sell their oil palm fruit at a premium to the mill or sell it as a RSPO credit directly to buyers, which helps to draw in higher, more diverse incomes.

However, drawing from their extensive experiences on the ground, RSPO is cognisant that the cost of certification can be challenging for smallholder farmers to overcome without external support. Hence, RSPO adopts a step-wise approach by starting with training first, and before gradually building awareness and knowledge around sustainable palm cultivation practices. RSPO also established the RSPO Smallholder Support Fund (RSSF) to provide financial support for both independent and scheme smallholder farmers to take up projects in livelihood improvement, gap assessments, independent smallholder audit, and preparation for certification. To date, RSPO has certified around 170,000 farmers across both independent and scheme smallholder groups in Southeast Asia.

26 International Rice Research Institute (IRRI), CGIAR (2024): Alternate Wetting and Drying

27 Climate & Clean Air Coalition (2016): Alternate Wetting and Drying Infographic

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Agros – Reducing carbon and costs for smallholder farmers

Agros provides innovative, climate-smart sustainable farming solutions to farmers across Southeast Asia, allowing farmers to increase their profitability while reducing carbon emissions; and make their farms climate resilient for generations to come.

Starting in Myanmar, Agros identified more than 1 million hectares of farmland being irrigated using diesel-powered water pumps, which is significant relative to the country's total land size. However, such water pumps incur significant operating expenses (OPEX) from farmers, who can spend $50-100 per month on diesel and are subjected to fluctuating fuel prices. Reliance on OPEX funding also limits farmers' ability to afford year-round irrigation, or irrigate their entire landholding, as the pump usage is dependent on the farmers' available cashflow at any given point in time.

As an alternative, Agros developed a solar-powered water pump (AgroSolar), which eliminates farmers' reliance on traditional fuel sources and enables year-round irrigation. To ensure that farmers can afford the capital expense investment and make the shift to AgroSolar, Agros provides a payment plan that requires a 25-40% down payment on the pump, which is equivalent to the cost of purchasing a new diesel pump. The remaining payment is collected in instalments at points of harvest, which provides flexibility for farmers to adopt the solution first at an acceptable, lower upfront cost. Through the adoption of their solar pump, Agros is able to build trust with farmers as the device will be used for multiple years, giving them a unique opportunity throughout the device's lifetime to offer additional products and services to the smallholder farmers that further increase profitability and reduce carbon emissions.

> "Farmers are really liking and giving great feedback on the product and it's something that is really needed. The goal is to have as many farmers as possible adopt climate smart technologies."

Max Nelen, Founder and CEO, Agros

Agros has since replicated their model to other countries in Southeast Asia, such as Cambodia and Indonesia; and will be expanding into Vietnam and Philippines in the future.

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Proximity Finance – Committing to Farmers

Proximity Finance is Myanmar's first farmer-focused financial institution that provides loans and savings and technical advice to rural farming households, including low- and middle-income farmers. Proximity Finance forms part of the country's largest agricultural services platform with over 15 years of experience in improving livelihoods in rural Myanmar. Their local distribution network accounts for more than 200,000 rural clients, and over 900,000 household members.

Amidst uncertainty in Myanmar, Proximity Finance continues to provide loans to farmers and to support livelihoods and food security for rural Myanmar. The financing gap remains huge however – while it is estimated that 70% of the population in Myanmar reside in the rural areas and rely largely on agriculture as the main source of income microfinance institutions in the country currently support only 12% of the rural population, a dramatic decrease since 2021.[28] It is also challenging to address this gap, given that external financing is heavily restricted, and rural lenders such as Proximity Finance can only source for funding through local banks and funders.

Nonetheless, Proximity Finance has persisted with its ambition to uplift the farmers of Myanmar, and to help them sustain their livelihoods and ensure food availability. Proximity Finance continues to increase their loan sizes to support the needs of farmers as much as possible, and to steer them away from borrowing from high-cost lenders, whose repayment terms could easily overwhelm the already stressed farming households. Staying close to the ground, Proximity Finance has been realistic in how they understand their portfolio, which consists of performing and non-performing loans, and has launched new climate smart agriculture initiatives for its clients. Proximity Finance also maintains multiple touchpoints with the farmer community, to better assess the farmers' repayment capacity and monitor loan utilization for agriculture.

28 IFPRI Project Papers, CGIAR (2024): Shocks and coping - Findings from the sixth round of the Myanmar Household Welfare Survey (June - November 2023)

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II. Bridging people and technology through 'phygital' models

The agriculture space is ripe for technological solutions that can be introduced to directly address pressing challenges. Digital solutions show great promise in bringing expertise and insights to farmers at scale to support them in making the changes needed most. However, given the fragmented farm landscape, it will be difficult for purely digital solutions not built on local engagement to take root – it is also important to **couple such solutions with physical interaction with smallholder farmers** to ensure that solutions are understood and adopted.

Meeting the needs of stakeholders in agriculture financing involves both hands-on engagement and innovative technology. ImpactSF, CGIAR's hub for sustainable finance, leverages AI-driven tools to bridge this gap by delivering precise, location-specific insights. This enables financial institutions to conduct accurate risk assessments, evaluate environmental impacts, and align their investments with sustainability goals. Engaging partners, including technical specialists and agronomists, familiar with local contexts further enhances support for smallholder farmers, promoting trust and knowledge sharing. Through this combined approach, ImpactSF empowers investors to make data-informed decisions, de-risking smallholder investments and unlocking their potential for positive returns and environmental resilience.

Similar approaches can be adopted by solution providers as well, whether in terms of tracking input utilisation or in Monitoring, Reporting and Verification (MRV). **By building on phygital models, solutions can scale across Southeast Asia at a more efficient rate.** At the same time, such solution providers can collect useful data to connect smallholders to other stakeholders.

RegenX – Weaving technology and networks to bring value to farmers and buyers

RegenX adopts a supply chain approach to make regenerative transitions profitable for both smallholder farmers and buyers alike. By working directly with corporates, RegenX offers support to train farmers within their supply chains, and to help implement regenerative agriculture practices throughout. After assessing farmers' readiness to adopt regenerative agriculture practices, RegenX develops customised farmer roadmaps and trains them on better practices and ways to procure better inputs (e.g. replacing chemical inputs with quality compost, cover crops, and liquid amendments). To enable a smooth transition to new practices, RegenX's remote agronomic team communicates directly with farmers and provides customised troubleshooting; as well as conducting routine check-ups and practical re-training to ensure progress.

On the digital front, RegenX rolled out a Farm App that allows farmers to track their practices and fertiliser usage. These data inputs are then computed on RegenX's data platform on the backend to derive carbon equivalence, which allow corporates to track their emissions more accurately. RegenX also verifies the data through performing routine checks on-ground, as well as data boundary checks digitally on their platform. By weaving into existing networks and relationships, RegenX can push forth the implementation of regenerative agriculture practices, while concurrently creating value for both farmers and buyers.

