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<i>prepared by</i>	Dr Brad Granzin (Australasian Dairy Consultants Pty Ltd)
<i>co-authors/ contributors/ collaborators</i>	Foodlink Advocacy Co-operative; PT Mitra Asia Lestari; Roberto Acosta
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- Anton Simon Palo and Mercy Rosetes from Foodlink Advocacy Co-operative;
- The 14 organisations and their representatives who participated in our interviews.

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- Ms Mirah Nuryati, ACIAR Country Manager, Indonesia;
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- The 10 organisations and their representatives who participated in our interviews.

Australia:

- Mr Howard Hall (Research Program Manager, Agribusiness, ACIAR);
- Professor Wendy Umberger, University of Adelaide.

2 Executive summary

The evolution of inclusive business models and market-based approaches has become a key strategy for smallholder development initiatives globally, with strong evidence justifying their investment. In both Indonesia and the Philippines, the private sector plays an integral role in dairy value chains, with many of these including smallholders. The private sector has the resources, expertise, networks and operations to potentially deliver sustainable market-based interventions to address many of the challenges and opportunities limiting the development of smallholder dairy inclusive value chains. Many have considerable influence on government policy while others offer new innovation and technology. They also offer greater flexibility than the public sector, with an ability to respond and intervene more quickly. Given this, engaging with the private sector early when developing smallholder inclusive projects offers scope for improved outcomes and sustained impact.

AGB/2021/124 '*Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy (SHD) sectors of Indonesia and the Philippines (South-east Asia Dairy - SEAD)*' is currently in development, with the view to initiating in-country activities in mid-2023 subject to funding approval.

At the time of commencing this project, we had identified a number of key interventions within SEAD to address a range of technical and supply chain opportunities and constraints. Overcoming poor milk quality, low cow and farm productivity, lack of supply chain cooling infrastructure, poorly functioning markets, and poor access to quality support services are all opportunities to grow SHD value chains. Ramifications of growing policy and consumer focus on greenhouse gas emissions also need to be considered.

Integral to the implementation and sustainability of many of these interventions will be market-based approaches supported by private sector partnerships. It was this project's primary purpose to research and initiate these partnerships, being cognisant of significant changes in the operating landscape of dairy supply chains in both countries. It was also the purpose of this project to re-engage with past collaborators in the previous IndoDairy and Philippine projects, as well as decide on the geographical location of SEAD on Java.

The operating environment in the Philippines has had little change since the conclusion of our research in 2021 (Philippine SHD Landscape Analysis), with Covid-19 still impacting some value chains. In contrast, Indonesia has experienced some major challenges since the conclusion of our on-ground activities in 2020, with the Foot and Mouth Disease (FMD) outbreak in May 2022 causing a decline in milk supply of up to 50% in some supply chains. From an operational perspective, the establishment of the National Research and Innovation Agency (BRIN) has and will cause challenges to establishing SEAD on Java. These changes in the Indonesian landscape have seen interventions added to SEAD to support with FMD recovery with a focus on re-establishing herds and nutrition.

Through a combination of online research and a series of face-to-face meetings, the project team has identified a number of commercial entities who SEAD could partner with going forward.

In the Philippines, Alaska Milk, Samahang Maggagatas NG Batangas Co-operative (SAMABACO), and a secondary co-operative Katipunan ng Mga Kooperatibang Maggagatas Inc (KKMI) all shared SEAD's purpose of growing the participation and profitability of SHDs in value chains. Addressing milk bacterial contamination and improving farm productivity were common themes that arose from consultations. An additional intervention arising from the mission was the poor longevity of imported heifers from Australia. Reasons why some Philippine private entities were excluded as potential collaborators included their milk supply strategies being focussed on large scale commercial farms, varying perspectives regarding the performance of Philippine government SEAD collaborators, a lack of willingness to change, a focus on policy

intervention through advocacy, or their businesses fell outside the geographical scope of SEAD.

In Indonesia, there was great intent from all private entities we met to collaborate on FMD recovery, with a focus on rebuilding herds and herd health. Other aligned interventions included improving milk quality, farm productivity (particularly herd feedbase and nutrition) and reducing greenhouse gas emissions. The private entities that offered the greatest scope for collaboration, primarily driven by their track record in either supporting SHD farmers directly or collaborating in past projects were Cimory, Nestle and Frisian Flag (FFI). Some reasons why some Indonesian private entities offered poor scope for collaboration included their focus on receiving direct aid (as opposed to the co-investment in intervention R&D), falling outside the geographical scope of SEAD or their ongoing commitments to other collaborations.

This project also completed its objective of re-establishing linkages formed during IndoDairy with Institut Pertanian Bogor (IPB), noting that some past project partners Indonesia Centre for Animal Research and Development (ICARD) and Indonesian Centre for Agricultural Socio-Economic and Policy Studies (ICACEPS) have been absorbed into BRIN. We are also of the conclusion that the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD), University of the Philippines Los Baños (UPLB) and Universitas Diponegoro (UNDIP) will be excellent SEAD collaborators moving forward.

While the objectives of this project have been achieved, there are some recommendations for consideration for future commercial engagement projects funded by ACIAR:

- Private entities operate in a volatile environment, which is generally in a state of flux for many. Their priorities can change quite quickly. Although an extreme example, the FMD outbreak in Indonesia is an example of how a landscape can change dramatically and as such will change the farm development focus and investment of the private sector very quickly. While ACIAR is required to ensure projects are well designed and an appropriate spend for government funds, long project approval processes do not sit well with investment decisions in the private sector;
- While online research provides some overarching background and track record regarding the potential of a private sector to collaborate, any screening must include field visits and an initial meeting of in-country consultants. There is much to be gained from the body language, attitude and tone of meetings;
- Private sector partners will not necessarily invest in projects that may potentially advantage a competitor. While this is understandable, it does create an issue for a funder such as ACIAR who is focussed on shared outcomes across SHD value chains, not projects that only benefit some. Managing these expectations very early in private sector collaborations is important.

3 Abbreviations

ACIAR	Australian Centre of International Agricultural Research
ADC	Australasian Dairy Consultants
Alaska	Alaska Milk Corporation
ARISA	Applied Research and Innovation Systems in Agriculture
AUD	Australian Dollar
BADACO	Batangas Dairy Cooperative
BCA	Benefit cost analysis
BRIN	National Research and Innovation Agency
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCS	PT Diamond Cold Storage
DTRI	Dairy Training and Research Institute
DVF	Danillo V. Fausto
ESL	Extended shelf life
ET	Embryo transfer
FAC	Foodlink Advocacy Co-operative
FFI	Frisian Flag Indonesia
FMD	Foot and Mouth Disease
GHG	Greenhouse Gas
Gol	Government of Indonesia
GoP	Government of the Philippines
IAARD	Indonesian Agency for Agricultural Research and Development
IA-CEPA	Indonesia Australia Comprehensive Economic Partnership Agreement
ICACEPS	Indonesian Centre for Agricultural Socio-Economic and Policy Studies
ICARD	Indonesia Centre for Animal Research and Development
IDEA	Indonesia Dairy Excellence Activity
IDSSC	Indonesia-Denmark Strategic Sector Cooperation
IP	Intellectual property
IPB	Institut Pertanian Bogor
IndoDairy	AGB/2012/099: Improving milk supply, competitiveness and livelihoods in smallholder dairy chains (SHD) in Indonesia.
ISAM	Industri Susu Alam Murni
KKMI	Katipunan ng Mga Kooperatibang Maggagatas Inc
KUD	Koperasi Unit Desa
MAL	PT Mitra Asia Lestari
MCP	Milk Collection Point
NDA	National Dairy Authority
NGO	Non-Government Organisation
3-NOP	3-nitrooxypropanol

PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
Philippines LSA	AGB/2020/120: Philippine's smallholder dairy: Landscape analysis and research priorities
PSE	Private sector engagement
R&D	Research and Development
RD&E	Research, Development and Extension
RFC	Royal FrieslandCampina
RTD	Ready to drink
SAMABACO	Samahang Maggagatas ng Batangas Cooperative
SCM	Sweet condensed milk
SEAD	Southeast Asia Dairy
SHD	Smallholder dairy
SIDPI	Sustainable Intensification of Dairy Production in Indonesia
SMDF	Sta. Maria Dairy Farm, Inc
SME	Small medium enterprise
SSL	Short shelf life
TPC	Total plate counts
UHT	Ultra-high temperature
UNDIP	Universitas Diponegoro
UPLB	University of the Philippines Los Baños
USD	United States dollar
WMP	Whole milk powder
YFA	Young Farmer Academy

4 Background

Research Concept Note AGB/2021/124 (*Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines*) was approved during July 2021. This project has been named South-east Asia Dairy (SEAD).

A full proposal is currently in development, for a five-year project due to commence in mid-2023 subject to approval. AGB/2021/124 is the culmination of two previous ACIAR projects:

- AGB/2012/099: *Improving milk supply, competitiveness and livelihoods in smallholder dairy chains (SHD) in Indonesia (IndoDairy)*; and
- AGB/2020/120: *Philippine’s smallholder dairy: Landscape analysis and research priorities (Philippines LSA)*.

For the SHD sectors in both countries, there is an opportunity to increase their participation in value chains to service emerging domestic markets. These chains will likely be based on chilled short shelf life (SSL) dairy products (e.g. fresh milk, drinking yoghurts, immature cheeses and milk for coffee baristas). Quality, consistency and logistically competitive milk supply, processing and wholesaling are all required if SHD inclusive supply chains are to capitalise on these opportunities. These improvements however also need to encompass the growing global environmental accountability of dairy value chains, particularly in the context of their carbon footprint. The scoping brief for SEAD has identified a number of key initial interventions across a range of supply chain opportunities and constraints. These include improving farm productivity, product quality and availability, supply chain efficiencies and creating a more conducive enabling environment for SHDs. These interventions are listed below:

Opportunity/constraint	Recommended interventions
Moving from a subsistence small holder dairy (SHD) to a full-time resilient dairy business.	<ul style="list-style-type: none"> • Identify the drivers of change for SHDs who are prepared to grow their business and assist them to identify key management areas to improve profitability. • Introduce farm milk supply incentives that will provide commercial benefits for supply chain partners. • Upskilling SHDs (and service providers) to make (or assist with) improvements on-farm in forage production, quality and utilisation, herd nutrition and health, reproduction and milk harvesting hygiene. • Working with agribusiness and co-operatives to supply more productive, cost-effective milking herd concentrates and commodities. • Model the impact of adverse seasons and climate events and pilot the introduction of farm practices to mitigate risk.
The seasonality of milk supply from SHD limits access to some markets.	Integrate pit silage into SHD feedplans to support all year round milk production. The efficacy of a mycotoxin binder in supplements should also be evaluated to mitigate the risk of aflatoxin contamination of milk.

<p>Poor milk quality results in reduced herd productivity, lower farm gate milk price and reduced market access.</p>	<p>Reduce pathogen contamination by the use of contemporary hygiene practices adapted for SHDs and evaluate on-farm milk cooling technology designed for SHDs.</p>
<p>Lowering the environmental impact of SHDs in tropical systems.</p>	<ul style="list-style-type: none"> • There are a number of interventions that could potentially reduce greenhouse gas (GHG) emissions and consequently reduce the carbon footprint of SHD farms. These include: improving cow productivity; feeding science-based methane reducing additives such as 3-nitrooxypropanol (3-NOP); installation of self-contained solar units as a source of electricity for farm use and milk cooling; integrate effluent into soils as a carbon sink, as well as a source of potassium and other nutrients for forage production. • Pooling carbon offsets from SHDs to deliver a tradable unit with private carbon traders. • Utilising liquid effluent as a nutrient source in hydroponic forage production systems.
<p>Partnering processors with co-operatives and/or SHDs to realise urban market opportunities.</p>	<p>There is market failure to initially develop and broker these business relationships and provide contemporary support and advice whether it be marketing, logistics or technical support on-farm.</p>
<p>Overcoming high transportation costs to urban centres by capitalising on local shorter supply chains.</p>	<p>Develop shorter regional supply chains using communication and support with micro compartmental processing plants.</p>
<p>Servicing espresso coffee outlets with high frothing, low taint milk.</p>	<p>Establish local fresh milk supply chains to service this market opportunity for coffee outlets, but also the hospitality sector.</p>
<p>Poor information about consumer's attitudes towards SSL dairy.</p>	<p>Undertake consumer research regarding SSL dairy products in urban regions and communicate these outcomes to processors, co-operatives and SHDs in regions which can feasibly service these markets.</p>
<p>Advising government regarding branding legislation.</p>	<p>Develop a policy paper for national and regional governments.</p>
<p>Introducing and imbedding contemporary approaches to dairy science development and extension services.</p>	<p>This project would look to continue the strategy from AGB/2012/099 of experimenting with contemporary practice change methodologies, communication platforms and capacity building.</p>

In both Indonesia and the Philippines, the private sector plays an integral role in SHD inclusive value chains. Their resources, expertise, networks and operations have the potential to deliver sustainable, market-based solutions to address many challenges and opportunities relevant to SHD farmers. Many have considerable influence on government

policy while others offer new innovation and technology. They also offer greater flexibility than the public sector, with an ability to respond, intervene and adapt more quickly. Given that milk is highly perishable and suspect to bacterial contamination, chain coordination approaches are integral.

The evolution of inclusive business models and market-based approaches involving the private sector has become a key strategy for small holder development initiatives globally, with strong evidence justifying their participation. They offer a powerful conduit to test and imbed real change in value chains, with the financial backing to replicate and scale-out successful interventions. Integral to their success however is ensuring that small holders are not exploited but can receive an equitable share in higher margins and sales generated from overcoming barriers and bottlenecks in supply chains and acting on market opportunities.

Given this, our research strategy in SEAD will be based on developing partnerships with collaborative and adaptable organisations (private and government) who will engage and/or co-invest (e.g., markets, capital, expertise, technology, opportunities) in interventions. As noted earlier, although we have identified various interventions to date, the choice, design and goals of project methodologies will still need to undergo further diagnosis and development, in consultation with project partners.

SEAD will address a number of research questions:

- What types of commercially viable smallholder inclusive value chain models and coordination approaches will help SHDs gain improved access to critical inputs, services, and training; leading to upgrading in processes (e.g., productivity) and products (e.g., quality, safety, value-adding); and ultimately result in increased SHD profitability?
- How can we scale-up and scale out potentially “successful” approaches and build capacity with industry, policy makers and researchers in Indonesia and the Philippines?

It is planned to address these questions through a number of key objectives. These are listed below:

- Pilot and evaluate inclusive business models and policy strategies to enhance access to inputs, services and higher farm-gate prices for SHD men and women, leading to increased efficiency, profitability and equity;
- Identify and assess commercially viable approaches to reduce the environmental footprint and negative environmental externalities from smallholder dairy production and;
- Evaluate effective ways to scale-up successful approaches and build capacity with industry, policy makers and researchers in Indonesia and the Philippines.

4.1.1 Context

Monitoring the strategic and operational landscape

Both Indonesia and the Philippines have complex environments influencing their dairy value chains.

The Covid-19 pandemic has caused significant social and commercial disruption to both countries, with its legacy still felt today. The onset of the pandemic in March 2020 saw IndoDairy activities conclude, with all visits by Australian collaborators ceasing. Anecdotal reports indicate there has been much change in Indonesia since this time

whether it be socially, politically or from a dairy supply chain perspective. There has been a restructuring of GoI R&D institutes with a new National Research and Innovation Agency (BRIN) developed which incorporates ICARD and ICACEPS; both project partners in IndoDairy.

Similarly during the Philippines LSA, we also observed significant impacts of Covid-19 on domestic dairy supply chains, with declines in retail sales of up to 30% and SHD's drying off herds in some regions due to market loss. The National Dairy Authority (NDA) was also under external review during the Philippines LSA, which may have ramifications for the delivery of SEAD.

With the view of identifying potential project partners (both government and the private sector) for SEAD, and also potentially modifying project interventions, environmental scans needed to be completed in the current project encompassing operating conditions in both dairy industries, with particular focus on milk supply, farm numbers, government regulation, private companies, co-operatives, key farm profit drivers, development projects and the backgrounds of other value chain members. Our knowledge of the Philippines is more current than our knowledge of the Indonesian landscape, however both required constant monitoring while reviewing, selecting and engaging with the private sector during this project.

Landscape analysis in Central and Eastern Java

IndoDairy was primarily focussed in West Java, with a limited number of activities delivered in North Sumatra, and a brief mission to East Java. Based on 2013 data, milk production on Java accounts for 98% of Indonesia's milk production, with West, Central and East Java producing 29%, 11% and 57%, respectively. The last major review of Central and Eastern Java SHD inclusive supply chains by ACIAR was in 2012 during the original IndoDairy scoping project (AGB/2011/010 *Improving milk supply, competitiveness and livelihoods in smallholder dairy chains in Indonesia*), with a small mission to East Java during IndoDairy in 2019 focussed on identifying inclusive business models between SHD farmers and private companies.

The project concept for SEAD includes the potential to scale out successful IndoDairy SHD-inclusive value chain approaches and interventions from West Java to Central and East Java. The decision to expand SEAD's geographical focus will depend on a number of external and internal factors. With the view of engaging partners and deploying resources, it was timely that a desktop landscape analysis of Central and East Java was completed to identify research priorities and potential research partners for further consideration.

Identifying and initial engagement with potential sector partners

There are three main types of private sector engagement (PSE) partnerships we see going forward for SEAD:

- *Collaborative* partnerships (e.g. staff participating in training);
- Partnerships with *in-kind aligned investment* (e.g. staff time or IP is contributed at no cost);
- Partnerships with *funding aligned investment* (e.g. direct funding of project activities).

These different partnerships require varying levels of governance. A partnership where the private sector provides direct funding will require significant engagement and formal documentation (e.g. contracts), whereas a collaborative partnership will require less overall engagement and formalised governance e.g. an exchange of letters or Memorandum of Understanding. It is quite feasible that there may be a change in the

status of project PSE partnerships over time, e.g. moving from collaboration to co-investment.

Of the potential interventions in SEAD we have identified to date, there is general scope for all three types of PSE. We would anticipate however a greater level of commitment from a commercial entity where the partnership includes direct co-investment.

There are some lessons from PSE in past agricultural development projects that need to be considered in the development of SEAD:

- There should be transparency in the engagement process;
- The impact of the partnership on market distortion or inhibiting new supply chain entrants needs to be considered;
- Due diligence should be undertaken early which includes assessing past performance in collaborations, reputation, policies, future plans, ethics, culture, corporate social responsibility, potential conflicts of interest, intellectual property, confidentiality and risk (financial, fiduciary, reputational, environmental, compliance; human rights; misaligned attitudes, market, lack of control over partner's actions, overall risk of project failure and developing contingencies);
- It is important to engage potential PSE partners early and frequently at a strategic level to allow for co-development of interventions;
- Initially, there needs to be communication (e.g. a prospectus) outlining the potential scope of the collaboration, modelled benefit/cost (both qualitative and quantitative) of piloting and potentially scaling out interventions (if successful);
- Robust governance structures need to be implemented early to ensure accountability;
- There needs to be clear outcomes and deliverables while acknowledging that partnerships need to be commercially realistic and offer some scope for flexibility.

During IndoDairy, our experience with Cimory, an Indonesian processor, is an example of a successful approach of PSE where there was alignment between project and commercial strategic priorities. In the original scoping project for IndoDairy in 2012, we were aware that there was alignment in vision and values of Cimory and what was being proposed for IndoDairy. Poor milk quality due to high TPC levels was limiting the participation of SHDs in SSL value chains that Cimory was looking to grow. Targeted interventions were agreed between IndoDairy and Cimory, with the IndoDairy team responsible for implementing and evaluating interventions and Cimory funding milk quality incentives. Our partnership with Cimory took a long time to develop (e.g. five meetings), and only truly took effect in 2019 once there was alignment with their current business strategy and IndoDairy operational resources. It was also important that there was alignment between their business values and project intervention outcomes, in this case processing marketable fresh milk from SHD farmers and redistributing profit to a KUD and their SHDs through quality bonuses. Integral to this engagement was the provision of technical services from the public sector (IPB).

Examples of private sector partners SEAD could consult with include multinational (e.g., Nestle and Royal FrieslandCampina who operate in both countries), national (e.g., Cimory in Indonesia and Daily Dairy Inc. in the Philippines), local companies (e.g., smaller retailers and cafes) and producers including co-operatives and farmer groups.

Prospectus development

In the commercial sector, prospectuses are regularly used to raise capital for new business investment. This could include starting a new business or an existing business starting a new venture or expanding its scope. A prospectus provides information to

investors about the business structure, its management and administration, past performance and risk of investment.

In regard to SEAD, the project team developed a prospectus to communicate what potential benefits commercial entities could derive from partnering in the project. This included an overview of the opportunities to improve SHD participation in value chains, the terms of reference of SEAD, descriptions of lead organisations, current barriers and issues affecting SHD-inclusive value chains, possible interventions and their associated projects.

5 Objectives

Objective 1. Undertake environmental scans of SHD inclusive dairy value chains, public stakeholders, private enterprises and dairy development projects in Indonesia and the Philippines.

Objective 2. Undertake a landscape analysis of Central and Eastern Java dairy value chains, identify potential private sector partners and evaluate the feasibility of proposed market-based interventions.

Objective 3. Develop a project prospectus for potential SEAD private sector partners.

Objective 4. Identify and undertake initial engagement meetings with potential Indonesian and Philippine private sector partners.

Objective 5. Consult with pre-engaged dairy value chain stakeholders in Indonesia and the Philippines regarding SEAD strategic direction and status.

6 Methodology

6.1.1 Project team

The project team comprised of researchers from Australasian Dairy Consultants (ADC), PT. Mitra Asia Lestari (an independent management and project consulting firm located in Jakarta, Indonesia) (MAL), FoodLink Advocacy Cooperative (a cooperative of leading Philippine agribusinesses located in Mandaluyong City in the National Capital Region (FAC) and Dr. Roberto R. Acosta, a senior agribusiness consultant based in Manila, Philippines.

Dr Brad Granzin from ADC was the Project Leader. Dr Granzin was also the leader of in-field project operations for IndoDairy and was the project leader for the Philippines LSA. Apart from his international experience in SHD systems in south-east Asia, Dr Granzin also services the Australian dairy industry in his role as Regional Manager for Subtropical Dairy, with access to contemporary dairy science RD&E through Dairy Australia. With the exception of the mission in August 2022, ADC worked remotely on this project via online platforms.

MAL is a management and project consulting firm that provides comprehensive services to the agribusiness sector in Indonesia. They offer key services in designing business strategies to attract and maintain project stakeholder support and agribusiness landscape analysis. Their key staff involved in delivering this project were: Archie Slamet, who was previously with Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Director CSIRO Indonesia five years) and an agrifood consultant in Indonesia (19 years); and Dian Yuanita Wulandari, (mid-career experience in innovation implementation, informing and enacting strategy, analysis, and reporting, building collaboration across GoI departments, international institutions, private industries and associations). The founder of MAL, Dr John Ackerman, who is an experienced agribusiness consultant with over 15 years' experience in Indonesia, was unavailable to work on this project directly, however provided oversight in conjunction with MAL President Director, Rahayu Maulandari.

FAC is a cooperative of leading Philippine agribusinesses. They were a key project partner in the Philippines LSA. FAC has key skills in accessing Government of Philippines (GoP) information and engaging with the commercial sector. Their key consultants who collaborated on this project were Anton Simon Palo, General Manager and Mercedita Amar Rosetes (Mercy). Collectively, they have over twenty-five years of experience of development work in both the public and the private sector.

Dr. Roberto R. Acosta is a senior consultant with 30 years' experience in agri-enterprise development in the Philippine horticulture sector through public-private partnerships in extension and advisory services.

ADC was the lead organisation for this project. Both ADC and MAL were the primary service providers for activities in Indonesia. FAC were the primary service providers for Objectives 1, 2 and 5 in the Philippines, while Roberto R. Acosta led Objective 4 in the Philippines. All project teams utilised resources and reports from the two proceeding ACIAR projects (IndoDairy and the Philippines LSA). Given the Philippines LSA was finalised in November 2021, much of the information regarding public and private sector partners was current and was still relevant.

Objective 1. Undertake environmental scans of SHD inclusive dairy value chains, public stakeholders, private enterprises and dairy development projects in Indonesia and the Philippines.

Activity 1.1. Review and assimilate relevant government policy in relation to priorities, objectives and initiatives relating to the dairy sector.

This activity was delivered between January and April 2022 by MAL (Indonesia) and FAC (Philippines) using online reports and preliminary interviews (by phone). There was a focus on the background, mandates, experience, budget, organisational performance, relevant policy and likely future direction of relevant ministries and institutes over the last 18 months (July 2020 to December 2021).

Government entities reviewed were:

Indonesia:

- Ministry of Agriculture;
- Ministry of Health;
- Ministry of Trade;
- Ministry of Industry;
- National Research and Innovation Agency (BRIN).

Philippines:

- Dairy Training and Research Institute (DTRI);
- Department of Agrarian Reform;
- Department of Environment and Natural Resources – Environment Management Bureau;
- Department of Trade and Industry;
- Food and Drug Administration;
- Institute of Animal Science (University of Philippines Los Banos);
- National Dairy Authority – Department of Agriculture;
- Philippine Carabao Center;
- Philippine Council on Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD).

Activity 1.2. Review dairy value chains (with a focus on SHD inclusive chains) encompassing key profit and productivity drivers of SHD farms, post-farm gate supply chains including markets, government regulation and dairy development projects (Indonesia only).

This desktop review was completed by MAL in March 2022. It provided an overview of the evolution of the Indonesian dairy industry to date, updates regarding markets, supply chain developments, recent developments in SHD inclusive value chains and changes in the policy landscape. A further small review was completed by MAL documenting current farm gate milk price and the cost of lactating herd concentrates in West and Central Java.

Activity 1.3. Review and assimilate the strategic and investment activities of dairy-related private enterprises using existing reports, data and stakeholder information.

MAL undertook a review of private sector investment in Indonesia over the last two years. Businesses reviewed were Nestle, IndoMilk, Frisian Flag Indonesia (FFI), Kalbe Nutraceuticals (Sanghiang Perkasa), Greenfields and Cisarua Mountain Dairy. Key aspects reviewed were ownership structures, the location of processing infrastructure, milk supply regions, milk intake quality parameters, key brands, business values in the context of their relationships with SHD farmers, and dairy development projects and initiatives.

Online reviews were completed by FAC of three Philippine dairy processors: Pinkie's Farm; Real Fresh Dairy Farms and DVF Dairy Farms. Reviews were also completed by FAC of two co-operatives: Quezon Dairy Farms Co-operative and the Sta. Maria Dairy Division of Catmon Multipurpose Co-operative. Reviews covered ownership structures,

operations, products manufactured, distribution networks, the impacts of Covid-19 and past milk supply arrangements involving SHDs over the last two to three years.

The outcome from this activity formed the basis of the analysis completed in Activity 4.1.

Objective 2. Undertake a landscape analysis of Central and Eastern Java dairy value chains, identify potential private sector partners and evaluate the feasibility of proposed market-based interventions.

Activity 2.1. Undertake a high level landscape analysis of SHD inclusive dairy value chains across disciplines of on-farm dairy productivity and profitability, milk quality and supply chain efficiency, agribusiness development opportunities, markets, policy and institutions. Evaluate the feasibility of interventions that are proposed for SEAD.

Although originally designed as a standalone activity, this activity was integrated into reports covering Indonesian investment by the public and private sectors. The project team also gained considerable insights regarding this activity during meetings with stakeholders.

Activity 2.2. Identify, describe and interview current key research and industry stakeholders, with particular focus on private sector entities.

This activity was integrated into subprojects in Objectives 4 and 5.

Activity 2.3. Document and evaluate the success of current and recent Government, non-government organisation (NGO) and industry development and policy initiatives and programs, identifying key learnings, opportunities and recommendations.

This review was completed by MAL. Dairy development projects reviewed were: IndoDairy; Applied Research and Innovation Systems in Agriculture (ARISA); and Sustainable Intensification of Dairy Production in Indonesia (SIDPI). Key aspects reviewed were: linkages to higher level policies; project objectives; timeframes; investments; partnerships and deliverables. All of these projects were implemented within the last ten years.

This activity also documented current SHD linked government policies and industry structures. Sikomandan/Upsus SIWAB program and activities of the Ministry of Industry were reviewed. Economic partnerships such as The Indonesia Australia Comprehensive Economic Partnership Agreement (IA-CEPA), ASEAN Free Trade Agreements, the New Zealand IDEA dairy development project, and ongoing trade discussions with Ireland and Denmark were also described.

Activity 2.4. Develop a recommendation regarding engaging potential SEAD private sector entities in Central and East Java.

This review was completed by MAL. Initially, desktop reviews were undertaken encompassing the following characteristics and attributes of private sector dairy companies in the context of potential collaboration in SEAD.

i. Legal, reputation and operating principles:

- Business history and stability;
- Relationship to dairy value chains and government;
- Competing interests and the risk they may compromise project outcomes e.g., using imported dairy ingredients in manufacturing;

- Values and ethics, particularly in regard to margin sharing;
- Legal or reputational risk.

ii. Strategic and investment alignment with proposed project outcomes:

- Business strategy regarding SHD inclusive value chains;
- Approach to innovation.

iii. Resources:

- Capacity to co-invest particularly in regard to public good outcomes;
- Capacity to scale out interventions;
- Expertise and skills;
- Linkages to other value chain members;
- Access to finance.

iv. Collaboration performance:

- Track record in business partnerships e.g. joint ventures;
- Past participation in development/public good projects;
- Business policy regarding intellectual property.

Of the 66 companies in Indonesia involved in the manufacture of dairy products, only 14 utilise domestic fresh milk. The top 10 companies in terms of their fresh milk volume utilised were reviewed in more detail. These were: Nestle Indonesia; Indolakto; Frisian Flag Indonesia; Ultrajaya Milk Industry; Greenfields Indonesia; Diamond Cold Storage; So Good Food Manufacturing; Cisarua Mountain Dairy (Cimory); Sarihusada Generasi Mahardika (Danone Group) and Industri Susu Alam Murni (ISAM).

Based on this initial analysis, phone interviews were completed with seven companies, with further reviews based on their likelihood of a partnership and type and extent of collaboration. It was from this final review that five companies were selected for face-to-face meetings during the August 2022 in-country missions.

Objective 3. Develop a project prospectus for potential SEAD private sector partners.

Activity 3.1. Undertake benefit cost analyses (BCAs) and risk analysis of interventions identified in SEAD at pilot and full deployment.

Interventions and project briefs identified in SEAD were described in terms of their potential draft methodologies, estimated costs, and quantitative and qualitative outcomes (physical, financial, sustainability and social). Some initial comments regarding risk were also included. Initial drafts of these BCAs were reviewed following the in-country missions.

Activity 3.2. Compile a prospectus outlining an overview of SEAD including project scope, leading organisations, key project personnel, project background and justification, scale and investment, and potential collaboration frameworks.

A 16 page prospectus was developed (electronic and hard copy) primarily targeting co-investors (both private and public), but also to provide further details to potential project collaborators. Sections included were overviews of the Indonesian and Philippine dairy industries, opportunities for more inclusive SHD dairy value chains, an overview of SEAD objectives and other terms of reference, the background of Australia collaborating organisations; potential public partners in both countries, draft interventions along value chains and within policy frameworks. Hard copies of the prospectus were shared with organisations the research team met during the in-country mission.

Objective 4. Identify and undertake initial engagement meetings with potential Indonesian and Philippine private sector partners.

Activity 4.1. Review and identify for initial engagement private sector entities including input providers, agribusiness, co-operatives and processors with potential collaborative, co-investment linkages and comparative advantage.

The methodology for this activity undertaken by MAL in Indonesia has been described in 2.4.

In the Philippines, this activity was completed by consultant Roberto R. Acosta, utilising the report from Activity 1.3 and the consultant's network in the Philippine rural and agricultural development sector. Input was also sought from various experts in the Philippine dairy sector. These included contacts from private and public entities, professional and industry organizations, and SHD associations and co-operatives. Online data sources were also reviewed.

During their initial vetting process, the consultant considered the review criteria described in Activity 2.4. From this background research, a list of targeted private sector partners was prepared. Contacts were then initiated through phone calls and social media followed by face-to-face meetings. Where possible these meetings were held at the organization's offices and processing facilities. This allowed some initial insights regarding the capacity of the potential partner to contribute resources.

Meetings generally involved an overview of the SEAD project (Appendix 17), a general discussion and a brief tour of the potential partner's facility. Initial feedback regarding potential future collaboration was also sought.

In a final analysis of the suitability of private sector partners for collaboration, the consultant considered the potential partners willingness to meet and discuss the project, their interest to learn more, and their willingness and openness to show their dairy enterprise's assets and resources. In addition, the consultant also reviewed the performance of organisations as past recipients of assistance from other external projects, whether international or local. Particular attention was placed on whether the private entity had been a recipient of the New Zealand Government Dairy Program, the World Bank-assisted Rural Development Program or Alaska Milk Corporation's Dairy Training and Development Program.

Overall, Roberto R. Acosta screened 12 different private sector partners, recommending eight for further meetings with the project team during its August 2022 mission. One business was conditionally recommended (based on the owners being unable to commit further); one was not recommended (given the business owned a large advanced dairy herd and did not have plans to engage with SHDs) and two would not return phone calls or other forms of communication. The following private sector entities were recommended for further meetings: Alaska Milk Corporation (Alaska); Batangas Dairy Cooperative (BADACO); Kalipunan ng mga Kooperatibang Maggagatas, Inc. (KKMI); Samahan ng mga Maggagatas ng Batangas Cooperative (SAMABACO); Sta. Maria Dairy Farm, Inc.; Farm Share Prime, Inc; Stagira Farm, Inc. and Dairy Daddy Farm, Inc.

Activity 4.2. Undertake initial in-country meetings with potential private sector partners.

Between August 7 and 18 2022, an Australian delegation (Howard Hall, Wendy Umberger and Brad Granzin) were accompanied by ACIAR Country Managers (Hazel Aniceto – Philippines and Mirah Nuryati – Indonesia) to meetings with nine private sector entities in the Philippines (five local companies/businesses, three co-operatives and one multinational with a local entity) and four private sector entities in Indonesia (three local companies and one multinational with a local entity). Due to logistical challenges, an

additional meeting was held online on September 6 with Indonesian subsidiary of another multinational company.

Of the 14 meetings completed, eight were held at the private sector partners office or processing facility, four were held in other venues, while two were held online. All entities had received background information on SEAD. There were no formal agendas circulated prior to the meetings. General discussion was had regarding the entities role in dairy value chains, opportunities and challenges facing SHD inclusive value chains in each country and potential areas of collaboration.

Objective 5. Consult with pre-engaged dairy value chain stakeholders in Indonesia and the Philippines regarding SEAD strategic direction and status.

Activity 5.1. Hold online information and consultation sessions with key public and private stakeholders previously engaged in IndoDairy and the Philippines LSA.

During the mission in August 2022, the project team met face-to-face with a number of past project partners from both IndoDairy and the Philippines LSA. These project partners were:

IndoDairy:

- IPB;
- PT Cimory;
- PRISMA.







Philippines LSA:


- FAC;
- PCAARRD;
- Samahan ng Maggagatas ng Batangas Cooperative (SAMABACO);
- Mr Joey Tapay – Sta Maria Farm (previously Dairy Confederation of the Philippines).

Topics covered during these meetings varied, but generally covered discussing the scope and objective of SEAD, potential collaboration and any learnings from the previous projects.




7 Achievements against activities and outputs/milestones

Objective 1: Undertake environmental scans of SHD inclusive dairy value chains, public stakeholders, private enterprises and dairy development projects in Indonesia and the Philippines.



No.	Activity	Outputs/ milestones	Completion date	Comments
1.1	Review and assimilate relevant government policy in relation to priorities, objectives and initiatives relating to the dairy sector.	<i>Report - National Dairy Authority Department of Agriculture (Philippines) - Appendix 1</i>  Appendix 1.pdf	Feb 28, 2022	Prepared by FAC
		<i>Report - Government Agencies and Government Research Institutions (Philippines) - Appendix 2</i>  Appendix 2.pdf	Apr 30, 2022	Prepared by FAC
		<i>Review of the Indonesian government policy relating to the dairy sector - Appendices 3 and 4</i>  Appendix 3.pdf  Appendix 4.pdf	Mar 31, 2022	Prepared by MAL
1.2	Review dairy value chains (with a focus on SHD inclusive chains) encompassing key profit and productivity drivers of SHD farms, post-farm gate supply chains including markets, government regulation and dairy development projects (Indonesia only).	<i>Indonesian Dairy Supply/Value Chains - Appendices 5 and 6</i>  Appendix 5.pdf  Appendix 6.pdf	Mar 31, 2022	Prepared by MAL

1.3	Review and assimilate the strategic and investment activities of dairy-related private enterprises using existing reports, data and stakeholder information.	<p><i>Private Sector Updates (Philippines) - Appendix 7</i></p>  <p>Appendix 7.pdf</p>	Jul 15, 2022	Prepared by FAC
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Objective 2: Undertake a landscape analysis of Central and Eastern Java dairy value chains, identify potential private sector partners and evaluate the feasibility of proposed market-based interventions.




No.	Activity	Outputs/ Milestones	Completion date	Comments
2.1	Undertake high level landscape analysis of SHD inclusive dairy value chains across disciplines of on-farm dairy productivity and profitability, milk quality and supply chain efficiency, agribusiness development opportunities, markets, policy and institutions. Evaluate the feasibility of interventions that are proposed for SEAD.	<i>Results from these analyses are presented across various appendices.</i>	Sep 30, 2022	Prepared by ADC
2.2	Identify, describe and interview current key research and industry stakeholders, with particular focus on private sector entities.	<i>Evaluation of NGO, industry, government SHD programs and review of investments by dairy companies in Indonesia is described in Appendices 8 and 9.</i>	Apr 30, 2022	Prepared by MAL
2.3	Document and evaluate the success of current and recent Government, NGO and industry development and policy initiatives and programs, identifying key learnings, opportunities and recommendations.	 <p>Appendix 8.pdf</p>  <p>Appendix 9.pdf</p>		
2.4	Develop a recommendation regarding engaging potential SEAD private sector entities in Central and East Java.	<p><i>The suitability of private sector entities for future project collaboration with IndoDairy (Appendix 10).</i></p>  <p>Appendix 10.pdf</p>	May 30, 2022	Prepared by MAL



Objective 3: Develop a project prospectus for potential SEAD private sector partners.

No.	Activity	Outputs/ milestones	Completion date	Comments
3.1	Undertake benefit cost analyses (BCAs) and risk analysis of interventions identified in SEAD at pilot and full deployment.	Appendix 11.  Appendix 11.pdf	Sep 23, 2022	Prepared by ADC
3.2	Compile a prospectus outlining an overview of SEAD including project scope, leading organisations, key project personnel, project background and justification, scale and investment, and potential collaboration frameworks.	The prospectus can be found in Appendix 12.  Appendix 12.pdf	July 26, 2022	Prepared by ADC

PC = partner country, A = Australia

Objective 4: Identify and undertake initial engagement meetings with potential Indonesian and Philippine private sector partners.

No.	Activity	Outputs/ Milestones	Completion date	Comments
4.1	Review and identify for initial engagement private sector entities including input providers, agribusiness, co-operatives and processors with potential collaborative, co-investment linkages and comparative advantage.	Progress report (Philippines) - Appendix 13.  Appendix 13.pdf Final report (Philippines) - Appendix 14.  Appendix 14.pdf Future engagement with potential Indonesian private sector partners - Appendix 15.  Appendix 15.pdf	Apr 30, 2022 Oct 15, 2022 Jun 30, 2022	Prepared by Roberto Acosta Prepared by MAL

4.2	Undertake initial in-country meetings with potential private sector partners.	<p><i>A report outlining outcomes from engagement activities can be found in Appendix 16.</i></p> <p style="text-align: center;"> Appendix 16.pdf</p> <p><i>A copy of the SEAD presentation used during these meetings can be found in Appendix 17.</i></p> <p style="text-align: center;"> Appendix 17.pdf</p>	Aug 19, 2022	Prepared by ADC
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Objective 5: Consult with pre-engaged dairy value chain stakeholders in Indonesia and the Philippines regarding SEAD strategic direction and status.

No.	Activity	Outputs/ milestones	Completion date	Comments
5.1	Hold online information and consultation sessions with key public and private stakeholders previously engaged in IndoDairy and the Philippines LSA.	<i>This is reported under outcomes from Activity 4.2.</i>	Sep 6, 2022	Prepared by ADC

8 Key results and discussion

8.1 Landscape analyses

8.1.1 Indonesia

In early March 2020 during the early stages of the Covid-19 pandemic, the Australian team of IndoDairy left West Java and returned home. Since this time, there have been three major events in the broader landscape which have potential ramifications for the outcomes of SEAD: Covid-19; the development of BRIN and the Foot and Mouth disease (FMD) outbreak.

While its global impacts have been well documented, Covid-19 had some key impacts on the buying habits of Indonesian consumers and consequently sales from processors. The pandemic caused the closure of cafés and restaurants. Large-scale social distancing measures caused a shift in consumer consumption trends for dairy products, resulting in co-operatives and other processors reporting declining sales to the food service sector (up to 16.5% in 2020), but increased sales of lines suited for home consumption. Retail sales of dairy products remained strong overall, led by an overall 8% growth in liquid milk sales. On the whole, retail dairy product sales grew by 5.8% in 2020. As more families prepared food at home, sales of larger sized packaged products increased, while sales of smaller size or single serving packaging decreased. Dairy also had a positive image in Indonesia from a health perspective during the pandemic with growth in retail sales of yoghurt and probiotic drinks.