> "The key to implement and scale regenerative agriculture with smallholder farmers is to bring immediate value to them in the first place. This usually required offline interventions. Only then can we loop in online tools to track or create additional value. To us, innovating in this space means combining offline and online innovation."
>
> **Bao Lan Nguyen, Founder and CEO, RegenX**

Rize – Reducing emissions and costs

Rize has built an AgTech platform that focuses on solving for adoption of sustainable practices to smallholder rice farmers. This enables improvements in farmer income and livelihoods as well as reduce emissions from rice cultivation. Adoption however is a challenging concept, but Rize has found a clear painpoint for farmers - ever increasing agriculture input costs, and is able to turn that into an incentive for change. By aggregating many farmers, Rize procures inputs at a lower price from retailers by purchasing in bulk and paying in cash up front, then resells these inputs to farmers at a more affordable rate with the caveat that farmers must implement Rize's recommended sustainable rice cultivation practices alongside. The high-quality low-carbon rice produced through Rize's methods is then brokered to offtakers, and Rize also receives a portion of the sales proceeds post-harvest from the farmers.

> "In order to change behaviors at a smallholder farmer level, you need to take a longer-term horizon. You really need to have people on the ground to provide assistance and solve for sustainable practice adoption, and the key to scale is to enable this with technology. We look at specific challenges that farmers are facing and align those with the right incentives to reach the larger goals."
>
> **Siem Schreurs, Head of Fintech and Partnerships, Rize**

To scale up its operations, Rize seeks to establish a digital-enabled agronomy model where farmers are supported in their transition to sustainable practices through the provision of more affordable inputs and agronomic advice. However, Rize recognises that the key to success is in solving for trust; and to do that, Rize has dedicated agronomists who are digitally guided, are in the field, and are building relationships with the smallholder farmers for the long term. Aside from being the smallest business unit facing the farmers, these agronomists also help to input data and information into Rize's backend application, which overcomes the farmers' digital skills gap and allows for smoother data collection. With Rize's MRV platform, each agronomist is enabled to efficiently service over 150 hectares of farmers per season and provide timely advice, either in-person or remotely.

At the end of their seed phase, Rize has onboarded 2,500 hectares equivalent of smallholder farmers, and are expecting to scale to 30,000 hectares by the conclusion of its Series A fundraising.

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III. Ensuring offtake to support farmers' livelihoods

The adoption of new solutions often requires significant investments from smallholders. Therefore, risk reduction is vital to encourage implementation. One way to do this is to bring together the fragmented market and allow farmers to experience the benefits of scaling and consolidation. Through offtake agreements, guaranteed revenues can be brokered. In addition, offtake schemes can also help to simplify complex supply chains and reduce unnecessary layers of middlemen, resulting in better profits and improved incomes for farmers.

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CROWDE – Supporting a whole market approach

CROWDE is an agriculture-focused fintech startup that empowers farmers across Indonesia with technology and capital. Early on, CROWDE recognised that smallholder farmers cultivating horticulture (e.g. vegetables, such as chili) often do not produce enough to trade in the wholesale market, where they have to be subjected to a long chain of brokers to sell their produce. While the value of horticulture products is high, it also requires huge capital investment upfront – coupled with the fractioned revenue that farmers receive through the many layers of middlemen, it is often the case where the profits cannot cover the cost of cultivation and go-to-market.

To remove the many layers of middlemen and ensure that farmers obtain the best price from the market, CROWDE operates their own distribution arm and participates in the wholesale market on behalf of the farmers. At the start of each crop cycle, CROWDE provides initial cultivation capital in the form of inputs, and then receives the first portions of production from farmers at point of harvest as repayment. The remainder is up to the farmer to decide – they could sell it to CROWDE or to other traders or keep it for individual consumption. Given CROWDE's vast network of farmers, they are able to amass sufficient volume to trade in the wholesale market, and guarantee offtake for the farmers that they work with.

> "Farmers sometimes do not help each other, and farming methods are different from field to field. (Here) the middlemen can "play" the farmer – when one person is harvesting, most probably everyone else is harvesting, so the middlemen try to squeeze the farmer for a lower price. If the farmer doesn't agree, then the middlemen walk away and come back on a later day, where the produce is no longer as fresh."

Ivan Gondoprastowo, Chief Product Officer, CROWDE

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Mayani– Uplifting incomes via a Business-to-Business (B2B) model

To Mayani, the most appropriate entry point to effect immediate and tangible impact to smallholder farmers is to provide them with stable pathways to markets. Having recognised the asymmetry of information in the Philippines – where there is as many as seven layers of middlemen – Mayani sought to optimise the supply chain by bypassing the middle layer, reducing the dilution of demand, and uncapping the output potential of smallholder farmers. Additionally, to ensure that as much of the increased output goes to the market as possible, Mayani has invested in cold chain logistics and even established the first Internet-of-Things (IoT)-powered cold facility in the Philippines to reduce percentage of produce loss. This helps to maximise the returns that smallholder farmers can obtain.

Through adopting a B2B partnership model, Mayani obtains supplier agreements from major F&B and retail corporates in the Philippines. Subsequently, Mayani then puts in purchase orders to farmers, cooperatives and associations (FCAs), and helps them to consolidate volume at point of harvest and fulfill supply. Mayani also lends the farmers better agricultural inputs, such as seeds, feed, soil conditioners and organic fertilisers, to help boost yield and increase tonnage per hectare. By harnessing the power of offtake agreements, Mayani can persuade farmers to adopt practices that they would have otherwise not considered, such as the Good Agri Practices certification; and unlock higher productivity and therefore, higher incomes.

> “The most appropriate entry point to effect immediate and tangible impact is to provide them (the smallholder farmers) a stable pathway to market.”
>
> **JT Solis, Co-founder and CEO, Mayani**

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Foodmap – Adopting a Business-to-Consumer (B2C) Approach

As one of the largest agro-produce e-commerce platforms in Vietnam, Foodmap seeks to empower farmers and small agri-businesses through technology and unlock the value of Vietnamese agro-products for the global market. To date, Foodmap has onboarded more than 200 suppliers and more than 1,000 stock-keeping units (SKU) to their platform, as well as established strategic collaborations with other major platforms such as Lazada, Shopee, TikTok, GrabMart and Alibaba. By connecting farmers to consumers, Foodmap is able to establish a widespread offtake channel and allow farmers to earn income through direct sales.

Separately, Foodmap also helps farmers to create their own brands and transform their specialty produce into consumer-friendly goods, including elements such as attractive packaging, traceability, and compelling brand stories. This helps farmers to unlock new consumer segments, such as the rising middle class and sell at a premium price. Additionally, Foodmap operates their own logistics, warehousing, and distribution arm to support their multi-channel sales platform. This enables farmers to tap onto their service to fulfill customers' orders, either through last mile delivery or drop-shipping, and optimise their sales through e-commerce.

> "If you don't sell for the farmer, the relationship that you build with them will not be sustainable."
>
> **Tung Pham, Founder, Foodmap**

IV. Building capacity

Smallholder farmers can be viewed as entrepreneurs running their own businesses. **Providing support for these smallholders to build their skills, sharpen their business management abilities, and develop their understanding of industry stakeholders can go a long way in helping them to operate their businesses more effectively.**

In addition, agricultural cooperatives can serve as key vehicles for smallholder farmers to increase their negotiating power as a group and achieve economies of scale. Cooperatives can also act as conduits for the dissemination of information regarding new farming practices and trends as well as represent smallholder farmers within their communities to policy makers and financiers. Capacity building and the improvement of governance structures within these cooperatives is vital to ensure that local communities are well equipped to perform their important role.

Gates – United Nations ESCAP Inclusive Agri-Business Initiative – Enhancing the role of agri-SMEs

Recognising that the agriculture sector is intrinsically linked to wider society, the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) noted the importance to effectively support agricultural development that brings value for smallholder farmers. However, previous approaches to agricultural development were traditionally driven by governments and often directed only at farmers. There is merit in situating the role of businesses within these approaches, where the right business models can bring value to the agricultural sector and generate profits while creating above-market-rate income opportunities for smallholder farmers.

Therefore, in collaboration with the Gates Foundation, United Nations ESCAP launched the "Regional Inclusive Business Models in Agriculture and Food Systems" initiative in India, Thailand, and Vietnam. The programme aims to accelerate the adoption of innovative business models and promote inclusive agricultural transformation through improving access to technologies, services and platforms. The programme seeks to create above-market-rate income opportunities and access to affordable goods and services for marginalised groups, and support governments to deliver low-cost essential services that lift people out of poverty at scale. This is done through (i) capacity-building of firms, (ii) policy support, (iii) facilitation and partnerships, (iv) evidence generation and (v) knowledge transfer.

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Fairventures Social Forestry – Building capacity of co-operatives[a]

Fairventures Social Forestry ('Fairventures') is a smallholder focused agroforestry developer that aims to establish stable mid-to-long-term offtake agreements for smallholder farmers through demand trends analysis and identification of higher-value crops. In doing so, smallholders can reduce their reliance on middlemen, who typically tend to focus on shorter run demand. In response, Fairventures intends to address the widespread dysfunction in many cooperatives, where poor management, lack of working capital, and entrenched personal interests of middlemen hinder progress.

To achieve this, Fairventures seeks to improve the ability of both timber and non-timber forest products co-operatives as a coordinating organization. This includes ensuring that there is a capable like-minded leader helming the group, gap and improvement analysis within the co-operative as part of Fairventure's due diligence, installing management structures targeting the key gaps identified, and implementing proper organizational structure, operation procedures and financial systems based on Fairventure's standard pillars. An ideal co-op, according to Fairventures, is one that oversees at least 200 hectares of farmland, which equates to around 100+ smallholder farmers.

Mutual trust between farmers and Fairventures is essential for the success of the partnership - farmers trust Fairventures as they are able to provide guaranteed offtakes, and Fairventures puts trust in farmers to sell to them at harvest. Fairventures also drafts customised planting plans and ideal agroforestry designs on an individual smallholder farmer basis, which includes a system of intercropping and tracking the growth in farmer's income and targets for carbon sequestration. Their collaborative approach pursues the dual objectives of improving the livelihoods of smallholder farmers and contributing to carbon sequestration efforts. This synergy thrives through a collaborative model that integrates foreign capital and expertise with local knowledge and fosters an agroforestry system that balances economic growth with environmental sustainability.

Fairventures has developed three partnerships with cooperatives over the last 18 months and sees significant opportunities to add new partnerships in the coming years. Fairventures' focus is in Indonesia.

> "Bringing stable market access to the co-ops plus enabling its members (the smallholder farmers) to become climate resilience through implementing agroforestry systems that we design together - that is where we believe we can make the difference. We believe it's all about trust and showing that we consistently pay fair and stable prices for the products of the smallholder farmers."
>
> **Paul Schüller, Chief Executive Officer, Fairventures Social Forestry**

a For simplicity, co-operatives may refer to a farmer group, a joint farmer group or a cooperative in this text.

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Jollibee Group Foundation – Partnering smallholder farmers throughout the value chain

Jollibee Foods Corporation (also known as the Jollibee Group) has a huge demand for agricultural products and a long-term interest in ensuring sustainable agriculture, from both the supply chain management and business continuity perspectives. To that end, Jollibee Group prefers to procure directly from sources to ensure that the freshest ingredients are used – in the context of the Philippines, this means buying directly from smallholder farmers.

However, the Jollibee Group is also cognisant that smallholder farmers, given their lack of scale, volume, and sometimes business acumen, are often not ready to face institutional buyers on their own. Hence, they tend to rely on middlemen such as traders as their end buyers. As a big corporation, it was also challenging for the Jollibee Group to buy directly from farmers given the complex management and coordination required. This is where the Jollibee Group Foundation stepped in and helped upskill smallholder farmers, building their collective capacities to meet the quality requirements to supply institutional buyers like the Jollibee Group. Thus, the Farmer Entrepreneurship Programme (FEP) was launched in 2008.

Adopting the agro-enterprise clustering approach, the Foundation dedicated the first ten years to train smallholder farmers so that they could turn their farming into enterprises that supply institutional markets. Post-pandemic, and in a bid to seek scale, they also partnered with Xavier University Ateneo de Cagayan to expand the training programmes on agro-entrepreneurship for inclusive value chains through 'training the trainers' where they provide upskilling

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> "The Jollibee Group has built their sustainability agenda around the three pillars of Food, People, and Planet. One of the focus areas under people is farmers livelihoods, which underscores our commitment to support smallholder farmers. In the Philippines, the farmers are very much part of the marginalised sector and are among the poorest. We know that they need (access to) markets, and the company (Jollibee) is in need of raw materials. Jollibee Group Foundation's programme (FEP) was set up to help farmers."
>
> **Joanna La'O, Programme Director, Jollibee Group Foundation**

to local partners and farmers who can organise and coordinate among their communities. The Foundation also established partnerships with the Department of Agriculture at both local and national levels to further scale FEP and benefit more smallholder farmers throughout the Philippines. As of 2023, FEP has engaged around 4,700 farmers; and among whom, over 1,000 farmers deliver directly to the Jollibee Group. Around 11.2 million kilograms of vegetables have been delivered since the start of the programme, equating to around US$8.85 million worth of sales for the farmers alongside better skills and knowledge obtained.[29]

29 Grow Asia (2022): Jollibee Foods Corporation - A Case Study on Responsible Investment into Farmer Entrepreneurship in the Philippines

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Choosing where to act

Southeast Asia's agriculture sector holds deep potential to help tackle urgent challenges in food security and climate resilience. Yet, despite the clear and significant role that the sustainable transformation of agriculture will play in reducing the region's emissions, investor attention has often been directed elsewhere.