Despite the uncertainty relating to Covid-19, we saw continued investment in milk processing infrastructure, with Nestle Indonesia building a new factory in Central Java for the manufacture of UHT RTD products. We also saw PT Dairi Alami, part of the Djarum Group (a local cigarette company) commences building a vertically integrated dairy company selling fresh milk. This commenced operation in August 2020.

The second major event was the development of BRIN which started in 2019. During IndoDairy, the Indonesian Agency for Agricultural Research and Development (IAARD) and its reporting organisations (Indonesia Centre for Animal Research and Development (ICARD) and the Indonesian Centre for Agricultural Socio-Economic and Policy Studies (ICACEPS)) were key Gol government partners. With respect to SEAD, the development of BRIN raised some challenges regarding future collaboration. Given the large number of institutional mergers, we hypothesised that there would be challenges typically associated with restructuring of strategy, policy and resources. Our research in this current project confirmed our hypothesis. In public hearings, issues were raised regarding the lack of vision and strategy of BRIN, loss of organisation outcomes and impact, higher levels of bureaucracy and administration, and the early termination of projects. From the perspective of SEAD, this information confirmed our earlier intentions to partner with a university in Indonesia.

The third major event was the outbreak of FMD. In May 2022, FMD was detected in East and Central Java. Until this outbreak, Indonesia had been declared a FMD-free country for 32 years. Following the initial incursion, it quickly spread throughout cattle producers on Java. It has had a catastrophic effect on the Indonesian dairy industry with 10% of the herd being culled, and national milk production declining 30% (due to culling and FMD symptoms). Throughput of SHD inclusive dairy value chains has been impacted, along with other associated businesses such as input providers and the food service industry.

During our mission in August, FMD recovery was the main topic of discussion. Many of these conversations focussed on what role and outcomes SEAD could have going forward to address this issue. Of note was the poor understanding amongst the SHD farming sector regarding the incidence of FMD with only 26% of farmers knowing its symptoms

and control measures (Appendix 8, PRISMA 2022). Government organisations, particularly in Central and East Java were overwhelmed by the scale of the outbreak. Supporting the Indonesian SHD sector to recover from FMD will be a key outcome from SEAD going forward. Our initial discussions with Indonesian processors (Nestle, Cimory and Indolakto) resulted in a strategic intent demonstrated from all to collaborate with SEAD on this issue. There were however a variety of perspectives regarding recovery interventions, ranging from heifer importation to herd nutritional strategies. PRISMA (2022) also suggested that FMD recovery may pose an opportunity for input providers, such as pharmaceutical and feed companies, to promote hygiene and herd health products.

8.1.2 Philippines

In comparison to Indonesia, the Philippines dairy landscape over the last two years has been relatively uneventful.

- From a policy perspective, we have seen the Department of Agrarian Reform still investing in processing infrastructure supporting the SHD sector. However, we did not see any evidence of new investment during our recent mission in August. Our visit did confirm however that hygiene standards within small scale processing factories are below the standard needed for entry into formal value chains. As we have reported previously, the lack of market opportunities for smaller co-operatives, either for their own brands or supplying bulk milk to another entity, can be linked to poor hygiene standards on farm and within co-operative processing facilities. Our initial conclusion is that the standard of food safety in SHD value chains in the Philippines is lower than Indonesia. This could be due to KUDs in Indonesia selling more milk to commercial entities, as opposed to the Philippine SHD industry supplying the school milk programme (with variable quality control) and their own brands.
- We were aware from our earlier research that the GoP was investing in both *Bos taurus* dairy heifers and carabao (Philippine Carabao Center). This current project also identified that species investment is now being extended to Girolando (*Bos taurus* x *Bos indicus*) and dairy goats. In contrast, the Indonesian dairy industry is dominated by *Bos taurus* genetics (80%+) with limited value chains based on other species. In discussions with PCAARRD during the initial project development phase of SEAD, government investment in goats and carabao for SHDs was raised. However due to their lack of presence in Indonesia, it is highly unlikely that SEAD will include research projects involving these species.
- *Embryo transfer (ET)*. Introducing and upskilling in ET as a SEAD project was discussed by PCAARRD and UPLB (and with Nestle in Indonesia). As a generalisation, ET is viewed as a silver bullet in many developing countries to rapidly improve the genetic merit and expansion of dairy herds. As a breeding technique, it is expensive and comes with high risk. Going forward, we will continue to engage with project partners regarding ET, however given the above comments, we will be looking to avoid this technology. It would be beneficial in both countries to undertake capacity building to inform collaborators regarding the benefits, challenges and risks with ET.
- Our experience in this project and from the Philippine LSA highlighted the complex policy relating to SHDs, with multiple government departments having different roles, projects and services.

National Dairy Authority (NDA)

Despite significant investment from the GoP, the NDA appears to be problematic. They are not delivering on outcomes as per their mandate, have issues regarding financial

management and are under-resourced from the perspectives of staff capacity and capability. Despite this under-performance their budget was increased during 2022.

We are of the view that the performance of NDA will continue to attract political interest over the near future, with the Philippine president and vice president sitting currently on the NDA Board.

8.2 Changes in demand and supply.

Our research indicates that there has been little improvement in trade balance of dairy products in the Philippines from what was reported in the Philippines LSA. The reduction in milk supply in Indonesia caused by FMD will add further to the supply deficit going forward, especially given the earlier comments regarding sector growth associated with Covid-19. An interesting anomaly noted during this study was the prediction that domestic milk powder production (whole milk powder (WMP)) is expected to grow at a rate of 5.8% in Indonesia until the end of 2026 (Euromonitor, 2021). WMP is used in the production of several dairy products including cheese, butter, yoghurt, and bakery. This potential value chain (particularly yoghurt) should be considered in the development of SEAD.

8.3 Prioritisation of interventions from benefit cost analyses

As with any investment, understanding the benefit of investing in interventions in a collaborative project like SEAD is an important question for public and private funders. As noted earlier, the Phase 1 project proposal for SEAD had developed interventions (25) that could possibly be implemented.

The list below shows the ranking of results from these analyses (Appendix 11). We acknowledge that the methodology used here was basic. Our recommendation would be that all High, Intermediate to High, and Intermediate value interventions warrant further consideration and scoping in SEAD.

1. High:

- Identify the drivers of change for SHDs who are prepared to grow their business and assist them to identify key management areas to improve profitability;
- Evaluate farm milk supply incentives that could potentially provide commercial benefits for supply chain partners;
- Evaluate alternative approaches to maximisation of milk income over feed costs through i) the development and evaluation of basic feed balancing apps and ii) remote diet formulation through the provision of farm captured information and images;
- Imbed a culture of concentrate formulation based on cost-effective nutrients as opposed to low-cost underperforming nutrients;
- Evaluate small batch high moisture forage conservation of perennial grasses utilising specialised high sugar fibrolytic inoculants and supplementing herds with mycotoxin binders;
- Pilot the effect of heating water (initially with gas, then either solar or biogas) used in milking procedures to destroy pathogens, lower milk total plate counts, and reduce the incidence of mastitis;
- Evaluate a self-contained micro solar system as an energy source for cooling milk on farm;

- Experimenting with contemporary practice change methodologies, communication platforms and capacity building.

2. Intermediate to High:

- Upskill SHDs and service providers regarding the impacts of herd nutrition management on reproductive performance;
- Develop demonstration farms focussed on herd water supply and quality to increase milk production per cow;
- Test the feasibility in Indonesia and Philippine SHD systems of small milk vats designed for SHDs in other countries;
- Feeding science-based methane reducing additives such as 3-nitrooxypropanol (3-NOP).

3. Intermediate:

- In conjunction with agribusiness, pilot demonstration sites on SHDs examining forage varieties (especially those containing starch);
- Evaluate the impact of forage cutting height on milk yield;
- Test the feasibility of replacing fresh milk fed to calves with powdered calf formula;
- An evaluation of contemporary soil management practices to balance nutrients provided by composted solid effluent;
- Develop shorten regional supply chains using communication and support with micro compartmental processing plants;
- Establish local fresh milk supply chains to service coffee outlets and the hospitality sector;
- Develop a policy paper regarding the use of “fresh” in dairy product branding.

4. Low to Intermediate:

- Undertake environmental scans (Jakarta and Manila) to identify cost effective protein and energy commodities that could be supplied directly to SHDs for integration into herd rations;
- Model the impact of adverse seasons and climate events on SHDs and pilot the introduction of farm practices to mitigate risk;
- Contract growing of maize or sorghum silage crops based on yield and quality incentives;
- Utilising portable methane meters to evaluate herd nutritional interventions under SHD conditions;
- Utilising liquid effluent as a nutrient source in hydroponic forage production systems.

5. Low:

- Pooling carbon offsets from SHDs to deliver a tradable unit with private carbon traders.

Despite considerable effort being invested into developing the above interventions, our meetings with potential collaborators identified other interventions that had not been considered previously. The FMD outbreak in Indonesia, the poor longevity of Australian heifers imported into the Philippines, and residual value chain impacts of Covid-19 were issues that prior research or scoping studies had not identified.

8.4 Private sector partnerships identified and their justification for potential collaboration in SEAD

8.4.1 Indonesia

As noted earlier, only 14 dairy companies in Indonesia use fresh milk in their manufacturing. The top 10 (in order of fresh milk volume utilised per day) were:

1. PT Nestle Indonesia (398.5 tonnes)
2. PT Indolakto (Indofood group) (254 tonnes)
3. PT Frisian Flag Indonesia (194 tonnes)
4. PT Ultrajaya Milk Industry Tbk (191 tonnes)
5. PT Greenfields Indonesia (120 tonnes)
6. PT Diamond Cold Storage (100 tonnes)
7. PT So Good Food Manufacturing (36 tonnes)
8. PT Cisarua Mountain Dairy (Cimory) (13 tonnes)
9. PT Sarihusada Generasi Mahardika (Danone Group) (7 tonnes)
10. PT Industri Susu Alam Murni (ISAM) (7 tonnes)

It was decided by the project team not to engage further with processors with intakes less than 10 tonnes of milk per day due to their lack of potential reach into the SHD sector. This eliminated Sarihusada Generasi Mahardika (Danone Group) and PT Industri Susu Alam Murni (ISAM) from further review.

Nestle

Nestle S.A. is a multinational food and drink processing conglomerate corporation headquartered in Switzerland. Since 2014, it has been the largest global publicly held food company. It sources fresh milk from over 200,000 dairy farms in 27 countries.

PT Nestle Indonesia is Indonesia's largest processor of SHD produced milk. It had a daily milk intake (pre FMD) of approximately 400 tonnes. It has been collecting milk from SHD farmers in East Java since 1972. It's global business model of supporting sustainable agriculture by "creating shared value" has seen Nestle invest in a wide range of SHD farm development projects in conjunction with 35 KUDs over time, ranging from training, provision of subsidised on-farm infrastructure, milk cooling infrastructure and forage provision. In 2014, they developed and implemented *ad libitum* watering systems in 20,000 (out of 26,000) SHD farms in East Java. Nestle focus on keeping farm improvement programmes simple, affordable and profitable. Looking forward, FMD recovery and reducing the carbon footprint of their supplying SHDs (aligned with their global strategy to reduce 2025 emissions by 30% (2018 baseline)) are key short term farm development priorities for Nestle in Indonesia. Nestle's FMD recovery strategy will focus on improving the productivity of herds through nutritional management and replacing culled animals through a variety of strategies (live imports, sexed semen and possibly ET). Their strategy to reduce the carbon footprint of SHDs remains unclear and offers scope for collaboration within SEAD.

In 2021, Nestle commissioned the construction of a new factory in Batang, Central Java. This factory will focus on the production of RTD products. In a later post mission discussion with Nestle (October 17, 2022), they discussed the start of a pilot project in conjunction with regional government to support the conversion of local beef farmers in Central Java to dairy. Initiatives within this project include providing extended on-farm training in East Java of beef farmers (looking to convert to dairy) and the development of local village centred dairy farmer development groups.

Nestle's proven track record of SHD sector development plus their new focus on Central Java provides a good strategic basis for collaboration in SEAD. In our meeting in August 2022, they committed in principle to supporting SEAD particularly in regard to FMD recovery in the short term and GHG mitigation in the longer term.

Indolakto

Established in 1967, PT Indolakto is one of Indonesia's local producers of dairy goods. It is owned by PT Indofood Sukses Makmur Tbk. The company's line of business includes processing fresh milk and cream, and related products. IndoMilk (pasteurised milk) is one of their main brands. Indolakto uses both fresh milk and imported ingredients in its manufacturing across five factories (two in East Java and three in West Java). Indolakto sources milk across all regions in Java from SHDs. Pre FMD, their daily milk intake was 250 tonnes per day, however this has decreased to 150 tonnes per day due to FMD (100 tonnes East Java, 25 tonnes Central Java and 25 tonnes West Java). Indolakto partners with 16 co-ops with intakes of between 1 to 110 tonnes per day.

In our meeting with Indolakto, a number of areas of strategic focus were discussed. FMD recovery was paramount, followed by ongoing issues with milk quality. Milk quality issues were focussed on adulteration and milk being unchilled for extended periods of time (when farmers were undertaking a third milking at night).

Our background research and the outcome from our meeting showed that Indolakto has invested in various SHD farm development initiatives recently. These have included projects focussed on fresh milk hygiene, herd expansion and feeding practices. Indolakto is also working to implement digitalization in partnership programs with cattle breeders and co-operatives (Kontan, 2020). Indolakto had commenced a farm development programme focussed on reducing milk somatic cell counts (caused by mastitis) and co-funded an organic milk project with Arla and the Danish Government. It is our understanding that the organic milk project has been terminated.

Looking forward, there is good alignment between Indolakto's farm development programmes focussed on FMD recovery and milk quality, and SEAD objectives. We would not see a project focussed on organic milk having a place in SEAD due to this falling outside of the project's scope.

Frisian Flag Indonesia (FFI)

PT Frisian Flag Indonesia (FFI) has been an Indonesian subsidiary of Royal FrieslandCampina (RFC) since 1922. RFC is the world's largest co-operative with 16,995 member dairy farmers in the Netherlands, Belgium and Germany. It operates in over 100 markets globally. FFI manufactures and markets a wide range of products including powdered milk, RTD milk, and sweetened condensed milk (SCM). It has two factories located in West Java with a third either recently or close to commissioning in the same province.

FFI works with 20,000 SHDs across Indonesia and has developed partnerships with KUDs since 1996 (predominantly in West Java). In the last four to five years, FFI initiated programs such as the Farmer2Farmers, Young Farmer Academy, Bewara/news (magazines, radio and TV), the Milk Collection Point (MCP) program in Pangalengan, and the Dairy Village in Subang, West Java (Trobos, 2018). They are currently delivering a project focussed on empowering women dairy farmers in West Java.

As with other Indonesian processors, FMD recovery is a high priority. FFI have seen herd mortalities of 5 to 15% and declines in milk supply ex-farm of 20 to 50%. Their recovery strategy going forward is heavily focused on herd reproduction, heifer importation, herd nutrition and training. A specific suggestion made by FFI during our mission was to undertake damage assessments across SHD farms to assist with the design of

interventions. Apart from this project idea, no specific details regarding projects were discussed. FFI were interested in discussing potential collaboration further as the SEAD project approval process progresses.

Cimory

The Cimory Group is a manufacturer of protein-based packaged food and beverage products in Indonesia, with a leading market share in premium yoghurt and sausages. Founded in 1993, the Cimory Group currently produces processed meat, dairy products and eggs under their own brand which are sold through various channels including modern and traditional retailers, food service and direct selling teams. It was listed in December 2021 on the Indonesia stock exchange.

PT Cisarua Mountain Dairy (Cimory) is their national dairy processing and retailing subsidiary. Cimory has three factories: Sentul in West Java (yoghurt, ultra-high temperature (UHT) milk), Semara in Central Java (yoghurt) and a third factory in East Java. It was also of interest that Cimory is planning on manufacturing plant-based milk products by 2023.

As noted earlier, Cimory collaborated in the previous ACIAR Indonesian SHD project, IndoDairy, where there was strategic alignment regarding a key issue (milk quality), in this case processing fresh milk from SHDs and redistributing profit through bonuses. This collaboration saw key interventions implemented targeting reducing TPC contamination. In meeting with Cimory in August 2022, Cimory reported that the average TPC in Giri Tani prior to the IndoDairy project was 2 million/ml. This has halved post IndoDairy to 1 million/ml (albeit still very high versus national and international standards).

A common outcome from two initial separate conversations with the Sentul factory manager and the milk supply manager was that Cimory would welcome further collaboration in SEAD. FMD recovery and milk quality are two key issues going forward. Cimory would prefer to work with KUDs who provide them exclusive milk supply (Giri Tani and Cianjur).

UltraJaya

PT Ultra Jaya Milk Industry & Trading Co. Tbk is an Indonesian company based in Bandung. They produce UHT and SCM with a growing emphasis on the liquid milk sector. UltraJaya is currently working with 40 SHDs. Exact details regarding development initiatives were not provided, nor could the project team evaluate their outcomes.

Two meetings were held initially: i) the Operations Manager with MAL and ii) the President Director and the Smallholder Dairy Manager with the project mission team. As with other Indonesian processors, FMD recovery was a key focus going forward. The Operations Manager expressed a view that undertaking farm development activities would be irresponsible as this could further spread FMD. In the second meeting, the possibility of the Australian government providing soft loans to support heifer importation was raised. Apart from FMD, general discussion was had regarding how to improve SHD's access to finance, on-farm hygiene and cooling chain infrastructure. Specific discussion was had on projects (in the context of FMD recovery) addressing water supply, supply of feed and concentrate, sanitation and the vaccination protocol of cows in quarantine. The President Director also suggested that government intervention to limit the importation of dairy ingredients was also needed to help support the growth of the local industry.

In summary, it is unlikely in the short term that SEAD will collaborate with UltraJaya. Overall engagements were not positive, with UltraJaya lobbying for direct financial support and advocating for policy changes, as opposed to showing intent to undertake collaborative research to design and pilot interventions. The second reason relates to their location in the Bandung province which will be out of geographical scope for SEAD.

Indonesian private sector partners reviewed, but not engaged

As part of the environmental scans in Activities 1.3 and 2.4, MAL undertook a desktop study of several other milk processors. It was decided not to pursue further engagement with these processors for the reasons discussed below.

PT Diamond Cold Storage (DCS)

DCS was formed in 1970 as a joint venture company engaged in the distribution of dairy and frozen foods. The founders of DCS had the intent to provide national coverage of cold storage and refrigerated logistics throughout Indonesia. Although they are one of the major ice-cream manufacturers, their main business is the distribution of perishable products, requiring refrigeration (Diamond, 2022). In an interview with Mr Eko Sugiarto, Director for Plant operations, he indicated that although DCS uses fresh milk, they have no dealings with SHDs and only interact with KUDs directly. Mr Eko has no concerns with either milk quality or quantity from their supplying KUDs and therefore declined further collaboration. This outcome is similar with earlier engagement with DCS during IndoDairy when the company was considering supporting their corporate social responsibility through co-investing in demonstration farms. After initial discussions, they withdrew their support.

Greenfields and So Good Food Manufacturing

There were two companies not recommended by MAL for further consultation: PT Greenfields and PT So Good Food Manufacturing. Both businesses are focussed heavily on profit, not supporting value chain members. An additional consideration regarding Greenfields related to their operations being based in Malang, East Java, which falls out of the geographical scope of SEAD.

There was debate amongst the project team regarding pursuing further collaboration with Greenfields, with the Project Leader not entirely agreeing with the recommendation of MAL. Since 2004, Greenfields has been empowering SHDs in the vicinity of their operations. These partnerships are based on purchasing fresh milk and the provision of farm services. There are 250 SHD partner farmers with a population of around 850 dairy cows. It would be appropriate at an early stage in SEAD for the Project Leader to engage with Greenfields.

8.4.2 Philippines

Alaska Milk Corporation

Alaska Milk Corporation (Alaska) is the second largest processor in the Philippines and is a subsidiary of Royal FrieslandCampina (purchased in 2012, Euromonitor 2021). It has been operating in the Philippines since 2012. Alaska has a factory located in San Pedro Laguna where it manufactures RTD (ambient) milk products and has sourced milk locally over the last 10 years. Historically, Alaska sold pasteurised fresh milk, but discontinued this. We have been unable to confirm when this occurred.

Alaska has supported SHD development in recent times. It instigated the Dairy Training Development Corporation in partnership with DTRI and NDA. It has also funded 300 SHDs to complete accredited training in Animal Production at Farm Share Prime during 2022'23. It has also recently engaged with Dutch-based consulting firm Agriterra to identify and facilitate board governance training for a number of local co-operatives.

Alaska is interested in collaborating in SEAD. Some potential areas of collaboration include: capacity building for smallholder dairy farmers to improve herd productivity and milk quality; improving the hygiene standard of co-operative processing facilities; and training artificial inseminators. They have recommended the project leaders meet with the RFC Global Dairy Development Team to scope out potential collaboration further (*This would also assist with furthering collaboration with FFI in Indonesia*).

Batangas Dairy Co-operative (BADACO)

BADACO is located in Lipa City and Malvar in Batangas Province. The co-operative has 23 members who own a large scale farm and processing plant. The co-operative farm is currently milking 100 cows (down from 300) with a daily milk supply of 1,200 litres. Historically, BADACO sourced milk directly from local SHDs with an average daily intake of approximately 100 litres but stopped this during the Covid-19 pandemic due to reduced sales. During our meeting with BADACO in August, directors also discussed their plans to build a second communal dairy farm adjacent to their processing facility. BADACO owns a factory capable of processing pasteurised, extended shelf life (ESL) and flavoured products. It currently manufactures fresh and flavoured milk and yoghurt. It's marketing strategy has changed post Covid-19 with a greater focus on direct consumer sales particularly in condominiums. BADACO delivers its own on-farm graduate training programme.



Image 1. Fresh milk products produced by Batangas Dairy Cooperative (BADACO)

BADACO expressed an interest to collaborate in SEAD. Topics of potential collaboration included assisting SHDs to grow their herds, year-round availability of high-quality forage and market development. It is highly unlikely they would be able to contribute financially to SEAD but would be able to offer physical and human resources in-kind.

One area of concern from potential collaboration with BADACO is their open criticism of the DTRI at UPLB. They are of the view that the facility and R&D is substandard. Given the major role UPLB will have in SEAD, it will be important to carefully manage this relationship going forward, should BADACO agree to collaborate.

Kalipunan ng mga Kooperatibang Maggagatas, Inc. (KKMI)

KKMI is a secondary co-operative with a processing factory in Calauan Laguna. KKMI is supplied milk from seven primary co-operative comprising of 200 farms. Farm size varies from 5 to 100 cows. Overall, their factory processes 2,000 litres per day. Its main lines

include pasteurised milk (plain and flavoured, dairy cow and carabao), soft cheese (kesong puti) and yoghurts. It primarily services restaurants, food service, coffee shops and other manufacturers in the Metro Manila region. The majority of its directors are chairs of primary co-operatives.

There was a strong interest from KKMI and/or its primary co-operatives to collaborate in SEAD. Unless a strong value proposition can be found, it is likely their collaboration will be in-kind with physical and human resources. Some general opportunities and challenges raised during meetings included high feed/fodder prices and low milk production per cow (10-12 litres per day).

Subject to further communication, KKMI would be a valuable partner to have in SEAD. Its scale, market access and integrated business relationship with a large number of SHD farms through primary co-operatives offers significant reach and potential impact.

Samahan ng mga Maggagatas ng Batangas Dairy Co-operative (SAMABACO)

SAMABACO is a co-operative of SHD farmers located in Tanauan, Batangas. It is a supply member of KKMI as described above. The co-operative has 40 members with a total milking herd of 125 cows. The largest farm (Mr Danny) has 50 milking cows.

There would be value in SEAD collaborating with SAMABACO especially in conjunction with upstream activities with KKMI. They have experience in international project collaboration, with SAMABACO partnering in the New Zealand dairy development project between 2014 and 2019. They also have collaborated with the World Bank Rural Development Programme to develop blueprints for a communal farm.

A number of opportunities and challenges were discussed with SAMABACO including: high mortality rates amongst heifers imported from Australia (versus those from New Zealand); feed availability and quality; mastitis management and availability of veterinary supplies; herd breeding and reproduction. Some observations from the Australian team also indicated that there may be opportunities for improved agronomy and nutritional quality of maize crops being conserved for silage. The accuracy of milk quality testing (TPC) is also an avenue for research.



Image 2. Office of Samahan ng mga Maggagatas ng Batangas Dairy Cooperative (SAMABACO)



Image 3. A larger SHD farm in Batangas, Philippines (SAMABACO)

Sta. Maria Dairy Farm, Inc. (SMDF)

SMDF is a privately owned farm in Malagunlong, Lipa City, Batangas owned by Mr. Jose Tapay. The farm milks 70 cows in a total mixed ration system with access to pasture. The farm sells its milk to Carmen's Best Ice Cream.

SMDF offers some scope for collaboration to undertake on-farm R&D regarding herd nutrition and pasture development.

Farm Share Prime, Inc.

The SEAD project team visited Farm Share Prime in Duhat, Cavinti, Laguna Province. This is a small farm offering accredited training. It is 4.8 ha in size with a small dairy herd. The farm also houses other species. As noted earlier, Farm Share Prime is partnering with Alaska Milk to offer NC2 training (Animal Production – Ruminants 25,000 PHP cost over 30 days). This course has limited teaching units with dairy cattle. The farm also undertakes some small scale processing and direct sales.

Overall the quality of the dairy facility and management was not suitable for further collaboration with SEAD. While the SEAD project team commends their initiative, we would consider undertaking training at another commercial farm supported by formal extension/training activities from UPLB as a preferred option.

Stagira Farm, Inc.

Stagira Farms is a privately owned farm at Pililla, Rizal Province. Due to logistics, the SEAD project team was unable to visit this farm but did meet with the owner (Mr Atty Elias "Bong" Inciong). The herd comprises of 77 cows (mix of Holstein and Holstein Friesian) with 13 currently lactating. The farm is based on grazing with concentrates fed in the dairy. Stagira Farms was also a partner farm in the New Zealand Dairy Development project. The farm supplies a processor in Rizal, and also produces its own unlicensed products for online sales.

In terms of commercial collaboration, Stagira Farms may offer scope for some forage development research. The remote location of the farm is a limitation.

Dairy Daddy Farm, Inc

Dairy Daddy Farm is a privately owned farm in San Isidro, San Mateo, Rizal Province. Despite having significant areas for business improvement from a number of perspectives, the owner, Gregorio San Diego, was very focussed on lobbying government to intervene to develop industry support programmes to address unsustainable business costs in Philippine intensive animal industries. Given this strong focus on advocacy, they would be an unsuitable collaborator in SEAD.

8.4.3 Private sector partners reviewed in the Philippines, but not engaged

Common themes

The following section provides an overview of the background of the Philippine private sector that were not identified for further engagement.

There are some recurring themes:

- Their SSL lines manufactured had high standards regarding low bacterial contamination ex-factory. For a number of businesses, they had their own farms to supply milk to ensure low TPC ex-farm;
- Organisations were undergoing significant change or restructuring;

- The logistical challenges caused by Covid-19 had changed their business models, excluding SHDs;
- Businesses have other non-dairy cow lines e.g. carabao milk-based products.

Pinkies

Pinkie's Farm brands are promoted as high quality, safe products servicing the high end market. Their stringent quality measures on raw milk intake would make integrating SHD milk supply difficult. It was noted in our research that when they have pursued sourcing milk external to their own farm supply, they have marketed these products under a different brand.

Quezon Dairy Farmers Co-operative

Further details are provided in Appendix 7. In summary, poor product sales due to Covid-19, logistical challenges servicing the National Capital Region, and the co-operative diversifying into other agricultural industries, made SEAD collaboration unfeasible.

DVF Dairy Farms (DVF)

Covid-19 caused a significant down-turn in sales of dairy-based products from DVF. As we noted during the Philippines LSA, DVF was already progressing on focusing on carabao dairy products as a strategy to find a point of differentiation in the marketplace. In time, DVF may return to processing cow's milk from SHDs farms, as had been the case in the past, however, there is no immediate intent to do this.

8.4.4 Other Philippine private sector partners who did not respond to meeting invitations

The consultant (Roberto R. Acosta) also contacted other dairy processors to arrange face-to-face meetings. Unfortunately, they did not return his e-mails, phone calls, SMS messages and social media private messages. While there might be other reasons, this lack of response was interpreted as an expression of non-interest to participate in the SEAD project. These dairy processors were Hacienda Macalauan, Inc. and Laguna Creamery, Inc.

In January 2021 during the Philippines LSA, the research team met online with Eduardo Soriano, the owner of Hacienda Macalauan. He was very critical of GoP dairy policy and the SHD sector in general. Their lack of response in the current project is not surprising.

8.5 A fundamental question with the deployment of SEAD regards whether SHD value chains are already being well serviced by another project? Are there other multi-industry projects that SEAD could collaborate with?

A starting point for this answer is the scale of the industries in both countries. In Indonesia, there are over 100,000 SHDs (Priyanti and Soedjana, 2016), while in the Philippines there were 8,691 SHDs in 2018 (NDA, 2019). Given the large number of SHDs, diversity in operating environments and stakeholders, there is an opportunity for the deployment of SEAD. As an example of this, the SIDPI project describe below and the IndoDairy project both operated in West Java over similar years 2016-2020. While the project teams communicated at various times, there were no challenges regarding projects competing for the time and resources of SHD farms and their stakeholders. The reports below focus on Indonesia. We could not identify any new dairy development projects that have not been referred to previously in this report, the Philippine LSA or the brief reference to a United States project noted below.

8.5.1 Current and recent projects

Sustainable Intensification of Dairy Production in Indonesia (SIDPI)

The SIDPI project was carried out in Lembang sub district of West Java between 2016 and 2020. The aim of this project was to increase herd productivity and farmer incomes of SHDs, while at the same time reducing environmental impacts and improving resource use efficiency. The project focused on two key challenges of SHDs, namely, to improve feed & feeding practices and manure management (Tejaningsih, 2021). The project was carried out in a collaboration between Wageningen University Livestock Research, dairy cooperative KPSBU Lembang, IPB, FFI and Trouw Nutrition Indonesia, a feed premix manufacturer. Results of the project showed that SIDPI contributed to changes in various social actors in its external environment i.e., the scientific community, industry and NGO. Changes were observed in knowledge and attitude (mainly of farmers), in policy or practice (mainly of the KUD), and changes were also observed in dairy farms related to project goals (herd productivity, farm incomes, environmental impacts, resource use efficiency) (Tejaningsih, 2021).

Indonesia Applied Research and Innovation Systems in Agriculture (ARISA) 2014-2018

The Indonesia Applied Research and Innovation Systems in Agriculture project was an \$8 million AUD program under the Australia-Indonesia Partnership for Rural Economic Development. It was project managed by CSIRO, which supports the Gol's development strategy to accelerate poverty reduction through inclusive economic growth.

New Zealand Partnership program within the Indonesia Dairy Excellence Activity (IDEA)

The Agriculture Ministry implemented the Indonesia – New Zealand Partnership program within the Indonesia Dairy Excellence Activity (IDEA) cooperation framework. The project was designed to run for eight years from 2015 – 2023. Its current status is unclear. After delivering pilot projects in Central Java (involving Diponegoro University) and in West Sumatra, there has been limited activities from the project.

The Danish Government

The GoI Ministry of Agriculture is collaborating with the Danish Veterinary Food and Administration within the Indonesia-Denmark Strategic Sector Cooperation (IDSSC) framework. This program was signed on 27 January 2021 and will last for three years, an equal partnership between Indonesia and Denmark. This collaboration aims to produce organic milk by involving dairy farmers in East Java and the milk processing industry as off-takers for processing (*please note earlier comments regarding Indolacto*). The project is also partnering locally with Jakarta-based NGO Bina Swadaya. Given the focus on organic value chains in East Java within this project, we do not see much overlap with this project and SEAD.

Heifer importation- updates

Indonesia

One of GoI's policies and incentives to increase milk supply includes increasing the herd population through the Sikomandan/Upsus SIWAB program, which consists of importation of dairy heifers, rearing of calves and providing investment incentives in the form of tax allowances. Sikomandan is an upstream/downstream integrated program of activities, beginning from efforts to increase calvings and reduce mortality through various disease control mechanisms and to increase livestock productivity by providing adequate quality feed. To maintain a balance in the composition of dairy cows, which has to be at least 20% of the total population, rearing is carried out using calves birthed at the farms (Republika, 2021).

Philippines

Overall the number of dairy cows in the Philippines has declined over the last 12 months (USDA 2022). The NDA is focusing on providing goats for the livelihood of small farmers. This is supported by a four year United States funded programme aimed at improving the dairy industry (estimated at \$31 million USD). This initiative is due to finish in 2024.

8.6 General comments regarding methodology and approach

8.6.1 Performance of project collaborators

Given the small scale of the dairy industries in both countries, it was always going to be challenging to find experienced in-country consultants with substantive knowledge of the dairy industry. The following are some in confidence comments relating to the performance of in-country contractors.

Indonesia:

- MAL's senior consultant, John Ackerman moved on to a new role immediately after an agreement was signed between ADC and MAL. Despite best endeavours, the replacement consultants appointed by MAL were comparatively inexperienced. Given the Project Leader had background experience in the Indonesian dairy sector, this was not overly problematic.

Philippines:

- FAC. FAC was a key collaborator in the previous Philippines LSA with their performance being satisfactory. In the current project they were commissioned to undertake a series of environmental scans. Unfortunately, FAC relied purely on published online resources to complete these activities and included vast data sets from reports that contributed little to this project. There are significant lags between what is published in reports and what is actively happening on the ground. Their

reviews of Philippine processors were unsatisfactory and did not include many of the processors identified in the Philippines LSA.

- Roberto R. Acosta. While Roberto did an excellent job engaging with prospective private sector partners, his lack of dairy technical experience led to the SEAD project team meeting with unsuitable potential collaborators. This was not overly problematic.

In hindsight, it would have been more valuable to have one consultancy firm undertake all project activities in the Philippines. Some duplication in activities occurred.

8.6.2 Integrating commercial volatility into longer term R&D projects

- As noted earlier, private sector partners are key to the long term sustained implementation of successfully researched value chain interventions. While this is true in many cases, there are many conflicting and confounding forces at an implementation level. The operating environment of commercial entities is generally volatile, with business needing to be responsive and develop or adapt strategies to meet new opportunities and challenges. Undertaking R&D, particularly with public investment, requires a high level of accountability (and approval) and as such is not easily modified to meet change.

In terms of the development of SEAD, the outbreak of FMD in Indonesia in May 2022 is a classic example of the above problem, with the major key priority of the milk processing sector in Indonesia changing over a few weeks. It was fortunate that SEAD was still in an early development phase and could accommodate FMD recovery into its design.

There are anecdotal reports that ACIAR projects currently have a 2.5 year approval timeframe. The recommendation from this is that if private sectors partners are going to co-invest into ACIAR agribusiness projects going forward, there needs to be more flexibility built into the ACIAR approval process.

- The past history of potential private sector entities needs to be carefully examined. Have they had a culture of engaging/supporting? In terms of the private sector partners identified for collaboration in SEAD, the majority have had past experience in project collaboration. Nestle and RFC (FFI, Alaska) both have (or had) investment in collaborative projects with the public sector. Cimory, SAMABACO and BADACO have been collaborators in domestic dairy development projects such as IndoDairy and the NZ Philippines project. There were some common attitudinal and behavioural themes that emerged from this project that are desirable attributes in identifying prospective private sector entities for collaboration. These included:
 - Being committed to invest their own resources;
 - Being prepared to adapt and change;
 - Not being overly critical;
 - Being relatively open about their business needs and strategies;
 - Not relying purely on advocating to government to change policy;
 - Not looking specifically for immediate cash/funding as a solution.

8.6.3 Dealing with fractured relationships and poor opinions amongst potential collaborators

During the course of meetings with co-investors, there were a few outcomes that would not be conducive to collaboration amongst the private and public sector:

- Some private sector partners were very critical of government policy and the quality of R&D from universities;
- Some processors would only work with KUDs that were exclusive suppliers;
- There was inequity in terms of funding support for SEAD. Some flagged that cash investment was possible, while some were only prepared (or could afford) to commit time.

The recommendation from this is that from an overarching project management perspective, all of these constraints are manageable. On reflection, it is more appropriate for SEAD to be a series of defined smaller projects with private sector investment where there is specific alignment. One area that will need further negotiation with the private sector will be the ownership and sharing of intellectual property arising from projects, with various scenarios possible. Some private sector partners may a. be agreeable to have IP shared publicly, b. may want some exclusivity for a period of time (e.g. two years post publishing), while c. some may not want to share outcomes with other private sector partners. The SEAD project team will need to seek advice from ACIAR and other public co-investors on this issue. Initial feedback would be Option C would not be acceptable.

8.6.4 This project provided key information regarding public sector collaborators

SEAD is looking to collaborate with two new institutions (UPLB and UNDIP) that have not worked with ACIAR in the past. Although both have good track records as collaborators in other dairy RD&E projects, this project provided a good opportunity to meet with them and understand their capabilities and capacity. We are of the view that both UPLB and UNDIP will be valuable SEAD partners going forward.

8.6.5 Timing is an important success factor in the engagement of the private sector

This project provided two instances where timing had an effect on private sector engagement.

The first was the FMD outbreak. Without understating the magnitude of this catastrophe to the Indonesian dairy industry, processors were very interested in collaborating with SEAD to help support the recovery of the milk supply from their SHD farms.

The second was the status of existing commitments from the private sector to collaborative projects. The IndoDairy project team tried on numerous occasions between 2012 and 2018 to meet with FFI, with the view of discussing collaboration. These meeting invites were either not accepted or a very junior member of staff was appointed to meet with the project team. On reflection, FFI was committed to partnering with the Dutch government and Wageningen University to deliver the SIDPI project, and as such, may have had their resources fully committed. With the SIDPI project ending in 2020 and the high priority placed on FMD recovery, it is likely that FFI now has resources available to commit to SEAD.

9 Impacts

9.1 Capacity impacts

In addition to the new information discussed above, the mission to the Philippines provided an opportunity for the SEAD project team to learn more about SHD inclusive value chains and their broader operating environment. This new knowledge complemented the information collated in the Philippines LSA during 2021.

10 Conclusions and recommendations

Overall, this project completed its objectives of understanding the current landscapes in Indonesia and the Philippines (as they relate to SHD inclusive value chains), identifying, meeting and seeking intent from potential project partners (particularly the private sector) and reconnecting with project partners from IndoDairy. The table below summarises where SEAD has reached at the time of writing this report in terms of project themes, locations, private sector partners, teams and projects. As SEAD moves into its next development phase, the project team will reconnect with these organisations to clarify their co-investment, as well as start to refine some project methodologies.

	Project themes and teams		
	Farm practices Team: ADC, PCAARRD, UPLB, UNDIP	Value Chains Team: ADC, PCAARRD, IPB	Policy and Capacity building Team: ADC, PCAARRD, UPLB, IPB, UNDIP.
	Projects		
Luzon Philippines Commercial partners: Alaska, KKMI, SAMABACO	Reducing bacterial contamination of milk Increase milk production through forage management and herd nutrition Improve productivity of imported Australian heifers	Overcoming poor communication within value chains Understand market opportunities and consumer preferences	Capacity building of on-farm service providers and SME development Branding policy regarding use of “fresh milk” Contemporary extension methodologies Women participation in marketing - SME development
West Java, Indonesia Commercial partners: Cimory, Frisian Flag,	Reducing bacterial contamination of milk Herd reproduction and replacement technologies Reducing off-farm nutrient loss	Overcoming poor communication within value chains.	Women participation in marketing - SME development Post FMD policy recommendations Policy – ramifications of greenhouse mitigation
Central Java, Indonesia Commercial partners: Nestle, Cimory	Increase milk production through forage management and herd nutrition Herd reproduction and replacement technologies On-farm carbon mitigation		Capacity building of on-farm service providers and SME development. Post FMD policy recommendations

ADC: Australasian Dairy Consultants; IPB: Institut Pertanian Bogor; KKMI: Katipunan ng Mga Kooperatibang Maggagatas Inc. PCAARRD: Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development; SAMABACO: Samahan ng mga Maggagatas ng Batangas Dairy Cooperative; UNDIP: Universitas Diponegoro UPLB: University of the Philippines Los Baños.

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12 Appendixes

12.1 Appendix 1: Situation Report 1: Philippine National Dairy Authority – Department of Agriculture



REPORT

TITLE : SITUATION REPORT 1: NATIONAL DAIRY AUTHORITY –
DEPARTMENT OF AGRICULTURE

CLIENT : AUSTRALASIAN DAIRY CONSULTANTS PTY LTD,
AUSTRALIA

DATE : FEBRUARY 28, 2022

PROPONENT CONTACT : Anton Simon M. Palo
General Manager
anton.palo@foodlinkac.com

EXECUTIVE SUMMARY

The National Dairy Authority is a government-owned or controlled corporation (GOCC) that is lodged under the Department of Agriculture. Its mandate is “act as the central policy determining and directing body tasked to ensure that accelerated development of the Philippine dairy industry through policy direction and program coordination and implementation”. The objectives, budgets and plans, and activities of NDA were reviewed by going through official and approved submissions, memoranda, performance scorecard submissions, procurement-related documents, and official documents of partner institutions (i.e., Department of Education and Department of Social Welfare and Development, etc.)