Over the last decade, approximately 70% of investments in Southeast Asia went into the mobility sector, which accounts for only 13% of emissions. In contrast, the agriculture, food, and land-use spaces, which contribute more than a third of the region's emissions, continue to be overlooked. Though impactful solutions for agriculture already exist, more must be done to ensure that efforts and resources are directed toward these high-impact areas.[30]

This gap between effort and impact can be addressed easily. To help provide a more precise identification of key sources of carbon emissions, Wavemaker Impact created the Carbon Maps. These are data-based tools that provide investors with insights on primary sources of carbon reductions and consequently, ways to select key investment opportunities that can provide the most impactful contribution toward emissions reduction.

approximately **70%** of investments in Southeast Asia went into the mobility sector, which accounts for only 13% of the region's emissions

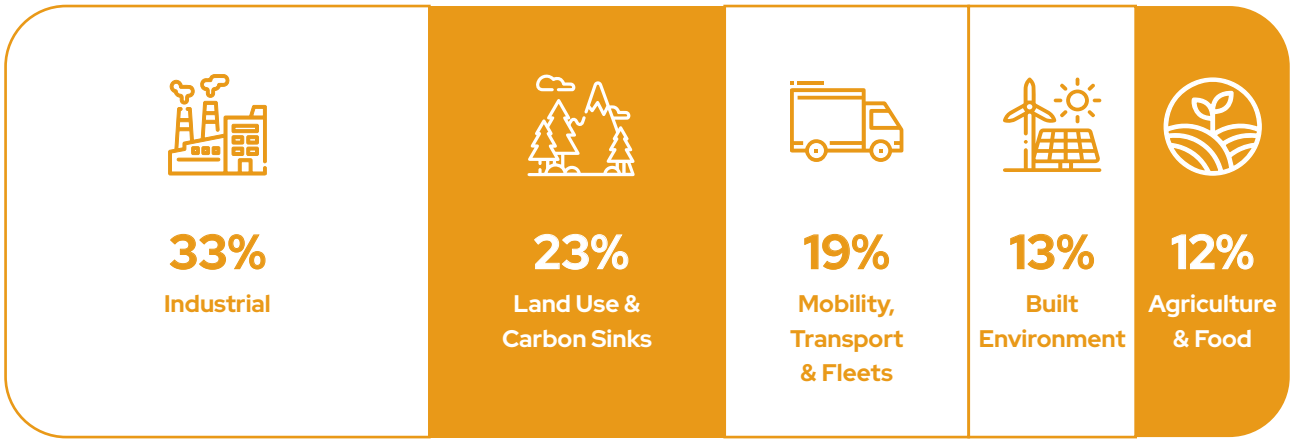

Diagram 4: Distribution of emissions across Southeast Asia

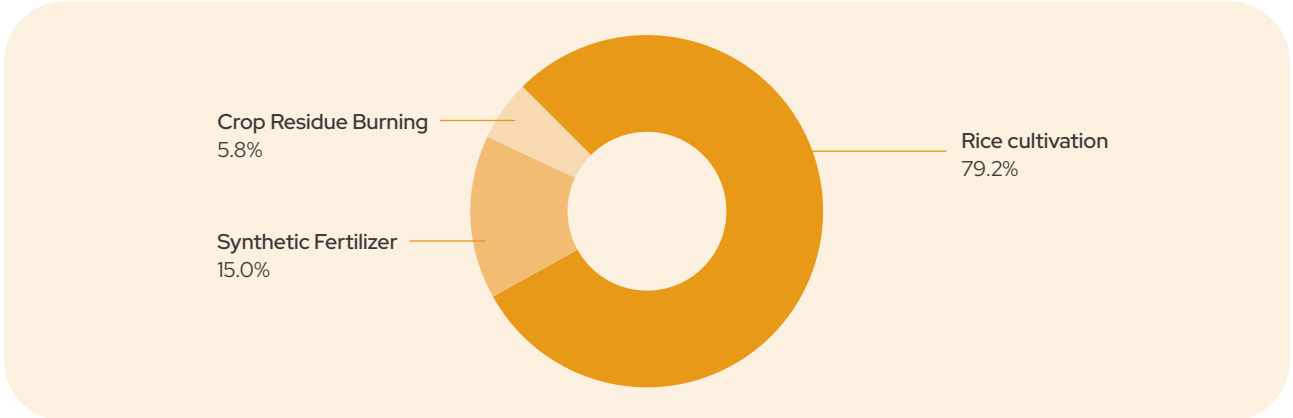

Diagram 5: Carbon Map showing emission breakdown by crop activities

30 Wavemaker Impact's Carbon Maps

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There are three primary sources of emissions in the food agriculture sector, namely crop cultivation, the rearing of livestock, and land use and land-use change. Collectively, these three areas are responsible for close to 1.4GtCO_2 in associated emissions in Southeast Asia.

I. Crop Cultivation

As shown from the Carbon Maps in Diagram 5, close to 80% of the greenhouse gas (GHG) emissions in Southeast Asia come from crop cultivation, more specifically rice. Rice is a crucial staple in Southeast Asia, providing approximately 50% of the region's caloric intake, but growing rice remains a carbon-intensive process. As shown from the Carbon Map in Diagram 5, close to 50 million hectares of land are currently being used for rice cultivation in the region, with Indonesia, Thailand, and Vietnam continuing to lead in amount of rice cultivated overall. Given the scale of rice production in the region and the outsized emissions it generates, solutions to decarbonise rice cultivation in Asia are vital.

II. Land use and land-use change

Land use and land-use change also makes a substantial contribution to emissions in Southeast Asia. As illustrated in Diagram 6, the conversion of forests to farmland and the loss of organic carbon within soils are the two largest contributors to emissions among land use and land-use change practices and outcomes, accounting for 37% and 59% of emissions respectively.

Hence, the key consideration for solution providers looking to make a meaningful impact in the space is whether their solution can either mitigate, or more ambitiously, reverse the effects of forest clearing and soil degradation. Established and effective interventions do exist, ranging from various methods of regenerative agriculture to intercropping, a process where two or more crops are cultivated concurrently on a single piece of land. For example, woody crops like coconut or rubber can help improve the amount of carbon fixation in a plot of land.