Key findings for the report include the following: that the activities of NDA do not line up with the mandate that it is given (i.e., no policy innovation activities conducted or planned); as a GOCC, it is not able to recover its own costs of operations; in its current setup, NDA is both understaffed and that majority of its staff do not have the proper competency levels for its intended activities; and that NDA seemed to have missed opportunities for it to perform its duties well and gain a chance to recover some of its costs during the COVID-19 pandemic and at the same time may have missed opportunities to improve local dairy industry participation. Even with very low standards in its performance scorecard, NDA was only barely able to receive a passing mark. Ironically, despite its several years of underperformance and lack of appreciable impact, NDA was able to significantly increase its annual budget for 2022.

Mandate, Objectives, and Performance

The National Dairy Authority is a government owned or controlled corporation (GOCC) that was setup as part of the requirements of the Republic Act 7884 National Dairy Development Act of 1995—as a GOCC, NDA is required to declare and remit at 50% of its annual net earnings to the national government.

NDA describes its mandate as “act as the central policy determining and directing body tasked to ensure the accelerated development of the Philippine dairy industry through policy direction and program coordination and implementation” (2022 National Expenditure Program). The key strategies (2022 NEP) for NDA are as follows (also see Table 1)

- Increase dairy animals through breeding technologies such as artificial insemination
- Upgrade local stocks into dairy breed
- Infusion of dairy animals through importation
- Ensure the adoption of safety standard protocols such as good animal practices, good farm manufacturing practices, etc.
- Empowerment of dairy farmers through dairy trainings and the provision of technical and logistical support
- Promote the consumption of locally produced milk and premium milk products
- Implementation of climate change adaptation projects.

Going over NDA’s 2021 performance scorecard submitted to the Governance Commission for GOCCs (GCG), the stated objectives were as follows (also see Tables 10 to 16)

- **Improved productivity of dairy animals:** local milk sufficiency over demand; dairy herd growth rate
- **Safe quality local milk:** raw milk acceptance (by plants) rate
- **Increased milk and animal value of dairy farms:** increment in annual milk and animal sales value of dairy farms; percentage of satisfied customers
- **Infuse and produce dairy animals:** number of dairy animals; number of animals bred and inseminated with dairy genetics (unique heads); Dairy Industry Development Program (disbursement); Participant satisfaction rating for training conducted
- **Enhance competence of NDA workforce:** Percentage of personnel with required competencies
- **Development Quality Management System:** ISO Certification (9001:2015)
- **Enhance existing and establish new revenue sources:** Earnings before interest, taxes, depreciation and amortization (EBITDA), Collection rate on animal repayments

NDA mandate as “central policy determining and directing body” is not clearly reflected within the key strategies nor the performance scorecard of the agency. There is also no clear indication of policy innovation activities being monitored nor funded by NDA. More than a policy development body, NDA’s programs and activities delve into technology and services provision.

Table 2 shows that there is 53% increase in total new appropriations between NDA’s 2021 and 2022 approved budget, with NDA receiving an allocation of Php 510,908,000 for 2022. 88.71% of 2022 appropriations will be allocated to the Dairy Industry Development Program (see Table 3), itself having 3 major items: Locally funded Projects amounting Php 269.87 million, Dairy Herd Build-up at Php 119.243 million, and Dairy Enterprise Development at Php 64.13 million. 90.37% of the Locally funded Projects will be distributed to provinces where only three items—the implementation of the Davao Oriental Dairy Development Program and implementation of Community-based Dairy Production Livelihood Program in Marinduque and Ilocos Sur—are specified and the rest of the almost 90% of the budget allocation is distributed uniformly across 21 identified provinces suggesting a possible lack of ready projects for these provinces. Also, historically in 2019, NDA was only able to disburse 73.29% of funds related to the Dairy Industry Development Program—normally not being able to fully disburse of annual program funds is a cause for reduction in budget allocation for succeeding years though this was not the case for NDA.

The Total Agency Budget which includes General Administrative Support, Support to Operations, and Operations has also increased by 47.36% to Php 346.16 million for 2022. The Operations budget was increased by 62.77% to Php 288.495 million for 2022 (See Table 4) is fully directed towards the Dairy Industry Development Program (see Table 6)—while the allocation is usually disaggregated between two major final outputs—provision of breeding stock and technical advisory services—this is no longer reported by NDA beginning 2019. Based on 2016-2018 data however, an average of 72.38% of Operations budget is allocated towards provision of breeding stock and was used for the following: supplying imported dairy animals, supplying semen straws, vaccination of dairy animals, and production of feeds silage.

Table 5 shows that NDA is operating significantly understaffed since 2016 and only achieving 72.96% in 2021—the highest level in 6 years. Furthermore, based on the performance scorecard submitted by NDA in 2021, it declared that only 25% of its personnel met the required competencies for their positions and that the targets for 2020 and 2021 were to improve this competency rate in 5% increments per year (see table 14). This puts into question the capability of NDA to deliver its services at an appreciable rate and also fully disburse its significantly increased allocations.

Given that NDA is a GOCC, the agency is supposed to, at the minimum, recover its own costs through the various services and products that it provides. From NDA’s 2021 performance scorecard, it is clear that NDA has not generated any revenues to recover its expenses: its EBITDA for 2018 and 2019 are at negative Php 189,977,252 and negative Php 258,799,597, respectively. Comparing these negative EBITDA values with those of the Total Agency Budget (in Table 4), the agency costs were at 99.98% and 97.57% of these values, respectively. What is curious is that the EBITDA targets set for 2020 and 2021 are also still negative with only incremental improvements at negative Php 227.62 million and negative Php 196.083 million, respectively.

In Table 17, the consultants accomplished the Performance Scorecard used by NDA using their indicators and weights. Their score for 2019 was at (pro-rated) 74.61%. It is interesting to note that for a GOCC, the EBITDA and Collection rate on animal repayments only receive weights of 8% and 6%. Also, the target for Local Milk Sufficiency over Demand is set at a very low level (1.64% in 2019).

National Dairy Authority: 2021 Activities

One of the potential revenue generating activities that NDA has engaged in is through its procurement and distribution activities related to the Department of Education (DepEd)'s School-Based Feeding Program (SBFP), itself a response to the requirements of Republic Act 11037 "An Act Institutionalizing a National Feeding Program for Undernourished Children in Public Day Care of 2018". The SBFP-Milk Feeding Program Component was designed to provide at least twenty (20) days' worth of 20-ml pasteurized milk to each identified beneficiary. Originally to start in the first quarter of 2020, due to several internal concerns the SBFP-MFPC would not be able to implement its activities until the 4th quarter of 2020 and during the COVID-19 pandemic. Fortunately for the program, the passage of the RA 11469 Bayanihan to Heal as One Act and later its extension law RA 11519 Bayanihan 2 would allow a direct procurement of agricultural/food supplies from any qualified institution, including cooperatives and farmer associations. RA 11469 and RA 11519 would allow the government agencies to engage in emergency procurement, allowing these agencies to procure supplies without any approved Annual Procurement Plan or bids (See Government Procurement Policy Board Circular 01-2020), hence simplifying and hastening the procurement process.

On October 30, 2020, DepEd issued Order No. 022 where it stipulated the process of procurement in reference to GPPB Circular 01-2020 but also the terms with NDA and the Philippine Carabao Center where they are to charge 2% service fee on top of the cost of the milk products that have been procured. The terms include that the 200ml pouches are priced at Php18 while 1L bottles are at Php90. The department order also stipulated covering the costs of Php1-2 per pouch or Php5-6 per bottle related to transportation of these items. An NDA Certification dated November 6, 2020 certified that Php 18 for 200-mL pouches and Php 90 for 1L bottles were advantageous prices for the Philippine government as it was lower in cost than their calculated mean commercial price Php19.49 for 200-mL and Php 97.45 for 1L bottles. The consultants investigated the survey data of the NDA for this certification and saw that the surveyed prices included up-market milk products (i.e., Pinkie's, etc.), hence skewing the price distribution to the right—calculating the median of the milk products surveyed revealed Median=Php86.25/L (minimum price = Php 70/L; max price = Php 240/L) of pasteurized milk (which is also closer to the mean prices as reported in the final report for AGB2020-120). This puts into question the price advantage referred to by NDA.

Going over the purchase orders posted by NDA in their website as of February 11, 2022, the purchase orders for pasteurized milk (including minimal volumes of "choco-milk" products) from 2nd to 4th quarter of 2020 totaled to 706,809L and by the 1st to 2nd quarter of 2021, they had released purchase orders for a total of 911,257.20L, capturing 2.57 and 3.3%¹ of dairy volume produced locally in 2020 and 2021, respectively. These would approximately amount to Php 63.6 million for 2nd to 4th quarter of 2020 and

¹ PSA Openstat shows that in 2020, 2671MT or 27.5 million L milk and in 2021, 2630MT or 27.09 million L milk was produced.

Php 82 million for 1st to 2nd quarter of 2021. Interestingly, in none of these transactions did NDA impose the 2% service fee that was provided for by DepEd, nor did they provide coverage for the costs of transport to the suppliers.

Of note is the fact that for these pasteurized milk procurements done in 2nd to 4th quarter of 2020 and 1st to 2nd quarter 2021, more than 85% of the total milk purchases were supplied by a single company, Aces PhilProducers Corporation², with the company covering 88.31% of the former and the 89.47% for the latter. Given the Bayanihan 1 and Bayanihan 2 emergency procurement stipulations, this is not at all wrong but seems to be a very risky move on the part of NDA to have allocated most of its eggs in one basket. Based on the NDA price survey, Aces' per liter retail price was at Php 100 which would seem to suggest that NDA received a discount of Php10 per liter. In the purchase orders that were approved with Aces—and as stated above—no additional monies were given in order to cover packaging and transport costs.

With the expiration of RA 11519 Bayanihan 2 on June 30, 2021, procurement practices have resumed back to its default setup where all procurement must be made part of Annual Procurement Plans, must undergo competitive bidding, etc. The DepEd SBFP-MFPC continues its distribution of milk products. The Department of Social Welfare and Development (DSWD) has also begun to implement its Milk Feeding Program—the implementation guidelines were issued October 30, 2020 but has only begun to publish its Invitations to Bid beginning second half of July 2021.

² Aces Philproducers Corporation is the agribusiness arm of the Philippines' largest co-operative, ACDI Multipurpose Cooperative. Aces Philproducers was formally registered in the Securities and Exchange Commission in 2017 though, prior to being spun off, much of the company's agribusiness activities have been in running since before 2015. It is still being determined when Aces Philproducers began operating its own dairy processing plant, but from the ACDI website they reported having imported 240 pregnant heifers and 2 pure breed jersey bulls from Australia back in 2017. ACDI MPC—including all its predecessor organizations—has been in operation since 1981 and is composed mostly of enlisted personnel.

Table 1 NDA Organizational Mandates and Objectives

Mandate	Act as the central policy determining and directing body tasked to ensure the accelerated development of the Philippine dairy industry through policy direction and program coordination and implementation.
Vision	A vibrant local dairy industry providing wholesome, affordable milk to delighted consumers, building a nation of healthier children and wealthier farmers.
Mission	<ul style="list-style-type: none"> • To accelerate dairy herd build-up and milk production • To provide excellent technical delivery service packages that enhance dairy business at the farm and enterprise levels • To promote consumption of local milk through increased coverage of milk feeding programs that help in reducing malnutrition • To mobilize broad support for local milk
Key Result Areas	Rapid, Inclusive and Sustained Economic Growth
Sector Outcome	Improved food security through the availability of locally produced milk in the market and increased rural incomes.
Organizational Outcome	<ol style="list-style-type: none"> 1. Growth and competitiveness of the dairy sector sustained/enhanced 2. Increased incomes in the dairy sector
Key Strategies	<ul style="list-style-type: none"> • Increase dairy animals through breeding technologies such as artificial insemination • Upgrade local stocks into dairy breed • Infusion of dairy animals through importation • Ensure the adoption of safety standard protocols such as good animal practices, good farm and manufacturing practices, etc. • Empowerment of dairy farmers through dairy trainings and the provision of technical and logistical support • Promote the consumption of locally produced milk and premium milk products • Implementation of climate change adaptation projects

Table 2 2022 Approved NDA Budget: New Appropriations

PROGRAMS/SUBSIDY (In '000 PHP)	2017	2018	2019	2020	2021	2022*
MOOE						
General administration and support	11,456	17,870	25,783	39,300	24,088	24,088
Support to operations	11,258	18,709	35,940	50,606	33,577	33,577
Operations (Dairy Industry Development Program)*	177,230	483,634	209,718	176,586	276,243	453,243
MFO1: Provision for breeding stock	137,362	n/a	n/a	n/a	n/a	n/a
MFO2: Technical advisory services	39,868	n/a	n/a	n/a	n/a	n/a
TOTAL, PROGRAMS	199,944	520,213	271,441	266,492	333,908	510,908
TOTAL NEW APPROPRIATIONS	199,944	520,213	271,441	266,492	333,908	510,908

Table 3 2022 Approved NDA Budget: 2022 Dairy Industry Development Program Budget

2022 DAIRY INDUSTRY DEVELOPMENT PROGRAM BUDGET BREAKDOWN:	
Dairy herd build-up	119,243,000
Dairy enterprise development	64,130,000
Projects:	
Locally Funded Project	269,870,000
Expanded Dairy Project	243,870,000
Region I – Ilocos	22,170,000
<i>Province of La Union</i>	11,085,000
<i>Province of Pangasinan</i>	11,085,000
Cordillera Administrative Region	11,085,000
<i>Province of Abra</i>	11,085,000
Region II – Cagayan Valley	11,085,000
<i>Province of Isabela</i>	11,085,000
Region III – Central Luzon	22,170,000
<i>Province of Pampanga</i>	11,085,000
<i>Province of Tarlac</i>	11,085,000
Region IVA – CALABARZON	11,085,000
<i>Province of Quezon</i>	11,085,000
Region IVB- MIMAROPA	33,255,000
<i>Province of Mindoro Oriental</i>	22,170,000
<i>Province of Mindoro Occidental</i>	11,085,000
Region V – Bicol	22,170,000
<i>Province of Albay</i>	11,085,000
<i>Province of Camarines Sur</i>	11,085,000
Region VI – Western Visayas	22,170,000
<i>Province of Aklan</i>	11,085,000
<i>Province of Guimaras</i>	11,085,000
Region VII – Central Visayas	22,170,000
<i>Province of Cebu</i>	11,085,000
<i>Province of Negros Oriental</i>	11,085,000
Region X – Northern Mindanao	33,255,000

<i>Province of Misamis Occidental</i>	11,085,000
<i>Province of Misamis Oriental</i>	11,085,000
<i>Province of Lanao del Norte</i>	11,085,000
Region XII – SOCCSKARGEN	22,170,000
<i>Province of North Cotabato</i>	11,085,000
<i>Province of Sultan Kudarat</i>	11,085,000
Region XIII – Caraga	11,085,000
<i>Province of Agusan del Norte</i>	11,085,000
Implementation of Davao Oriental Dairy Development Program in Mati City, Davao Oriental	6,000,000
Implementation of Community-based Dairy Production Livelihood Program in the Province of Marinduque	10,000,000
Implementation of Community-based Dairy Production Livelihood Program in the Province of Ilocos Sur	10,000,000
Sub-total, Operations	453,243,000
TOTAL NEW APPROPRIATIONS	510,908,000

Table 4 2022 Approved NDA Budget: NDA Expenditure Program

EXPENDITURE PROGRAM (in '000 Pesos)	2016	2017	2018	2019	2020	2021	2022
General administrative support	11,457	11,457	17,870	25,783	39,300	24,088	24,088
MOOE	11,457	11,457	17,870	25,783	39,300	24,088	24,088
Support to operations	11,258	11,258	18,709	35,940	50,606	33,577	33,577
MOOE	11,258	11,258	18,709	35,940	50,606	33,577	33,577
Operations	147,757	167,230	153,366	189,718	176,586	177,243	288,495
MOOE	147,757	167,230	153,366	189,718	176,586	177,243	<u>288,495</u>
TOTAL AGENCY BUDGET	170,472	189,945	189,945	251,441	266,492	234,908	346,160
MOOE	170,472	189,945	189,945	251,441	266,492	234,908	346,160

Table 5 2022 Approved NDA Budget: Staffing Requirements

STAFFING SUMMARY	2016	2017	2018	2019	2020	2021	2022
Total No. of Authorized Positions	233	233	233	233	233	233	233
Total No. of Filled Positions (Proposed)	118	151	172	166	168	233	170
(Actual-Filled Positions)	137	168	165	127	128	170	
	58.80%	72.1%	70.81%	54.51%	54.94%	72.96%	

Table 6 2022 Approved NDA Budget: Total Operations by Major Final Outputs

OPERATIONS BY MFO (IN '000 PESOS)	2016	2017	2018	2019	2020	2021	2022
Dairy Industry Development Program*	147,757	167,230	153,366	189,718	176,586	177,243	288,495
MFO 1: Provision of breeding stock	107,889	127,362	104,228				
MFO 2: Technical advisory services	39,868	39,868	49,138				
Expenditure by Regional allocation (net of Central Office)	170,472	189,945	189,945	251,441	266,492	234,908	346,160
National Capital Region (NCR)	170,472	189,945	189,945	251,441	266,492	234,908	346,160
TOTAL AGENCY BUDGET	170,472	189,945	189,945	251,441	266,492	234,908	346,160

Table 7 2022 Approved NDA Budget: Organizational Outcomes and Performance Indicators (Part 13)

ORGANIZATIONAL OUTCOMES / PERFORMANCE INDICATORS	2016 Target	2016 Actual**	2017 Target	2017 Actual	2018 Target	2018 Actual
Growth and competitiveness of the dairy sector sustained/enhanced						
Percentage increase in dairy animal inventory	17% (38,953)	45,439	17% (38,953)	4.03%	52,457	52,418
Percentage increase in local milk production of NDA assisted areas	16.66 million liters	15,622.78	16.66 million liters	3.20%	18	16.90
Percentage share of local milk production to national liquid milk supply	32% = 22.64 million liters (local)	no data	13.14% (22.64 million liters)	10.77%		
	100% = 69.72 million liters	no data	9.50% (69.72 million liters)			
Percentage of children with weight gains over the overall number of children served with milk*	n/a	n/a	n/a	n/a	90%	95%
Percentage increase in the number of children served in milk feeding program	n/a	n/a	n/a	n/a	88% (1,064 children)	355% (4,255 children)
Increased incomes in the dairy sector						
Percentage increase in income	46% (P3,333)	P941,265.65	46% (P3.33 Million)	no data	15%	54% (P382,301.00)
Percentage of Milk Processing Plants registering positive sales growth	90%	no data	90%			

Table 8 2022 Approved NDA Budget: Organizational Outcomes and Performance Indicators (Part 14)

ORGANIZATIONAL OUTCOMES / PERFORMANCE INDICATORS	2019 Target	2019 Actual	2020 Target	2020 Actual	2021 Target	2022 Target
Growth and competitiveness of the dairy sector sustained/enhanced						
Percentage increase in dairy animal inventory	59,855	54,961	64,564	56,584	71,594	64,878
Percentage increase in local milk production of NDA assisted areas	18.08	17.22	19.68	20.23	24.74	24.86
Percentage share of local milk production to national liquid milk supply						
Percentage of children with weight gains over the overall number of children served with milk*	90% (baseline – 5,000)	0%	90% (baseline – 2,085 children)	no data	90% (baseline – 2,085 children)	90% (baseline – 5,000)
Percentage increase in the number of children served in milk feeding program	92% (baseline – 5,000)	88%	20% (or 2,083 children)	0%	20% (or 2,083 children)	10% (baseline = 5,000)
Increased incomes in the dairy sector						
Percentage increase in income	14% (baseline – P247,908.37)	67%	13% (baseline – P247,908.37)	10%	15% (baseline – 414,303.17)	7.8% (baseline = P247,908.37)
Percentage of Milk Processing Plants registering positive sales growth						

Table 9 2022 Approved NDA Budget: Major Final Outputs and Performance Indicators

MFO / Pls	2016 Target (Actual)	2017 Target (Actual)	2018 Target (Actual)	2019 Target (Actual)	2020 Target (Actual)	2021 Target (Actual)
MFO 1: PROVISION FOR BREEDING STOCK						
Number of imported dairy animals supplied	300 (436)	200 (0)				
Number of semen straws supplied	17425 (13,876)	12000 (12000)				
Number of cooperatives/dairy entities supplied with stock	15 (43)	10 (17)				
Percentage of requests for semen straws met in full within five days	90% (90%)	90% (90%)				
Number of local animals produced	5825 (0)	0 (0)				
Total revenue of dairy entities	P100.00 million (P84.99 million)	P250 Million (P276.37 million)				
Number of dairy animals bred	5000 (5000)	35000 (4755)				
Number of dairy animals upgraded	5000 (5000)	5000 (4967)				
Number of dairy animals vaccinated	3000 (3000)	3500 (3500)				
Volume of feeds silage produced for dairy animals (tons)	1226 (196)	750 (750)				
MFO 2: TECHNICAL ADVISORY SERVICES						
Number of persons provided with training	1816 (1816)	1850 (1635)	1853 (2418)	1212 (1848)	2975 (876)	1000 (710)
Percentage of training participants who rate the training as good or better	90% (90%)	90% (90%)				
Percentage of requests for technical advice acted upon within 3 days	90% (90%)	90% (90%)				
Number of marketing activities conducted	5 (5)	6 (6)				
Number of dairy visits conducted	5 (5)	5 (5)				
Number of dairy farms accredited	10 (100)	100 (0)				

Table 10 NDA 2021 Performance Scorecard: Improved Productivity of Dairy Animals

Component				Baseline		Targets	
Objective/Measure	Formula	Wt.	Rating System	2018	2019	2020	2021
Local Milk Sufficiency over Demand (M kgs)	Total milk production over Milk Demand* *Demand = Population x Per Capita Consumption	15%	Actual / Target	1.33% (23.69 / 1,785.72)	1.35% (24 / 1,811.1)	1.49% (27.33 / 1833.26)	1.68% (34.84 / 2070.36)
Dairy Herd Growth Rate	Current – Base Year's Count over Base Year	10%	Actual / Target	5.12% (52,188 – 49,648) / 49,648	5.31% (54,961052,188) / 52,188	7.87 (64,564 – 59,855) / 59,855	10.89% (71,594 - 64,564) / 64,564
Cattle				25,481	25,858	28,532	34,587
Carabao				10,097	10,410	12,841	13,973
Goat				16,610	18,693	23,192	23,034

Table 11 NDA 2021 Performance Scorecard: Safe Quality Local Milk

Component				Baseline		Targets	
Objective/Measure	Formula	Wt.	Rating System	2018	2019	2020	2021
Raw Milk Acceptance Rate	Total raw milk accepted by plants over Total Raw Milk Delivered to the Plants	12%	Actual/Target	99.32% (2,684.09)/ 2,702.59)	99.58% (8,774.9 8/8,811.82)	98.59% (10,911.9 3/11,067.87)	98.4% (9,147.1/ 9,300.04)

Table 12 NDA 2021 Performance Scorecard: Increased Milk and Animal Value of Dairy Farms

Component				Baseline		Targets	
Objective/Measure	Formula	Wt.	Rating System	2018	2019	2020	2021
Increment in annual milk and animal sales value of dairy farms							
Milk Value	Current year's value-past year's value over past year's value (annual value per farm)	5%	Actual / Target				
Small Farms				N/A	N/A	N/A	9%
Medium Farms				N/A	N/A	N/A	8%
Large Farms				N/A	N/A	N/A	7%
Animal Sales Value		5%		N/A	N/A	N/A	4%
Percentage of Satisfied Customers	Survey Result	5%	Actual over Target 0% = if less than 80%	N/A	86.69% (280/323)	90%	90%

Table 13 NDA 2021 Performance Scorecard: Infuse and Produced Dairy Animals

Component				Baseline		Targets	
Objective/Measure	Formula	Wt.	Rating System	2018	2019	2020	2021
Number of Dairy Animals							
Imported – Cattle heads	Actual head count of imported dairy animals NDA accepted and distributed to dairy farmers	8%	Actual / Target	-	1,733	2,625	2,016
Produced locally (heads)	Total calves born from Breeding and Upgrading Program	9%	Actual / Target	5,029	6,860	7,751	9,795
Number of dairy animals collected	Actual Count	0%	Actual / Target	50.95%	45.01%	66%	714
Number of animals bred and inseminated with dairy genetics (unique heads)	Actual Count	0%	Actual/Target	13,770	16,330	14,272	19,554
Dairy Industry Development Program	Obligated Amount / Program Budget	5%	Actual / Target	-	73.29%	100%	100%
Participant satisfaction rating for training conducted	Actual number of participants satisfied over total number of participants	5%	Actual / Target	-	96.07%	80%	80%

Table 14 NDA 2021 Performance Scorecard: Enhance Competence of NDA Manpower

Component				Baseline		Targets	
Objective/Measure	Formula	Wt.	Rating System	2018	2019	2020	2021
Percentage of personnel with required competencies	Milestone	2%	All or Nothing	-	25% (30/120)	5% improvement from previous year's competency rate	5% improvement from previous year's competency rate

Table 15 NDA 2021 Performance Scorecard: Develop quality management system

Component				Baseline		Targets	
Objective/Measure	Formula	Wt.	Rating System	2018	2019	2020	2021
ISO Certification	Milestone	2.5%	All or Nothing	ISO 9001:2015 Certified	Pass Surveillance Audit	Pass Surveillance Audit	ISO 9001:2015 Certification of Southern Mindanao Department
		2.5%					Passed surveillance audit for Central Office, Central Visayas Department and Northern Mindanao Department

Table 16 NDA 2021 Performance Scorecard: Enhance existing and establish new revenue sources

Component				Baseline		Targets	
Objective/Measure	Formula	Wt.	Rating System	2018	2019	2020	2021
EBITDA	EBITDA	8%	Actual / Target	(P189,977,252)	(P258,799,597)	(P227,620,000)	(P196,083,000)
Collection rate on animal repayments	Sum of Collections over Collectibles Due for the Year (in P'000)	6%	Actual / Target	18.59% (31,583.98 / 169,920)	18.56% (43,157.8 / 232,573.41)	52.87% (127,958/242,032)	32.9% (103,452.14/314,819.31)

Table 17 Consultants' Accomplished Performance Scorecard of NDA using 2019 targets and NDA reported values in 2021 Performance Scorecard submission

		2019 Target	2019 Actual	Score
Local milk sufficiency over demand	15.00%	1.64%	1.35%	12.35%
Dairy herd growth rate	10%	19%	5.31%	2.79%
Raw milk acceptance rate	12.00%	95.90%	99.58%	11.95%
Dairy farm value*	5%	399,076.31	NA	
Dairy multiplier farm value*	5%	3,458,751.79	NA	
Percentage of satisfied customers	5%	90%	86.69%	4.33%
imported cattle	8%	1875	92%	7.39%
produced locally	9%	10619	64.60%	5.81%
dairy multiplier farm dairy animals harvested	0%	345	45.01%	0.00%
number of animals bred and inseminated with dairy genetics (unique heads)	0%	19,311	16,330	0.00%
Dairy Industry Development Program	5%	189.718 M (100%)	73.29%	3.66%
Participant satisfaction rating for trainings conducted*	5%	NA	96.07%	4.80%
Percentage of personnel meeting required competencies	2%	Improvement from the baseline	25%	0.50%
ISO Certification	5%	Pass surveillance audit	passed	5.00%
EBITDA	8%	(261,120,000)	(258,799,597)	0%
Collection rate on animal repayments	6%	55.55% (129,189/232,573)	18.56%	1.11%
Total Score	100.00%			*** 74.61%

*Indicators were changed between 2019 targets and 2021 submission.

** Original indicator was specific to the Dairy Goat Farming Program trainings but was later (2021 scorecard) changed to trainings in general

*** reported value is pro-rated to account for NA values.

12.2 Appendix 2: Situation Report 2: Philippine Government Agencies and Government Research institutions



[REPORT]

TITLE : SITUATION REPORT 2: GOVERNMENT AGENCIES AND GOVERNMENT RESEARCH INSTITUTIONS

CLIENT : AUSTRALASIAN DAIRY CONSULTANTS PTY LTD, AUSTRALIA

DATE : APRIL 30, 2022

PROPONENT CONTACT : Anton Simon M. Palo
General Manager
anton.palo@foodlinkac.com

CONSULTANT FINDINGS

- The Department of Science and Technology (DOST), Department of Agrarian Reform (DAR) have both implemented projects that involve setting dairy processing plants in partnership with cooperatives and Agrarian Reform Beneficiary Organizations. These processing plants have been provided with License to Operate by the Food and Drug Administration (which is under the Department of Health).
- Philippine Carabao Center also operates dairy cattle related activities. They currently have a stock of Girolando cattle breed which they use to conduct their tests on the use of Embryo Transfer.
- Department of Environment and Natural Resources – Environment Management Bureau and Department of Trade and Industry do not have programs that are dedicated to cattle dairy activities. Their participation comes in for purposes of environmental policy compliance (i.e., issuance of environmental compliance certificate for agro-industrial facilities by DENR-EMB) and business permits but also business development support services by DTI.
- Institute of Animal Studies have course subjects specific to dairy operations. Dairy Training and Research Institute currently has 3 on-going dairy projects.

Philippine Council on Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)

Relevant Recent News and Updates

Date and Source	Details
<p>December 3, 2021 Website: dost.gov.ph</p>	<p>Title: DOST Albay helps boost dairy production in the province</p> <ul style="list-style-type: none"> • Location: Cabangan Camalig, Albay Province, Region V (Bicol Region) • DOST Region V provided Php 12 million to fund equipment, accessories and product testing of the Albay Dairy Plant. • The Provincial Government of Albay set up the Multi-purpose Dairy Plant Building as its project counterpart. Expansions to include additional manufacturing areas and ice cream parlor in the works. • The ADP has been granted license to operate by the Food and Drug Administration to manufacture milk products. • The ADP sources dairy products from nearby cooperatives. ADP also serves as toll milk manufacturer for the DepEd’s milk feeding program. Other products are also sold through cooperatives as marketing channels. • https://www.dost.gov.ph/knowledge-resources/news/72-2021-news/2577-dost-albay-helps-boost-dairy-production-in-the-province.html
<p>December 15, 2021</p>	<p>Title: Coop for a cup: Role of cooperatives in coffee and dairy buffalo technology adoption</p> <ul style="list-style-type: none"> • PCAARRD funded UPLB team led by Dr. Agham Cuevas to conduct program “Role of cooperatives in technology adoption for improved production and market efficiency in dairy buffalo and coffee.” • Goal of program was to assess effectiveness of cooperatives in technology adoption, production and marketing efficiency, effectiveness as platforms for innovation and technology transfer, as well as come up with recommendations on how to enhance technology adoption among cooperatives or other rural/community-based organizations (RBOs). • Challenges identified included lack of information on or poor access to technologies, inadequate equipment/facilities, high cost of inputs and transportation, poor access to credit, and limited access to markets. Other challenges include membership delinquency and low membership participation, poor planning and management of resources.

	<ul style="list-style-type: none"> • https://ispweb.pcaarrd.dost.gov.ph/coop-for-a-cup-role-of-cooperatives-in-coffee-and-dairy-buffalo-technology-adoption/
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Goals and Objectives

Sector Outcome:

- Technology adoption promoted and accelerated
- Innovation stimulated

Organization Outcome:

- Increased benefits to Filipinos from science-based know-how and tools for agricultural productivity in the agriculture, aquatic and natural resources (AANR) sectors

PERFORMANCE INDICATORS	2017	2018	2019	2020	2021	2022
	Actual Accomplishments (based on NEP)				Targets (based on NEP)	
Outcome indicators:						
1. percentage of priorities in the harmonized national R&D agenda addressed	100%	98%	94%	100%	90%	90%
2. number of partnerships with local (public and private) and international organizations*	no data	255	147	165	137	120
Output indicators:						
1. number of proposals funded	1,473	674	488	438	566	643
2. number of projects monitored	576	630	776	698	750	637
3. percentage of projects completed which are published in peer-reviewed journals, presented in national and/or international conferences, or with IP filed or approved	94%	92%	90%	95%	90%	90%
<i>NOTE: Outcome indicator #2 is a new indicator added in 2018.</i>						

Budget

ITEMS	2017	2018	2019	2020	2021	2022
General Appropriations	1,237,421,000	1,287,254,000	1,204,966,000	723,981,000	1,437,189,000	1,397,118,000
Staffing Summary	2017	2018	2019	2020	2021	2022
Total Number of Authorized Positions	254	254	254	256	256	256
Total Number of Filled Positions	220	225	225	211	214	214
	2017	2018	2019	2020	2021	2022
Programs - Operations	1,144,367,000	2,167,122,000				
Agriculture, aquatic and natural resources sectors research and development policy services	67,814,000	n/a	n/a	n/a	n/a	n/a
Research and development management services for agriculture, aquatic and natural resources sector	1,076,553,000	n/a	n/a	n/a	n/a	n/a
NATIONAL AANR SECTOR R&D PROGRAM	n/a	1,083,561,000	1,095,959,000	1,120,542,000	1,277,889,000	1,285,304,000
Development, integration and coordination of the natural research system for the AANR sector	n/a	1,083,561,000	1,095,959,000	1,120,542,000	1,277,889,000	1,285,304,000

FOOD AND DRUG ADMINISTRATION

Relevant Recent News and Updates

<p>February 26, 2021 Memo Circular 2020-033</p>	<p>Procedure for the Use of the Modified Electronic Registration System for Raw Materials and Prepackaged Processed Food Products Repealing FDA Circular No. 2016-014 “Procedure for the Use of Electronic Registration system for Prepackaged Food Products</p> <ul style="list-style-type: none"> • Risk classification following Administrative Order No. 2014-0029 Annex A. Dairy Products and their analogues have been classified as High-Risk Food (or “foods that may contain pathogenic microorganisms and will support the formation of toxins or the growth of pathogenic microorganisms and foods that may contain harmful chemicals”). Exceptions to these are given to condensed milk, evaporated milk, reconstituted milk, and milk powders which are classified as medium risk foods.
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Goals and Objectives

Mandate

As a regulatory agency under the Department of Health, the Food and Drug Administration, created under Republic Act No. 3720, series of 1963, as amended by Executive Order 175, series of 1987, otherwise known as the “Food, Drugs and Devices, and Cosmetics Act”, and subsequently Republic Act No. 9711 otherwise known as “The Food and Drug Administration Act of 2009”, is mandated to ensure the safety, efficacy or quality of health products which include food, drugs, cosmetics, devices, biologicals, vaccines, in-vitro diagnostic reagents, radiation-emitting devices or equipment, and household/urban hazardous substances, including pesticides and toys, or consumer products that may have an effect on health which require regulations as determined by the FDA.

Mission

To guarantee the safety, quality, purity, and efficacy of products in order to protect and promote the right to health of the general public.

Goal

- To protect and promote the right to health of the Filipino people by ensuring the safety, efficacy, quality, and purity of foods, drugs, devices, and cosmetics, and;
- To establish and maintain an effective health products regulatory system responsive to the country’s health needs and problems.

Performance Targets and Indicators for 2021

Particulars	Actual	Estimate	Total
Health Regulatory Program			
Outcome Indicators			
Percent of health establishments and health products* compliant to regulatory policies	N/A	84.32% (78,395/92,978)	84.32% (78,395/92,978)
Output Indicators			
Percent of applications for permits, licenses, or accreditation processed within the Citizen’s Charter timeline	93.11%	91.44% (63,404/69,336)	92.64% (229,964/248,227)
Percent (& Number) of establishments and health products monitored and evaluated for continuous compliance to regulatory policies	52.05% (59,941)	68.07% (78,395)	68.07% (78,395)

*RA9711 defines “health products” as “food, drugs, cosmetics, devices, biologicals, vaccines, in-vitro diagnostic reagents and household/urban hazardous substances and/or combination of and/or derivative thereof. It shall also refer to products that may have an effect on health which require regulations as determined by the FDA”.

DEPARTMENT OF AGRARIAN REFORM

Relevant Recent News and Updates

<p>January 29, 2022 Website: dar.gov.ph</p>	<p>DAR turns over dairy processing facility in Nueva Ecija</p> <ul style="list-style-type: none"> • DAR turned over a Php 300-million dairy processing facility to the Bongabon Dairy Cooperative, an agrarian reform beneficiary organization (ARBO). The support was availed through the business development service with support facility under the Village Level Farm Focused Enterprise Development (VLFED) of DAR. • Bongabon LGU provided a counterpart amounting to Php 500 thousand, while DTI, PCC, and DOST region 3 (Central Luzon) will be providing technical assistance support and extension services to the cooperative. • https://www.dar.gov.ph/articles/news/103310
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Goals and Objectives

Mandate and Functions

To lead in the implementation of the Comprehensive Agrarian Reform Program (CARP) through Land Tenure Improvement (LTI), Agrarian Justice and Coordinated delivery of essential Support Services to client beneficiaries.

- To provide Land Tenure security to landless farmers through land acquisition and distribution; leasehold arrangements' implementation and other LTI services;
- To provide legal intervention to Agrarian Reform Beneficiaries (ARBs) through adjudication of agrarian cases and agrarian legal assistance;
- To implement, facilitate and coordinate the delivery of support services to ARBs through Social Infrastructure and Local Capability Building (SILCAB); Sustainable Agribusiness and Rural Enterprise Development (SARED); and Access Facilitation and Enhancement Services (AFAES).

Mission

DAR is the lead government agency that holds and implements comprehensive and genuine agrarian reform which actualizes equitable land distribution, ownership, agricultural productivity, and tenurial security for, of and with the tillers of the land towards the improvement of their quality of life.

Vision

A just, safe and equitable society that upholds the rights of tillers to own, control, secure, cultivate and enhance their agricultural lands, improve their quality of life towards rural development and national industrialization.

Sector Outcome

- Access to economic opportunities by small farmers increased

Organization Outcome

- Tiller's security of tenure ensured
- Tiller's rights and welfare promoted
- Agrarian reform areas improved

	AGENCY PERFORMANCE REVIEW CY 2020-2021		
Outcome Indicator:	January - December 2020		January - June 2021
Percentage of farmers actually installed in awarded lands	During the year, DAR surpassed its target of installing 78% of the agrarian reform beneficiaries awarded with Eps/CLOAs by achieving a performance rate of 158%.		no data available yet
Output Indicators:			
No. of landholdings with claimholder documentation completed	Completed documentation of claimholders covering 4,328 landholdings equivalent to 91% of the 2020 target of 4,742 landholdings. In terms of hectareage covered by documented CFs, 16,840 hectares or 37% of the 45,406 hectare target for the year was accomplished.		Completed documentation of claimholders (CFs) covering 9,158 hectares, or 20.32% of the target for the year of 45,070 hectares and 39.14% of the target for the semester of 23,399 hectares.
No. of hectares with emancipation patents/certificate of land ownership award (EP/CLOA) registered	Registered EPs and CLOAs involving 18,789 hectares and 14,529 ARBs. The accomplishment in terms of Eps/CLOA registered is equivalent to 44% of the target for the year of 42,792 hectares.		Registered Emancipation Patents (EPs) and Certificates of Land Ownership Award (EPs/CLOAs) involving 6,430 hectares and 5,757_ ARBs. The accomplishment in terms of number of hectares covered by EPs/CLOAs registered is equivalent to 14.15% of the target for the year of 45,455 hectares and 53.36% of the target for the semester of 12,050 hectares.

No. of generated certificate of land ownership awards (CLOAs) registered (LRA-CARP)	Distributed EPs/CLOAs covering 40,407 hectares to 31,771 ARBs. In terms of area covered by distributed EPs/CLOAs, the DAR delivered 121% of its target for the year of 33,310 hectares. In terms of number of ARBs, the DAR also surpassed its target of 29,502 ARBs by almost 8%.	Distributed EPs/CLOAs covering 46,120 hectares to 36,580 ARBs. In terms of area covered by distributed EPs/CLOAs, the DAR delivered 113.67% of its target for the year of 40,578 hectares, and 304% of the target for the semester of 15,155 hectares. In terms of number of ARBs, the DAR also surpassed its target for the year of 32,001 ARBs by 14%.
No. of Agrarian Reform Beneficiaries (ARBs) installed	Installed 22,969 ARBs in 30,479 hectares of CARP lands. The accomplishment in terms of number of ARBs installed is equivalent to 82% of the target for the year of 28,086 ARBs.	Installed 24,024 ARBs in 32,149 hectares of CARP lands. The accomplishment in terms of number of ARBs installed is equivalent to 76.02% of the target for the year of 31,601 ARBs, and 198.87% of the target for the semester of 12,080 ARBs.
No. of hectares place under leasehold arrangements	A total of 12,382 hectares, or 121% of the 2020 target of 10,223 hectares. This benefitted 6,816 ARBs.	Placed under leasehold a total of 6,108 hectares, or 52.27% of the CY 2021 target of 11,685 hectares, and 105.35% of the target for the semester of 5,798 hectares. This benefitted 3,198 ARBs.

Budget

ITEMS	2017	2018	2019	2020	2021	2022
General Appropriations	9,801,491	9,533,430	7,832,478	9,135,200	8,450,785	12,423,349
Staffing Summary	2017	2018	2019	2020	2021	2022
Total Number of Authorized Positions	11,594	11,856	10,471	10,209	10,209	10,209
Total Number of Filled Positions	8,147	8,506	8,546	8,256	8,113	8,113
	2017	2018	2019	2020	2021	2022
PROGRAMS - OPERATIONS	5,547,636,000	7,869,223,000	5,859,653,000	7,274,783,000	6,531,671,000	8,149,924,000
Agrarian Policy Advisory Services - policy formulation, planning, monitoring and evaluation, information management, and systems development	131,277,000	628,855,000	641,668,000	671,777,000	678,999,000	655,333,000
Land Tenure Security Program - land acquisition and distribution, claim folder preparation and documentation	2,986,497,000	2,466,284,000	2,472,061,000	3,874,359,000	3,444,537,000	5,354,536,000

Agrarian Justice Delivery Program - planning, programming of legal information for effective delivery of legal services and assistance to agrarian reform beneficiaries and landowners and adjudication of agrarian reform cases	720,773,000	935,772,000	806,052,000	813,778,000	897,429,000	826,198,000
AR Beneficiaries Development and Sustainability Program - programming and development of agrarian reform beneficiaries, organizations and agrarian reform communities.	1,709,089,000	3,838,312,000	1,939,872,000	1,914,869,000	1,510,706,000	1,313,857,000
	2017	2018	2019	2020	2021	2022
Land Tenure Services for CALABARZON	359,000	115,772,000	117,204,000	110,730,000	122,095,000	113,732,000
PARO- BATANGAS	32,000	27,106,000	27,597,000	25,063,000	26,246,000	24,191,000
PARO - CAVITE	20,000	8,621,000	9,295,000	8,690,000	8,439,000	7,036,000
PARO - LAGUNA	28,000	11,136,000	10,983,000	10,298,000	10,533,000	8,203,000
PARO - QUEZON I	33,000	14,028,000	14,547,000	11,862,000	15,504,000	14,679,000
PARO - QUEZON II	237,000	39,647,000	38,891,000	39,036,000	46,565,000	43,501,000
PARO - RIZAL	9,000	15,234,000	15,891,000	15,781,000	14,808,000	16,122,000
<i>Note: Provincial Agrarian Reform Office (PARO)</i>						

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES – ENVIRONMENT MANAGEMENT BUREAU

Goals and Objectives

Mission

To protect, restore and enhance environmental quality towards good public health, environmental integrity and economic viability

Vision

A national empowered to protect our finite natural resources, attuned to the pursuit of sustainable development, for a clean and healthy environment that enhances the Filipino Quality of life for present and future generations.

Sector Outcome

- Environmental quality for a cleaner and healthier environment improved

Organizational Outcome

- Clean and healthy environment sustained

Performance Information	2017	2018	2019	2020	2021	2022
<i>Environmental Assessment and Protection Program</i>	Actual	Actual	Actual	Targets	Targets	Targets
Number of projects monitored based on ECC conditions with reports submitted	n/a	16,930	14,910	14,910	14,910	no data
Information, education and communication materials developed and disseminated	n/a	57,000	40,000	40,000	40,000	no data
Number of environmental research studies conducted for policy purposes	n/a	1	1	1	1	no data
Performance Information	2017	2018	2019	2020	2021	2022
<i>Environmental Regulations and Pollution Control Program</i>	Actual	Actual	Actual	Targets	Targets	Targets
Percentage of permits, clearances, and certificates issued within the prescribed timeframe	82%	89%	80%	80%	80%	no data

Number of sites/facilities or areas that have been inspected with report submitted	64,948	62,286	50,091	50,091	52,595	no data
Percentage of cases/complaints acted upon within the prescribed timeframe	100%	96%	96%	96%	96%	no data

Budget

ITEMS	2017	2018	2019	2020	2021	2022
General Appropriations	2,204,416,000	2,643,768,000	2,560,820,000	3,297,996,000	2,672,231,000	3,638,427,000
Staffing Summary	2017	2018	2019	2020	2021	2022
Total Number of Authorized Positions	1,780	1,780	1,780	1,772	1,772	1,772
Total Number of Filled Positions	1,325	1,342	1,423	1,466	1,450	1,450
	2017	2018	2019	2020	2021	2022
Programs - Operations	1,899,763,000	1,961,129,000	1,760,426,000	2,687,215,000	1,984,824,000	3,115,069,000
Environmental Regulation Services	1,899,763,000	n/a	n/a	n/a	n/a	n/a
Environmental assessment and protection program	n/a	344,272,000	376,577,000	420,420,000	407,939,000	367,345,000
Environmental regulation and pollution control program	n/a	1,616,857,000	1,383,849,000	2,266,795,000	1,576,885,000	2,747,724,000

DEPARTMENT OF TRADE AND INDUSTRY

Goals and Objectives

Mandate

The DTI is responsible for realizing the country's goal of globally competitive and innovative, industry and services sector that contribute to inclusive growth and employment generation.

Sector Outcome

- Economic opportunities in industry and services expanded
- Access to economic opportunities in industry and services for Micro, Small, and Medium Enterprises (MSMEs), cooperatives and Overseas Filipinos (OFs).
- Consumer welfare improved

Organizational Outcome

- Exports and investments increased
- Industries developed
- MSMEs assisted and developed
- Consumer welfare enhanced

Performance Information	2017	2018	2019	2020	2021	2022
Organizational Outcomes/Performance Indicators	Actual	Actual	Actual	Actual	Targets	Targets
EXPORTS AND INVESTMENTS DEVELOPMENT PROGRAM						
Amount of exports	no data	US\$91.2 Billion	no data	US\$58 Billion	US\$93.9-95.8 Billion	US\$105.3 Billion
Amount of approved investments	no data	Php915 Billion	no data	Php1,016 Billion	Php905.08 Billion	Php1,094 Billion
INDUSTRY DEVELOPMENT PROGRAM						
Employment generated from the industry increased annually	no data	466,000	no data	n/a	333,000	200,000
Employment generated from the services sector increased annually	no data	617,000	no data	n/a	528,000	600,000-700,000
MSME DEVELOPMENT PROGRAM						
Percentage of MSMEs assisted to the total number of MSMEs in manufacturing, retail, construction and services sectors	no data	34%	no data	44%	31%	32%
CONSUMER PROTECTION PROGRAM						

Consumer resolution rate	no data	97%	no data	99%	98%	98%
CONSUMER EDUCATION AND ADVOCACY PROGRAM						
Level of consumer awareness increased	no data	70%	no data	81%	72%	76%

Budget

General Appropriations - Operations	2017	2018	2019	2020	2021	2022
Export and investments development	653,659,000	747,363,000	733,677,000	1,388,677,000	860,192,000	790,465,000
Industry development program	489,249,000	456,628,000	441,805,000	706,223,000	569,485,000	506,697,000
MSME development program	518,430,000	2,246,477,000	1,832,212,000	2,650,737,000	2,359,836,000	3,485,267,000
Consumer protection program	265,853,000	456,053,000	449,309,000	510,973,000	635,954,000	465,884,000
Consumer education and advocacy program	224,102,000	93,599,000	95,123,000	83,482,000	84,200,000	83,529,000
Staffing Summary	2017	2018	2019	2020	2021	2022
Total Number of Authorized Positions	2,533	2,623	2,638	2,640	2,645	2,645
Total Number of Filled Positions	2,029	2,186	2,210	2,249	2,253	2,253

PHILIPPINE CARABAO CENTER

Relevant Recent News and Updates

<p>April 4, 2022 Website: ispweb.pcaarrd.dost.gov.ph</p>	<p>Title: Feeding protocols and Practices</p> <ul style="list-style-type: none"> • Philippine Carabao Center developed the Complete Nutrient Diet (CND) to improve the Average Daily Grain and milk yield. • From their assessment, ADG was increased by 0.116kg, a reduction in feed cost by Php 43.09 per kilogram gain in weight or Php 9.25 on feed cost per kg of milk produced. Estimated savings is at Php 13,770 in feed cost across 120 days using the CND. • Milk production was increased from 4.49kg/day to 6kg/day, leading to Php 6,894,370 total income from 284 days of lactation from 60 dairy buffalo. • https://ispweb.pcaarrd.dost.gov.ph/development-of-feeding-protocols-and-practices-to-support-the-nutritional-requirements-of-dairy-buffaloes/
<p>April 4, 2022 Website: ispweb.pcaarrd.dost.gov.ph</p>	<p>Title: Establishment of dairy cattle foundation breeder herd through Embryo Transfer (ET) using imported pedigreed frozen embryos</p> <ul style="list-style-type: none"> • Philippine Carabao Center successfully able to produce its first calf using ET and fresh embryo from a Girolando donor cow. • PCC used optimized fixed time AI and multiple ovulation and embryo transfer protocols. Pregnancy was confirmed 45 days after the ET procedure and calf was born on April 24, 2020 with 33kg body weight. • https://ispweb.pcaarrd.dost.gov.ph/project-title-establishment-of-dairy-cattle-foundation-breeder-herd-thru-embryo-transfer-et-using-imported-pedigreed-frozen-embryos/

Goals and Objectives

Mandate

The PCC, operating as an attached agency of the DA, is mandated to conserve, propagate, and promote the Carabao as a source of milk, meat, draft power and hide to benefit the rural farmers.

Vision

A premier research and development institution propelling sustainable growth of the livestock industry.

Mission

Improve the general well-being and competitiveness of the livestock industry stakeholders through animal biotechnology and technology development, technology dissemination and knowledge resource management, active private sector participation, livestock-based enterprises, and policy reforms to sustain development of livestock enterprises, thus ensuring socio-economic empowerment for nation building.

Sector Outcome

- Economic opportunities in Agriculture and Fisheries expanded and access to economic opportunities by small farmers and fisherfolk increased

Organizational Outcome

- Carabao-based enterprise enhanced

Performance Information	2017	2018	2019	2020	2021	2022
Carabao-based enterprises enhanced	Actual	Actual	Actual	Actual	Targets	Targets
% increase in the production of genetically improved calves	Decrease of 3.87% from 2016 (18,017)	10.17%	10.05%	10.09%	5% annually	5% annually
Family income from carabao-based enterprises increased	48.57% (52,000)	20%	23.36%	24.43%	10%	10%
Percentage of technology adopters/users	n/a	10%	22%	22%	20% in 3 years	25% in 3 years

Budget

ITEMS	2017	2018	2019	2020	2021	2022
General Appropriations	419,810,000	489,530,000	651,981,000	587,105,000	485,703,000	736,433,000
Staffing Summary	2017	2018	2019	2020	2021	2022
Total Number of Authorized Positions	221	221	217	214	208	208
Total Number of Filled Positions	199	198	193	177	179	179
	2017	2018	2019	2020	2021	2022
National Carabao Development Program	382,553,000	456,023,000	617,689,000	555,924,000	555,924,000	680,410,000
Formulation and monitoring of policies, plans and programs	10,076,000	10,531,000	43,009,000	33,939,000	33,939,000	25,651,000
Intensification of the National Upgrading Program/Production support services	221,827,000	257,509,000	235,311,000	253,028,000	253,028,000	251,837,000

Carabao-Based Enterprise Development/Market development services	14,078,000	32,461,000	212,969,000	130,455,000	130,455,000	270,455,000
Knowledge Management and Support Services/Extension support education and training services	14,690,000	10,453,000	10,430,000	11,685,000	11,685,000	11,608,000
Research for Development	121,882,000	108,071,000	87,526,000	94,242,000	94,242,000	88,262,000
Animal Genetic Resource Conservation and Utilization	n/a	36,998,000	28,444,000	32,575,000	32,575,000	32,597,000

INSTITUTE OF ANIMAL SCIENCE – UPLB

Goals and Objectives

Vision

A world class academic institution of higher learning in animal science contributing to national development

Mission

To produce highly competent graduates with deep sense of nationalism; advance knowledge and effective technology adoption among end-users; and advocate policies that will promote animal food security and safety based on sound social and ecological principles.

Courses offered

- Dairy Technology
- Dairy Production and Advances in Dairy Production
- Milk Hygiene

Faculty on Dairy-related courses

- Ms. Olivia C. Emata, Assistant Professor 7, Dairy Technology and Microbiology
- Mr. Angelo M. Tapia, Assistant Professor 1, Dairy Technology
- Ms. Cristy M. Bueno, Assistant Professor 7, Meat Science and Animal Nutrition
- Ms. Isabelita O. Aychoco, University Researcher 1, Ruminant Production

DAIRY TRAINING AND RESEARCH INSTITUTE

Goals and Objectives

Mandate

DRTI is a research and training institution for the local dairy industry. It will address issues pertaining to intensive and alternative dairy production systems.

Goals and Objectives

1. To train competent manpower required by the local and international dairy industry
2. To conduct research relevant to the needs of the dairy industry, which includes genetics evaluation, reproductive biotechnology, forage evaluation, and milk products development, and
3. To assist farmers in improving their activities in coordination with government and private agencies concerned with the local dairy industry and develop and disseminate dairy technologies and information responsive to the needs of all sectors at all levels of the dairy industry and related industries.

As a non-degree granting unit, it will provide manpower and physical resources to dairy/food courses of the college, as well as academic support to SCU's and government agencies.

Research Aims:

- Improvement of animal performance through genetic, reproductive biotechnology and nutrition biotechnology
- Development and improvement of animal products and by-products; and
- Waste management and utilization for sustainable animal production

On-Going Research Projects

Philippine Local Forages as Sustainable Feed Alternative for Dairy Cattle	Loresco, M. M., Banayo, J., Yambao, R. R. C., Centeno, J.	On-Going
Developing a Sustainable Dairy Cattle Genetic Stock in the Philippines: Phase I – Establishing Base for Future Breeding	Salces, A. J., Banayo, J. B., Umali, K. M.	On-Going
NDA-ADSC Dairy Semen Production Project	Bautista, J. A. N., Salac, H. S., Fructoso, P. M., Manjares, M. L. D.	On-Going

Please see Appendix B for list of completed research projects (2011-2015).

12.3 Appendix 3: Review of the Indonesian government policy relating to the dairy sector



Review of the Indonesian government policy relating to the dairy sector

IndoDairy

March 2022





About PT. Mitra Asia Lestari

PT. Mitra Asia Lestari is an independent management and project consulting firm committed to sound research, effective & strategic advice and promoting partnerships for the benefit of all stakeholders,

Office 8 level 18-A, Jl. Jend. Sudirman Kav 52-53
Sudirman Central Business District (SCBD)
Jakarta 12190, Indonesia

Email: contact@mitraasia.com
Web: <http://mitraasialestari.com/>



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Abbreviation

AANZFTA:	ASEAN-Australia-New Zealand Free Trade Agreement
DGLAHS:	The Directorate General of Livestock and Animal Health Services (Ministry of Agriculture)
Gol:	Government of Indonesia
GKSI:	Indonesian Dairy Cooperative Association
IA-CEPA:	Indonesia-Australia Comprehensive Economic Partnership Agreement
IPS:	The Indonesian Association of Milk Processors
KUD:	Koperasi Unit Desa (Village Cooperatives)
LME:	Liquid Milk Equivalent
MoA:	Indonesian Ministry of Agriculture
MPI:	Milk Processing Industry
SCM	Sweetened Condensed Milk
SHD:	Smallholder Dairy Farmer
SMP:	Skim Milk Powder
WMP:	Whole Milk Powder



Executive Summary

COVID-19 has caused significant social and commercial disruption globally. As part of the international community, Indonesia has not escaped this tragedy. Dairy is one of the national strategic commodities for Indonesia. This report provides a systematic analysis of the general situation and policies on Indonesian dairy just before and during the COVID-19 pandemic.

Indonesia has had complex environments influencing its dairy value chains. The demand for dairy continues to increase, albeit domestic supply has not been able to keep up with this opportunity. Consequently, the gap has been filled by imports, mainly milk powder, which have increased to over 80% of domestic consumption, during the early part of the 21st century.

To reverse this trend and most importantly assist the smallholder dairy (SHD) to produce more quality fresh milk and improve their livelihoods, various policies have been formulated by the relevant ministries; including the Ministry of Agriculture, Ministry of Trade, Ministry of Industry, Ministry of Health, and other GoI agencies. Although these regulations are complementary, unfortunately, policies made are often not based on evidence and the disharmony of regulatory changes that have occurred, are sometimes detrimental to the industry.

Evaluating supply chain interventions and partnerships to sustainably grow the SHD dairy sectors of Indonesia is part of an ACIAR project AGB/2021/124. To date, the project has identified several key interventions to address a range of technical and supply chain opportunities and constraints to assist SHD farmers. Integral to the implementation and sustainability of many of these interventions will be market-based approaches supported by private-sector partnerships. This report aims to provide the project, a baseline perspective of the relevant government policy concerning priorities, objectives, and initiatives relating to the dairy sector, post-January 2020.



1. Objective and Overview of the Report

This report, designated as '1a' is a subset of a larger **Objective 1**: *“Undertake environmental scans of SHD inclusive dairy value chains, public stakeholders, private entities and dairy development projects in Indonesia post-January 2020...”*

The rationale of the January 2020 timeline is to build on information from the previous project: AGB/2012/099, which ended just before the commencement of the COVID-19 pandemic in late 2019. Before we review relevant Gol policies, perhaps it is prudent to initially review the pre-pandemic situation of the Indonesian dairy industry towards the end of 2019.

2. Dairy Policy Analysis Pre COVID-19 Pandemic

2.1 General Analysis Pre COVID-19 Pandemic

Indonesia is currently positioned as a net consumer in the international trade map in dairy. Until now, the national dairy processing industry is still very dependent on imports of dairy raw materials.

As an overview, the Indonesian dairy sector consists of two very distinct scales of production. In 2019, the USDA noted that the first group is a small yet growing group of modern, efficient, productive, and integrated dairy companies. On average, each company owns about ten percent of the dairy herd yet contributes 23 percent of fresh milk production, with 5,000 head of lactating dairy cows per farm and are generating outputs of 20 litres/animal/day (USDA 2019).

Meanwhile, the second group is the smallholder dairy farmers (SHD), with typically only three to five cows, who are characteristically inefficient, yielding on average less than 10 litres/animal/day. SHD profitability remains low, leading to high dairy cow culling rates in times of high beef prices. Nonetheless, these small-scale operations still account for 77% of fresh milk production (USDA 2019)

The Indonesian Ministry of Agriculture (2020) recorded that close to 97% of such farms are concentrated in Java Island (West, Central, and East Java) with a small proportion of around 3% in Sumatra. East Java is Indonesia's largest dairy production base accounting for 57% of all milk production. The average productivity of cattle in Indonesia is less than half of the international standard at 10-14 litres per day, compared to around 25-30 litres per day.

Since the Dutch colonial era, most farms have had the Frisian-Holstein breed, the Gol dairy breed of choice. Currently, one integrated company is trying out Jersey cows. All live dairy cattle are currently imported from Australia, the only country with live dairy cattle import protocol with Indonesia (USDA, 2019).

The shortage of dairy heifers and the farm's management difficulties limit SHD domestic fresh milk production. The Indonesian Government has a credit program that SHD can use to buy more dairy cows for their businesses. Still, this credit program is reportedly hardly used, as most dairy farmers lack the



collateral needed to participate in the loan program. It is evidenced by the 2013 Agriculture Household Census, which indicates that milk production by SHD contributes to the livelihoods of 144,000 families, including some of the poorest who have limited access to land and capital. This situation makes Indonesia one of the most efficient countries in the world to develop inclusive dairy business models (IPB 2018), as it provides high economic and social impacts on rural communities.

Furthermore, the overall demand growth of total dairy consumption has increased by approximately 5% in 2019, reaching 3.99 billion litres, or 4.08 million tons LME. In 2019, the Indonesian Ministry of Agriculture recorded that the dairy consumption level was around 16.62 kg/capita/year. This figure is still among the lowest in the Asia Pacific region and still far below other ASEAN countries (USDA, 2019).

2.2 Policy Analysis Pre COVID-19 Pandemic

For a baseline perspective, there are several relevant pre-pandemic dairy policies that warrant review. In 2017, there was a policy initiative from the Indonesian Ministry of Agriculture to stop issuing import recommendations for retail-ready milk products, including fresh (pasteurised) milk, liquid milk (UHT, and evaporated), sweetened condensed milk, and creamer. These products are only allowed if used as an input for industrial production or further processing in Indonesia. The justification given by the Ministry of Agriculture was that imports would only be allowed if domestic production was insufficient and/or products could not be produced domestically.

In the same year, the ministry released Ministry of Agriculture Regulation Number 26/2017. The regulation had mandated that importers establish “partnership agreements” with local entities to procure local milk, invest in local milk production, and/or invest in promoting local fluid milk consumption. The regulation also prescribes the restrictions of imports of horticulture, animal products, and their derivatives, which unfortunately conflicts with Article 11 paragraph 1 of the GATT 1994 (The General Agreement on Tariffs and Trade 1994).

Consequently, the Ministry of Agriculture Regulation Number 26/2017 was twice revised. First, it became Minister of Agriculture Regulation Number 30/2018. Subsequently, on the second revision, it transformed into Minister of Agriculture Number 33/2018. This second revision removes the notion that partnership agreements are mandatory, removes mandatory reporting requirements, removes the remaining sanctions related to non-compliance, and allows milk processors to build their factories within three years. The provision that it must establish and produce locally procured milk was also removed.

Prior to the pandemic in 2019, the Indonesian Ministry of Trade issued a new regulation regarding the Provisions of Export and Import of Animals and Products of Animal Origin Number 29/2019, which deregulates labeling requirements and removes the mandatory inclusion of Import Permit number on the Certificate of Health that previously had caused the delay of the Certificate of Health issuance. However, the Import Permit number must be included on the Customs Import Notification instead.

At the commencement of 2020, Oceania’s SMP import tariff was eliminated under the ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA). Moreover, Australia and Indonesia announced the end



of negotiations and commenced the signing of the Indonesia-Australia Comprehensive Economic Partnership Agreement (IA-CEPA). The IA-CEPA provides preferential access for Australian agricultural products, including eliminating or reducing tariffs on several dairy products.

3. Dairy Policies During COVID-19 Pandemic

3.1 General Analysis During COVID-19 Pandemic

The GoI introduced the Indonesian Dairy Blueprint 2015-2025, intended to serve as a basis for coordinating the formulation of national policies in the dairy sector by the Coordinating Ministry for Economic Affairs. In addition, it serves as a working document that becomes a reference in the development of a national milk program. Meanwhile, operational activities are carried out by each relevant ministry/institution by involving stakeholders, including breeders, business actors, financial institutions, associations, and professional organisations in animal husbandry and veterinarians.

The blueprint is a long-term plan made up of several stages, firstly the stage of Preparation and Consolidation (2013 – 2014), which starts with planning coordination and policy synchronisation that is recorded in the RJPM (Medium Long-Term Plan) and Renstra (Strategic Plan).

Secondly, the Advanced National Dairy Development stage (2015 – 2020) encourages increasing milk consumption and domestic fresh milk production. This involves increasing the population of dairy cattle, the formation of dairy breeding clusters, accompanied by the growth of IPS, and upskilling farmers to improve their livelihood and income.

Last but not least is the Resilient and Sovereign National Dairy stage (2021 – 2025). The plan is to achieve food security and self-sufficiency, which includes the assurance of affordable, quality, safe, healthy, halal, and competitive dairy products to meet the nutritional adequacy and increase the intelligence of the nation's generation.

The COVID-19 mobility restriction in April 2020 did not directly influence dairy processing activities since dairy is categorised as a national strategic product. However, the restrictions have disrupted other fundamental aspects, particularly the availability of cattle feed. For example, farmers have relied on tofu dregs as part of their feeding regime, since many tofu factories were closed during the restriction, farmers had to resort to other alternatives with lower nutrition, resulting in low milk quality and production.

Nonetheless, during the COVID-19 pandemic, milk consumption increased to more than 50% from previous demand, especially in Java. Some breeders have also increased production capacity. However, declining national economic growth has burdened many SHD to obtain capital.



3.2 Dairy Policy Analysis in 2020

The Indonesia-Australia Comprehensive Economic Partnership Agreement (IA-CEPA) entered into force in July 2020. The agreement, with provisions covering tariffs, customs procedures, and technical barriers to trade, among other areas, expands upon the existing ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA).

- Dairy products of HS codes 04.01.10 (Milk and cream, not concentrated nor containing added sugar or other sweetening matter—of a fat content, by weight, not exceeding 1 %) with important notes as follows:
 - 0401.10.10 (in liquid form): tariff is decreased from 5% to 4% until year 2032, then 0% beginning year 2033.
 - 0401.10.20 (other): tariff is decreased from 5% to 4% until year 2025, then 0% beginning year 2026.
- Dairy products of HS codes 0401.20 (Milk and cream, not concentrated nor containing added sugar or other sweetening matter—of a fat content, by weight, more than 1% but not exceeding 6%) with important notes as follows:
 - 0401.20.10 (in liquid form): tariff is decreased from 5% to 3.75% then decreased 0.25% annually until year 2032, then 0% beginning year 2033.
 - 0401.10.20 (other): tariff is decreased from 5% to 4% until year 2025, then 0% beginning year 2026.

Regarding the registration and licensing of livestock businesses, the Minister of Agriculture Number 14/2020 concerning Registration and Licensing of Livestock Businesses highlighted the type and scale of business and procedures for running a livestock business in Indonesia, including dairy farming. The regulation is an amendment of the previous Regulation of the Minister of Agriculture Number 404/2002. The previous regulation did not clearly explain the role and activities of the dairy actors. For example, the nuances between who is eligible to conduct 'livestock farming' and who is eligible for 'livestock breeding' were not clearly defined. The most recent regulation also provides the requirements of *Online Single Submission*, with respect to the dairy cattle population.

In October 2020, the Indonesian Parliament ratified the "Cipta Kerja" Omnibus Law, which amends several provisions of Law Number 18/2009 and Law Number 41/2014 regarding Animal Husbandry and Animal Health. This law was introduced to simplify some of the regulations in the country, with no exception for the dairy sector. Under the Omnibus Law, it removes the requirement to obtain a recommendation to import animal products and removes partnership requirements for the animal products processing industry.

As a fiscal incentive, to improve the economic growth and state revenue, as well as maintain economic stability, the Government of Indonesia issued Minister of Finance Regulation Number 134/2020 regarding Duty Paid by the State on "Import of Goods and Materials for the Production of Goods and/or Services of Certain Industries Affected by CoronaVirus Disease 2019 (COVID-19) Pandemic". Under the regulation, several ingredients in the dairy processing industry have been agreed as eligible to have their duties paid by the Government of Indonesia until December 31, 2020.



3.3 Dairy Policy Analysis in 2021

Further to the Omnibus Legislation, the Gol issued Law Number 11/2021 in November 2021, which went into effect immediately. Law Number 11/2021 amends several laws, including Number 18/2009 and Number 41/2014, which govern livestock and animal health issues. Law Number 11/2021 requires the import approval of animal products to be based on animal health and veterinary public health risk analysis. It requires imports to observe the interest of local livestock farmers.

After the publication Law Number 11/2021, the Gol issued Government Regulations Number 5/2021 regarding “the Administration of Risk-Based Business Licensing” in February 2021. This regulation went into effect immediately and requires the business licensing of livestock and animal health sector, including export and import activities, to be based on risk analysis and require the submission of regular activity reports from the livestock and animal health-related businesses.

In February 2021, the Gol issued Government Regulations Number 26/2021 regarding “the Administration of the Agricultural Sector” as the derivative of Law Number 11/2021. the Government Regulations Number 26/2021 also went into effect immediately, but it does not include any provisions related to the trade of food products of animal origin.

In line with the National Dairy Blueprint 2015 - 2025, the Indonesian Ministry of Industry has undertaken targets to develop the dairy processing industry as follows:

- Production side
 - Increase the growth of the processed milk industry by 10%/ year.
 - Increase the population of dairy cattle.
 - Increase the ownership of dairy cows by breeders to more than ten cattle/breeders.
 - Increase the productivity of dairy cows to yield over 20 liters/head/day.
 - Increase the supply of fresh domestic milk to 50%.
 - Increase the mastery of technology to improve the quality of small and medium-scale processed milk.
- Consumption side
 - Increase national milk consumption to 23 kg/capita/year.
 - Develop diversification of dairy products in competitive areas.
 - Promote consumption of various dairy products

4. Regulatory/Policy Discussions, Conclusion & Recommendations

Dairy is one of the national strategic commodities. Relevant ministries have formulated various policies, including the Ministry of Agriculture, Ministry of Trade, Ministry of Industry, the Ministry of Health, and other Gol agencies. Owing to the number of ministries overseeing the dairy sector and perhaps the lack of coordination with the policies, some disharmony is evident. Aside from that, many regulations have



been amended several times that have magnified issues. Sometimes it is also a challenge to connect the policies and regulations with the Gol's National Dairy Blueprint (2015-2025).

In line with the findings above, it seems there are two paths to increase the quantity and quality of domestic milk production, which is consistent with the overview of the Indonesian dairy sector, discussed at the beginning of the report. The first is to encourage the establishment of vertically integrated companies such as Greenfield. This is the shape of things to come, in fact, a state-owned enterprise PT Berdikari, has just signed investment cooperation with QATAR, to develop a vertically integrated dairy company with 10,000 cows worth USD 500 million (PT Berdikari, 2022). Unfortunately, this is a straight commercial enterprise and may have very little impact on inclusive dairy business models. Nevertheless, it fulfills Gol's requirements to increase the quantity and quality of domestic milk production.

The second path which is inclusive and in keeping with the sustainable Food System is to work with SHDs to produce good quality milk, since according to the proceedings of the workshop on "Foresight scenarios for the dairy sector in Indonesia", it provides high economic and social impacts on rural communities (IPB 2018). However, it comes with a proviso in that "...it needs to also encompass the growing global environmental accountability of dairy value chains, particularly in the context of their carbon footprint...", as stated in the terms of reference for this project.

Having read several studies on Indonesia's dairy sector, there is a common denominator that the SHDs seem to be struggling with and that is the issue of access to feed. In a recent statement by the Director-General of Agro-Industry, Putu Juli Ardika, stated "...to spur domestic fresh milk production, one of the keys is the provision of quality forage feed." However, to grow any sort of feed, one requires land, SHDs have very limited privately owned land. Ownership ranges from 0.25 to 0.4 hectares per household (de Vries & Wouters, 2017). To overcome the feed shortage, many SHD communities in Java depend on native forage and planted grass in agroforestry areas (Gunawan et al., 2004). Perhaps one area to explore with the Ministry of Environment and Forestry is how to increase the quantity and quality of feed for SHDs. In taking up this suggestion, an initial discussion of their current and future policies, in relation to accessing forages in the agroforestry areas is recommended.

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12.4 Appendix 4: Evaluation of BRIN - MAL

Evaluation of BRIN

Retrieved from Kompas, 29 March 2022

The amalgamation of various research institutions into the National Innovation Research Agency (BRIN) is considered to deviate from Law Number 11 of 2019 concerning the National System of Science and Technology. In addition, the management transition also did not go well, thus hampering the performance of researchers and disrupting various strategic projects, including the completion of the Merah Putih vaccine.

Various issues related to BRIN were expressed by researchers and academics members of the Society for the Advancement of Science and Technology and National Innovation (MPI) during a public hearing with Commission VII DPR, on 28 March 2022. Some of the issues raised included:

1. The management transition did not go well, causing the effectiveness of research, research development, and application of science and technology to be degraded.
2. Centralization and bureaucracy are getting more complicated.
3. The BRIN program scheme is considered not to have a clear vision, mission, and direction. Policy research to address social issues is also complicated.
4. Termination of national strategic programs previously run by research institutions, for example, the termination of the Tsunami Early Warning Assessment and Implementation Program, which was considered detrimental to research investment and potential benefits.
5. The weakening of the vision and implementation of national science and technology promotion.

Furthermore, it is also explained that what happened to the Eijkman Institute for Molecular Biology is an example of how research activities and investments that are currently ongoing are suddenly stopped reason to fulfil the BRIN transition process.

12.5 Appendix 5: Indonesian Dairy Supply/Value Chains



Indonesian Dairy Supply/Value Chain

IndoDairy

March 2022





About PT. Mitra Asia Lestari

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Office 8 level 18-A, Jl. Jend. Sudirman Kav 52-53
Sudirman Central Business District (SCBD)
Jakarta 12190, Indonesia

Email: contact@mitraasia.com
Web: <http://mitraasialestari.com/>



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Abbreviation

AANZFTA:	ASEAN-Australia-New Zealand Free Trade Agreement
AI:	Artificial Insemination
DGLAHS:	The Directorate General of Livestock and Animal Health Services (Ministry of Agriculture)
Gol:	Government of Indonesia
GKSI:	Indonesian Dairy Cooperative Association
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MoA:	Indonesian Ministry of Agriculture
MPI:	Milk Processing Industry
SCM	Sweetened Condensed Milk
SHD:	Smallholder Dairy Farmer
SMP:	Skim Milk Powder
WMP:	Whole Milk Powder



Executive Summary

Since its beginnings during the Dutch colonial era, the Indonesian dairy sector has evolved through many changes. Integral to these changes were:

- The birth of SHDs in Indonesia after independence, as a consequence of the distribution of cows owned by Dutch enterprises to local farmers.
- The rise of domestic milk production during 'Orde Baru' and the development of cooperatives (GKSI and KUDs) by the Soeharto government.
- The decline of domestic milk production after the Asian financial crisis in 1997
- The resurrection of domestic milk production—pre-Covid 19 era, end of 2019.
- The ascent of domestic milk production, post January 2020 and the potential of the Indonesian dairy industry

The actors and stakeholders involved in the development of the Indonesian dairy industry, is akin to the 'quadruple helix', involving the government through the establishment of institutions and policies; private sectors responsible for determining markets and the value/supply chain; the knowledge sector intent in improving quality and quantity of milk production, through science & technology; civil society/NGOs concern about the welfare and livelihoods of poor farmers and not least the SHDs themselves. This report looks at the dynamics of markets, supply and demand in the Indonesian dairy industry, which are closely linked to key profit and productivity drivers for SHDs.

1. Background – Evolution of Indonesian Dairy Supply/Value Chains

Dairy farming in Indonesia was introduced by the Dutch during the colonial era (Sulastri & Maharjan, 2002). After independence and during President Soekarno's administration (1945-1966), local milk production relied on dairy cows inherited from the Dutch, with little government intervention. Dutch dairy farms established during the colonial era were dissolved, and their cows distributed to local farmers (Nugraha, 2010). This became the milestone of the establishment of the smallholder dairy farmer (SHD) community in Java (Sulastri & Maharjan, 2002).

Unfortunately, during the Soekarno era, the government of Indonesia (GoI) did not pay much attention to the existence and development of dairy farms (Diwyanto, Anggraeni, & Djajanegara, 1997). Only a small number of cows were imported from Denmark and the Netherlands to increase the breeding stocks (Diwyanto et al., 1997). However, in 1962 there was an attitudinal change when the GoI established the first dairy cooperative in East Java, Pujon (Malang regency-East Java), by the Soekarno administration; followed by a second in 1967 at Nongkojajar (Pasuruan regency-East Java), by the Soeharto administration (Sulastri & Maharjan, 2002; Uotila & Dhanapala, 1994).

Initially, these cooperatives were designed to assist farmers in collecting and marketing fresh milk (Uotila & Dhanapala, 1994). However, during this early period, cooperatives faced challenges, because they were less competitive than individual milk collectors or middlemen who directly collected milk and exploited



the dairy farmers (Uotila & Dhanapala, 1994). This was made worse by the ‘uncontrolled’ importation of milk powder (Sulastri & Maharjan, 2002).

The development of the SHD communities through the cooperative system was continued by the Soeharto administration, who established more dairy cooperatives in West and Central Java, such as Pangalengan (Bandung Regency-West Java) in 1969, followed by dairy cooperatives in Central Java, such as Grati, Ungaran, Boyolali and Solo, established during the 1970s.

To support the local dairy cooperatives, the government created an organisation called Gabungan Koperasi Susu Indonesia (GKSI – Indonesian Dairy Cooperative Association). GKSI acts as an umbrella organisation for mediating collaboration among the KUDs (village cooperatives) with milk processing industry (MPI) and enhancing their bargaining position in negotiating milk prices (Sulastri & Maharjan; Uotila & Dhanapala, 1994; White, 1997) . The GKSI was supposed to be structurally independent of the GoI, however some do not share this view and see it as a ‘semi governmental cooperatives’ (Wijers, 2019).

2. Indonesian Dairy Business Development

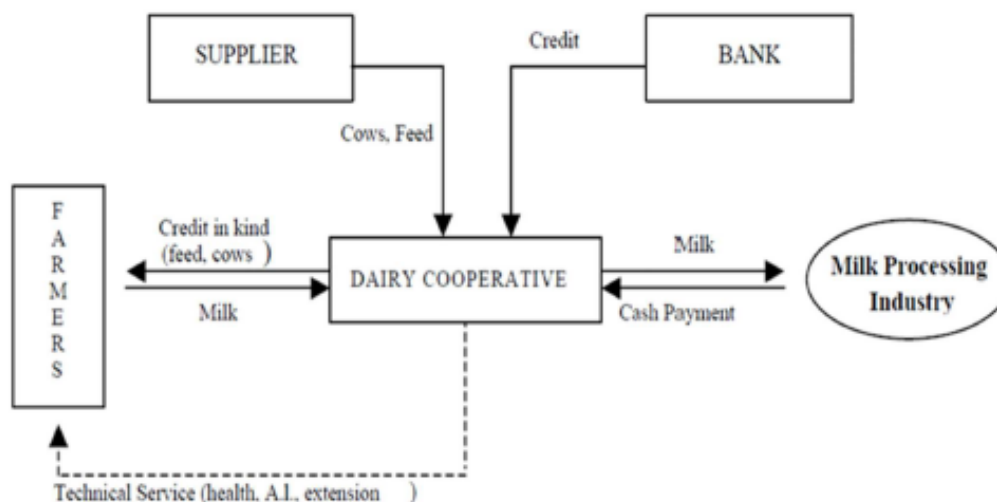
2.1 Policy and Institution

The government’s expansion of dairy cooperatives throughout Java was to achieve various goals; including; providing a source of cash flow to poor households in rural areas; generating employment through the multiplier effects of the dairy development; converting unused agricultural residues and by-products; increasing the capability of subsistence farmers to cope with hardships; raising the nutritional status of rural communities through milk consumption; and reducing the nation’s dependence on imported milk. (Remenyi 1986 and Sulastri & Maharjan, 2002). To accomplish these goals, various policies, such as dairy cow importation, credits for smallholders, local milk market protection, and technical assistance, were injected to support the dairy sector’s development during the 1970s (Riethmuller & Smith, 1999; White, 1997; Young et al., 1990).

In helping SHDs (via the cooperatives), the government supplied storage and transportation equipment to support dairy production, such as milk chillers installed by the state in many dairy cooperatives (Young et al., 1990). Milk trucks were also distributed through the GKSI to transport fresh milk from dairy cooperatives to MPI. The Indonesian government established two artificial insemination (AI) centres in Malang-East Java and Lembang-West Java (Morey, 2011). The AI centres produce and distribute frozen semen to dairy cooperatives to support dairy cattle reproduction and to improve the genetic quality of ‘the local dairy breed’ on local farms. Dairy cooperatives provide for the economic wellbeing of smallholder dairy farmers in Indonesia in many ways, as illustrated:



Figure 1. Dairy Cooperative Scheme in Indonesia



Source: Sulastri & Maharjan, 2002

Farmers' groups (collection of SHDs), are affiliated with dairy cooperatives, from which the SHD communities obtain several benefits and services. Farmers' groups formed by a dairy cooperative, government or farmer initiatives, offer "...support through collective action to secure inputs such as animal feed, milking tools and veterinary services, and improved market opportunities." (Muzayyanah et al., 2014).

Farmers' groups are also useful in organising individual farmers in delivering government aid. For instance, in an emergency such as the post eruption of Merapi Mountain in 2010, dairy farmers' groups in Yogyakarta played a vital role in the disaster recovery processes (Muzayyanah et al., 2014).

To support the local milk market, the Soeharto government also enacted local milk-absorption regulations or the 'mixing ratio policy' (Riethmuller et al., 1999). The policy refers to milk import quota regulations, by which the quota of imported milk allowed was based on the amount of local fresh milk utilised by the MPI. This policy was relatively effective in supporting the domestic milk market (Riethmuller et al., 1999; White, 1997). From 1982 to 1996, the contribution of local fresh milk to the national milk-supply rose to 45 per cent (Riethmuller et al., 1999) Later, this regulation was abolished by agreements between the International Monetary Fund (IMF) and the Indonesian government, as a precondition for gaining funding for economic recovery after the monetary crisis in 1997 (Riethmuller & Smith, 1999).

With this new policy, local milk producers had to compete directly with milk importers with less reliance on government intervention (Soedjana, 2012). During the fifteen years after the crisis, from 2000 to 2014, the supply of domestic milk decreased from 31.62 per cent in 2000 to 18.96 per cent in 2014, falling by an average of 0.92% annually, showing the low competitiveness of local milk against foreign dairy products (Kresna R, 2021). In contrast, in the same years, imported dairy supply increased from 68.4% in 2000 to 81.3% in 2014, a rise of 12.93 per cent within this period.



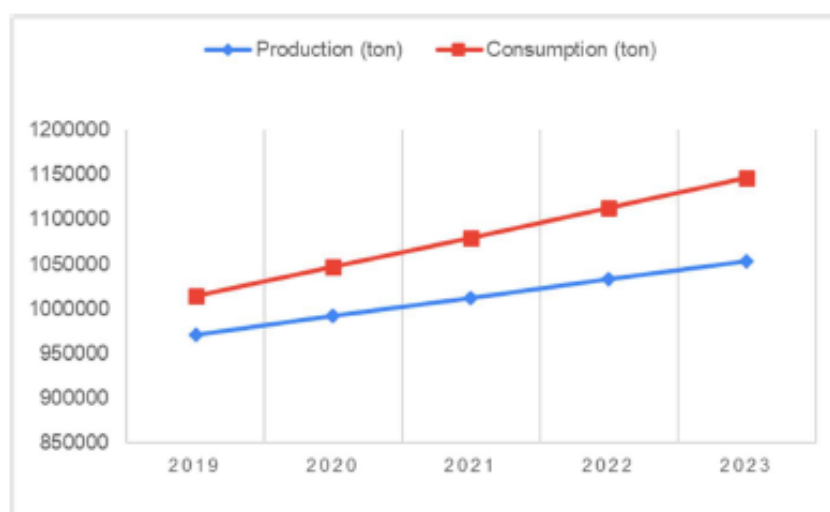
2.2 Demand and Supply of Dairy

From 2012 to 2013, domestic milk production also experienced a significant loss of 18.15 per cent caused by a considerable drop in the cow population from 606,046 to 437,579 cows (Kementan RI, 2017). At that time, many local milk producers, dominated by SHD farmers, sold and culled their dairy cows due to the high meat demand and high cattle prices to meet beef requirements (Wright & Darmawan, 2016) .