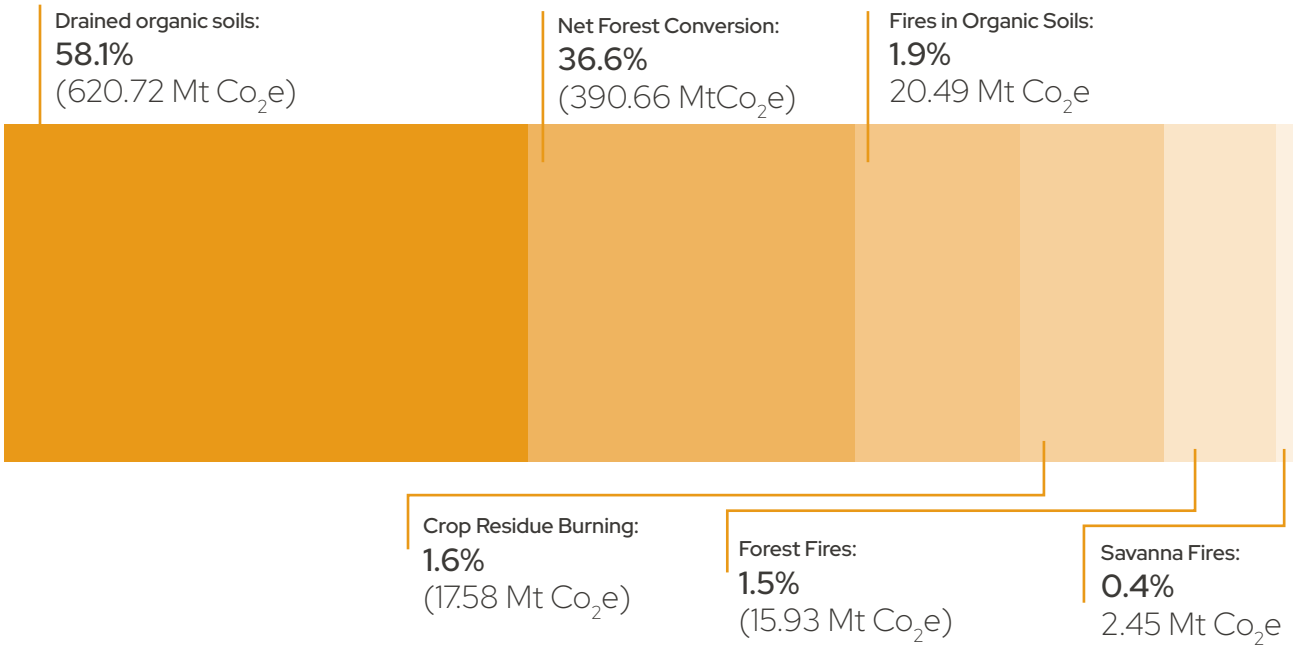

Diagram 6 - Carbon emissions from land and land-use change

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III. Livestock

After crop cultivation and land use and land-use change, livestock emissions form the third major bucket of emissions in the region. As seen in Diagram 7 below, the rearing of beef and dairy cattle accounts for approximately 60% of all livestock emissions globally.

By segmenting emissions according to the livestock lifecycle, it becomes clear that close to 44% of all livestock emissions (3.5 $GtCO_2e$) comes from enteric fermentation, a natural process that occurs in the digestive systems of ruminant animals such as cattle, sheep, goats and buffalo, which generates methane as a by-product (see Diagram 8). According to the ASEAN Statistical Yearbook 2022, in 2020, chicken is the only livestock that saw a decrease in growth rate (-2.3%), as opposed to all other livestock (see Diagram 9). Ruminant animals, especially cattle, on the other hand grew by around 2-3% across all categories. Given the significant emissions arising from enteric fermentations, solutions that address cattle feed have the potential to make the greatest impact in emissions reduction globally.