According to the World Bank, the increase in demand for dairy products in Indonesia is closely related to the increase of the middle class population, which is estimated to have reached approximately 60% of the Indonesian population. Although Indonesian milk consumption is still the lowest among ASEAN countries, the middle class increase has pushed the country’s level of per capita milk consumption. In the meantime, between 2000 – 2016, the Indonesian population has also increased from 205 – 260 million, hence expectations are that demand will continue to grow.

Unfortunately, domestic supply of milk is not in keeping with demand, since 2011 the growth of the dairy sector has stopped. Between 2012 and 2015, domestic milk production decreased from 1 million to 800 000 tons. According to the USDA GAIN report, domestic milk production has decreased even further since 2015. In 2019, the pre-pandemic domestic milk production was only 667 mill litres or 647,000 tons, liquid milk equivalent (LME). Fortunately, production has increased since then to 777 mill litres or 754,600 tons LME in 2021 and is expected to be close to the 2015/2016 level by the end of 2022.

Figure 2. Estimated Production and Consumption of Dairy in Indonesia (2019 - 2023)



Source: Data extracted from BPS

Consequently, the share of the milk powder imports has grown. Between 2000 and 2018, dairy imports soared from 1 million tons to 3.7 million tons of LME, which is more than 80% of the domestic consumption. In approximate retail terms, this quantity is represented by 60% powdered milk and 20% sweetened condensed milk (which also uses powdered milk as the main ingredient in its processing).



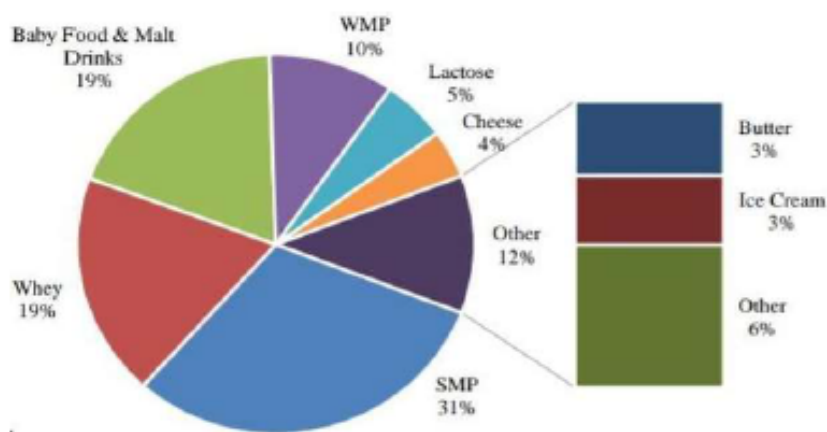
Table 1. Real Consumption, Real Domestic Production, and Calculated Import of Indonesian Dairy

Year	Real Consumption (Mill. Litres – liquid milk equivalent)	Real Domestic Production (Mill. Litres – liquid milk equivalent)	Calculated Import (Mill. Litres – liquid milk equivalent)
2019	3,990	667 (16.7%)	3,323 (83.3%)
2020	4,030	710 (17.6%)	3,320 (82.4%)
2021	4,190	777 (18.5%)	3,413 (81.5%)

Source: Data is extracted from USDA reports 2019 - 2021

Obviously, Indonesia relies heavily on imported dairy products to meet its domestic demand, with approximately 80 percent of all dairy products consumed are imported, such as SMP, whey, WMP, lactose and cheese.

Figure 4. Global Dairy Products Export to Indonesia, Jan-Aug 2021

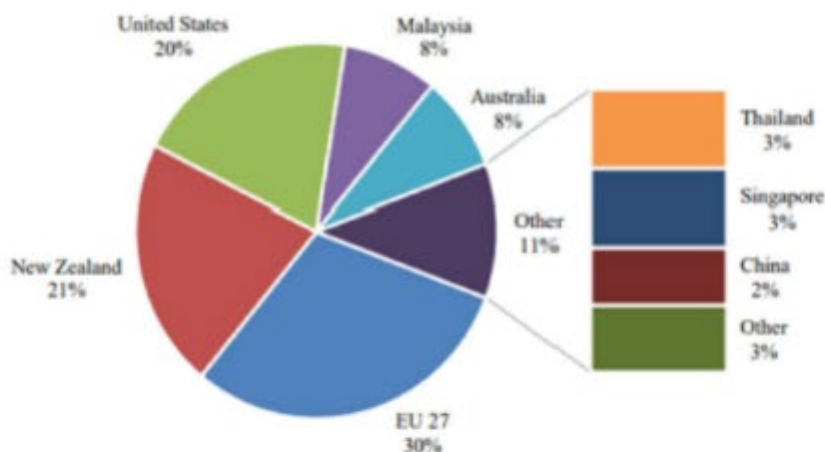


Source: Retrieved from USDA (2021)

Despite the pandemic conditions and local dairy production challenges, demand for dairy products continues to increase. Imports increased 11 percent between January and August 2021 compared with the same period of 2020. All exporting countries increased their trade volume, except for Singapore and the United States due to shipping constraints. Currently, the top exporters of dairy products to Indonesia are the EU (30%), New Zealand (21%), US (20%), Australia (8%), and Malaysia (8%) as presented in Figure 5. Retailers such as hypermarkets and supermarket chains, are the main channels for imported dairy products.



Figure 5. Global Dairy Product Exports to Indonesia, Jan-Aug 2021



Source: Retrieved from USDA (2021)

The Indonesian Ministry of Agriculture (2020) highlighted that the market share of imported dairy products is expected to increase due to continued challenges and increasing demand for milk powder in the region. The largest exporters of milk powder to Indonesia are New Zealand, Australia, United States, EU, Malaysia, and China. However, Indonesia's total milk powder production has also continued to grow at a rate of 5.8% until the end of 2026 (Euromonitor, 2021).

The 20% or so domestic fresh milk production currently occupies a specific market segment in the form of fresh drinking milk (pasteurised, homogenised – plain & flavoured), yoghurt (plain & flavoured) and high frothing milk for Barista coffee. Whatever excess fresh milk is available is converted to Whole milk powder (WMP), which is suitable for several dairy products such as cheese, butter, yoghurt, and bakery. When domestic fresh milk production achieves 40% of total consumption, which is in line with the Gol plan, perhaps it would be more prudent to make sweetened condensed milk, with domestic fresh milk, instead of using powdered milk.

2.3 Supply Chain Disruption during COVID-19 Pandemic

The COVID-19 pandemic and resulting closure of cafés, restaurants and large-scale social distancing measures have caused a shift in consumer consumption trends for dairy products, resulting in cooperatives and other processors reporting declining sales to the food service sector, by up to 16.5% in 2020. Conversely, retail sales of dairy products have remained strong, led by an overall 8% growth in liquid milk sales. On the whole, retail dairy product sales grew by 5.8% in 2020. As more families prepare food at home, sales of larger sized packaged products have increased, while sales of smaller size or single serving packaging have decreased.



During the COVID-19 pandemic, Indonesian consumers projected a positive image of dairy products, predictions are that total dairy consumption is expected to increase by 7.4% in 2022, based on continued strong retail demand and mitigation of social distance measurements. This is expected to help the restaurant and hospitality industry recover from the negative effects of COVID-19 (USDA, 2021).

The perishable nature of fresh liquid milk and fresh dairy products makes them particularly vulnerable to supply chain disruptions. The effects of the pandemic varied regionally, with negative effects ranging from shipping container shortages to disposing of surplus products. The presence of refrigerators, cold storage, and cooler boxes is significant to preserve the quality of milk and dairy products. Future investment in cold chain infrastructure will increase efficiency and effectiveness in this sector.

Despite the hurdles posed by COVID-19, large dairy industries reported that demand for dairy products for fresh milk continues to grow. COVID-19 has hit economies and industries worldwide with blockades, travel bans, and business closures. The closure of various factories affects the global supply chain and negatively impacts product manufacturing, supply schedules, and sales in the global milk powder business market. Online sales of milk powder are expected to grow in the long term, with the rapid development of e-commerce platforms in Indonesia.

2.4 Dairy Distribution Channels in Indonesia

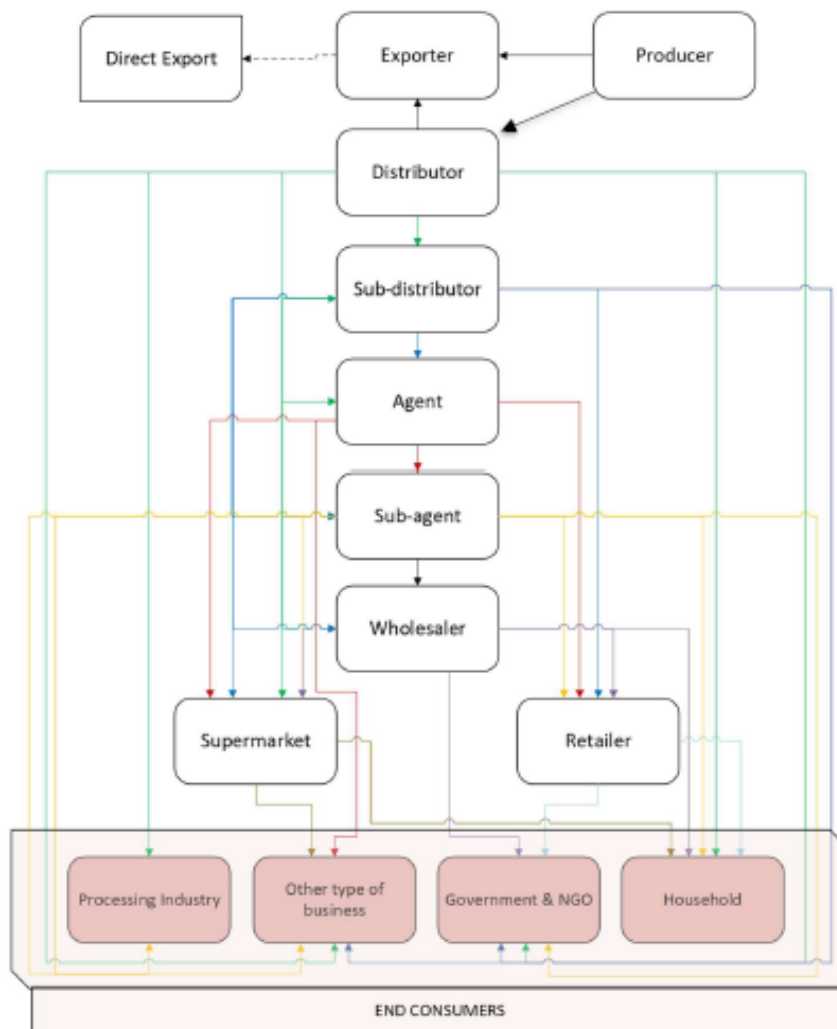
Supply of powdered milk to the provinces are mainly from Jakarta and East Java, which also carry out export-import activities of dairy products (Ministry of Trade, 2019). Distribution activities in each province are carried out by wholesalers and retailers. Wholesalers also distribute dairy commodities to other trading channels including MPI.

Most Indonesians shop at conventional grocery stores, as opposed to convenient stores such as supermarkets. These traditional stores make up the largest distribution channel for milk products, at 51.3% of all grocery outlets. Their popularity is due to offerings of products in small package sizes, which are affordable to most economic levels of the community and are generally within short distances to their homes (Ministry of Trade, 2019). In view of the current competitive market structure, it is safe to say that the Indonesian dairy industry will not be subject to the control of a few supermarket chains, as in the case of Australia, at least not in the very near future.

Figure 3 illustrates how the distribution channels are affected by the length of the distribution chain and the actors involved in it. Obviously, the longer the distribution channel, the higher the distribution-contribution costs to milk prices, at the consumer level. It also illustrates how MPI, distributors, and retailers are important actors in the distribution channel of dairy commodities. However, MPI is the primary channel actor who decides how local processed milk is going to be distributed and to which distributors or retailers will pass on to the final consumers.



Figure 3. Dairy Distribution Channels in Indonesia



Source: Simplified from BPS (2014)

2.5 Key Profit and Productivity Drivers for SHDs

Three main changes and their corresponding internal drivers exist in the Indonesian dairy sector:

i. From large farms (milk enterprise) to SHD farm units

Despite the current existence of the large vertically integrated dairy company, if we look at the history of SHD farming in Indonesia, it actually started with large farms, which occurred in 1942–1950. The drivers of this change were mainly external. The Japanese came and took over the power from the Dutch (1942–1945). After Independence in 1945, the revolution broke out to defend Indonesia's



independence against the Dutch. Many dairy cows were slaughtered and some were distributed to local smallholder farmers. This was the turning point from Dutch milk enterprises to Indonesian SHD farms.

ii. From SHDs farm units to multi activity farms

SHDs added 'off-farm activity' as a complement to their dairy farming income. According to Sembada et al (2018) the internal drivers of change were

- Limited capital/income – SHDs have limited capital, i.e. not only physical capital such as cows, barn, and land ownership, but also human capital (know-how), thus resulting in limited income from the dairy business. SHDs have difficulties in covering their daily expenses if they only depend on their dairy activity.
- Limited access to land, and risks – land opportunities to grow forages are generally limited. Some SHDs live in a district where land is mostly used for housing, whilst others have access to state forest land or unused land e.g. tea plantations, to grow forage. However, this situation is uncertain because in the future, owners of these land, mainly state enterprises such as Perhutani or PTPN may use them for their own business needs. By practising multi activity farming, SHDs can reduce the risk from their dairy business such as the uncertainty of milk and input prices, and the limited access to production factors.
- Off-farm income – some farmers also indicated that they generate more income by trading and being hired as wage workers. The two external drivers of change are:
 - a) Job opportunities – job opportunities are presented in areas developed for tourists such as souvenirs trading, food selling and being hired as wage workers. For example, in Subang, tea plantations offer job opportunities for SHD as wage workers.
 - b) Land conversion from agricultural land and unused land to housing is also a major external driver. It reduces the access to land with forage, consequently reducing SHDs income (Sembada et al 2018).

iii. From multi activity farms to SHD specialised farms

According to Sembada et al (2018), an in-depth interview with farmers indicates that some farmers give up 'off-farm activity' because of five drivers. The first three internal drivers of change consist of;

- limited family manpower,
- improved dairy business,
- increased dairy income.

In families with a limited number of workers, considering a change in the activities is a central issue. Often SHDs have difficulty in managing several activities at the same time, such as when a family member passes away or one of the children has to move to the city to find employment. However, with a focus on their dairy business, often SHDs find that there is an improvement in milk production and quality hence more income and perhaps capital increase, due to affordability to increase herd size. Giving up the multi activity farming may be a solution to keep the dairy farm well managed.



The remaining two external drivers consists of;

- subsidies or grants from a dairy development project
- easy access to credit.

For example; the government, milk enterprises, cooperatives and stakeholders supply cows to the farmers to boost the dairy cow population and milk production in Indonesia, using a credit scheme. There is also a project called 'revolving cows', which provides a cow to selected SHDs and after two calving, the cow is then passed on to the next farmer. Each selected SHD thus obtained milk and two calves. With increasing economic performance, the SHD consequently focuses only on their dairy business and gives up off-farm activity (Sembada et al 2018).

3. Dairy Business Development Opportunities

3.1 Indonesian Dairy Industry

In 2020, approximately 15 percent of the 710 million litres of domestic fresh milk production is processed and marketed by a few vertically integrated dairy farm-processors as fresh pasteurised milk, and the rest supplied by SHDs through KUDs. Fresh milk is processed by dairy processors to make UHT milk, sweetened condensed milk (SCM), but predominantly as WMP (USDA 2020).

Indonesia does not produce skimmed milk powder (SMP), and the majority of imported SMP is used by dairy processors to recombine with local milk and other imported ingredients to form reconstituted milk, which are generally cheaper than fresh pasteurised milk. SMP is also used in powdered milk beverages products, and along with lactose, as ingredients in food manufacturing (USDA 2020).

Cooperatives and dairy processors produce further processed dairy products such as yoghurt, kefir, butter, or cheese. Salted and unsalted butter production is limited, while cheese is more commonly produced. Local cheese producers make a variety of cheeses, including mozzarella, ricotta, parmesan, and cheddar. Cheddar remains one of the most popular cheeses, for both local producers and imports, as it was one of the first types of cheese introduced to Indonesia. Dairy manufacturers import powder on an as-needed basis, and any inventory can be considered pipeline stocks. All locally-produced WMP or its equivalent is used in-country (USDA 2019; USDA 2020; USDA 2021).

Table 2 shows 8 companies that use fresh domestic milk from SHDs in one form or another. It does not include vertically integrated dairy companies such as Greenfield, since it does not rely on SHDs production. Out of the 8 companies, perhaps only Sari Husada is not producing liquid dairy products. Owned by the Danone Group, Sari Husada mainly uses powdered milk (local & imported) for their infant formula and other powdered dairy products. The rest, to varying degrees, are producing both liquid and powdered dairy products and a few companies are also converting fresh milk to WMP. The milk processing industry is dominated by five companies who are official members of the Indonesian Dairy Processing Industry Association. The five dairy companies are PT Sari Husada, PT Nestle Indonesia, PT Frisian Flag Indonesia, PT Indolakto (Indomilk), and PT Ultra Jaya. According to the association, their members account for 71% of the total domestic milk production capacity.



Table 2. List of Indonesian Dairy Companies and Its Main Products

No	Type of Products	Nestle	Indomilk	Frisian	UltraJaya	Diamond	Cimory	Sarihusada	ISAM
1	Fresh Pasteurised Milk - Plain		✓		✓	✓	✓		
2	Fresh Pasteurised Milk - Flavoured				✓	✓	✓		
3	UHT Milk - Plain	✓	✓	✓	✓	✓	✓		✓
4	UHT Milk - Flavoured	✓	✓	✓	✓	✓	✓		✓
5	Condensed Milk - Plain								
6	Condensed Milk - Sweetened	✓	✓	✓	✓				
7	Yoghurt (incl. drinking yoghurt)					✓	✓		
8	Ice cream					✓			
9	Infant Formula	✓		✓				✓	
10	Pdr Milk - Toddler	✓		✓				✓	
11	Pdr Milk - Children / Junior	✓		✓				✓	
12	Pdr Milk - Family	✓	✓	✓				✓	
13	Pdr Milk - Elderly	✓	✓	✓				✓	
14	Pdr Milk - Convalescing	✓		✓				✓	
15	Special Formula e.g. energy, diabetes etc	✓						✓	
16	Cheese					✓			

Source: Data is extracted from MPI company websites (2022)

3.2 Indonesian Dairy Markets

The Indonesian dairy market will grow further supported by increased consumer health awareness, introduction of new products or flavours into the dairy market and affordability. Indonesian people in general still consume more milk powder and sweet condensed milk than fresh milk. In the future, the demand for fresh milk and its derivative products is expected to continue to increase in line with population growth, economic growth, improvement of education level, nutrition awareness, and lifestyle change.

i. Liquid Drinking Milk Market

The liquid drinking milk market is in the growth stage and has grown significantly over the years. Retail channels, including hypermarkets and supermarket chains are the main distribution channels in the dairy segment. Key players include Nestlé, Royal FrieslandCampina and Greenfield, with Nestlé leading the market in 2019 sales. Flavoured milk drinks are expected to dominate in the future, with a maximum CAGR in both value and quantity over the period 2019-2025 (Ken Research, 2020).

The second year of the COVID-19 pandemic (May 2021) PT Nestle Indonesia built a new factory for UHT liquid milk and liquid milk ready for consumption in the Batang Industrial Estate, Central Java. In addition, PT Nestle Indonesia expanded a milk factory in Pasuruan and a chocolate factory in Lampung, with an investment value of the three factories worth Rp 3.1 trillion (US\$217 million). PT Dairi Alami, part of the Djarum Group, a local cigarette company, is also building a vertically integrated dairy company for fresh drinking milk, which commenced operation in August 2020.



ii. Condensed Milk Market

The condensed milk market is observed to be in the early stages of growth, but in recent years growth (value and quantity) has stagnated due to strict government regulations. The market is further divided into plain and flavoured condensed milk products, with companies promoting low cost alternatives by offering cheap SCM products, whilst promoting brand awareness. Some of the major players are Royal FrieslandCampina, Indolacto/Indomilk and others, with Royal FrieslandCampina leading the market in 2019 sales. Dairy industries are increasingly focussed on introducing new flavour variations of sweet condensed milk (Ken Research, 2020).

iii. Yoghurt and Sour Milk Products Market

The market has shown reasonable growth over the years. It was also observed that consumers are shifting from traditional retail to modern retail, creating demand for yoghurt and sour milk products. Due to the still high demand for drinking yoghurt and the preference for flavoured products, companies launched a number of new flavoured drinking yoghurt products in 2019. For example, Yummy Food Utama's Yofit Citrus Probiotic is a fat-free orange-flavoured yoghurts drink in a convenient 180g container, and Diamond Cold Storage's BioKul is a strawberry-flavoured yoghurts drink in a 150ml can. Competition in the Indonesian yoghurt and sour milk product market has been observed to be relatively concentrated, with key players competing based on factors such as health benefits, quality, pricing, product type and pack size. Key players include Yakult, Sisalua Mountain Daily and Asahi Group Holdings, with Yakult leading the market in 2019 revenue. Both plain yoghurt and flavoured yoghurts are expected to grow in the future. Yoghurt is gaining in popularity due to the general focus on health and wellness and the growing awareness of the benefits of consuming fermented products (Ken Research, 2020).

During the COVID-19 pandemic, increased consumption of dairy products i.e. either fermented by lactic acid bacteria or fortified with prebiotics or probiotics was also encouraged in the interest of improving gut health among Indonesians. However, procurement and supply issues notably persist.

Panic buying has left grocers with empty trolleys therefore, increasing a burden for the yoghurt producer to fill the supply-demand gap during COVID-19. During the pandemic situation, people are expected to carry out clean as well as healthy behaviour by keeping the body's stamina strong. Various methods are being used in order to maintain strong stamina including increasing consumption of diverse and nutritious foods such as yoghurt and sour milk.

iv. Ice Cream and Frozen Dessert Market

The ice cream and frozen dessert market has experienced a period of volatile growth rates for many years. Retail stores and outlets have proven to be the main distribution channels for Indonesian ice cream and frozen desserts. The ice cream and frozen dessert market segment is further subdivided based on impulse consumption and take-home or take away ice cream packs. Key players include Unilever, Campina Ice Cream and Alpine (leading the market in 2019 sales). Launching new products along with healthy varieties will boost the ice cream segment in the near future. Take-home multipack ice cream is projected to have a high CAGR in the future, compared to the impulse ice cream segment (Ken Research, 2020).



Along with the cessation of consumption outside the home, the COVID-19 pandemic resulted in an increase in food sales at home, which had a significant impact on large multinational players such as Unilever's impulse ice cream business. Interestingly, during the pandemic, Aice Group Holdings appears to be optimistic about expanding by establishing a third factory in the Sumatra region. In addition, they plan to introduce five new products that will be tailored to market demands.

v. Cheese Market

Cheese market in Indonesia also experienced volatile growth over the years due to shifts in demand from retail to foodservice channels. 44.0% of the total consumption of dairy products include cheese, powdered milk and bakery uses. Majority of cheese products are imported from New Zealand, Australia and the U.S. The diet of Indonesians is being influenced by western cuisines with cheese as a popular ingredient (EIBN, 2020).

Entry of international players such as Kraft Heinz Co., Mulia Boga Raya, Rokko Butter Co. and others have made the market more competitive with Kraft Heinz Co. leading the market in terms of sales revenue by value in 2019. The sales for 2020 record a dip due to low production and availability of cheese products in the market. Supermarkets or hypermarkets are expected to be the leading distributors in Indonesia for retail sales; Indomart, Giant, Ramayana and Hero will remain the top retailers for cheese products (Ken Research, 2020).

Local companies have not always been able to meet the domestic demand for cheese in Indonesia. As a result, a slew of international competitors, including Kraft Foods, have flooded the market. As hoarding due to the pandemic has left many grocery store shelves empty, Kraft Heinz factories have been observed working a total of three shifts a day to accommodate the increased demand for its products. Due to low production and availability of cheese and cheese-related items on the market, sales in 2020 are expected to decline significantly.

vi. Cream Market

The cream market in Indonesia is in its early growth stage. Demand has been driven primarily by hospitality channels such as cafes, bakeries and restaurants. More than two-thirds of Indonesian baked goods are made by small, traditional family-owned and small businesses. The retail sector continues to modernise by adopting a "supermarket and convenience store model" and promoting its products on online portals. The cream segment has proven to be one of the least contributing to revenue in 2019. Competition in the cream market is very concentrated and key players are competing based on texture, price and other factors. Major players include Sukanda Djaya, Fonterra Brands and Greenfields. Increased per capita household consumption, coupled with increased catering channels, will increase demand for chilled or fresh cream and whipped cream in the long run (Ken Research, 2020).



vii. Indonesia Butter and Spreads Market

Butter and spreads market is now in a mature growth stage with massive growth over the past few years. The market is segmented into butter, margarine and spreads. Some of the major players include Unilever, Indofood, Fonterra and others with Unilever leading the market in terms of sales revenue by value in 2019. The sale of butter and spreads is still expected to grow in the near future owing to the increase in health awareness along with improvement in the logistics infrastructure. Margarine market is expected to be affected due to increasing controversies of the Indonesian rainforest related to palm oil. Many large companies are beginning to work on alternative raw materials for their products (Ken Research, 2020).

Domestic demand for butter and margarine has been affected due to the global lockdown situation causing a decline in terms of production capacity. As a result, Fonterra was reported to establish a partnership with Lazada Indonesia to bring changes in the retail concept and digitising sales while Upfield plans to further launch a new product "New Flora Plant". The impact of COVID-19 is still impacting on the domestic dairy industry, which also affected the online buying & selling of imported goods in Indonesia.

4. Indonesian Dairy Industry Discussion & Summary

4.1 Policy and Institutions

From an SHD perspective, the halcyon days were the period of the 'Orde Baru' when the Soeharto administration took a special interest, not only in dairy, but also on farming in general. The government developed institutions such as the KUD and GKSI not only to assist SHDs in their operation, but also to increase their business capital by providing credits and protecting them by introducing policies such as the 'mix ration policy', which was a type of non-tariff barrier to imports.

When the Soeharto administration ended in 1998, the SHDs were left to their own devices with less reliance on government intervention in competing with milk importers (Soedjana, 2012). For example, the 'mix ration policy' was abolished by the IMF as a precondition for gaining funding for economic recovery after the monetary crisis (Riethmuller & Smith, 1999).

However, there seems to be renewed interest in helping SHDs by the current Jokowi administration, although some of the new policies introduced require synchronisation and fine-tuning, in relation to the vision of the blueprint for the Indonesian dairy industry.

4.2 Demand and Supply

Before the monetary crisis in 1997, demand was almost in line with local supply of fresh milk, when the contribution of local fresh milk to the national milk-supply rose to 45 per cent (Riethmuller et al., 1999). However, during the fifteen years after the crisis (from 2000 to 2014), the supply of domestic milk decreased from 31.62 per cent in 2000 to 18.96 per cent in 2014, falling by an average of 0.92% annually (Kresna R, 2021). This decline was exacerbated in 2012 – 2013, when domestic milk production experienced a significant loss of 18.15 per cent caused by a considerable drop in the cow population from



606,046 to 437,579 cows from sale of dairy cattle for culling, due to high beef cattle prices relative to dairy production. (Wright & Darmawan, 2016; Kementan RI, 2017)

Between 2012 and pre-covid period of 2019 domestic milk production decreased from 1,000,000 tons to 687,000 tons, according to the USDA-GAIN report. But by the end of 2021 it has recovered to its 2015 level of 800,000 tons and is predicted to continue to grow. Post estimates total dairy consumption will increase 7.4 percent in 2022 based on continuing strong retail demand and the easing of social distancing measures, which is expected to help restaurants and the food service sectors rebound from the COVID-19 adverse effects.

4.3 Supply Chain Disruption Due to COVID-19

During the COVID-19 pandemic, Indonesian consumers generated a positive image of dairy products, which helped push liquid milk sales up by 13.1 percent in 2020. Correspondingly, retail dairy product sales continue to grow by 5.3 percent in 2021. Predictions are that total dairy consumption is expected to increase by 7.4% in 2022, based on continued strong retail demand

The COVID-19 pandemic also has influenced Indonesian consumer behaviour in terms of purchasing and lifestyle choices, as well as distribution/shopping channels and media consumption. During the early stages of the Indonesian government's restrictions, both milk procurement and milk sales were adversely impacted in various places around the country. The drop in liquid milk sales also disrupted the production of dairy by-products such condensed milk, cream, butter, and cheese, among others. The supply of milk raw materials and final items was also hampered by trade halts from neighbouring nations such as China, Vietnam, Singapore, and others.

4.4 Dairy Distribution Channels

Despite the increase of domestic fresh milk production, imports of dairy products, mainly SMP, is also expected to grow due to strong consumer demand. However, for perishable dairy products such as fresh milk, there are much needed improvements in cold storage and transportation infrastructure. To address the problem, dairy manufacturers initially used refrigerated mobile carts, vans, and e-commerce to transport milk and milk-based goods to households. In addition, safety standards are being enforced for factory workers and other employees to prevent the spread of COVID-19. Cold storage facilities are central to a number of booming perishable grocery sectors. By 2027, cold storage construction is projected to reach US\$18.6 billion in value, or an increase of 14 percent per annum, according to Emergen Research.

4.5 SHD Key Profit and Productivity Drivers

From the evolution of the Indonesian dairy industry, there seems to be a centrality or prominent place for the KUDs, where government, private sector, academia, communities and SHDs meet. It is therefore not surprising that the key to the welfare, profit and productivity of the SHDs depends on the performance and governance of their KUDs, of which the function includes:

- Ensuring quality control of SHDs dairy produce



- Training SHDs to manage and improve quality of milk
- Provide credit to purchase cows and other reproductive assistance such as AI and 'revolving cow'.
- Provide concentrate and quality feed
- Veterinary services
- Provide emergency assistance to SHDs

4.6 Dairy Business Opportunities

Anecdotally Indonesian fresh pasteurised milk is exported by air to Hong Kong and Singapore for Baristas coffee. Owing to this and other potential market growth, dairy processing companies continue to assist dairy farmers through the cooperatives, arranging for low or no interest loans to cooperatives. These loans are used to maintain the fresh milk supply chain, providing for much-needed upgrades to cold chain infrastructure, collection points, handling equipment, and transport vehicles. Some processors also provide business and production management training for young farmers.

5. Conclusion and Recommendation

Due to the potential growth of the Indonesian dairy sector, there seems to be enough room for every existing or new dairy business model to thrive, whether it be a vertically integrated processing farm, a KUD led SHDs; or maybe a 'farming community owned cooperative company', such as the ones in Australia and New Zealand, which saw the beginnings of the world's biggest dairy company, Fonterra.

However, in reference to the ToR of this project, in improving the income of SHDs through better management of their dairy business by producing good quality milk (initially and subsequently quantity), one should look no further than the KUDs as the platform by which the actors interact, be it the government, private sector, academia, communities and the SHDs themselves. Therefore, it is through the KUDs that one can provide effective and efficient assistance to SHDs in terms of introducing good governance, training, SOPs, enforcing standards such as GAP or GMP, marketing and business development for all stakeholders.

To develop a sustainable food system, developing and helping SHD farmers is also in line with the ToR of this project. Farmers can be trained to use livestock waste to increase productivity such as manure for fertilisers or reduce energy costs by producing and using biogas. Also the fact that if many KUDs and processors can provide fresh milk to their own respective communities, this will reduce long distance transportation hence minimising greenhouse gases.



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12.6 Appendix 6: Indonesia farm gate prices for milk and concentrate

Pricing of Milk and Concentrat in West Java and Central Java (last 3 months)			
No	Location	Price of Milk from Farmers per Liter	Price of Feed Concentrat per kg
West Java			
1	KUD Puspa Mekar, Bandung Barat	Rp5,976	Rp3,000
2	KUD Mandiri Bayongbong, Garut	Rp5,850	Rp3,000
3	KUD Giri Tani, Bogor	Rp5,925	Rp3,150
Central Java			
1	KUD Cepogo, Boyolali	Rp5,750	Rp2,600
2	KUD Mojosongo	Rp5,800	Rp2,750
3	KUD Jatinom, Klaten	Rp5,650	Rp2,600

12.7 Appendix 7: Situation Report 3: Private Sector Updates (Philippines)



[REPORT]

TITLE : SITUATION REPORT 3: Private Sector Updates

CLIENT : AUSTRALASIAN DAIRY CONSULTANTS PTY LTD, AUSTRALIA

DATE : July 15, 2022

PROPONENT : Anton Simon M. Palo
CONTACT : General Manager
anton.palo@foodlinkac.com

Executive Summary

Situation Report 3 looks at the profiles and recent updates of 5 dairy business enterprises. Pinkie's Farm and Real Fresh Dairy Farms cater to the up-markets and have demonstrated stability through the disruptions of COVID-19 by leveraging customer brand loyalty albeit differences in business models and intentions. DVF Dairy Farms, while able to bounce back from disruptions as company, seems to have opted to limit (and temporarily cease) operations related to their dairy cow's milk product lines. Two cooperatives have also been profiled: Quezon Dairy Farms Cooperative, which seems to be in a rather fluid situation, and the Sta. Maria Dairy Division of Catmon Multipurpose Cooperative, which has been a long player in the dairy business and has performed well in recent years by leveraging government support and government procurement requirements.

Participation in the dairy cattle value chain and their potential for engaging with smallholder dairy farmers vary from enterprise to enterprise, with some more geared towards such activities while others are more limited either due to deliberate business intentions or due to inability to grow and sustain their dairy business. Commercial dairy tend to be highly integrated in their supply chain activities, covering raw milk production all the way to processing and even retail distribution, while dairy cooperatives are more designed to link smallholder dairy farmers into their supply chains. While smallholder farmers supplying to commercial dairy companies is possible, keeping raw milk prices competitive while at the same time keeping up with the quality standards would be key to sustain such arrangements.

Commercial dairy businesses profiled priced their fresh milk at least 61% higher than the NDA Php 90/L pricing, making participation in the government's Milk Feeding Programs unlikely. Cooperatives like QUEDAFCO and SMD-Catmon MPC however priced their products around the NDA pricing standard.

Pinkie's Farm

Overview

Pinkie's Farm started operating back in 2008 and has been known to produce single-origin, naturally produced, non-UHT milk catering to high-end markets. While the company is associated with the Limcaoco family, which owns and manages the LICA Group of Companies known for automotive sales as well as real estate development, Pinkie's Farm itself is not explicitly described to be part of the main businesses of the conglomerate and is intentionally kept limited in scale. The farm is owned by Pinkie Limcaoco and is managed by her daughter Katrina Limcaoco-Alcuaz.

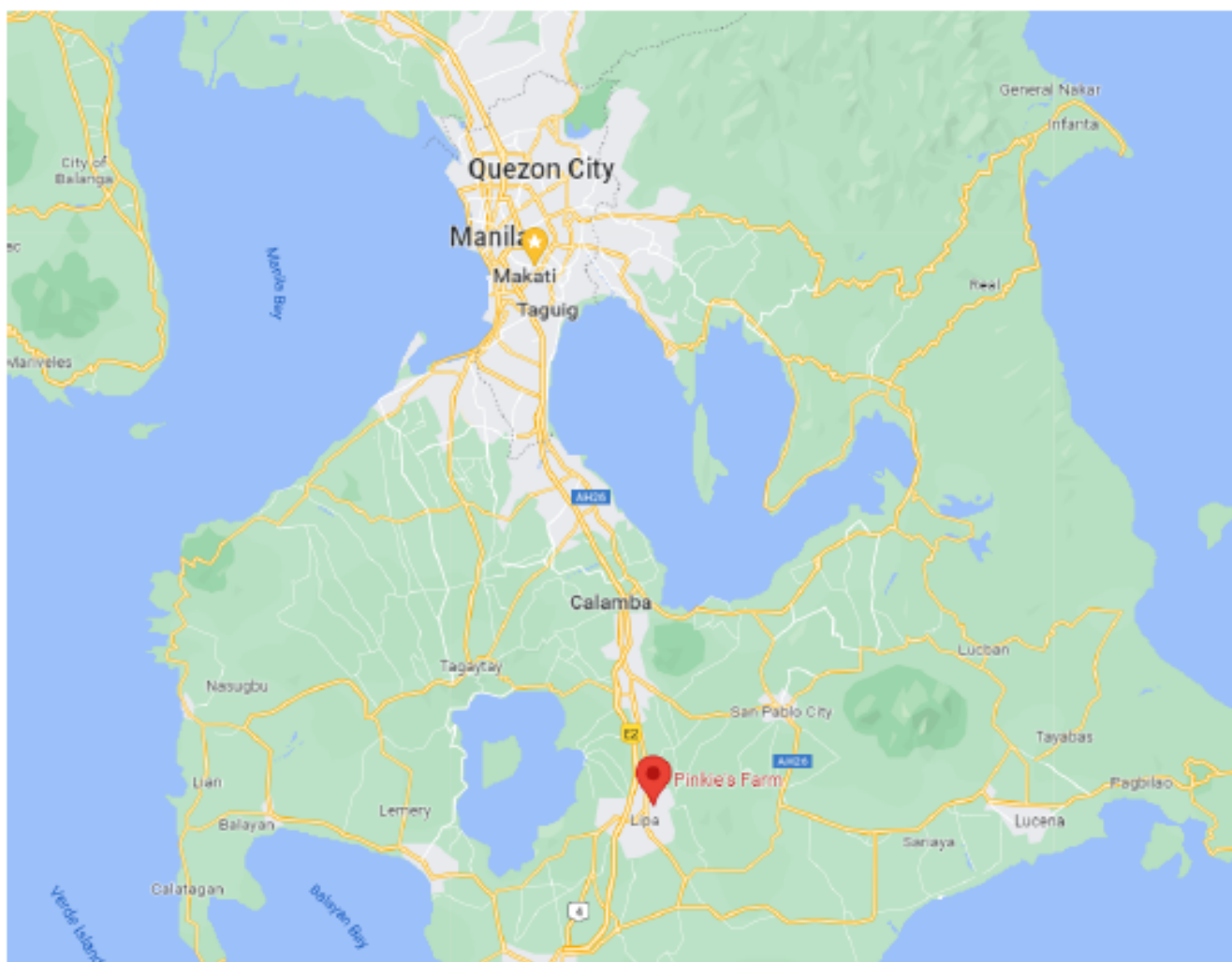


Figure 1 Location of Pinkie's Farm in Lipa City, Batangas Province. Estimated 78 km (road distance) south from the center of the National Capital Region.

Operations

Pinkie's Farm has a highly integrated value chain from milk production all the way to retail marketing. Currently, they have 150 cows with varying breeds: Holstein, Jersey, Kiwi-cross, and Aussie Reds. These cows are fed cut-grass that are sourced within the farm premises but they have sought supply from neighboring grasslands on a per need basis.

Products and their prices are as follows:

Product	Unit	Price
Fresh full cream milk	1 liter	Php 240
Low Fat milk	1 liter	Php 240
Flavored milk	1 liter	Php 250
Full Cream sweetened yogurt	1 kilogram	Php 250
Full Cream unsweetened yogurt	1 kilogram	Php 250
Low fat unsweetened yogurt	1 kilogram	Php 250
Full cream flavored yogurt	1 kilogram	Php 280
Greek Yogurt	1 kilogram	Php 250
Frozen yogurt	375 grams	Php 370
White Cheese (kesong puti)	200 grams	Php 150
Cultured buttermilk	1 liter	Php 350
Butter, unsalted	125g	Php 125
Smoked scamorza	280 grams	Php 400

Retail distribution is done primarily through a subscription model “Dairy Habit Subscription Program” where fresh milk products are delivered door-to-door or picked up in selected hubs (i.e., Farm site in Lipa City, Old Swiss Inn). Walk-in purchases are also done via their farm site in Lipa City and as well as the Old Swiss Inn, which is also managed by Katrina Limcaoco-Alcuaz. Pinkie’s Farm uses glass packaging for liquid products.

Full cream milk product of Pinkie’s farm is at 167% higher than the NDA standard pricing.



Figure 2 Pinkie’s Farm in Lipa City, Batangas. Photo from fnbreport.ph

Conclusions

While Pinkie’s Farm is certainly a good business model for practices in catering to high-end markets, their intention to keep the business scale limited plus the high level standards they impose on their milk quality makes supply linkages with smallholder dairy farmers highly unlikely. However, there have been instances when Pinkie’s Farm marketed other dairy products from other businesses especially in cases where these products are differentiated from the selection they have at the moment.

Despite the premium pricing set by Pinkie’s Farm, there seems to be no indication that the business was severely affected by the COVID-19 pandemic lockdowns. It would seem that the subscription model used with a loyal customer base and their door-to-door deliveries allows them to weather the problems that the pandemic brought.

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Real Fresh Dairy Farms, Inc.

Overview

Real Fresh Dairy Farms, Inc. started back in 2007 by Francisco “Paco” Magsaysay, son of former Sena Ramon Magsaysay, Jr. RFDF is one of many businesses under the Carmen’s Best Group along with Carmen’s Best Dairy Products, Inc. Carmen’s Best International Dairy Company, Inc., and The Laguna Creamery, Inc. (TLCI), with TLCI serving as the holdings company for the CB Group. RFDF itself markets its products under the brand name “Holly’s Milk” but also supplies dairy milk to Carmen’s Best products for their premium-market ice cream.

In June 27, 2022, Metro Pacific Investment Corporation, which is headed by Manuel V Pangilinan and the investment company for what is popularly known as the PLDT Group (also MVP Group) of Companies, took control of 51% of ownership of the CB Group and TLCI retaining 49% of ownership.

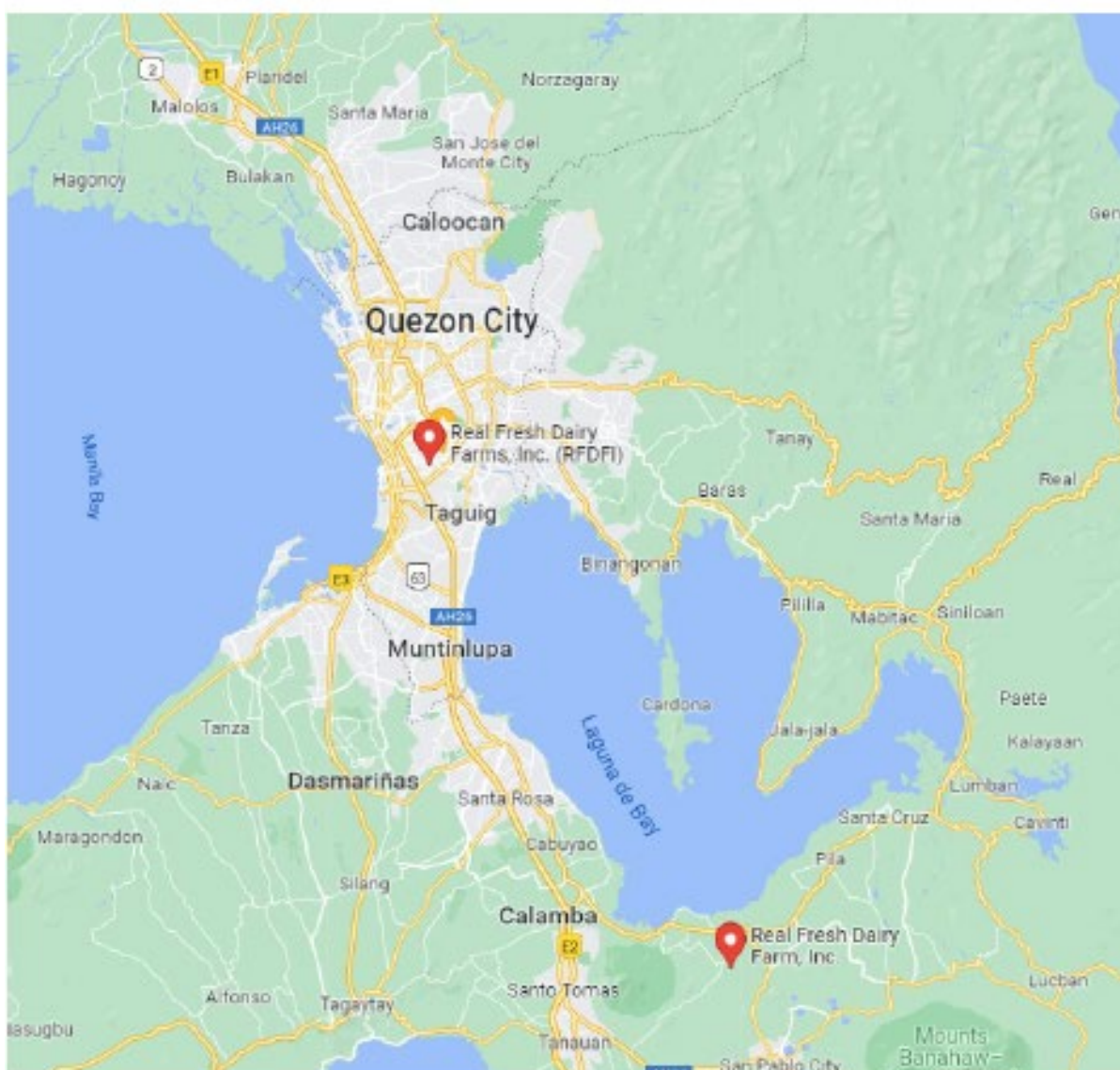


Figure 3 Location of the Real Fresh Dairy Farms site in Brgy. Masaya, Bay, Laguna approximately 71 km (road distance) south east from the center of the National Capital Region.

Operations

RFDF started in 2007 with 100 heads of Holstein-Sahiwal cattle imported from New Zealand with support from the National Dairy Authority. As of 2017, this number has grown to 250 heads and is situated within a 27 hectare land area within Barangay Masaya, Bay, Laguna.

RFDF uses grass, molasses, soy, spent grain or barley, corn, and silage as cattle feed and is supplemented by grass that is cut-and-carried. RFDF claims not using any growth hormones or antibiotics.

Cows are milked twice daily via milk pump with estimated 60-65% of volume collected 4AM and then again at 4PM. Milk samples are tested for quality with their on-site laboratory.

RFDF operates its own pasteurizers using high temperature short time (HTST) and as well as Extend Shelf-Life (ESL) milk and homogenizer. They reported producing 7,000 Liters of milk per week.

RFDF's products and their prices are as follows:

Product	Unit	Price
Whole Milk	200ml (also available in 300ml and 1L)	Php40
Low Fat Chocolate Milk	200ml (also available in 300ml and 1L)	Php40
Low Fat Yoghurt	200ml (also available in 1L)	Php60
Non Fat Yoghurt	500ml	Php110
Low Fat Milk	200mo (also available in 300ml and 1L)	Php40
Kesong Puti	200 grams	Php125
Half & Half	300ml	Php90
Cafe Latte	300ml	Php75
Milk Tea	300ml	Php60
Cream Cheese	400ml	Php250
Salted Butter	200 grams	Php350
Gouda Cheese	1 kilogram	Php120

Final report: Initiating private sector partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines
Carmen's Best ice cream products have a price range of Php 385 to Php 520 per pint, with most product offerings priced at Php 485.

Retail distribution is done via on-line through their website, resellers, restaurants, and as well as large supermarkets. The on-line platform and their use of community resellers have been enough for CB Group to thrive under much disruption experienced by the supermarkets and restaurants.

Holly's Whole Milk is 61% higher than the NDA pricing standard.



Figure 4 27-hectare farm land of Real Fresh Dairy Farms. Photo from dude4food.blogspot.com



Figure 5 Cattle housing of RFDF. Photo from dude4food.blogspot.com

Conclusions

Initial intentions of Paco Magsaysay for the RFDF was to provide livelihood for 60 families that resided within their 27 hectare farm land. MPIC—the current managing owner of the Carmen’s Best Group—has always been on the look out for agriculture sector investments with preference for industries where it could achieve major market control in the country and in Southeast Asia, but also to fulfill its developmental goals of poverty reduction and food security. The combined development-oriented and business-oriented intentions leads to a high potential for expansion of operations which may include contract-supply arrangements with qualifying dairy farmers. It must be noted though that, because CB Group caters to a premium and export market, the quality standards for the milk supply would be quite rigorous—any smallholder dairy farmer wishing to get involved in such an arrangement may need much support in order to comply with the quality standards.

Despite premium pricing and catering to the up-market, RFDF was able to sustain operations well through the COVID-19 pandemic, through the use of on-line platforms and community resellers. The new development with MPIC almost guarantees rapid expansion of the operations of RFDF—and the Carmen’s Best Group as a whole—in the coming years.

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Quezon Dairy Farmers Cooperative

Overview

Quezon Dairy Farmers Cooperative (QUEDAFCO) is a Cooperative Development Authority-registered primary dairy cooperative since 2015 operating within the Municipality of Alunan, Quezon Province, Isabela Region. From the start QUEDAFCO received support from dairy processing plant consultant Bernd Schumacher since its preregistration in 2014. Cows were received from Heifer International and were distributed to qualifying members. Capacity-building was received from Community One Resource Development. By June 3, 2016, QUEDAFCO has received its license to operate as manufacturer of dairy products from the Food and Drug Administration. In 2019, the cooperative was received Civil Society Organization – accreditation from the DA-Region 2 office, giving them better access to DA program benefits. As of end of 2019, QUEDAFCO was classified as a small-scale cooperative with an asset size estimated at Php 3.9 million and has 244 members. They also carry the brand “LACTELA”.



Figure 6 Location of QUEDAFCO site estimated 432 km (road distance) north from the center of the National Capital Region.

QUEDAFCO is said to be in the process of amending their articles of cooperation to change from a dairy cooperative to a multipurpose cooperative. This allows them to market products outside of dairy products such as rice and organic vegetables. Other lines of business registered for include lending services, agro chemical and marketing of other inputs, and corn milling.

Operations

As part of a research program of DA-Bureau of Agricultural Research (DA-BAR) and run by Isabela State University that ran from 2017 to 2019, QUEDAFCO became part of pilot project to produce corn silage using air vacuum technologies and polyethylene bags. The corn silage had projected costs of Php 4.15/kg. There is no evidence however that QUEDAFCO has decided to commercialize production of corn silage.



Figure 7 Bernd Schumacher demonstrating use of milk pumps (2016). From QUEDAFCO Facebook page

During the time it was operating, QUEDAFCO LACTELA offerings included the following:

Product	Unit	Price
Pasteurized milk	1 Liter	Php80
Flavored milk (Buko pandan, choco, etc.)	1 Liter	Php90
Yogurt drink	1 Liter	Php45
Yogurt	1 Liter	Php100

LATELA pasteurized milk product is 88% of the NDA standard pricing.

Conclusion

The situation of QUEDAFCO seems to be quite fluid at the moment. Given the problems faced by the cooperative in their dairy business—from decreasing performance of milk production to severe impacts dealt by the COVID-19 pandemic in their sales—as well possibilities of adding new lines of business that are quite removed from the dairy business, it is likely that the dairy business will become less of a priority of the cooperative in the coming years.

Unfortunately for QUEDAFCO, the demand for dairy products—seemingly centered around the National Capital Region—is not readily accessible due to long distance of travel. Even if with access to reefer vans, the travel may not be economically feasible. Catering may to the Department of Education’s Milk Feeding Program would be good if such a program was implemented in the Isabela Region—from information gathered for Situational Reports 1 and 2, there is no readily available information that suggests that the Isabela Region schools are implementing the MFP.

Providing assistance to their dairy business may require much due diligence in order to ensure that development objectives are properly met.

DVF Dairy Farms, Inc.

Overview

DVF Dairy Farms, Inc. is a milk production and processing company established in 1991 in Talavera, Nueva Ecija by owner Danilo V. Fausto. From its inception, DVF Dairy Farms has been producing carabao's milk and other dairy products such as cheeses, candies, and yoghurts. Dairy cattle products happens to be a secondary line of products. Products are described as natural with no additives or preservatives.

The farm's location in the province of Nueva Ecija makes it key partner with the Philippine Carabao Center, a government agency that provides technical and veterinary services, as well as the Central Luzon State University—one of the country's leading agricultural schools.

Aside from being CEO and President of DVF Dairy Farms, Danilo V Fausto is also president of the agriculture lobby group Philippine Chamber for Agriculture and Food Inc. (PCAFI) as well as the National Chairman of the Dairy Confederation of the Philippines and is in regular discussions with private sector entities, farmers organizations, and the government.

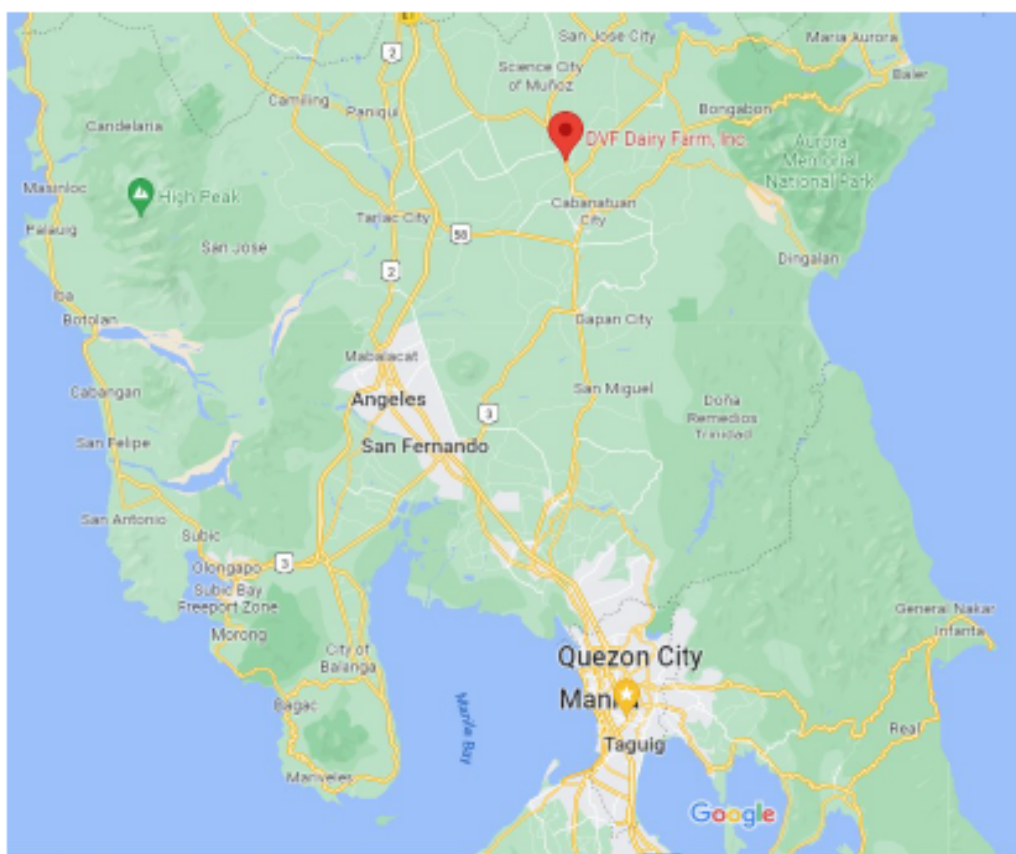


Figure 8 Location of the DVF Dairy Farm, Inc. site approximately 163 km (road distance) north from the center of the National Capital Region.

Operations

DVF Dairy Farms operates a highly integrated dairy value chain, operating its own production area, milk collection center, milk processing center, semi-automatic pasteurizers, and milk quality testing facilities.



Figure 9 DVF Farms cattle housing. From www.dvfdairyfarm.com

DVF Dairy Farms claims to work closely with the cooperatives with the cooperatives of Talavera, Nueva Ecija (Fausto being a founding member of the Talavera Dairy Cooperative, a small-scale dairy cooperative with, as of end of 2019, an estimated asset size of Php 3 million). It is likely that aside from knowledge and technology transfers, linkages with cooperatives are likely accessed to augment supply.

The following are the product offerings of DVF Dairy Farms:

Product	Unit	Price
Greek Yogurt (Carabao's Milk)	450 grams	Php238
Milk Love Cow's Milk	1 L	Php145
Gourmet Cheese	8oz Bottle	Php450
Yogurt Drink (Carabao's Milk)	250ml	Php90
Espasol De Leche (from carabao's milk)	1 box	Php180
Pastillas de Leche (from carabao's milk)	1 box	Php200
Queso Blanco	200 grams	Php298

Buffala Mozzarella	200 grams	Php365
Kesong Puti (from carabao's milk)	200 grams	Php298
Chocolate Carabao's Milk	1 L	Php262
Low Fat Carabao's Milk	1 L	Php380
Carabao's Milk	1 L	Php 298

DVF Dairy Farms primary market is in the National Capital Region. Retail distribution is done through major supermarket groups managed by the SM (Sy) Group, Robinsons (Gokongwei) Group, Waltermart (Lim), and others, covering around 200 supermarkets as well as hotels and restaurants.

Due to COVID-19 community quarantine restrictions, DVF Dairy Farms sales suffered a lot when foot traffic within supermarkets and malls got severely restricted and food service operations had to be severely limited. It was then that the company began to leverage existing on-line platforms such as Grab, Lazada, Shopee, and others.

The cow's milk product line had to temporary cease operations and went back up in late 2021. Recent check on DVF Dairy website dated July 14, 2022 shows that cow's milk product is not listed / not available. When it was available, the cow's milk was priced at Php 145/L, 61% higher than NDA standard pricing.

Conclusion

While the DVF Dairy Farms has since bounced back from the impacts of the COVID-19 pandemic community quarantine restrictions, the same could not be said about the company's cow's milk line of products. Given that the company's forte is on carabao dairy products, it is safe to say that their focus will be kept on this product line.

Interface with DVF Dairy Farms, and specifically Danilo V. Fausto, however, should be maintained given his large network and key position in both the agribusiness sector in general and in the dairy industry as a whole.

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- <https://twitter.com/dvfdairyfarm>

Sta. Maria Dairy Division – Catmon Multipurpose Cooperative

Overview

The Sta. Maria Dairy Division of the Catmon Multipurpose Cooperative is milk processing business unit that sells dairy cattle products under the brand “Sta. Maria Dairy”. Initially, a cooperative under the name Sta. Maria Dairy Farmers Multi-Purpose Cooperative was established back in 1970 and renewed registration with the Cooperative Development Authority on February 23, 2010 with purpose of serving as a market for dairy farmers in Sta. Maria, Bulacan and neighboring towns. By 2014, the SMDF MPC merged and got subsumed under the Catmon Multipurpose Cooperative, a large-scale primary cooperative with over eleven thousand members and an estimated asset size of 540 million Pesos.

Since 2013, the SMDF MPC and its current setup as Sta. Maria Dairy Division has been awarded with much government support through the Department of Trade and Industry’s Shared Service Facility Program and specifically by providing equipment and facilities for storing and packaging the dairy products. On January 21, 2020—just before the COVID-19 pandemic hit the country, SMD was again awarded by DTI Region 3 with additional SSF support.



Figure 10 Location of the Sta. Maria Dairy Division of Catmon MPC, approximately 44 km (road distance) from the center of the National Capital Region or estimated 1 hour and 29 mins travel.

Operations

The Sta. Maria Dairy Division focused its business in the purchase of raw milk from dairy farmers, processing to various dairy products such as fresh and flavored milk, cheeses, candies, yoghurt, etc. They claim to have their purchase price of raw milk from farmers to be quite competitive, hence developing long-standing purchase relationship with the farmers.

The product offering of SMD and their prices are as follows:

Product	Unit	Price
Yogurt (flavored) (strawberry, blueberry, mango, pineapple)	200ml	Php49
Yogurt (flavored) (strawberry, blueberry, mango, pineapple)	1 Liter	Php167
Plain Sweetened Yogurt- 143.00	1 Liter	Php131
Premium Chocolate Milk	200ml	Php18
Chocolate Milk	1 Liter	Php131
French Vanilla Coffee	1 Liter	Php131
Okinawa Milktea	1 Liter	Php140
Flavored Milk (Strawberry, Ube, Melon, Buko Pandan)	1 Liter	Php140
Fresh Cow's Milk	1 Liter	Php107
Fresh Carabao's Milk	1 Liter	Php155
Kesong Puti	20 grams	Php140

Products are marketed via social media platform such as Facebook and have advertised door-to-door deliveries. Retail distribution is also done via select supermarkets in the National Capital Region and in restaurants and "Pasalubong Centers" (tourism novelty shops) in the province of Bulacan.

The prices of fresh cow's milk for SMD is 18.89% higher than NDA standard price per liter. However, they have been involved in the Department of Education's Milk Feeding Program as facilitated by the NDA. In their government contracts, SMD accepted the Php 90/L pricing of NDA.

Conclusion

The Sta. Maria Dairy Division of Catmon Multipurpose Cooperative looks to be a good candidate for study and further support. Their long history in the dairy business, good relationship with the Department of Trade and Industry, and their business model of purchasing raw milk at competitive prices for dairy farmers seem to suggest initial qualification as an inclusive business model in the dairy industry. Their pricing models also allows them to readily participate in the Department of Education's Milk Feeding Program.

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12.8 Appendix 8: How ready is the market to contain Foot and Mouth Disease in Indonesia? (PRISMA)



Indonesia Market Watch

June 2022

How ready is the market to contain Foot and Mouth Disease in Indonesia?

The Australia-Indonesia Partnership for Promoting Rural Incomes through Support for Markets in Agriculture (PRISMA) is a development partnership between the Government of Australia (Department of Foreign Affairs and Trade, DFAT) and the Government of Indonesia (Bappenas).



Australian Government

Introduction



Foot and Mouth Disease (FMD) is a highly contagious viral disease acute in cloven-hoofed animals like cattle. FMD has a significant economic impact due to its high morbidity¹ (up to 100%) in susceptible populations. The disease is widely considered the most economically destructive livestock disease in the world. Although Indonesia was declared FMD-free in 1986, the country has just recently experienced a new wave of the disease. This is significant for PRISMA livestock interventions in East and Central Java, and the program has undertaken a rapid assessment to determine the readiness of the market actors to effectively respond to the outbreak.

Current Spread of FMD Outbreak in Indonesia as of 15 May 2022



The current outbreak of FMD was reported for the first time in East Java between the 28th of April and the 3rd of May 2022. The provincial government of East Java stated that around 1,247 cows in four districts² showed clinical signs of FMD. In just 3 weeks, the FMD outbreak systematically spread across the country. About 15 provinces with more than 70 districts and municipalities are suspected of having FMD cases³, and more than 13,000 animals were reported positive for FMD, about 96.6 percent of which were cattle. Most FMD cases are concentrated in Java and Sumatera Islands, which

account for almost 80 percent of the national beef production. The rapid spread of FMD poses a significant threat to the livestock industry in Indonesia and its neighboring countries.

The cattle with FMD eat less and lose weight resulting in lower incomes for farmers. Farmers are unable to sell the infected animals and hence, do not invest in critical inputs like concentrate feed. Farmers also need to invest in biosecurity products such as disinfectants, vitamins, and medicines for symptomatic treatments.

¹ The term 'Morbidity' (of infectious disease) refers to the incidence of disease (number of occurrence) within a specific population.

² Gresik, Lamongan, Sidoarjo, and Mojokerto.

³ As of the 2nd June 2022, the provincial government reported that the FMD has spread in 18 provinces with 127 districts and municipalities suspected of FMD, and 57,732 animals have already reported positive for FMD.

PRISMA, a market systems development program aimed at improving the incomes of smallholder farming households in Indonesia, conducted a rapid assessment of the FMD outbreak in East Java and Central Java. The assessment aimed to assess the awareness, knowledge, preparedness, and response of key players

in the beef and dairy sector to the FMD outbreak. PRISMA interviewed farmers, experts, and government officials and triangulated the findings with desk research undertaken in mid-May 2022. The results were also triangulated with government and media monitoring reports.



The potential impact of FMD

Most studies into FMD outbreaks state that impacts occur in many forms, from complete stock loss due to animal death or part stock loss. In all cases, there is an impact on farm revenue. In addition to stock loss, there is a reduction in farm income due to reduced animal weight gain or milk production and increased cost of treatment and cash flow risk due to delayed sales. According to a case study in Cambodia (Shankar et al., 2012), it was known that FMD reduced the annual income of farming households by about 4 percent to 12 percent. In other cases in Laos, the loss was as high as 60 percent (Nampanya et al., 2013).

Ripple effects from FMD can also occur at a broader level throughout the livestock value chain, including costs related to compensation, surveillance, vaccination,

cold chain, field officer training, and outbreak control management. Other industry-wide spillover effects could also disrupt growth in various industries such as the food and beverage, tourism, animal feed, and wider supporting agricultural industries. An OIE⁴ report in 2017 estimated a potential loss in a year for Indonesia due to FMD at IDR 9.9 trillion (US\$ 761.3 million)⁵.

The economic impact of the FMD outbreak in Indonesia is yet to be estimated, as the outbreak is still in its early stage. Further analysis is needed to understand the extent and scale of the potential impact, and this rapid assessment is a beginning point for PRISMA. The program will support the provincial governments in carrying out a cost-benefit analysis in addition to this assessment in the coming months.

⁴ Office International des Epizooties

⁵ Nalpaspos T.S.P. and Suseno P.R. 2017. Cost Benefit Analysis of Maintaining FMD Freedom Status In Indonesia. Report to the World Organisation of Animal Health, November 2017.

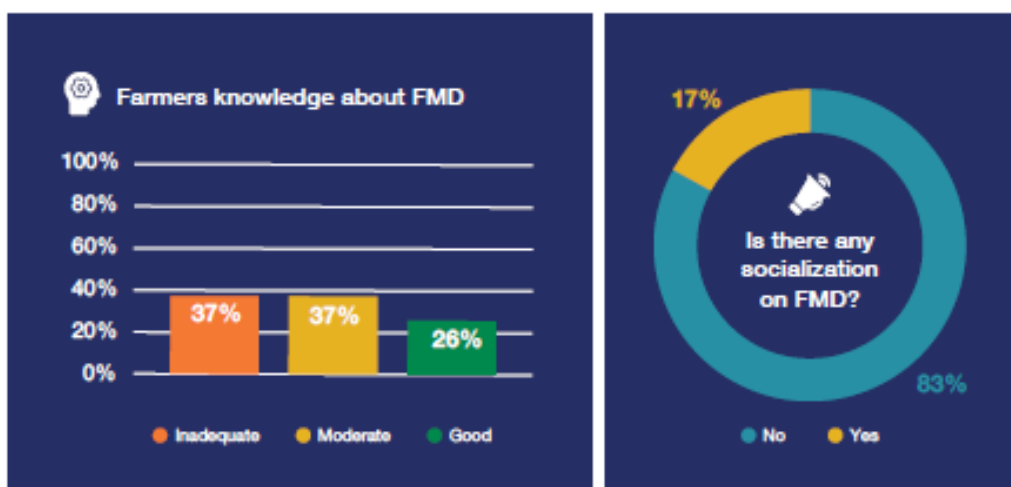
Key trends

Knowledge, preparedness, and practices



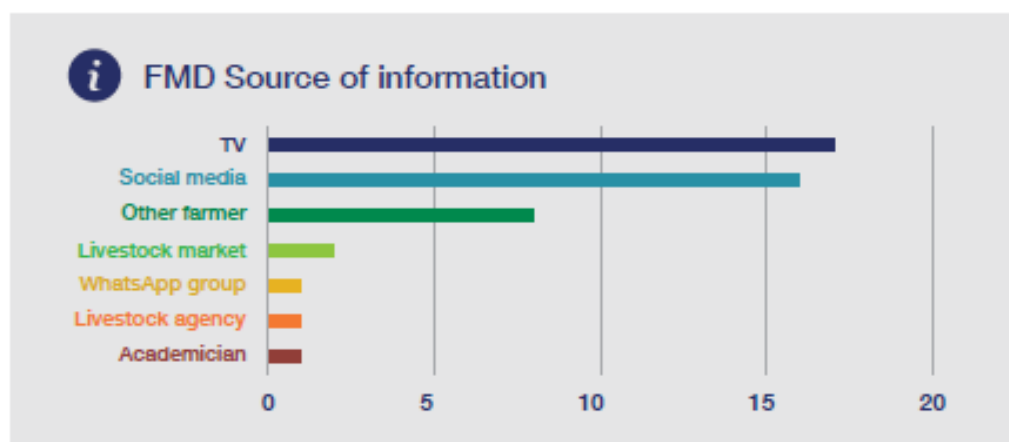
Most farmers lack adequate knowledge of FMD.

Only 26% of farmers interviewed knew about the recent FMD cases, its symptoms, and prevention steps. Around 83% of farmers surveyed have not received any information from the government agencies despite their efforts to disseminate information and raise awareness of FMD among farmers and market actors.



TV and Facebook are the two most critical information sources.

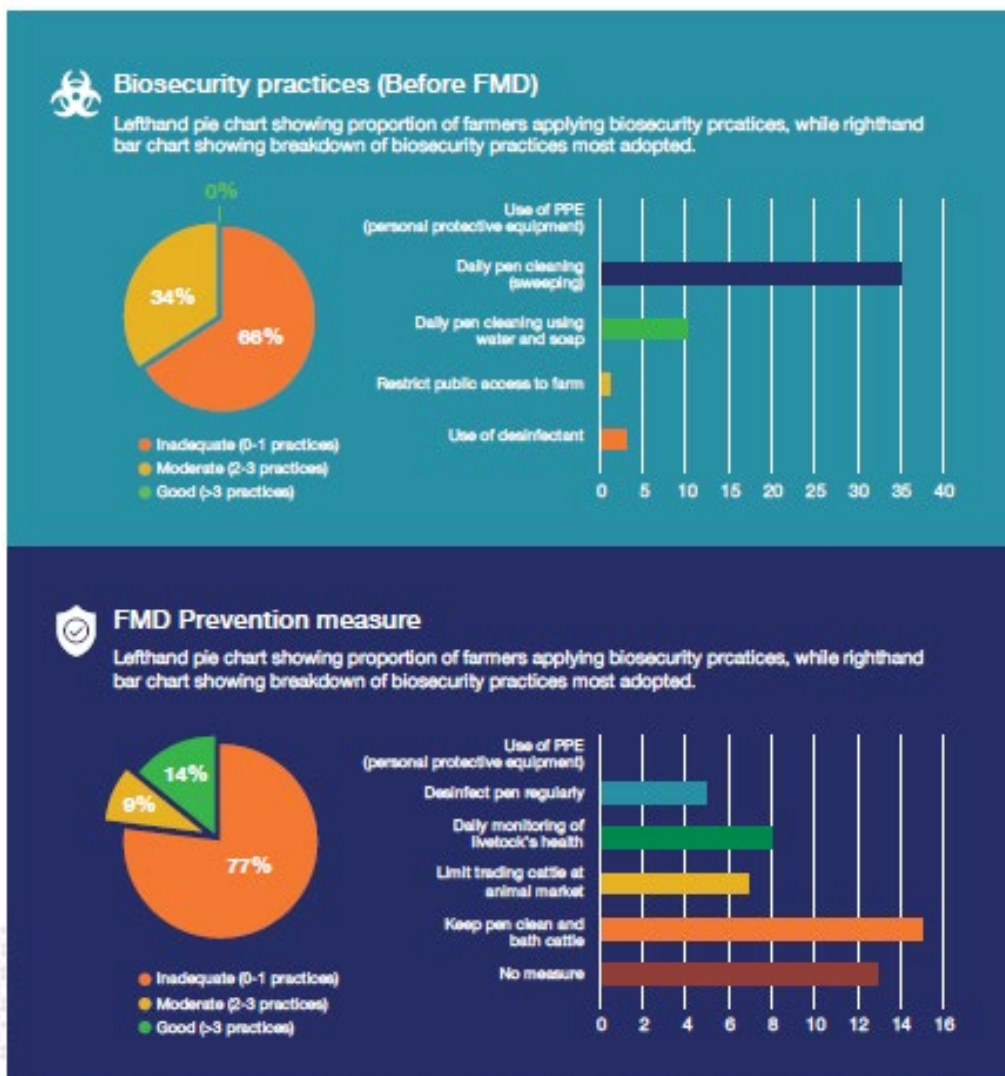
Those farmers who were aware of the FMD outbreak acquired most of their knowledge through television and social media. Farmers and local market actors reported checking news reporting on TV and listening to relevant talk shows. Farmers with smartphones also checked updates on social media (primarily Facebook) for FMD-related information.





Preventative and biosecurity measures by farmers are still inadequate.

While farmers generally clean their pens daily and wash their cattle with water, many of these practices remain inadequate as a preventive measure against FMD. Cleaning the pens with soap only is not enough to prevent FMD. Farmers need to follow all five preventive measures mentioned in the chart. However, the assessment found that about 66% of farmers followed only one or no bio-security measure.





⁶ According to the MoA case report of June 2, 2022, a total of 57,732 animals reported positive FMD in 127 districts and municipalities in 18 provinces in Indonesia.

Outlook



The number of FMD cases will continue to rise until mass vaccination starts.

Indonesia is not a member of the world vaccine bank for FMD. With DFAT's support, the Ministry of Agriculture (MoA) plans to import 3 million doses of vaccines by the end of June 2022.⁷ However, the country needs many more doses to contain the outbreak. East Java alone has estimated the need for nearly 10.5 million doses of the FMD vaccine by 2022. Delayed implementation of vaccination and other eradication measures may increase the number of cases. The government's late declaration of infected zones will worsen the situation further.



The upcoming religious festival might put fresh pressure on the FMD cases.

The demand for cattle during the upcoming Eid al-Adha ceremony will increase significantly. The cattle movement will likely increase following the festival despite government restrictions. The lack of adherence to movement protocols may result in a country-wide spread of FMD.



What's Next

PRISMA will continue to monitor the FMD outbreak closely and is supporting the provincial governments with on-ground information and insights. In response to the government's request, PRISMA plans to conduct a cost-benefit analysis of FMD in East Java and Central Java. This will help justify any further budget allocation needed to improve the government's emergency preparedness and response.

PRISMA will leverage its extensive private sector networks and capacity to accelerate the delivery of correct information. PRISMA will assist the Government of Indonesia's prevention and response, including awareness raising activities and the vaccination in collaboration with relevant DFAT programs (i.e. IA-RMCP, AIHSP) and Australian Department of Agriculture, Water and the Environment (DAWE).

⁷ In mid-June, AIHSP reported that the government has imported 800,000 vaccines; another 2.2 million will come in July.

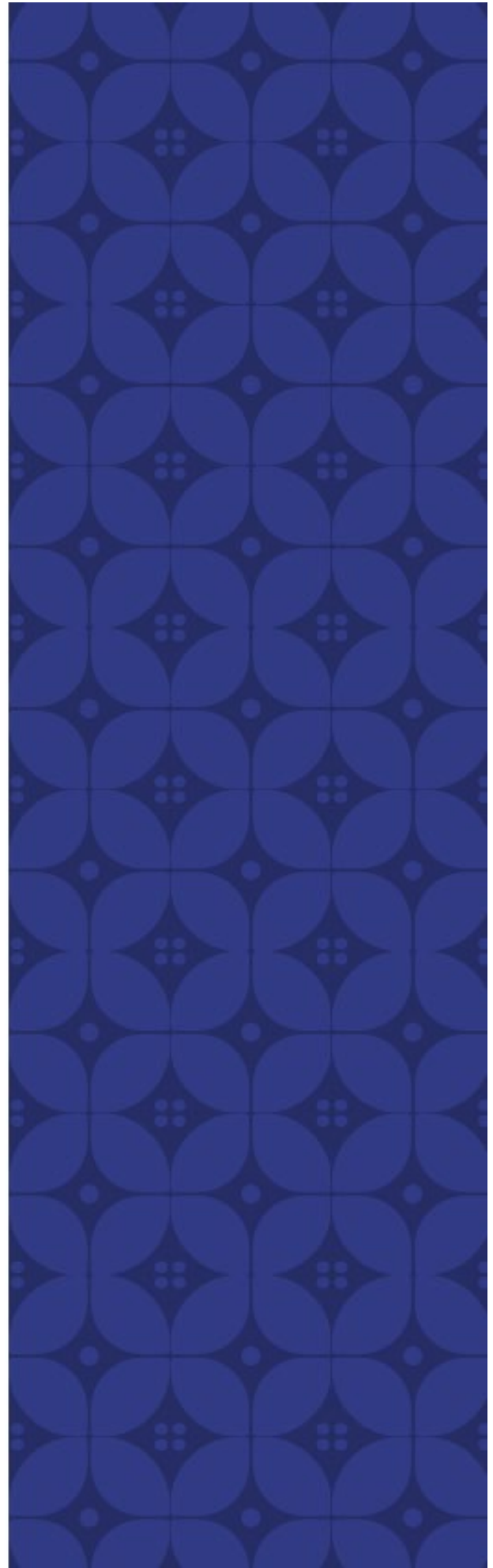


 Jl. Margorejo Indah I blok
A-535, Surabaya 60238,
Indonesia

 info@aip-prisma.or.id

 +62 31 8420473

PRISMA is supported by the Governments
of Australia and Indonesia and implemented
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12.9 Appendix 9: Evaluation of NGO, industry, government, SHD programs and review of investments by dairy companies in Indonesia



Evaluation of NGO, industry, government SHD programs and review of investments by dairy companies in Indonesia

IndoDairy

April 2022



About PT. Mitra Asia Lestari

PT. Mitra Asia Lestari is an independent management and project consulting firm committed to sound research, effective & strategic advice and promoting partnerships for the benefit of all stakeholders,

Office 8 level 18-A, Jl. Jend. Sudirman Kav 52-53
Sudirman Central Business District (SCBD)
Jakarta 12190, Indonesia

Email: contact@mitraasia.com
Web: <http://mitraasialestari.com/>



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Abbreviation

AANZFTA:	ASEAN-Australia-New Zealand Free Trade Agreement
ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
ARISA	Applied Research & Innovation System in Agriculture
BPOM	Indonesian Food Drug Authority
CCAFS	Climate Change, Agriculture and Food Security
CGIAR	Consultative Group on International Agricultural Research
CSIRO	Commonwealth Scientific Industrial Research Organisation
DGLAHS:	The Directorate General of Livestock and Animal Health Services (Ministry of Agriculture)
DVFA	Danish Veterinary Food and Administration
Gol:	Government of Indonesia
GKSI:	Gabungan Koperasi Susu Indonesia (Indonesian Dairy Cooperative Association)
IA-CEPA:	Indonesia-Australia Comprehensive Economic Partnership Agreement
IPS:	The Indonesian Association of Milk Processors
KUD:	Koperasi Unit Desa (Village Cooperatives)
LME:	Liquid Milk Equivalent
MoA:	Indonesian Ministry of Agriculture
MCP	Milk Collection Point
MPI:	Milk Processing Industry
SCM	Sweetened Condensed Milk
SHD:	Smallholder Dairy Farmer
SIDPI	Sustainable Intensification of Dairy Production Indonesia
SMP:	Skim Milk Powder
WMP:	Whole Milk Powder



Executive Summary

Indonesia's dairy sector still faces many challenges, despite the fact that much effort has been made to assist smallholder dairy farmers (SHD) by the government of Indonesia (GoI), foreign aid, non-government organisations (NGOs), civil societies, academia and the private-sector.

The support comes in many forms from GoI's intervention by way of policies and initiatives, such as the establishment of dairy cooperatives, to projects funded by foreign governments, such as IndoDairy (ACIAR), ARISA (CSIRO) and SIDPI (CGIAR) to name a few. Research institutes, universities, NGOs and civil communities were also encouraged or invited to participate and collaborate in SHD projects.

The incentives for the private sector in supporting SHDs, is the increasing domestic demand for good quality fresh milk. Dairy processing companies provide credits, training and facilities through village cooperatives or KUDs. This report examines the programs and initiatives implemented, to improve the livelihoods of SHDs, develop the industry and identify the strategic investment made by companies, for Indonesia's dairy sector.

Background

The main challenges to milk production in the Indonesian dairy industry are:

- i. **On-farm** – poor farm and herd management practices, small farm sizes, scarcity of forage and quality feed, poor quality genetics, diseases, and lack of livestock inputs
- ii. **Downstream** – poor milk quality, high TPC, low fat content and uncontrolled antibiotic use;
- iii. **Dairy supply/value chain** – lacking in the understanding of market dynamics.
- iv. **Systemic constraints** – limited access to credit, lack of networking between government, research institutions and industry, and the need to support the development of new dairy zones (ARISA, 2016).

This report is an attempt to identify the stakeholders and their constituency and the degree to which their interventions, initiatives and activities address the above-mentioned challenges and constraints.

Foreign Aid and NGOs on SHD Program

Australian Centre for International Agriculture Research – IndoDairy Project AGB/2021/124

This project is the culmination of previous ACIAR projects:

- IndoDairy scoping project – AGB/2011/010
- IndoDairy project AGB/2012/099. Improving milk supply, competitiveness and livelihoods in smallholder dairy chains in Indonesia (ACIAR 2020).

A full proposal is currently in development, for a five-year project on *evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia*, due to commence on the 1st of July, 2022 (ACIAR, 2020).



Applied Research and Innovation Systems in Agriculture (ARISA)

ARISA was an AUD 8 million program under the Australia-Indonesia Partnership for Rural Economic Development (AIP-Rural), implemented by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), which supports the Gol's development strategy to accelerate poverty reduction through inclusive economic growth. ARISA aimed to strengthen farmer-relevant innovation at the research and business interface by increasing the capacity and incentives for public research institutes to collaborate with private sector agribusinesses to disseminate and commercialise existing innovations for agriculture (ARISA, 2019).

ARISA made it possible to bring Nestlé and University of Brawijaya (UNBRAW) together, to work in experimenting different feeding options for improved milk supply and help facilitate the establishment of fodder production businesses. However, this partnership was more transaction-based rather than collaborative and required significant brokering by ARISA. Nonetheless, Nestlé was able to take the results from forage growing and feeding trials as part of their broader package of information and guidance to dairy cooperatives. ARISA contributed to Nestlé, plans and strategies to support farming households, and has benefited from the extent of reach, resources, motivation and capacity of Nestlé to foster change within Indonesia's dairy sector. This intervention generated a final outreach number of 2,571 SHD households with a net attributable income change (NAIC) of AUD 7.14 million (ARISA, 2019).

Sustainable Intensification of Dairy Production in Indonesia (SIDPI)

Through the Directorate General of Livestock and Animal Health (DGLAH), the Ministry of Agriculture is committed to pursuing dairy farming for sustainable production. This sustainable milk production program aligns with the 2013-2025 Indonesian Dairy Blueprint issued by the Coordinating Ministry for Economics. It is hoped that by 2025, the target of meeting the national milk needs from domestic fresh milk is 60% (Ditjen PKH, 2021).