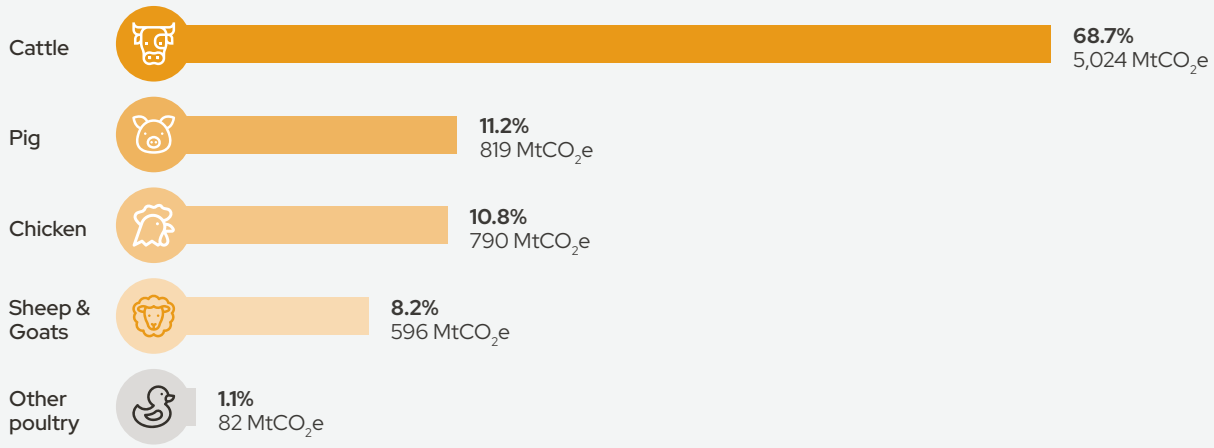

Diagram 7: Top five sources of livestock emissions by animal group

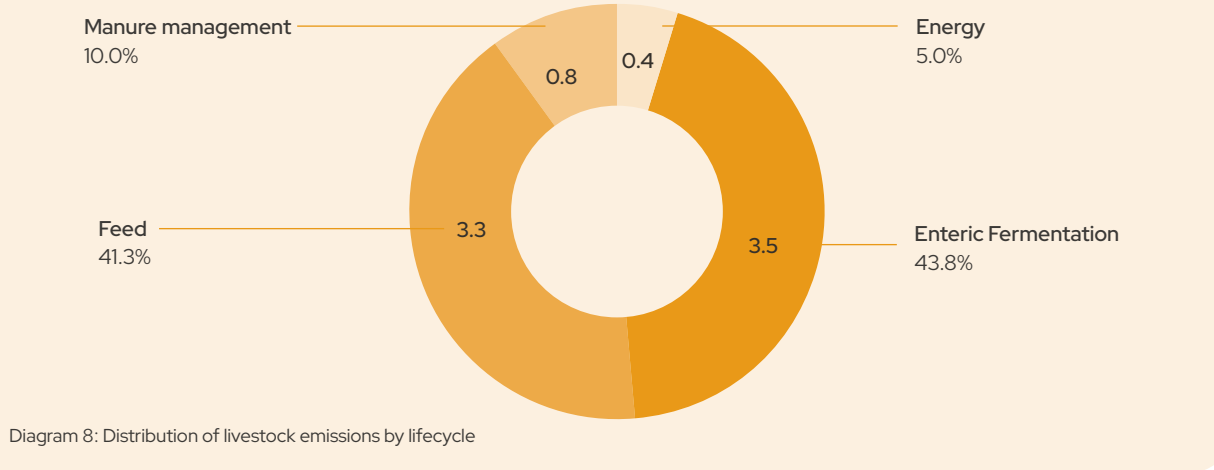

Diagram 8: Distribution of livestock emissions by lifecycle

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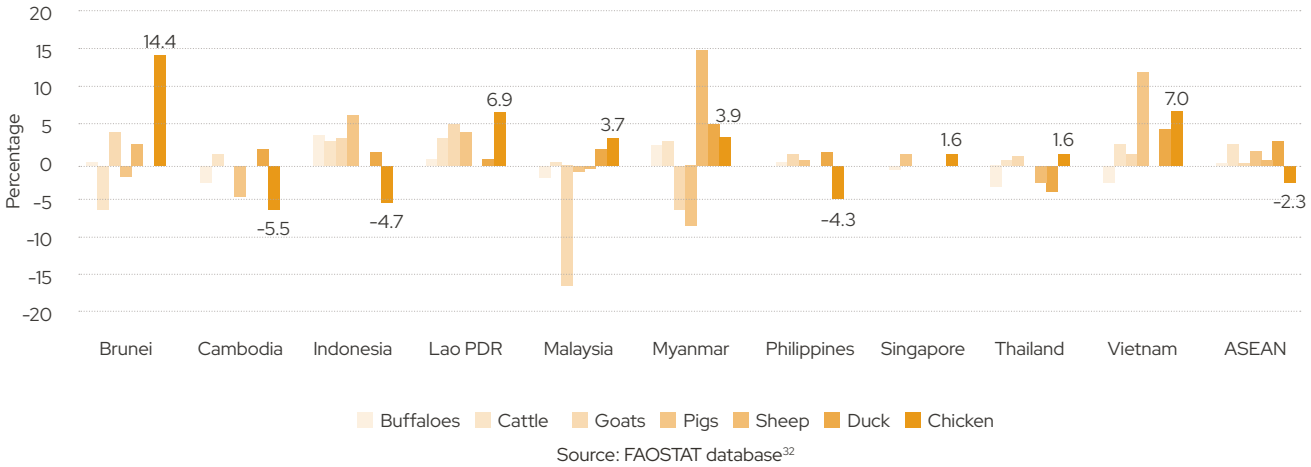

Source: FAOSTAT database[32]

Diagram 9: Growth rate of livestock and poultry population in ASEAN, 2020

These examples are but some examples of how Carbon Maps developed by Wavemaker Impact, leveraging existing data from various international organisations, can serve as powerful tools to guide key stakeholders in the agriculture space toward active intervention in areas that can lead to higher emissions reductions.

Wavemaker Impact's Carbon Maps

By identifying key sources of emissions in the region with data from various international organisations, Wavemaker Impact's Carbon Maps can serve as a powerful tool in helping key stakeholders choose where to act. Funders looking to provide strategic solutions for challenges in Southeast Asia can tap on such materials to deploy their resources effectively, ensuring each intervention ensures agricultural stability and contributes positively to addressing climate change. Mapping high emissions areas such as crop cultivation, land use and land-use change, and livestock can empower stakeholders to allocate efforts and capital precisely where they will have the most meaningful, scalable impact in emissions reduction.

32 The ASEAN Secretariat (2022): ASEAN Statistical Yearbook 2022

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Investing with Impact at the Core

Beyond identifying where to invest, the fundamental consideration for deployment of capital is to ensure that there is a **clearly defined mandate and an intention for impact**. Funders need to bear in mind the unique context of Southeast Asia and connect with smallholder farmers to identify and understand how their investments directly affect change on the ground. Additionally, **having impact at the core of decision making will allow organisations to prioritise where, and how, to allocate funding clearly.** It is crucial to develop a structured and validated Impact Measurement and Management framework to fully assess the potential returns – both in financial and impact terms – of each investment made. It is also essential to measure outputs and outcomes, as well as how both are linked to each other. The measurement of positive and negative outcomes can be applied to tweak business models or adjust investment strategies accordingly.

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ABC Impact – Unwavering commitment creating and scaling positive impact

Adopting a proprietary impact measurement and management framework, ABC Impact carefully evaluates and quantifies the potential impact of every investment, and monitors and tracks progress against the plan comprehensively post-investment. ABC attributes key importance to validation of founders' impact intention through a holistic diligence process, which includes in-depth conversations with the founding team and primary and secondary research on the impact the business is driving. ABC's due diligence helps determine the impact and financial metrics that the fund tracks, post-investment, to ensure the company is fulfilling the thesis and achieving its targets.[33]

For example, ABC Impact invested in India-based AgTech Cropin in 2021, driven by the impact thesis that Cropin would improve the productivity and livelihoods of smallholder farmers and drive greater efficiency in agriculture supply-chains. Cropin has been guided by its mission to digitise the agriculture sector and improve the efficiency, productivity, predictability, and sustainability of crop value-chains for agri-businesses. Cropin takes a farmer-centric approach in its solution design, providing field management and technical assistance on agricultural data to farmers using geo-tagging, analytics, and data science tools. With ABC Impact's investment, Cropin launched its Cropin Cloud solution, a multi-tenant, scalable, flexible, and intelligent cloud platform, in 2022. Cropin Cloud helps to increase the climate resilience of crop supply through advisories on climate and adaptive farming practice, informed by its data intelligence and predictive analysis approach.