In line with the DGLAH commitment, between 2016 and 2020, the SIDPI project was carried out in Lembang sub district of West Java. The aim of this project was to increase herd productivity and farmer incomes of Indonesian small-holder dairy farmers, while at the same time reducing environmental impacts and improving resource use efficiency. The project focused on two key challenges of SHDs, namely, to improve feed & feeding practices and manure management (Tejaningsih, 2021).

This work was implemented as part of the Consultative Group on International Agricultural Research (CGIAR) program on Climate Change, Agriculture and Food Security (CCAFS), with funding support from the government of The Netherlands. The project was carried out in a collaboration between Wageningen University Livestock Research, dairy cooperative KPSBU Lembang, Agricultural University of Bogor (IPB), Frisian Flag Indonesia, and Trouw Nutrition Indonesia, a feed premix manufacturer.

Results of the project showed that SIDPI contributed to changes in various social actors in its external environment i.e., the scientific community, industry and NGO. Changes were observed in knowledge and attitude (mainly of farmers), in policy or practice (mainly of the dairy cooperative), and changes were also observed in dairy farms related to project goals (herd productivity, farm incomes, environmental impacts, resource use efficiency) (Tejaningsih, 2021).



Significant outcomes were expressed in the higher quality compound feed and the installation of a revolving credit fund for manure management improvement. The dairy cooperative KPSBU played a key role in this. Despite a high adoption rate (25%) and significant effects on milk yield, a drawback of the high quality compound feed is its negative effects on GHG emissions. The practical feasibility of and cost-effectiveness of manure management remains a key issue (Tejaningsih, 2021).

Government Policies and Initiatives on SHD Program

One of Gol's policies and incentives to increase milk supply includes increasing the herd population through the Sikomandan/Upsus SIWAB program, which consists of importation of dairy cattle (heifer), rearing of calves and providing investment incentives in the form of tax allowances.

Sikomandan is an upstream/downstream integrated program of activities, beginning from efforts to increase births and reduce mortality through various disease control mechanisms and to increase livestock productivity by providing adequate quality feed. Meanwhile, the replacement of brood-stock is conducted through local breeders in the importation of dairy cows with high quality genetic seeds, which has fulfilled harmonised animal health requirements of the Indonesian government. To maintain a balance in the composition of dairy cows, which has to be at least 20% of the total population, rearing is carried out using calves birthed at the farms (Republika, 2021).

Partnerships are also encouraged through investment incentives, i.e., partnerships are formed between breeders, dairy cattle companies, milk cooperatives and the milk processing industry, thus qualifying for a reduction in income tax. The Gol has also made efforts to increase productivity through genetic improvement by developing new breeds of dairy cattle, assisting in the implementation of Good Farming Practices (GFP), and improving feed quality and quantity (Agropustaka, 2021).

KUD is the village branch of the Indonesian Dairy Cooperative Association (GKSI). KUDs supply farmers with advice on production, animal health and provide veterinary services. The KUDs often act as the local milk collection centre and are the key link between farmers and milk processors. The KUD collects and distributes money to the farmer based on milk quality and volume. There are an estimated 220 KUDs in Indonesia with about 100 in Java. Some of the KUDs have exclusive arrangements to supply major milk processors and some have established their own milk products and brands for the local market.

Upstream investment is urgently needed to fill the milk supply gap and thereby support Indonesia's dairy industries. Most livestock investment over the past years has gone towards meat production, while milk production has made no headway despite rising consumption (GBG Indonesia, 2020).

Meanwhile, downstream product diversification and innovation are carried out in the research and development laboratories of dairy processing companies, in modifying, texture, taste, flavour and ways to consume dairy products. There are rooms for improvement in the food quality and safety space, by increasing public awareness in hygiene, food provenance and certifications. Cooperation with BPOM is necessary to facilitate and assist distribution permits for processed food products from livestock so that they can be marketed more widely. Investment opportunities in scaling up production, introducing



modern technology, and improving farming methods. Greater capacity in cold storage and transportation is also needed to transport dairy products across the archipelago (GBG Indonesia, 2020).

In February 2022, the Minister of Industry confirmed that the dairy processing industry is of priority for development, due to its significant contribution to the national economy with a solid partnership program to SHDs. One of the keys is the provision of quality forage feed therefore, the Ministry of Industry encourages the dairy processing industry to contribute in cultivating forage feed and spur investment in the forage feed industry to grow this sector (Ministry of Industry, 2021).

The Indonesia Australia Comprehensive Economic Partnership Agreement (IA-CEPA)

The reduced tariffs and tariff rate quota (TRQ) provided under the IA-CEPA will undoubtedly increase the already competitive position of Australian agricultural goods in Indonesia. Given the complexity and frequent delays of Indonesia's import licensing system, the removal of one step in the licensing process, through automatic issuance of import licences, will also likely result in additional market access advantages for Australian agriculture. IA-CEPA immediately eliminates tariffs on concentrated or sweetened milk and cream as well as grated or powdered cheese. On dairy, Australia already stood to benefit from progressively reduced tariffs under the AANZFTA (US Gain, 2021).

The ASEAN Australian New Zealand Free Trade Agreement (AANZFTA) on dairy:

- Eliminate tariffs of dairy products not eliminated under AANZFTA
- Elimination on Electronic Import Form (EIF) for concentrated or sweetened milk and cream
- Elimination on EIF of grated or powdered cheese
- Elimination in 2033 of tariffs on liquid milk and cream (not concentrated or containing added sugar or other sweetening matter)
- Elimination in 2026 of tariffs on milk and cream (not concentrated or containing added sugar or other sweetening matter), other than in liquid form (US Gain, 2021)

The New Zealand Government

The Agriculture Ministry has implemented the Indonesia – New Zealand Partnership program within the Indonesia Dairy Excellence Activity (IDEA) cooperation framework. The project, which runs for eight years from 2015 – 2023, is expected to be beneficial for SHDs. Pilot projects are to be conducted in Central Java and West Sumatra. Meanwhile, the focus of the collaboration is technical cooperation in the dairy sector to increase sustainable productivity and profitability and the economic value of dairy farmers. Therefore, the expected outcome is to increase productivity, profitability, and living standards of SHDs (Ministry of Agriculture, 2018).

The Irish Government

In 2019, the Irish Government conducted a series of trade missions in Southeast Asian countries, one of which is Indonesia. Ireland itself is the top five dairy product exporting countries in the world. However, entering the Indonesian market is not easy for Ireland because there are many challenges, such as competition with similar products from Australia and New Zealand, which have been dominant in



Indonesia. In addition, unlike Australia and New Zealand, Ireland does not have a trade agreement with Indonesia, so a number of trade and fiscal facilities cannot be perceived (Kontan, 2018).

The Danish Government

The Ministry of Agriculture is collaborating with the Danish Veterinary Food and Administration (DVFA) within the Indonesia-Denmark Strategic Sector Cooperation (IDSSC) framework. This cooperation program was signed on 27 January 2021 and will last for three years, an equal partnership between Indonesia and Denmark. This collaboration aims to produce organic milk by involving dairy farmers and the milk processing industry (IPS) as off-takers for processing. The DVFA noted that the pilot project is in collaboration with Dairy Cooperative KPSP in Pasuruan, East Java. It has an ambitious initiative to participate in Indonesia's first organic dairy production pilot project (Ministry of Agriculture, 2022). It is speculated that this project may be aligned to Aria Food, a Danish company famous for its organic dairy products, who has formed a joint venture with Indomilk.

Private Sector on SHD Program and Dairy Investments

Nestle

Nestle currently has three factories in Indonesia producing:

- i. Liquid drinks (Milo) in Karawang, West Java
- ii. Milk products (Bear Brand) in Kejayaan Pasuruan East Java
- iii. Coffee and spices (Maggi) in Lampung, South Sumatra

Currently the company is building a 4th factory in Batang, East Java and will be the second facility to produce the Bear Brand liquid milk and ready-to drink beverages Milo and Nescafé to fulfil a growing demand. Initial supply of fresh milk will be from KUDs in the western part of East Java i.e. Ponorogo, Tulungagung, Pacitan and Magetan. In the meantime, Nestle is currently training the inexperienced Batang SHDs in East Java, where they are well entrenched (Nestle, 2022).

Nestle has a long history in East Java, and processes the majority of milk in the province through its factory in Pasuruan. Their business model aims to support sustainable agriculture by 'creating shared value' across the value chain. They work closely with cooperatives to provide a range of support to member farmers, with the aim that smallholders increase the quality and quantity of their milk, while Nestle secures the supply of a key commodity for its business. For example, Nestle provides interest free loans for the purchase of equipment, training on good agricultural practices, and sexed-semen for breeding (ARISA, 2017).

Nestle Indonesia has fostered 27,000 cattle farmers in East Java, by providing training on good and sustainable dairy farming practices, to optimise productivity, improve quality, and ensure a more environmentally friendly implementation. Nestlé Indonesia also built 8 access to clean water in dairy farming areas in East Java, which not only supports these farms but also the surrounding community, to help improve public health. To keep the environment clean and reduce greenhouse gas emissions, since 2010 Nestlé Indonesia has helped build 8,400 biogas domes to process cow dung into renewable energy used for cooking and lighting. In addition, the slurry produced from the biogas processing process can be



used as organic fertiliser to increase the fertility of animal feed fields. This creates an integrated circular farming system on a dairy farm in East Java, in line with Nestlé's ambition to achieve net-zero emissions by 2050 (Nestle, 2022).

Indomilk

Indolacto/Indomilk has built 5 dairy processing factories in Jakarta, West and East Java and have supported SHDs through KUD cooperatives by providing soft loans (zero interest), training facilities and introducing new technologies via the cooperatives (Indomilk, 2022).

Recently Indomilk has formed a new joint venture company, called Arla Indofood Sukses Makmur (parent company of Indomilk). The shareholding composition of the joint venture will be 51% to be owned by Arla Foods and 49% by Indofood Sukses Makmur. Based in Denmark, Arla Foods is an international dairy company owned by more than 8,900 farmers from Denmark, Sweden, the UK, Germany, Belgium, Luxembourg and the Netherlands. Arla Foods is focused on providing dairy products from sustainable farming operations and is also the world's largest manufacturer of organic dairy products. Denmark is of course one of the world leaders in organic food production (Arla Foods, 2017).

Frisian Flag Indonesia (FFI)

Like their competitors, PT Frisian Flag Indonesia is also contributing and supporting the SHDs through programs such as the Farmer2Farmer program, where Frisian Flag sent four Indonesian farmers to learn about Good Dairy Farming Practices directly to the Netherlands. Farmer2Farmer is an ongoing initiative under the Dairy Development Program by the parent company, FrieslandCampina (FFI, 2022).

PT Frisian Flag Indonesia (FFI) has made various efforts to develop the productivity and capability of dairy farmers through the Dairy Development Program (DDP), which was started in 2020. DDP has reached more than 20,000 dairy farmers and partnered with 15 cooperatives, farmer groups, and mega-farms spread across the islands of Java and Sumatra. The aim and focus of the program are to focus on improving welfare through developing the capability of the dairy farming community regarding Good Dairy Farming Practice (GDFFP), including through livestock techniques, livestock management, and cage cleanliness. The Dairy Development Program (DDP) is one of FFI's commitments to helping farmers improve the quality of local fresh milk. Through several education and training programs, FFI seeks to help farmers to produce fresh milk in accordance with prescribed standards (FFI, 2022).

FFI also introduced Digital Milk Collection Point (MCP) with the aim to keep the number of Total Plate Count (TPC) or bacteria contained in milk as low as possible. With this system, farmers will get a fair price of milk in accordance with the quality of milk produced.

The development of the Dairy Village through a partnership program is a collaboration between PT Frisian Flag Indonesia (FFI), PT Perkebunan Nusantara (PTPN) VII, and North Bandung Cattle Breeders Cooperative (KPSBU) Lembang West Java, the Government of Indonesia and the Government of the Netherlands. This program was implemented to build the spirit of dairy farmers and improve the quality and productivity of fresh milk at the farmer's level. The development of the Dairy Village is expected to change the mindset of farmers, namely from traditional farming methods to modern and economic farms. In the future, it is



hoped that the surrounding breeders can duplicate the livestock concept to encourage and develop domestic milk production (FFI, 2022).

Below is a summary of FFI's program to assist SHDs:

Year	Activity
2015	FFI Launches Indonesia's First Digital Milk Collection Point (MCP) Automation System at Los Cimaung Pangalengan, West Jawa
2017	FFI launches young farmer academy creates a generation of young farmers for Indonesia
2018	FFI encourages breeders and cooperatives to improve fresh milk quality through Dairy Development Program
2018	FFI together with KPBS Pangalengan to build five digital MCPs
2018	FFI launches the first independent 'Dairy Village' in Indonesia (model run by KPSBU)
2019	FFI comes to greet dairy farmers in Tulungagung in 'Bewara Live Show'
2020	FFI helps farmers increase dairy cattle productivity through cage renovation program (Lembang & Pengalengan)
2021	FFI to build skills and expertise of women breeders in managing dairy farms through the Kartini Program for Indonesian breeders

Extracted from FFI Company website (2022)

Kalbe Nutraceuticals (Sanghiang Perkasa)

PT Sanghiang Perkasa, better known as Kalbe Nutritionals, is in collaboration; with a local milk producer, PT Industri Susu Alam Murni (PT ISAM) from Bandung, West Java, owned by GKSI. This partnership came to an agreement in November 2020 and is expected to improve product quality. Currently, Kalbe Nutritionals is the only national company that competes with the top 5 multinationals for the 'human growth' milk category. GKSI West Java is one of the leading fresh milk producers in Indonesia, which caters to around 100,000 local dairy farmers, with approximately 300,000 heads and a production capacity of 1,600 tons of fresh milk/day (Bisnis, 2021).

Greenfields

PT Greenfields Indonesia, one of the IPS which has its own dairy farm in Gunung Kawi area, Malang, East Java, has chosen to develop partnerships since 2004 by empowering farmers around the location of their farms. The form of partnership is not only in purchasing fresh milk but also in the provision of feed materials such as grass, corn stalks, reproductive health services, and counselling to farmers.

Currently, there are 250 partner farmers with a population of around 850 dairy cows. The average dairy cattle ownership is 3-4 heads per farmer, with an average production rate of 11-12 L/day. But there are also farmers who have 20 to 200 dairy cows, and can produce 15 L/head/day.

In addition to their own farms, Greenfields absorbs milk from partner farmers of around 6-7 tons/day. Greenfields buys milk based on quality with parameters for Total Solid (TS) and Total Plate Count (TPC). First quality fresh milk TS 12.5% and TPC below 1 million, farmers receive around Rp6,000-6,100 per litre.



PT Cisarua Mountain Dairy

Previous IndoDairy's experience with PT Cisarua Mountain Dairy Tbk (Cimory), an Indonesian dairy processor, is an example of a successful approach with the private sector, where there was strategic alignment regarding a key issue (milk quality) within a value chain. A targeted intervention was agreed upon between Indodairy and Cimory, although the partnership took a long time to develop and only truly took effect once there was alignment with Cimory's business strategy and operational resources. It was also important that there was alignment between their business values and project outcomes, in this case processing fresh milk from Indonesian farmers and redistributing profit to SHDs through bonuses (ACIAR, 2020)

In 2021, ADB subscribed to around 19.4 million shares, worth 59.9 billion Indonesian rupiah (\$4.2 million), as part of the initial public offering (IPO) of Cimory on the Indonesia Stock Exchange. The ADB proceeds will support the company's efforts to expand its production capacity of dairy products, improve consumer access to nutritious food, and support the livelihoods of stakeholders across the dairy value chain, including SHDs (ADB, 2021).

Discussions and Lessons Learned

To date, ACIAR has identified a number of key interventions to address a range of technical and supply chain opportunities and constraints. These include improving farm productivity, product quality, availability, supply chain efficiencies and creating a more conducive enabling environment for SHDs. Integral to the implementation and sustainability of many of these interventions, will be market-based approaches supported by private sector partnerships. The project AGB/2021/124 will commence the process of private sector engagement, beginning early July 2022, subject to approval (ACIAR 2020).

ARISA was underpinned by an innovation systems perspective that research alone does not trigger innovation, rather the interactions between research and a broader set of actors that are involved in the process of adapting and using research. From this perspective, building the capacity of actors within the system to effectively drive and engage in innovation becomes important, as do the policy and institutional settings that create the enabling (or constraining) environment for innovation to occur (ARISA 2019).

For Nestle, the motivation or incentive to be involved in the partnership is access to technical expertise that can help inform business decisions. For example, UNBRAW experiments quantifying the benefit of odot grass in increasing dairy production. The benefits for UNBRAW from the partnership include data and access to information from field experiments and other activities, and a direct mechanism to link research findings, which expand household level impacts from their work. The case also reinforces the different motivations, incentives and practices for research and private sector organisations which are commonly discussed in the literature. In this case, Nestle has been willing to support experiments that are at the periphery of their interests, as long as core needs are addressed (ARISA, 2017).

Despite a high adoption rate (25%) and significant effects on milk yield, the drawback to the SIDPI project is the negative effects on GHG emissions of the high-quality compound feed used. The upscaling of manure management through a revolving credit fund is slow but steady and has a high potential for simultaneous reduction of GHG emissions and nutrient losses to air, water and soil. The practical feasibility



of and cost-effectiveness of manure management solutions, however, remains a key issue. The project found that lack of data at farm and cooperative, or even task force level makes validation difficult. Lessons learned from SIDPI is that baseline, monitoring and evaluation plus endline survey is critical to the output and outcome of projects (Tejaningsih, 2021).

Since the beginning of 'Orde Baru', the livelihoods of SHDs and dairy sector have been significantly improved by the policies and initiatives introduced by the Soeharto administration. However, the halcyon days ended during the Asian monetary crisis in the late 90s. Fortunately commencing 2014, the Jokowi government has once again introduced new regulations, a new vision in the form of the Indonesian Dairy Blueprint 2013-2025 and additional incentives in support of SHDs and the dairy sector. Some projects are conducted in partnership with foreign governments such as the Australian, New Zealand and Danish governments.

The top dairy processing companies have vested interest in providing assistance to SHDs via their respective KUDs due to increasing demand for good quality fresh milk. The support comes in the form of soft loans, training, equipment & facilities, new technologies and other incentives such as the 'Young Dairy Farmer' and 'Farmer2Farmer' programs. Perhaps this is not enough, since SHDs as well as the private sector also require research, to address the challenges facing the industry, which universities and research institutes can provide.

Conclusion and Recommendations

Despite the support by governments, NGOs, Academia and the private sector, there are still many challenges to overcome in Indonesia's dairy sector. This will take time but tariff barriers or protection is not the answer, Indonesia's fresh milk industry has to stand on its own, be creative and competitive.

However, many are of the opinion that Indonesia does not have adequate dairy zones or capacity, to be self-sufficient in milk production, nor to achieve the 40-60% self-sufficiency targeted by the Gol. Well at least for the foreseeable future.

Perhaps it may be prudent to focus Indonesia's milk production to niche markets such as the pasteurised fresh milk drink segment (unflavoured & flavoured) and milk for Barista coffee, any excess can then be used for high demand sweetened condensed milk. Unfortunately, no one has estimated the demand for this market segment in Indonesia, for comparison, the demand for fresh drinking milk in Australia is 30%. If this percentage is estimated to be roughly equivalent in Indonesia, then the current production is well on its way to achieving the target. Once quality production of milk is addressed as priority, then propitiously quantity will follow through a combination of SHD farming, vertically integrated dairy companies such as PT Greenfield and 'Nucleus-Plasma' models, as in PT Ultra Jaya.



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12.10 Appendix 10: Review the suitability of private sector entities for future project collaboration with IndoDairy



Review the suitability of private sector entities for future project collaboration with IndoDairy

May 2022





PT. Mitra Asia Lestari

About PT. Mitra Asia Lestari

PT. Mitra Asia Lestari is an independent management and project consulting firm committed to sound research, effective & strategic advice and promoting partnerships for the benefit of all stakeholders,

Office 8 level 18-A, Jl. Jend. Sudirman Kav 52-53
Sudirman Central Business District (SCBD)
Jakarta 12190, Indonesia

Email: contact@mitraasia.com
Web: <http://mitraasialestari.com/>



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Abbreviation

AANZFTA:	ASEAN-Australia-New Zealand Free Trade Agreement
ACIAR:	Australian Centre for International Agricultural Research
ADB:	Asian Development Bank
ARISA:	Applied Research & Innovation System in Agriculture
BPOM:	Indonesian Food Drug Authority
CCAFS:	Climate Change, Agriculture and Food Security
CGIAR:	Consultative Group on International Agricultural Research
CSIRO:	Commonwealth Scientific Industrial Research Organisation
DGLAHS:	The Directorate General of Livestock and Animal Health Services (Ministry of Agriculture)
DVFA	Danish Veterinary Food and Administration
Gol:	Government of Indonesia
GKSI:	Gabungan Koperasi Susu Indonesia (Indonesian Dairy Cooperative Association)
IA-CEPA:	Indonesia-Australia Comprehensive Economic Partnership Agreement
IPS:	The Indonesian Association of Milk Processors
KUD:	Koperasi Unit Desa (Village Cooperatives)
LME:	Liquid Milk Equivalent
MoA:	Indonesian Ministry of Agriculture
MCP	Milk Collection Point
MPI:	Milk Processing Industry
SCM	Sweetened Condensed Milk
SHD:	Smallholder Dairy Farmer
SIDPI	Sustainable Intensification of Dairy Production Indonesia
SMP:	Skim Milk Powder
WMP:	Whole Milk Powder



Executive Summary

For the larger AGB/2021/124 project, it is expected that a review and consultation with local and international private sector actors be conducted. Companies with potential prospects for future project collaboration and investment will be selected in a process incorporating the following selection criteria:

- i. Legal, reputation and operating principles
- ii. Business history and stability
- iii. Relationship to dairy value chains and government
- iv. Collaboration performance

This report outlines the selection process for the potential companies and recommendations of the 5 Indonesian dairy processing companies to be considered as prospects for collaborations and investment.

Background

Partnerships with industry are the entry point for domestic dairy farmers to modernise livestock farming. This allows farmers to improve the quality and quantity of their products. The 2020 statistical data shows that the population of dairy cows in Indonesia is still 568,265 heads with a production of 947,685 tons of milk. Meanwhile, the demand for raw materials for the milk processing industry is 3.85 million tons, fresh milk equivalent. This need is met from 0.85 million tons (22 percent) domestic and 78 percent of imports in the form of skim milk, full milk, buttermilk, and others (Ministry of Agriculture, 2020).

The private sector plays an integral role in SHD inclusive value chains. Their resources, expertise, networks and operations have the potential to deliver market-based solutions to address many of the challenges and opportunities identified. Private sector has the capacity for interventions to be sustainable through self-funding by market-based mechanisms. Many have considerable influence on government policy while others offer innovation and technology. They also offer greater flexibility than the public sector and an ability to respond and intervene more quickly.

Selection criteria

The following factors were considered in reviewing private sector companies for potential collaborations:

- i. Legal, reputation and operating principles
 - Business history and stability
 - Relationship to dairy value chains and government
 - Competing interests and the risk they may compromise project outcomes e.g., using imported dairy ingredients in manufacturing
 - Values and ethics, particularly in regard to margin sharing
 - Legal or reputational risk
- ii. Strategic and investment alignment with proposed project outcomes:
 - Business strategy regarding SHD inclusive value chains;
 - Approach to innovation.
- iii. Resources:
 - Capacity to co-invest particularly in regard to public good outcomes;
 - Capacity to scale out interventions;
 - Expertise and skills;



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- Linkages and leverage to other value chain members;
 - Access to finance;
- iv. Collaboration performance:
- Track record in business partnerships e.g. joint ventures;
 - Past participation in development/public good projects;
 - Business policy regarding intellectual property.
- (Granzin, 2021)

There are 66 companies in Indonesia involved in the manufacture of dairy products. Within these companies, data from GCSI (Indonesian Dairy Cooperatives Group) shows that only 14 utilise domestic fresh milk. Out of the 14, the following top 10 (in order of fresh milk volume utilised in brackets) will be considered for the project engagement.

1. PT Nestle Indonesia (398.5 ton)
 2. PT Indolakto (Indofood group) (254 ton)
 3. PT Frisian Flag Indonesia (194 ton)
 4. PT Ultrajaya Milk Industry Tbk (191 ton)
 5. PT Greenfields Indonesia (120 ton) (Japfa)
 6. PT Diamond Cold Storage (100 ton) –
 7. PT So Good Food Manufacturing (36 ton) (Japfa)
 8. PT Cisarua Mountain Dairy (Cimory) (13 ton)
 9. PT Sarihusada Generasi Mahardika (Danone Group) (7 ton)
 10. PT Industri Susu Alam Murni (ISAM) (7 ton)
- (Univ. Adelaide, 2018)

From the above-mentioned companies, 2 companies were eliminated for consideration, namely PT So Good Food Manufacturing and PT Greenfields Indonesia, as they are part of the JAPFA Group, who owns the largest vertically integrated dairy company in Indonesia. An assumption is made here that their business model, in relation to interactions with SHDs will be minimal or insignificant (GAPMMI, 2022).

Candidates selected for consideration

1. Nestle

Nestlé has been present in Indonesia since the 19th century. With around 3,400 employees, they operate four factories that process approximately 650,000 litres of fresh milk daily from farmers. Through their four distribution centres and hundreds of distributors present in each province, to ensure the availability of Nestlé products for consumers throughout Indonesia. Since 1975, Nestlé Indonesia has partnered with dairy farmers through cooperative predominantly in East Java by providing technical assistance and other assistance to increase productivity and quality of fresh milk production and ensure environmental sustainability (Nestle, 2022)

Nestle has provided around 500 milk storage units from the total cooperatives they partnered with .The milk storage is open every afternoon and evening for only one hour each so that farmers are disciplined to immediately deposit milk. The milk has to be cooled to 4°C in the milk storage. Through this method,



the TPC (Total Plate Count) or the number of milk bacteria at the farmer level in East Java is on average below 800 thousand (Trobos, 2021).

2. PT Indolakto/Indomilk (Indofood Group)

PT Indolakto also carries out a strategic program to empower local dairy farmers. Indolakto plays an active role in improving human resources for breeders and cooperatives, increasing the dairy cattle population, facilities and infrastructure, and sustainable feed management (Indolakto, 2022). The priority programs carried out by Indolakto include Good Farming Practices and good fresh milk handling, increasing cattle ownership in farmers, and feed sustainability. Indolakto is also working to implement digitalization in partnership programs with cattle breeders and cooperatives (Kontan, 2020).

3. PT Frisian Flag Indonesia (FFI)

FFI is part of one of the largest dairy cooperatives in the world, FrieslandCampina, based in the Netherlands. They employ more than 2,000 employees throughout Indonesia. In producing and distributing dairy products, FFI not only follows national and international standards but also advocates for its stakeholders to always support the holistic development of children and promote exclusive breastfeeding in accordance with WHO guidelines. FFI was also a partner in the SIDPI project (2016 – 2020), with IPB, Wageningen University and dairy cooperatives in West Java, funded by the Netherlands government (FFI, 2022).

FFI has developed a partnership through cooperatives, with farmers since 1996 predominantly in West Java. In the last 4-5 years FFI initiated programs such as the Farmer2Farmers (F2F), Young Farmer Academy (YFA), Bewara/news (magazines, radio and TV), the Milk Collection Point (MCP) program in Pangalengan, and the Dairy Village. in Subang, West Java (Trobos, 2018).

4. Ultrajaya

From a dairy operation in the 1950s, PT Ultrajaya has grown dramatically to become one of Indonesia's leading producers of dairy products and other ready to drink beverage products. PT Ultra Jaya is a pioneer in ultra-high temperature (UHT) processing in Indonesia and the largest UHT milk company in Indonesia with a market share of 42 percent in liquid milk products (Ultrajaya, 2022).

Ultrajaya itself has a 60-hectare cattle farm, with 3,500 head of cattle in West Java called Ultra Peternakan Selatan Bandung (UPBS). The business can supply 45 tons of fresh milk every day to its factory in the West Bandung area (SWA, 2014). Nonetheless Ultrajaya also utilises milk directly from SHDs, thus forming what is commonly called in the Indonesia agriculture sector as the 'Nucleus-Plasma' model, with a 'safety-net' of supply from their own dairy farm (Ultrajaya, 2022).

Distribution ranges from Sumatra to Papua which includes more than 50 distributors, 125,000 retail stores throughout Indonesia. Ultrajaya is still more focused on developing its domestic business (95%). The rest is in the form of exports to America, Australia and Africa (SWA, 2014).

5. PT Cisarua Mountain Dairy (Cimory)

Cimory is an Indonesian food and beverage manufacturer, with a leading market share in premium yoghurt products and sausages. Founded in 1993, the Group currently produces processed meat, dairy



and egg-based products, sold under various brands including Cimory, Kanzler and Besto. Cimory's products are distributed through multiple channels, including modern and traditional retailers, Food Service and direct selling markets. Cimory is based in Jakarta with manufacturing facilities in West Java, Central Java and East Java (Cimory, 2022).

As covered in the report 'Evaluation of NGO, industry, government SHD programs and review of investments by dairy companies in Indonesia' (Mitra Asia, 2022), Cimory is a good example of IndoDairy's successful collaboration with a private sector, where there was strategic alignment regarding a key issue (milk quality) within a value chain and between their business values and project outcomes, in this case processing fresh milk from SHDs and redistributing profit through bonuses (ACIAR, 2020)

During the Covid pandemic, when most businesses were struggling to survive, Cimory expanded and went public, attracting significant investment from the Asia Development Bank (ADB), who subscribed to around 19.4 million shares, worth 59.9 billion Indonesian rupiah (\$4.2 million), as part of the initial public offering (IPO) on the Indonesia Stock Exchange (ADB, 2021).

6. PT Industri Susu Alam Murni (ISAM)

PT ISAM is a toll manufacturing company for the processing and co-packing of 'Ready-To-Drink' (RTD) milk products. PT ISAM is owned by GKSI (The Union of Indonesia Dairy Cooperatives). Established in 1982, the company initially commenced as a fresh milk collection hub for SHDs. It then evolved to produce RTD products, as a toll manufacturing company for the Indonesian dairy industry. PT ISAM also produces its own RTD Milk brand "Alam Murni" (ISAM, 2022). Since it is owned by the GKSI, one assumes that it exists and operates with the interest of the SHDs at heart.

7. PT Diamond Cold Storage (DCS)

In 1970 DCS was formed as a joint venture company engaged in dairy and frozen foods, the founders of DCS had an idea to provide national coverage of cold storage and refrigerated logistics throughout Indonesia. Although they are one of the major ice-cream manufacturers, using fresh milk, their main business is manufacturing and distribution of perishable products, requiring refrigeration (Diamond, 2022).

In an interview with Mr Eko Sugiarto, Director for Plant operations, he indicated that although DCS uses fresh milk, they have no dealings with SHDs and only interacts through the cooperatives that supply their fresh milk requirements and has no issues regarding quality nor quantity. Although he did not mention DCS importing fresh milk, prior to the Indonesian government restrictions in 2017, DCS were importing pasteurised milk from Australia under the Brookfarm label (Minime, 2014).

8. PT Sarihusada

PT Sarihusada is a company operating in Indonesia since 1954 that produces various powdered nutritional products for pregnant, lactating mothers and children. With an increase in its business growth, PT Sarihusada strengthened its position on an international level by allying with Nutricia International BV (Royal Numico NV). Danone Group then acquired Royal Numico in 2008, which automatically made PT Sarihusada a Danone company (Sarihusada, 2022).



Conclusion and Recommendations

The 10 candidates for potential collaboration were selected by the following criteria:

- i. Legal, reputation and operating principles
- ii. Business history and stability
- iii. Relationship to dairy value chains and government
- iv. Collaboration performance

However, two (2) companies namely PT Greenfields and PT So Good Food Manufacturing, owned by PT Japfa could not be recommended (perhaps unfairly), due to the assumption that they may not fulfil one criterion, but not least an important part of criteria number 'i', which involves "Competing interests and the risk they may compromise project outcomes...". It must be emphasised here that this is purely speculative. Despite the fact that PT Greenfields also provides assistance to SHDs in terms of feed regime and training, there may exist a potential conflict between the priorities of *company profit* versus the interest of the SHDs, since PT Japfa owns a vertically integrated dairy company, in the form of PT Greenfields.

The remaining 8 candidates selected for consideration, are ranked by preference and importance still using the criteria above. Nonetheless, if reducing the number to say 5 candidates is required, it would mean culling companies numbers 6 – 8, namely ISAM, DCS and PT Sarihusada. With regards to company significance, another criterion was added, whereby companies that uses less than 10 ton of fresh milk, can be dropped, which means ISAM and PT Sarihusada can be taken off the list, furthermore the latter uses mostly powdered milk instead of fresh liquid milk. This raises the question as to why we do not recommend DCS, even though the company uses 100 ton of fresh milk, which is more than Cimory, who uses only 13 ton, given that Cimory was an excellent collaborative partner in the previous IndoDairy project.

In our interview with the DCS Director for Plant operations, he indicated that he had no problems with the supply and quality of fresh milk from the dairy cooperatives and therefore they had no need to be involved with the operations of the cooperatives, which includes interaction with the SHDs. This was most puzzling as most companies that rely on the supply of fresh milk from cooperatives, pinpoints quality and quantity as major challenges and therefore, this is the main reason why they assist SHDs to alleviate the problem.

Perhaps, since DCS uses fresh milk only for their ice cream, one can only assume that an extra processing step of fresh milk before manufacturing of ice cream may reduce the TPC, thereby solving the problem of high bacterial count. Anhydrous Milk Fat (AMF) may also be an ingredient added, to adjust the fat content of the fresh milk, if it is inadequate. Of course, these steps in the manufacturing of ice-cream using fresh milk can also be avoided if one is using WMP and/or SCP. Perhaps a chat with Unilever, the maker of Walls Ice Cream may confirm this.

In conclusion, the 5 companies recommended for potential collaborations with IndoDairy are:

- 1) PT Nestle Indonesia, 2) PT Indolakto/Indomilk, 3) PT Frisian Flag, 4) PT Ultrajaya and 5) PT Cimory.



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12.11 Appendix 11: South-east Asia Dairy (SEAD) - Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy (HD) sectors of Indonesia and the Philippines - Benefit Cost Analyses (BCAs) of interventions

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3h. Undertake environmental scans (Jakarta and Manila) to identify cost effective protein and energy commodities that could be supplied directly to SHDs for integration into herd rations	15
3i. Model the impact of adverse seasons and climate events on SHD systems and pilot the introduction of farm practices to mitigate risk	16
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Background

This review outlines some preliminary analyses of the benefits and costs (BCA) associated with potential interventions developed in Phase 1 of *AGB/2021/124 Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines*.

Proposed interventions and their associated projects identified in *AGB/2021/124* are described here in terms of their potential draft methodologies, estimated costs, and quantitative and qualitative outcomes (physical, financial, sustainability and social). Some initial comments regarding risk are also included. All costs (unless stated otherwise) are calculated based on evaluating an intervention in one country (as opposed to being evaluated in both Indonesia and the Philippines at the same time).

It is recommended that these BCAs are read in conjunction with the prospectus developed for the South-east Asia Dairy Project (SEAD). A copy of this prospectus can be found in Appendix 12 of the final report for *AGB/2021/171 Initiating private sector partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines*.

Priority ranking of interventions based on outcomes from Benefit Cost Analyses:

1. High:

- Identify the drivers of change for SHDs who are prepared to grow their business and assist them to identify key management areas to improve profitability;
- Evaluate farm milk supply incentives that could potentially provide commercial benefits for supply chain partners;
- Evaluate alternative approaches to maximisation of milk income over feed costs through i) the development and evaluation of basic feed balancing apps and ii) remote diet formulation through the provision of farm captured information and images;
- Imbed a culture of concentrate formulation based on cost-effective nutrients as opposed to low-cost underperforming nutrients;
- Evaluate small batch high moisture forage conservation of perennial grasses utilising specialised high sugar fibrolytic inoculants and supplementing herds with mycotoxin binders;
- Pilot the effect of heating water (initially with gas, then either solar or biogas) used in milking procedures to destroy pathogens, lower milk total plate counts, and reduce the incidence of mastitis;
- Evaluate a self-contained micro solar system as an energy source for cooling milk on farm;
- Experimenting with contemporary practice change methodologies, communication platforms and capacity building.

2. Intermediate to High:

- Upskill SHDs and service providers regarding the impacts of herd nutrition management on reproductive performance;
- Develop demonstration farms focussed on herd water supply and quality to increase milk production per cow;
- Test the feasibility in Indonesia and Philippine SHD systems of small milk vats designed for SHDs in other countries;
- Feeding science-based methane reducing additives such as 3-nitrooxypropanol (3-NOP).

3. Intermediate:

- In conjunction with agribusiness, pilot demonstration sites on SHDs examining forage varieties (especially those containing starch);
- Evaluate the impact of forage cutting height on milk yield;
- Test the feasibility of replacing fresh milk fed to calves with powdered calf formula;
- An evaluation of contemporary soil management practices to balance nutrients provided by composted solid effluent;
- Develop shorten regional supply chains using communication and support with micro compartmental processing plants;
- Establish local fresh milk supply chains to service coffee outlets and the hospitality sector;
- Develop a policy paper regarding the use of “fresh” in dairy product branding.

4. Low to Intermediate:

- Undertake environmental scans (Jakarta and Manila) to identify cost effective protein and energy commodities that could be supplied directly to SHDs for integration into herd rations;
- Model the impact of adverse seasons and climate events on SHDs and pilot the introduction of farm practices to mitigate risk;
- Contract growing of maize or sorghum silage crops based on yield and quality incentives;

- Utilising portable methane meters to evaluate herd nutritional interventions under SHD conditions;
- Utilising liquid effluent as a nutrient source in hydroponic forage production systems.

5. Low:

- Pooling carbon offsets from SHDs to deliver a tradable unit with private carbon traders.

Abbreviations

ACIAR	Australian Centre for International Agricultural Research
AUD	Australian Dollar
BCA	Benefit cost analysis
CO ₂ e	Carbon dioxide equivalents
CTP	Carbon trading platform
DM	Dry matter
ESL	Extended shelf life
EUR	Euro
FPCM	Fat and protein corrected milk
GHG	Greenhouse gas
IDR	Indonesian Rupiah
KUD	Koperasi Unit Desa
MOFC	Milk income over feed costs
NGO	Non-Government Organisation
3-NOP	3-nitrooxypropanol
PHP	Philippine Peso
R&D	Research and Development
RD&E	Research, Development and Extension
SEAD	Southeast Asia Dairy
SHD	Smallholder Dairy
SME	Small medium enterprise
SSL	Short shelf life
TPC	Total plate count
UHT	Ultra-high treatment
VLR	Village level researcher

Strategy 1. Developing sustainable small holder dairy (SHD) farming systems in Indonesia and the Philippines

1. Identify the drivers of change for SHDs who are prepared to grow their business and assist them to identify key management areas to improve profitability

Overall Benefit / Cost: *High*

Approach and Methodology:

A fundamental requirement of dairy development is identifying farmers who have the motivation and capacity to improve their business, providing options for change and supporting them through a change process. This segment of farmers then becomes the demographic for trialling interventions focussed on farming systems and practices.

One approach to identify this population of farmers is to undertake a baseline and segmentation study focussed on farmer attitude, intent and key farm profit indicators. This activity would involve the collection and analysis of detailed farm-household level biophysical, financial and human resource data through a structured baseline survey. This analysis would identify farm-level profit drivers, management and technology options in relation to cost of production, contribution of dairy (milk and cattle sales) to household income, enterprise profitability and viability. Comparative analysis of technical options, labour use, risk and sensitivity analysis to price, input costs and other factors would also be included. Information captured during SHD farm visits would include: input providers; services and markets; farm assets and infrastructure such as land, housing and sheds; farm equipment and transportation; herd inventory; financial such as revenue, expenses and access to credit; labour inputs; marketing of dairy products; milk production including quality; farm practices such as herd nutrition, calf management, herd health, and hygiene; access to extension resources such as information and service providers; adoption of technology and management practices; membership to industry organisations such as co-operatives; attitudes to risk; perceptions of external operating environment and their personal and business aspirations. A typical survey size would involve 300 SHDs per country. Data would be then analysed based on segmentation methodology.

It should be noted that baseline studies were completed in West Java in Indodairy (AGB/2012/099 - *Improving milk supply, competitiveness and livelihoods in smallholder dairy chains in Indonesia*). In SEAD, this survey would focus on Central Java, with an additional baseline survey completed in the Philippines.

Cost: *Intermediate*
\$50,000 to \$100,000 AUD.

Potential benefit: *High*

From the perspective of demonstrating and achieving practice change with SHDs in both countries, the identification of farmers who are focussed on dairy production and are prepared to change their business is fundamental to the research, development and adoption of successful interventions.

Risk: *Low*

Specific risks include a dramatic change in operating environments e.g. a major weather event, volatility in terms of trade, or a significant change in government policy.

2. Evaluate farm milk supply incentives that could potentially provide commercial benefits for supply chain partners

Overall Benefit / Cost: *High*

Approach and Methodology:

Poorly functioning institutions result in an environment where farmers lack motivation to change practices or adopt technologies that provides benefits to their own farm in addition to other members of value chains.

In both Indonesia and the Philippines, the reliance on imported dairy commodities due to low national milk supply and bacterial contamination (high total plate count (TPC)) of milk ex-farm are key barriers to the growth of SHD inclusive value chains. The use of milk price incentives to reduce TPC ex-farm has been poorly implemented for various reasons. In the Indodairy project in West Java, TPC levels for a local Koperasi Unit Desa (KUD) were reduced from two million to one million with the introduction of farm level incentives, TPC analysis of milk ex-farm, and implementing a training programme with SHDs regarding farm practices to improve milking hygiene.