ABC Impact tracks Cropin's impact across several metrics, namely the number of farmers - especially smallholder farmers - benefitted globally, the number of farmers leveraging advisory for better farming practices, and the number of farms digitised. Additionally, their Impact Measurement and Management process is designed to create a feedback loop that benefits both the fund and its portfolio companies. Through systematic monitoring, ABC Impact ensures that companies meet their stated objectives and identify early signals of business shifts. The firm also conducts tailored studies to develop a ground-truth understanding of outcomes, strengthening their decision-making and providing investees with actionable insights by capturing the needs and experiences of target consumers. For example, a survey conducted for smallholder farmers associated with Cropin in India revealed that 78% of the farmers lived in the bottom 60th percentile of the country. Following the adoption of Cropin's services, these farmers experienced a 31% increase in yield and a 38% increase in income.[34] Since ABC Impact's investment in Cropin, they have been able to empower more than 7.9 million farmers across Asia to date.[35]

33 CIIP (2022): ABC Impact & Kim Dental - Safeguarding Impact Commitment through Strong Management and Accountability
34 Based on survey undertaken by 60 Decibels in 2021
35 ABC Impact (2024): Portfolio Highlights

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Breaking the Cycle through Cross-Sector Collaboration

Creating tangible change in sustainable agriculture requires partnerships across sectors, and there is a role for all actors along the spectrum of capital to play a part. In closing the financing gap, new opportunities can be unlocked too - sustainable agriculture has huge business potential, where it is estimated that the market will grow to almost US$22 billion by 2028.[36] According to the Rockefeller Foundation, as much as US$4.5 trillion, or 13x returns on the costs of investment, and significant cost savings in reducing damages to people and the planet can be obtained.[37]

There is **strong demand for practices and models that are good for the triple bottom lines of people, planet, and profit**. The role of intentional and catalytic capital, such as blended finance, unites stakeholders across the private, public, and philanthropic sectors to align on shared goals, manage risks, and scale solutions tailored to each community's unique conditions. These partnerships lay the foundation for resilient and productive agricultural systems and enable smallholders to strengthen their practices and thrive amid evolving challenges.

Smallholders **need solutions that suit their day-to-day realities and are attuned to specific markets, as well as collaborative partnerships that create market-specific interventions such as customised solutions or build capacity of local talent**. Solutions must be adaptable to diverse crops, landscapes, and socioeconomic contexts too. Tailored capacity-building efforts help farmers adopt practices that stick and create lasting improvements in productivity and resilience. Additionally, **aligning these solutions with market realities ensures long-term impact** - unlike traditional aid, which can falter due to reliance on continuous funding, market-driven solutions are designed to operate independently and provide ongoing value and create self-sustaining growth within smallholder communities.

There are many ways in which private and philanthropic funders can partner with public organisations to finance the regeneration of our agri-food systems and build smallholder farmer resilience. We highlight three approaches for how different players have partnered to support the transition to sustainable agriculture, through innovative and targeted financing:

Sustainable agriculture has huge business potential, where it is estimated that the market will grow to almost **US$22 billion by 2028**

I. Investing in data-driven research

While Southeast Asia has made progress in strengthening its agricultural research and development capacity, regional agricultural research spending has remained stagnant. In fact, spending as a share of agricultural GDP has steadily declined from 0.5% in 2000 to just 0.33% in 2017[38]. Without deepening our data repositories, what we can learn and do will always be limited. Addressing data gaps will be needed to develop more precise and effective solutions and create longer-lasting impact.

The type and depth of data that we have today remains highly limited. In an interview with the Rockefeller Foundation, it was shared that *"While everyone wants to know how to measure carbon sequestration and how to make solutions more affordable, if measurement, reporting and verification is not managed well, it can be seen as greenwashing instead. Separately, current AI algorithms are trained on existing data sets, which are generated from fossil-fuel dependent, traditional farming practices. There is a need to train AI on data from regenerative practices too."*

36 GlobeNewsWire (2024): Sustainable Agriculture Market Projected To Reach $21.95 Billion in 2028, Driven By Environmental Awareness And Demand for Organic Products
37 Rockefeller Foundation (2024): Financing for Regenerative Agriculture
38 ASTI (2020): Agricultural Research in Southeast Asia – A Cross-Country Analysis of Resource Allocation, Performance, and Impact on Productivity

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Silverstrand Capital – Investing in valuing, protecting and restoring natural ecosystems

Silverstrand Capital is a Singapore-based family office with an investment mandate to create biodiversity positive impact and enable a world where nature is valued intrinsically, conserved, and restored at scale. Their investment portfolio in Southeast Asia includes Singapore-based climate-smart farming solutions provider, Agros, and leading Indonesian AgTech company Koltiva, which provides traceability solutions.

In 2021, Silverstrand anchored an investment in US-based Mad Agriculture's Perennial Fund to support farmer's transition from conventional agricultural practices to more regenerative ones. Working with mission-aligned farmers in the US, the Perennial Fund provides debt capital to farmers who are looking to transition to regenerative practices. In addition to anchoring the fund, Silverstrand also supported the baseline data gathering and analysis costs of the farms under transition with a grant. The study is conducted with third-party researchers, led by Dr. Steve Apfelbaum of the Applied Ecological Institute (AEI) and Dr. Jonathan Lundgren from Ecdysis Foundation.

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II. Supporting market-oriented programmes

International development aid (or foreign aid) has sometimes been criticised for doing more harm than good in emerging markets. Some have raised questions about the sustainability of the design of programmes funded by development aid and the longevity of outcomes achieved after funding stops.

To ensure that development programmes create a lasting impact on the communities they serve, considerations of long-term market forces and the potential to handover to the local market are best taken in right from the start of programme design. When commercial capital takes over and brings solutions forward, changes become sustained by the market and allows funders to be freed up to support other needed initiatives.

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PRISMA - Developing market-led agricultural systems through public-private partnerships

The Australian-Indonesia Partnership for Promoting Rural Incomes through Support for Markets in Agriculture (PRISMA), is a partnership between the Government of Indonesia and the Government of Australia to grow agricultural markets in rural Indonesia. Since 2013, PRISMA has been partnering with businesses and governments to remove market barriers, introduce product and production innovations, address food security, and reduce poverty.

To do so, PRISMA partnered with private and public sector market actors to increase farmers' access to productivity-enhancing inputs, know-how, and services. The aim is to increase farmer incomes and resilience to climate change and market shocks.

For example, to enhance access to finance for agri-kiosks and SMEs that support smallholder farmers, PRISMA partnered with the local AgTech company Semaai. This collaboration enabled Semaai to offer alternative input supplies through its e-commerce platform. The partnership focused on the development of a digital advisory service and a flexible payment feature, achieved through:

- Conducting product research, development, and impact measurement for the agri-advisory and flexible payment features.
- Promoting these features to agri-kiosks.
- Facilitating connections between Semaai and other stakeholders to support business expansion.

As a result of this partnership, Semaai increased its transaction value by 82%. Additionally, 8,900 farmers benefited from improved agricultural practices and access to higher loans from agri-kiosks. Moving forward, Semaai plans to maintain and enhance both features, expanding the variety of content in the agri-advisory service and offering more financing options within the flexible payment feature.

The market systems development (MSD) approach PRISMA uses, does not deliver solutions directly, it introduces pro-poor innovations through the market, with the expectation that if the innovation is relevant, market forces will sustain the change. The approach is analytical and relies on rigorous measurement; it starts small, tests, and then scales up; and is based on economic partnership and incentives. The private sector partner will continue to invest in the long run, because it is in their commercial interests to do so. The private sector partner has a stake in and ownership of solutions and is likely to continue investing after aid support has ceased.

Eleven years on, PRISMA has enabled more than 1.45 million smallholder farming households to have access to and greater use of innovations. PRISMA forged 273 partnerships that has resulted in AUD 280 million in investment by the private sector and farmers, resulting in a revenue increase of AUD 32.9 million. For PRISMA, commerciality is sustainability, and the impact of the investments will be felt for years to come.

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III. Using blended finance to bring together multiple stakeholders

Organisations are increasingly looking at creating new financial structures and blending of finance across the capital stack to allow diverse stakeholders to pool their resources together and support a common outcome. According to Convergence, the global network for blended finance, 236 agriculture deals (21% of the overall market) with a total deal volume of $17.9 billion (8.4% of overall aggregate financing) and a median deal size of $20 million were recorded between 2014-2023. However, there is still potential for agriculture sector to perform better through aggregation plays that pull larger investors into the space.[39]

To support the success of collaborations, blended finance structures can be a means to bring together the different mandates, risk tolerance and investment horizons that stakeholders come to the table with. Blended finance can be a way to make projects more favourable to investors and has the potential to mobilise much more of the needed capital to underfunded areas of greatest needs.

39 Convergence (2024): State of Blended Finance

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Temasek Foundation and Abler Nordic – Partnering through blended finance to cultivate sustainable palm oil

Many of Indonesia's smallholder oil palm plantations are older than 25 years, and desperately need to be replenished to help boost output. According to the Indonesian Palm Oil Board, it is estimated that the country's output of tropical oil is expected to be flat this year, or worse, as much as 5% lower compared to the year before.[40] For the world's largest producer of palm oil, this dip in productivity is both an urgent concern, and a timely opportunity to redesign existing plantations to improve productivity, implement more sustainable practices and plant better oil palm trees.

However, sustainable replanting using quality inputs is often costly at around US$5,000 per hectare, which is beyond what smallholder farmers can typically afford. Due to lack of ownership through legal land titles, farmers are unable to access public or private funding schemes. Furthermore, agriculture loan interest rates of more than 20% prevent farmers from obtaining traditional means of financing. The inability to finance sustainable replanting – despite the growing pressure to do so as global regulations on deforestation and traceability kick in – cause smallholder farmers to resort to encroachment and unsustainable land clearing to establish new plantations and cope with demand.

In recognition of the urgent need to support Indonesian smallholder farmers, and to seize the opportunity to imbue sustainable, regenerative agricultural practices, Temasek Foundation paired up with Abler Nordic, a public-private investor in building financial inclusion in Africa and Asia, to pilot a public-private-philanthropic blended finance model to make sustainable oil palm replanting accessible for all, while positively impacting both people and planet. Other key partners in the project include PlanB, an institution that actively promotes social, economic and environmental change and Abler Nordic's implementation partner, leading sustainable palm oil producer Musim Mas, supply chain traceability AgTech company Koltiva, Indonesia-based digital bank Amar Bank, climate and resilience coalition The Livelihood Funds, and global development partner SNV Netherlands Development Organisation. The partnership intends to support smallholder farmers comprehensively, from the provision of accessible and affordable loans, to training and capacity building and legalising land titles, to ensuring long-term offtakes of oil palm fruits.

40 The Business Times (2024): Indonesian palm oil output set to fall on dry weather, old trees

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Conclusion

This is your invitation to co-create the sustainable growth of Southeast Asia.

From its inception, this report sought to highlight the intricate interplay of both social and environmental issues faced by Southeast Asia's agriculture sector today, highlight innovations and practices crucial to achieving a sustainable and equitable food system, as well as outline the role of different sources of capital to fund impactful businesses. **Smallholder farmers remain at the heart of the region's agricultural sector**. Yet they remain uniquely vulnerable to the wicked problem of intersecting structural challenges, such as fragmented farms, ageing farmer communities, land degradation, barriers to financing, and the growing impacts of climate change.

What we have sought to demonstrate through this report is that **many compelling, effective, and contextually sound solutions do exist today and are each working to address different elements of this wicked problem**. Addressing the dual goals of regenerating our food systems and improving the resilience of smallholder farmers in the region is not impossible, and there are successful models and ready solutions already available. What is missing is intentional and targeted financing to enable adoption of solutions at scale and the creation of greater impact across the region.

Catalytic financing from across the spectrum of capital, including the private, public, and philanthropic sectors, is crucial to supporting the development and growth of key solutions that cater to specific, day-to-day needs and ground challenges that smallholder farmers face. To help to address the core wicked problem that smallholder farmers face, diverse stakeholders can provide key financial support in the forms of **blended finance projects, support for market-oriented programmes, and investments in data-driven research**.

By centring on the needs and lived experiences of smallholder farmers, **catalytic financing can help to break through the vicious cycle that many farmers continue to contend with**. To ensure that the regeneration of our agri-food systems is well-funded and that smallholder farmers are well-supported, all stakeholders would need to cooperate and commit to collective action.

Together, we can create a sustainable tomorrow for all.

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Centre for Impact Investing and Practices

The Centre for Impact Investing and Practices ("CIIP") was established in 2022 as a non-profit entity by Temasek Trust to foster impact investing and practices in Asia and beyond by building and sharing knowledge, bringing together stakeholders in the community, and bringing about positive action that accelerates the adoption of impact investing. CIIP is the anchor partner for the United Nation Development Programme's Private Finance for the SDGs, providing Asia investors and businesses with clarity, insights and tools that support their contributions towards achieving the SDGs. Temasek and ABC Impact are CIIP's strategic partners. For more information, please visit www.ciip.com.sg.

wavemaker IMPACT

Wavemaker Impact is the climate-tech venture build VC fund of Wavemaker Partners. Launched in 2021, Wavemaker Impact co-founds sustainability startups with proven entrepreneurs, with the goal of building a portfolio of companies by 2035 that has the potential to reduce 10% of the global carbon budget. Every startup that Wavemaker Impact builds is a '100x100' company – with the potential to abate 100 million metric tonnes of CO2e and generate US$100 million revenue per year. Wavemaker Impact focuses on building ventures that target the biggest drivers of emissions such as agriculture, energy, industrial processes, built environment, and transport. Its US$60 million debut fund focuses primarily on Southeast Asia and includes limited partners such as the United States International Development Finance Corporation, British International Investment, Triple Jump, JG Summit, and Qarlbo Energy. For more information, visit wavemakerimpact.com.

Philanthropy Asia Alliance by Temasek Trust

Philanthropy Asia Alliance (PAA) is a Temasek Trust initiative dedicated to catalysing collaborative philanthropy in Asia through dynamic multi-sector partnerships. By harnessing collective strengths, PAA multiplies impact, accelerates positive change, and takes urgent action to address the pressing environmental and social challenges of our time. PAA's flagship programme is the annual Philanthropy Asia Summit. For more information, visit http: http://philanthropyasiaalliance.org

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