Our prior research could not find an example where SHDs are incentivised to grow their milk supply. In Australia, dairy farms are periodically offered a *new milk* bonus when processors are seeking more milk supply. This typically is paid as a higher price for milk produced in a month versus the volume produced 12 months prior. For example, if a farm produced 250,000 litres in October 2022, and produced 200,000 litres in October 2021, a one-off higher milk price (15 to 40% premium) would be paid on the additional 50,000 litres produced.

An additional problem often encountered particularly in West Java is the lack of a sustained relationship between processors and KUDs, with KUDs often selling milk to a variety of processors based on short-term pricing. While this is commercially logical in the short term, it does not allow for sustained investment by processors in farm development initiatives, as these initiatives could potentially benefit a competing processor. In East Java where there are fewer processors, we have seen Nestle invest considerably in SHD farm development projects with KUDs that have long term milk supply agreements. An option to research in West (or Central) Java would be an evaluation of a milk price premium ex KUD for long term milk supply contracts e.g. three to five years.

Cost: *High*

Assuming that processors fund incentives in pilot projects, the cost of researching these interventions would be \$100,000 to \$150,000 AUD.

Potential benefit: *High*

The piloting of TPC incentives in West Java during Indodairy has led to significant benefits to SHDs, KUDs and processors. In northern Australia, the introduction of incentives linked to milk quality, quantity and milk supply contract length has instigated significant changes in farm practices, particularly following industry deregulation in 2000.

Risks: *Intermediate*

There are several risks with this strategy:

- a. *Using penalties to fund incentives.* Funding incentives in milk pay systems generally relies on generating revenue from a higher wholesale price (linked to an approved attribute) and/or reduced overhead costs due to more turnover. In cases where neither are achievable, incentives are often funded by penalties within farmgate payment systems based on a standardised parameter. For example, if the quality standard is 500,000 TPC per ml of milk, a farm supplying 250,000 TPC per ml of milk will be paid a 500 IDR premium per litre, whereas a farm supplying milk 750,000 TPC per ml of milk will receive a penalty of 500 IDR per litre.
- b. *Farms cannot sustain margins linked to higher farm milk production targeted at new milk incentives.* A criticism of new milk bonuses is that it is a one-off payment. We see instances in Australia where farms will aggressively grow their milk supply to access new milk bonuses in one year based on unsustainable longer term costs, debt or farm practices.

3. Upskilling SHDs and service providers to make or assist in step wise improvements on-farm in forage production, quality and utilisation, herd nutrition and health, reproduction and milk harvesting hygiene

3a. In conjunction with agribusiness, pilot demonstration sites on SHD farms examining forage varieties (especially those containing starch)

Overall Benefit / Cost: *Intermediate*

Approach and Methodology:

Market research globally shows the consumption of short shelf life (SSL) dairy products occurs frequently (e.g. daily). Processors servicing these markets require consistent milk supply all-year round. For many tropical dairy farmers, maintaining milk production in rain-fed fresh forage systems during the dry season, and in some cases the wet season, can be challenging. In the longer term, droughts and floods also have significant impacts on year to year milk supply.

In tropical dairy regions in countries such as Australia and USA, processors will source milk by road or rail from domestic temperate regions to supplement local underproduction. However in archipelagos such as Indonesia and the Philippines, sea freight costs make this strategy infeasible.

Excessive feeding of low fibre concentrates (e.g. > 10 kg per cow per day to maintain milk production) can cause herd health issues. Given this, conserved forages in combination with suitable storage and feeding infrastructure play a key role in maintaining cow productivity all year round.

Our research in Indonesia has shown that the feeding of maize stover (stalks with no cobs) is practiced in some regions, however there is limited maize silage fed on SHD farms. The feeding of maize silage is practiced in the Philippines on larger scale farms given their proximity to cropping land. We have also observed in both countries that maize silages contained low ear to stem ratios, which would result in a lower than expected milk conversion efficiency due to low milking herd dietary starch concentrations. We noted that commercial farms in the Philippines that incorporate maize silage in milking herd diets average 22 litres per cow per day, compared to SHD average daily milk production of eight litres per cow per day.

There is an opportunity for SHDs to develop more productive relationships with contract maize silage growers, with a particular focus on improving silage quality. There may also be an opportunity for local grain growers to diversify into other crops which may be more viable under drier climatic conditions, such as grain forage sorghums.

A possible intervention under SEAD would be to undertake some regional plot trials (e.g. Central Java, north Luzon) in co-operation with seed and fertiliser companies. Yield, quality and milk yield of silage varieties of maize and sorghum would be evaluated under a range of productivity scenarios over multiple seasons.

Cost: *High*

\$100,000 to \$150,000 AUD

Potential benefit: *High*

At a milk conversion ratio of 0.8 litres per kg dry matter (DM) of either maize or sorghum silage and assuming a cost of \$0.26 AUD per kg DM fed, this represents a milk income over feed costs (MOFC) per litre of \$0.34 AUD for Indonesia and \$0.58 AUD for the Philippines. In northern Australia, an equivalent MOFC is approximately \$0.49 AUD per litre.

Risks: *High*

- No access to land or contract growers;
- Production of grain or sweet corn (as opposed to silage) is more profitable;
- Variable yield under rainfed conditions;
- Inability to use mechanical harvesting due to wet conditions;
- Silages are low in protein which requires supplementation;
- Lack of adoption.

3b. Evaluate the impact of forage cutting height on milk yield

Overall Benefit / Cost: *Intermediate*

Approach and Methodology:

Tropical forages, such as perennial tropical grasses, are key to Indonesian and Philippine SHD farming systems. Their high yield and input efficiency makes them a low cost feedstuff. However, their productivity in terms of milk production per cow is low in comparison to temperate forages due to their high

concentration of lignified structural carbohydrates. This has significant impacts on the total amount of forages consumed by lactating cows as well as the amount of nutrients digested per unit of feedstuff.

Our past research has shown that the majority of SHDs hand-harvest forages such as Napier grass and fed these to milking cows on the ground or in troughs. These forages are harvested late in their growth cycle (high plant height) to maximise harvesting efficiency as opposed to cutting at an earlier growth stage which would have greater nutritive value. Over half of SHDs chop forages prior to feeding, with the majority chopping by hand. Although this practice can reduce feed residues, it forces milking cows to eat lower quality stem (as opposed to leaf) and reduce the nutritional quality of the diet.

There has been little research completed with lactating cows examining the effect on their productivity of the harvesting interval of Napier grass, especially for newer varieties or other subspecies such as *Odot*. Other more contemporary perennial forage grasses, such as *Brachiaria* hybrids, also require evaluation under cut and carry SHD systems at different stages of regrowth.

Cost: *Intermediate*

\$50,000 to \$100,000 AUD over three years.

Potential benefit: *Intermediate*

After crop by-products, tropical perennial grasses are one of the most cost effective feedstuffs available to SHDs. As such, their utilisation should be maximised before introducing other feedstuffs. At a milk conversion ratio of 0.7 litres per kg DM and assuming a cost of \$0.09 AUD per kg DM, this equates to a milk income over feed costs (MOFC) per litre of \$0.54 AUD for Indonesia and \$0.78 AUD for the Philippines. Comparable performance (MOFC) in the northern Australian dairy industry is \$0.64 AUD per litre. Improving milk conversion efficiencies by 30% (increasing from 0.7 to 0.9 litres per kg DM) and assuming a slightly higher cost due to additional labour (\$0.10 AUD per kg DM) would see MOFC per litre increase to \$0.56 AUD for Indonesia and \$0.80 AUD for the Philippines for every kg DM of Napier grass fed. This strategy would also result in increased milk yield (~20%) per cow resulting in a significant profit increase for the farm overall.

Risk: *Intermediate*

The practice of harvesting tropical forages at maturity is strongly embedded in SHDs. This may be difficult to change despite demonstrated productivity and financial benefits.

3c. Evaluate alternative approaches to maximisation of milk income over feed costs through i) the development and evaluation of basic feed balancing apps and ii) remote diet formulation through the provision of farm captured information and images

Overall Benefit / Cost: *High*

Approach and Methodology:

Our recent research in the Philippines has shown that the average daily forage intakes of milking cows (avg 5.5 kg dry matter or approximately 22 kg as fed fresh) is approximately half of the target feeding rate of fresh forages (10% of cow liveweight) in other SHD industries. We also calculated that 90% of milking herd diets were deficient in protein and water soluble carbohydrates. Additionally, high dietary fibre concentrations were limiting intakes. Research from Indodairy showed significant productivity benefits from feeding concentrates with higher levels of protein, especially when high quality protein sources were introduced such as soyabean meal. In this instance, milk yield increased from 14 to 17 litres per cow per day.

As a generalisation, milking herd diets in SHDs in Indonesia and the Philippines are based on the cheapest available feed rather than the most profitable diets. This is mainly due to a poor understanding of the benefits of improved diets and a lack of available tools to formulate a simple diet based on nutritional principles. Educating SHDs and their service providers in herd nutrition and developing a cost-effective basic nutrition calculator are both starting points to address this problem.

An alternative approach to assisting SHDs to improve the profitability of their herd diets is the provision of remote nutritional advice. Online conferencing technology such as Zoom, in addition to remote sourced

data (such as farmers sending samples for feed analysis, images provided by farmers) allows consulting nutritionists to remotely review herd diets. While this approach does have practical limitations (e.g. internet connectivity), and will periodically not capture essential information, it does provide an option to cost-effectively review the nutritional adequacy and profitability of SHD herd diets. It also provides an opportunity to upskill and develop local small medium enterprise (SME) businesses to service this market.

Cost: High

- Piloting herd nutrition training programmes for SHDs in Central Java and the Philippines: \$50,000 to \$100,000 AUD;
- App development and testing (pilot): \$100,000 to \$150,000 AUD;
- Development, training (SMEs) and piloting of remote nutritional consultancies: \$50,000 to \$100,000 AUD.

Potential benefit: High

Herds that are typically fed unbalanced or poorly formulated diets will have milk production 20 to 30% lower than well managed herds.

Risk: Low

- Poor literacy levels amongst some SHD farmers;
- Lack of access to technology, particularly smart phones or suitable internet speeds;
- Key information is missed, such as culture, other problems on farm;
- Longer term factors and strategies are not considered, e.g. feed reserves for the dry season.

3d. Upskill SHDs and service providers regarding the impacts of herd nutrition management on reproductive performance

Overall Benefit / Cost: Intermediate to High

Approach and Methodology:

From four weeks before calving to four weeks after calving (the *transition period*), a cow undergoes a series of dramatic metabolic changes that allow her body to adapt to the challenges of calving, lactation and re-breeding. It is estimated that 80% of a lactating dairy cow's health problems occur in the first four weeks after calving. Cows with issues during the transition period often have problems getting into calf within the target period of 80 days post calving.

Attaining high reproductive performance in tropical dairy herds with average to high genetic merit is challenging. The inherent low quality of tropical forages, heat stress and disease challenges lead to underconditioned herds, abnormal cycles and poor fertility. In developed countries, these impediments are overcome (to a certain extent) by transition cow management, reducing the proportion of tropical forages in early lactation diets, hormone treatments and investing in infrastructure to mitigate the effects of heat stress.

A benchmark of herd reproductive performance used in commercial Australian herds is for the number of non-lactating stock to equal the number of milking cows. For example, an Australian dairy herd with a rolling average of 200 milking cows should have approximately 200 replacements and dry cows. In a recent ACIAR survey with Philippine SHDs, the average number of milking cows managed per farm was 2.7, with the total of dry cows and heifers (pregnant, yearlings and calves) being 6.0. Overall, this represents a ratio of milking cows:non-milking females of 0.45, which is less than ideal.

A potential intervention to address this issue would include training SHDs and their service providers in both countries in managing herd body condition, transition cow management and feeding early lactation cows better to improve cycling and conception. The evaluation of emerging technology to detect heats or health issues, such as low-cost rumen bolus sensors linked to smart phones, warrant further investigation. This intervention would be supported by on-farm benchmarking of herd reproductive performance and the implementation of demonstration farms. Private sector partners would be encouraged to support the on-farm assessment of innovative technologies and approaches.

Cost: *Intermediate*
\$50,000 to \$100,000 AUD

Potential benefit: *High*

Transition cow management has been one of the most significant global advances in dairy herd nutrition in the last 20 years. It provides SHDs with an opportunity to improve cow health, milk production and reproductive performance.

Depending on the approach used, a transition feeding program in Australia costs between \$20 and \$60 per cow but can return a net benefit of up to \$200 or more per cow, even after additional labour and feed costs are accounted for (Dairy Australia).

Many Australian dairy farmers have implemented successful transition feeding programs pre-calving and reported dramatic reductions in milk fever and other cow health problems, as well as improvements in milk production and fertility.

Risk: *Intermediate*

- The level of education and literacy of SHDs may be too low to understand and learn new knowledge;
- Other productivity limitations such as overall planes of herd nutrition or lack of access to labour may impede adoption;
- SHDs may not invest in modern technology.

3e. Test the feasibility of replacing fresh milk fed to calves with powdered calf formula

Overall Benefit / Cost: *Intermediate*

Approach and Methodology:

It is a regular practice in developing countries for SHD farms to feed fresh milk to calves. Consumption of fresh milk by a calf until weaning is typically 300 litres subject to breed and genetics. For a SHD farm based on three cows, with each cow calving once a year, this equates to a total of 900 litres being fed to calves annually. When expressed as a proportion of total annual milk production, this equates to 7% of annual SHD farm milk production in Indonesia (13,000 litres p.a.) or 12% of annual SHD farm milk production in the Philippines (8,000 litres p.a.). It should be noted that milk fed to calves can be unsellable waste milk from cows with mastitis.

For SSL dairy value chains in both Indonesia and the Philippines, fresh milk supply is limited in many instances. If SHDs and larger scale farms practiced feeding calves with milk powder (as opposed to fresh milk), this would increase annual national milk supply by 100 million litres in Indonesia and three million litres in the Philippines.

It would be of value to undertake research trials on-farm comparing the efficacy and economics in SHD systems in both countries of feeding milk replacers as opposed to fresh milk. Additional potential benefits of replacing fresh milk with milk replacers include: a reduced risk of digestive upsets and scours; milk powders can be stored and handled more easily than fresh milk; they can be easily fortified with additional vitamin, minerals and medicines if necessary; and a reduced risk of disease transfer from cow to calf. At a farm level, they also offer some disadvantages such as additional labour to mix and prepare replacers, the need for facilities for dry storage, the risk of spoilage by rodents and that alternative disposal options will be needed for unsellable milk (Dairy Australia).

Cost: *Intermediate*

To undertake a series of pilot feeding trials, and subsequent extension and training would cost between \$50,000 and \$100,000 AUD.

Potential benefit: *Intermediate*

Apart from the farm level benefits described earlier, this intervention provides an opportunity for additional milk supply for processors to service markets. It would also generate new SMEs to sell calf replacers which could be manufactured locally from imported dairy commodities.

Risk: *Intermediate*

Some initial desktop modelling would be required to scope whether this intervention is feasible under a range of revenue, cost and efficacy parameters.

One risk with this intervention is that reduced farm milk price and higher costs for calf milk replacer powders would make this conversion unfeasible. As calf powders are made predominantly from milk powders, it is often the case that their price is linked. This may not be the case in the Philippines where the government support of school milk programmes leads to abnormal market forces i.e. farm milk price may stay the same, while global dairy commodity prices increase.

3f. Develop demonstration farms focussed on herd water supply and quality to increase milk production per cow

Overall Benefit / Cost: *Intermediate to High*

Approach and Methodology:

A cow's body is between 60–80 per cent water while milk is 87 per cent water. Water is essential for regulation of body temperature, rumen fermentation, flow of feed through the digestive tract, nutrient absorption metabolism and waste removal. Cows should have access to fresh, clean water at all times.

In the Philippines, initial scoping studies have shown that 73% of SHDs had their herd's water supply in separate troughs, with 87% of these requiring manual refilling. Only 47% of milking herds had access to *ad libitum* water, with the remaining herds having access to water once- (13%) or twice- (40%) a-day. Given the physiological importance of water, further research would be warranted to determine if lack of water availability is contributing to low milk production. This would involve some initial testing with manual filling of water troughs followed by the evaluation of self-filling systems.

Cost: *Intermediate*

To undertake a series of on-farm pilot trials, and subsequent extension and training would cost \$50,000 to \$100,000 AUD.

Potential benefit: *High*

There are limited reports on the effect of *ad libitum* (as opposed to restricted) water availability on the milk production of Holstein Friesians or Jerseys in tropical environments. Results with Sahiwal cattle in Pakistan showed a 14% increase in milk production when water is supplied *ad libitum* versus offered twice a day.

Risk: *Intermediate*

As with the introduction of many technologies, poor cash flow can stop implementation, unless a strong benefit/cost can be demonstrated. There is also the consideration that automation can reduce staff requirements. This loss of employment may not be culturally acceptable by some SHD farmers.

3g. Imbed a culture of concentrate formulation based on cost-effective nutrients as opposed to low-cost underperforming nutrients

Overall Benefit / Cost: *High*

Approach and Methodology:

The price of milking herd concentrates in KUDs is often closely correlated with milk price. When milk price decreases, there is an expectation from SHD farmer members that KUDs will also reduce the price of concentrates. To achieve this, KUD feed mills formulate concentrates using lower quality by-products, resulting in suboptimal energy and protein concentrations. Energy intake of dairy cows is a key driver of milk production, while protein plays a key role in rumen fermentation efficiency and cow metabolism. Reducing the concentration of both in lactating cow concentrates (unless energy is initially fed in excess) will reduce milk yield.

Milking herd diets based on tropical perennial forages are inherently deficient in calcium and sodium, with other macro minerals such as phosphorus, magnesium and sulphur in variable quantities. Micro mineral intakes can also vary regionally. Balancing diets requires feed testing and ongoing reviews when core ingredients change.

Alternatively, we have seen in the Philippines the ongoing use of injectable vitamins. It is common in commercial farms to use injectable vitamins pre calving to bolster reserves in the liver of lactating cows, however dosing during lactation is not practiced. This is because some vitamins are not stored and require daily intake (often from the core feedstuff or in a concentrate premix) or the liver provides a long-term storage reserve over lactation.

This intervention would be researched at pilot and demonstration scale in both Central Java and the Philippines. The productivity of concentrates formulated based on nutrient intake to maximise milk income over feed costs for milking herds would be compared to cheaper concentrates formulated from lower quality ingredients.

Cost: *Intermediate*

\$50,000 to \$100,000 AUD to undertake R&D and long term on-farm feeding trials.

Potential benefit: *High*

We have seen in Indodairy significant cost-effective milk production benefits from formulating milking herd concentrates to balance total dietary crude protein and water soluble carbohydrates. Observations show a response of 2 to 3 litres per cow per day across a range of environments when concentrate protein levels were increased from 12 to 16%.

Risk: *Intermediate*

Sourcing high quality protein supplements, such as soyabean meal and canola meal in tropical environments can be problematic and costly. Protein meal supplements available locally can have lower efficacy due to their poor amino acid profiles.

3h. Undertake environmental scans (Jakarta and Manila) to identify cost effective protein and energy commodities that could be supplied directly to SHDs for integration into herd rations

Overall Benefit / Cost: *Low to Intermediate*

Approach and Methodology:

Given their large scale, monogastric industries in both Indonesia and the Philippines are key users of a wide range of locally produced or imported commodities. Our research would indicate that local dairy industries do not have access to many feed stuffs e.g. grain and protein meals, which could potentially lead to improved herd productivity. Their low perceived benefit/cost would appear to be a deterrent to feeding these commodities, in conjunction with dairy concentrate supply chains being unable to source some of these ingredients in bulk. This would be despite some commodities being produced adjacent to local SHDs, as is the case with maize grain production in the Philippines. We also noted in the Philippines that there is misleading advice regarding feeding some commodities such as maize grain.

Desktop research would be undertaken in both countries reviewing the following:

1. Undertake an audit of the feeding value, availability and cost of concentrate ingredients, with particular focus on those utilised in monogastric industries;
2. Investigate new alternative feedstuffs that could be cost-effective components of dairy herd concentrates (milking, dry and replacements), including their feeding value, availability and cost.

Cost: *Low*

Less than \$50,000 AUD. Subject to results, further investment would be needed for training activities with service providers, KUDs or large SHDs that mix their own concentrates.

Potential benefit: *Intermediate*

Cow productivity, forage management and nutrition management are fundamental profit drivers of dairy herds globally. Feeding more nutritious concentrates would lead to greater milk production and profitability.

Risk: *Low*

There is minimal risk from this intervention.

3i. Model the impact of adverse seasons and climate events on SHD systems and pilot the introduction of farm practices to mitigate risk

Overall Benefit / Cost: *Low to Intermediate*

Approach and Methodology:

We are seeing globally today extreme weather events, whether drought, floods or storms, have significant impact on dairy farm systems *per se*, or agricultural entities that supply their inputs e.g. contract forage growers or industries that provide commodities such as grains or by-products. We see instances where dairy supply chains post-farm gate do not react quickly enough through increasing farm gate price to address higher farm costs of production. Consequently, dairy farmers have to absorb these higher costs and adjust their management accordingly. We are seeing more frequently dairy farms being unable to absorb higher production costs, especially where there is some substantive debt servicing in their business.

A key strategy to address this problem is to equip SHDs and their service providers with evidence-based knowledge, skills and confidence to reduce their risk and exposure to climate variability and extreme weather events utilising sustainable farming systems and practices. The development of planning resources to estimate the sensitivity of employing a range of strategies is a crucial component of building this capacity. Our experience in Australia shows that sustainable practices can be shared between businesses (as opposed to a business completing their own benefit/cost risk analysis) but ultimately any solution is business unique due to their individual feeding system, genetics and economics.

This intervention would initially be a desktop modelling study adapting methodologies and approaches used in northern Australian dairy systems to SHD systems in Indonesia and the Philippines. Outcomes from this modelling would be developed into pilot extension resources for a particular region and delivered through a series of workshops and 1:1 consultations.

Cost: *Intermediate*

\$50,000 to \$100,000 AUD

Potential benefit: *Intermediate*

Extreme weather events can lead to SHD's exiting dairying, with flow-on effects to their families, local communities and the value chains they participate in. Soil degradation and other environmental impacts can also occur from overgrazing or extensive cropping.

Risk: *Intermediate to High*

The willingness for SHDs to invest in farm practices for longer term benefits remains unclear. Many do not have the cash flow or access to credit for risk mitigation assets.

3j. Contract growing of maize or sorghum silage crops based on yield and quality incentives

Overall Benefit / Cost: *Low to Intermediate*

Approach and Methodology:

Forage quality and quantity are key fundamental drivers of herd productivity and profitability globally. In Indonesia, forage availability is a major limitation for many landless SHDs. Many use road-side forage or fibrous by products (including maize stover) to feed their herds. Those with limited amounts of land often grow high yielding forages such as Napier grass (*Pennisetum purpureum*) or more leafy variants such as odot (cv. Mott).

In the Philippines, there is less pressure on land availability, with farms adjacent to SHDs growing maize, predominantly for grain. There are examples where commercial scale dairy farms in the Philippines feed maize silage in their milking herd diets. This has been shown to have beneficial effects on milk production, with one farm surveyed in 2021 producing 22 litres per cow per day as opposed to an average of 8.4 litres per day from SHD farms. In other developed tropical and subtropical dairy industries such as United States and northern Australia, the use of grain-based silages has grown significantly over the last 20 years, with perennial tropical grasses being a smaller proportion of milking herd diets due to their inherent lower quality. Having access to more stored forage has become an important weather risk strategy incorporated into inland and subcoastal Australian dairy farms. Based on the costs of corn grain production in Luzon, maize silage would potentially be a competitively priced feed ingredient in Philippine SHD milking herd diets.

It is proposed under SEAD that the feasibility of SHDs purchasing contract grown maize silage (or possibly other tropical grain crops such as sorghum) is evaluated. With contract growing of any forage crops, there are two major risks for the purchaser that need to be managed. These are a. ensuring that the price for ensiled forages is competitive with other feedstuff options. Yield per ha is a key factor, and b. ensuring the quality of purchased forage is suitable for a lactating herd. Evaluating contractual incentives regarding these two parameters would be evaluated under a pilot project.

Cost: Intermediate
\$50,000 to \$100,000 AUD

Potential benefit: High

Including conserved forages in lactating milking herds in tropical SHD systems has significant scope to increase milk production per cow, maintain farm milk supply during the dry season when the availability of fresh forages may be limited, and to mitigate feed risks caused by severe weather events.

Risk: High

Contract growing of forages for dairy farms can be problematic. Reneging of contracts, low yields and inadequate quality can all be challenges. High-starch forages require balancing with protein supplements. While fresh fertilised tropical forages can provide dietary protein, some protein meal supplementation is required to balance lactating cow diets.

While silages can be conserved in drums or bags, some semi-permanent on-farm storage would be preferred to minimise waste. There would be a capital cost associated with this for SHDs.

3k. Evaluate small batch high moisture forage conservation of perennial grasses utilising specialised high sugar fibrolytic inoculants and supplementing herds with mycotoxin binders

Overall Benefit / Cost: High

Approach and Methodology:

Ensiling tropical grasses is problematic in high rainfall tropical environments. The wet season often coincides with the time of the year when farms have excess forage. This makes wilting (reducing the moisture content of the forage) difficult. The fibrous nature of prostrate tropical grasses makes them hard to compact to ensure anaerobic fermentation. They are also inherently low in water soluble carbohydrates (such as sugars) which makes lactic acid fermentation difficult.

Our focus farm project in Indodairy showed that with the use of elevated application rates of inoculants, adding an absorbent material such as bran, and adding a source of sugars such as molasses, it is possible to make excellent quality silage from high moisture tropical grasses. This was completed under field conditions, with the use of a generic local silage inoculant.

Given the importance of this challenge globally, there has been considerable research undertaken evaluating a range of inoculants and absorbents. We would undertake controlled research utilising contemporary practices to evaluate their effect on perennial grass silage quality and waste under several

agronomic and harvesting regimes. We would then undertake on-farm development and extension activities to generate uptake by SHDs and their service providers of this innovative technology.

Integrating silage into tropical dairy systems poses a risk in terms of mycotoxin contamination which can impact cow productivity and pose a human health risk when mycotoxins are transferred to milk. As a risk mitigator, the efficacy of a mycotoxin binder in supplements would also be evaluated.

Cost: High

\$100,000 to \$150,000 AUD

Potential benefit: High

Tropical grasses are a low cost, persistent feed resource for SHDs. Increasing their utilisation in SHD systems would reduce feed costs during the dry season. It would also provide a more nutritious forage source than fibrous by-products such as rice straws and/or reduce higher cost supplementation.

Risk: Intermediate

There has been considerable effort and investment over the last 30 years to address this issue with mixed success.

3I. Pilot the effect of heating water (initially with gas, then either solar or biogas) used in milking procedures to destroy pathogens, lower milk total plate counts, and reduce the incidence of mastitis

Overall Benefit / Cost: High

Approach and Methodology:

Our observations indicate the lack of hot water in SHD milking sheds is a major contributor of high milk TPC levels in both Indonesia and the Philippines. Experience from Australia shows that dairy farms experience high TPC counts when hot water systems malfunction. Similar observations from Canada show a 53% correlation between coliforms in water and milk TPC levels. This observation is consistent with World Health Organisation (WHO) recommendations which summarises bacteria are particularly sensitive to heat with 90% mortality at temperatures above 65°C for one minute and 99.99% mortality above 70°C.

We have noted various examples of using different energy sources to heat water to reduce pathogen loads. In Indodairy, we observed that large scale SHD farms selling milk directly to processors used in line propane water heaters to treat water used during milking. These units are relatively low cost.

In Malawi, solar-powered hot water supply systems have been evaluated with good effect. In this case, the system was communal, with SHD farms accessing heat treated water from a central location.

Heating water using biogas produced on-farm is also another option. Non-government organisations (NGOs) have distributed biogas plants in Indonesia, with many of these located on SHDs. Their heat output is generally used for domestic purposes. This project would look at the feasibility of integrating these systems into SHD milking parlours.

A final approach would be to evaluate the use of electricity generating heating units from grid supply. These would not have the environmental benefits of renewable energy sources described above.

Cost: Intermediate

\$50,000 to \$100,000 AUD

Potential benefit: High

The outcome from this intervention is for SHDs to receive a higher farm gate price for milk with lower TPC concentrations. This outcome would also have benefits for upstream participants in SSL value chains. There are potential environmental benefits to be gained from the use of solar. Biogas fermenters also reduce nutrient migration off-farm.

Risk: Low

High energy costs for propane and electricity are risks.

3m. Test the feasibility in Indonesian and Philippine SHD systems of milk vats designed for SHDs in other countries.

Overall Benefit / Cost: *Intermediate to High*

Approach and Methodology:

It is imperative that milk is chilled (below 5°C) within four hours post milking. This aligns with best practice in developed dairy industries such as Australia and New Zealand where codes of practice stipulate that milk needs to be chilled to less than 4°C within 3.5 hours of the commencement of milking. As we have seen in Indodairy, the storage of milk at ambient temperatures for extended periods of time under tropical conditions causes significant bacterial growth.

Some processors in Indonesia have invested in cooling infrastructure in milk collection centres. In the Philippines, similar investment has been made by government and NGOs. However in both countries, there has been relatively little investment at the farm level in milk cooling infrastructure. Other projects, such as in Kenya, have shown that direct drive solar milk chillers can be successfully integrated into SHD farms with no issues over a two and a half year period. A testament to this project was that no overnight solar chilled milk was rejected by milk buyers over this time and farmer incomes increased by over 30 percent.

In a pilot project, this intervention would look to evaluate commercially available coolers (albeit limited options) in the context of SEAD SHD systems. We would evaluate these units from the perspectives of cooling ability, milk quality, cost and reliability. Fifteen units (three brands x five farms each) would be evaluated.

Cost: *Intermediate*

\$50,000 to \$100,000 AUD

Potential benefit: *High*

See preceding comments.

Risk: *Intermediate*

We have seen in the Philippines that despite being provided with on-farm cooling units, SHDs chose not to use these due to their electricity running costs and not being paid more for lower TPC milk. Servicing these units may also be problematic.

3n. Evaluate a self-contained micro solar system as an energy source for cooling milk on farm

Overall Benefit / Cost: *High*

Approach and Methodology:

A solar panel system with associated freezer fridge cooling unit retails in Australia for approximately \$300 AUD. Assuming a lifespan of five years, this would equate to a cost of \$0.16 AUD per day. Typical low TPC bonuses paid to SHDs equate to \$0.05 AUD per litre, or \$1.80 per day for a three milking cow herd producing 36 litres per day. This intervention would be piloted by buying five units for SHDs in either Indonesia or Philippines as an initial investigation.

Cost: *Low*

<\$50,000

Potential benefit: *High*

This strategy used in combination with heating used in the dairy has the potential to provide transformational improvements in TPC levels ex-farm.

Risk: Low

Low cost solar fridge freezers do not adequately chill milk quickly or uniformly enough.

4. Reducing carbon emissions and off-farm nutrient migration from SHDs

4a. Feeding science-based methane reducing additives such as 3-nitrooxypropanol (3-NOP)

Overall Benefit / Cost: Intermediate to High

Approach and Methodology:

There is emerging global compliance to reduce Greenhouse Gas (GHG) emissions in dairy supply chains, with many multinational processors setting a zero-emission target by 2050. Dairy farms are a significant contributor to the carbon footprint of dairy products with GHG equivalent emissions (CO₂e) in developed countries ranging from 0.8 kg to 1.1 kg per litre of milk from both carbon and nitrogen sources. Dairy systems in subtropical and tropical countries produce a third of the world's milk supply but emit over half of the global dairy GHG emissions ex-farm. The low milk yield per cow of diets based on tropical forages, and suboptimal reproductive performance leads to higher than global average emissions of methane per litre of milk produced. The average modelled GHG emissions from the SHDs we surveyed in the Philippines during 2021 equalled 1.9 kg CO₂e per kg Fat and Protein Corrected Milk (kg FPCM), with a range of 1.2 to 3.8.

Enteric methane synthesis accounts for approximately 85% of GHG emissions on SHD farms. The feed additive 3-nitrooxypropanol (3-NOP) reduces enteric methane emissions by up to 90% in feeding trials in developed countries. A 5% improvement in feed conversion efficiency was noted in some projects.

3-nitrooxypropanol has been approved for use in Brazil and Chile. This will be marketed as Bovaer® by DSM. It is highly probable 3-NOP will be approved for use in Europe (which traditionally has set stringent conditions for additive approval). To date, there has been limited research with Bovaer® supplementation to herds fed tropical forages.

Cost: High

\$100,000 to \$150,000 AUD to undertake feeding trials across a range of SHD farming systems scenarios. The retail price of Bovaer® has not been released. In the unlikely scenario that its daily supplementation cost is excessive, an evaluation of its efficacy with SHD herd fed diets based on tropical forages such as Napier grass (*Pennisetum purpureum*) or Mulato varieties (*Brachiaria* hybrids) is still warranted. Subject to IP constraints, it is likely in time that cheaper generics will become available.

Potential benefit: High

It would appear that any SHD value chain that supplies a multinational dairy company or is servicing consumers that scrutinise the environmental credentials of a brand, will be required to reduce its carbon footprint or purchase carbon offsets.

Risk: Intermediate

As 3-NOP is untested on milking herd diets based on tropical forages, there is a possibility it may not significantly reduce enteric methane synthesis. This is unlikely as to date it has been researched across a wide range of ruminant species and forage types.

As discussed above, the retail price of Bovaer® remains unclear. It would improve its value proposition to SHDs if an additional productivity benefit (such as improved food conversion efficiency or increased milk production) could also be achieved from its supplementation.

4b. Pooling carbon offsets from SHDs to deliver a tradable unit with private carbon traders

Overall Benefit / Cost: Low

Approach and Methodology:

Globally, we are seeing the development of carbon trading platforms (CTPs) that incorporate mitigation offsets from dairy farms. Many of these CTPs are underwritten by government to ensure their integrity. As such, there are policies and regulations which present significant barriers for the participation of the farming sector. Key barriers are the high compliance and auditing cost of trading carbon units.

An option that is currently being investigated in Australia is the possibility of trading the pooled carbon offsets of multiple businesses. Aggregation can be undertaken by individuals or organisations. As dairy farms are generally highly productive and relatively small (by Australian agricultural standards), it is likely that an aggregated model could be the best way for landholders to participate in a CTP. This is because scale is required to make carbon projects economically feasible. There are two broad categories of aggregation that could potentially apply:

1. Project aggregation. This is where activities that use the same method to bring about carbon abatement are grouped into a single registered project;
2. Contract aggregation. This is where projects are grouped or 'bundled' into a single bid made by the aggregator at an auction for a single carbon contract. An aggregated contract can include projects using different carbon abatement methods.

The widespread use of a rumen modifier such as Bovaer® to reduce methane emissions or the widespread adoption of a productivity farm practice (e.g. the implementation of biogas, improved herd reproduction) could be potential carbon mitigation aggregation strategies.

It would be proposed that an initial desktop study is undertaken to develop a feasibility project. The ability to access an offshore trading platform, such as the EU, would be an important consideration given the lack of current CTPs in the Philippines and Indonesia (albeit in development).

Cost: Low
< \$50,000 AUD

Potential benefit: Low

The typical annual carbon footprint of a Philippine and Indonesian SHD would be 15 and 22 tonnes, respectively. Based on a current carbon trading price of 67 EUR per tonne and assuming 100% abatement is achieved, this would represent additional revenue (subject to trading costs) of 58,000 PHP and 22,000,000 IDR per SHD farm in the Philippines and Indonesia, respectively. This would represent 15% and 17% of additional revenue for each system.

Risk: High

This intervention *per se* is high risk relative to benefits. Attaining collaboration amongst SHDs, and the adoption and maintenance of abatement technologies and practices would be problematic. An alternative perspective is that if SHD farms need to reduce their carbon footprint to permit them to participate in a value chain, then gaining revenue from these offsets, especially when managed by a third party, would be beneficial.

4c. Utilising portable methane meters to evaluate herd nutritional interventions under SHD conditions

Overall Benefit / Cost: Low to Intermediate

Approach and Methodology:

The Philippine Landscape study identified some strong correlations between CO₂e per kg FPCM, and i) the ratio of milking to dry stock, ii) milk production per cow and iii) a parameter combining these two variables; annual milk production per head of farm livestock. Given the quadratic and cubic relationships identified, some thresholds were noted, with CO₂e increasing once the ratio of dry stock to milking stock exceeded 1 (60% of farms), when daily milk production per cow was less than 8 kg (47% of farms), and when milk production averaged per head of farm livestock was less than 1250 kg per annum. To calibrate these emission models to both Philippines and Indonesia SHD farming systems, on-farm quantification is warranted utilising low cost emission meters (laser methane detectors) that are now available. These

would be used to measure changes in herd methane emissions through cost effective nutrition interventions and implementing practices and technologies to improve herd reproductive performance.

Cost: *High*

\$100,000 to \$150,000 AUD

Potential benefit: *Intermediate*

This research would provide on-farm evidence of reduced methane concentration emitted from dairy herds. This would be important from both policy and commercial perspectives.

Risk: *High*

A limitation of portable methane meters is they only measure methane concentration in exhaled air, not total methane emissions. To measure this would require the use of a marker or more intensive controlled research.

4d. Utilising liquid effluent as a nutrient source in hydroponic forage production systems

Overall Benefit / Cost: *Low to Intermediate*

Approach and Methodology:

The use of hydroponics integrating treated effluent to grow forage has been shown to be feasible in desert environments. Liquid effluent is also sprayed on pastures in Australia. It is a cost-effective nutrient source and anecdotally has been observed to have positive effects on soil microflora and plant health. Given that some SHDs have no or limited access to land, the development of small hydroponic systems growing nutritious perennial tropical legumes such as *Vigna* spp. offers an option to provide high protein and calcium containing feedstuffs adjacent to a SHD dairy. An initial desktop study would need to be undertaken to identify if suitable technology is available, what species could potentially be grown and the cost of forages grown under these systems versus other feed sources locally available.

Cost: *Low*

<\$50,000 AUD

Potential benefit: *Intermediate*

Sourcing high quality locally grown protein supplements for SHD farms in the Philippines and Indonesia is problematic. Tropical legume forages offer a good source of protein. They are also more digestible than tropical grasses due to their high leaf:stem ratio and short vascular bundles.

In addition to forage production, there would also be the environmental benefit of nutrients being retained and recycled on farm, as opposed to contaminating waterways or subsurface water reserves.

Risk: *Intermediate*

Compared to tropical grasses, tropical legumes have low yields. The benefit/cost of their propagation, given the capital cost of hydroponic systems, would need investigation. In Australia, the development of housed forage production systems based on sprouted grain has been problematic. Lessons from these failures need to be considered in reviewing this strategy going forward.

4e. An evaluation of contemporary soil management practices to balance nutrients provided by composted solid effluent.

Overall Benefit / Cost: *Intermediate*

Approach and Methodology:

The preliminary forage agronomy interventions with Focus Farms in the Indodairy project revealed significant soil degradation on forage plots. This was typically observed as a lack of soil structure, no bioflora being present, compaction and poor forage productivity. Our scoping study in the Philippines showed that 40% of farmers were using fertiliser from commercial providers. We are unclear of the type,

amounts and costs of fertiliser purchased and how it was used. Of the farms using fertiliser, 83% were also using manure as fertiliser as well. There was no recording of SHDs applying lime to counteract soil acidification caused by nitrogen fertilisers. The majority of images taken of forages on Philippine SHD farms show nitrogen deficiency and variable growth within paddocks. We would recommend that soil fertility and soil management practices on SHD farms should be reviewed going forward, with demonstration sites established to show the benefit cost of contemporary soil remediation practices. On our recent mission to the Philippines in August 2022, we observed leading SHD farms using unbalanced blended fertilisers for maize silage production leading to suboptimal yields and quality.

Cost: Intermediate
\$50,000 to \$100,000 AUD

Potential benefit: High

Soil acidity due to the overuse of nitrogen-based fertiliser leads to the unavailability of many macro and micronutrients for plants. Correcting soil pH can also improve soil structure and water-holding capacity. It is understandable for SHDs with limited land to use intensive practices to produce as much forage as possible. Undertaking some basic soil tests and correcting imbalances could offer a significant improvement in productivity in some circumstances. The overall long term degradation of soils on SHD farms is of concern and raises challenges about their long term productivity.

Risk: Intermediate

- We noted in Indodairy that soil degradation (particularly in regard to soil organic matter) may be that extensive that correcting nutrient balances may have minimal productivity benefits, as other soil structural problems are more limiting;
- The lack of adoption of new practices is a risk.

Strategy 2 - Processing to retail

1. Develop shorten regional supply chains using micro compartmental processing plants and business mentoring

Overall Benefit / Cost: Intermediate

Approach and Methodology:

Our SEAD mission in August 2022 showed a number of proprietary businesses and co-operatives direct market their own products to consumers. These value chains were based primarily on sourcing milk from larger corporate or community owned farms. Marketing online or using agents were often used as distribution channels.

Neither our research in Indodairy nor our scoping study in the Philippines has been able to identify smaller co-operatives with multiple SHD supply farms who have been able to successfully implement direct consumer marketing. This is despite significant government support for manufacturing infrastructure in the Philippines. Our observations indicate that bacterial contamination ex-farm and poor hygiene during manufacturing means small co-op brands are uncompetitive in formal value chains due to their food safety concerns and short shelf life.

A feasibility study would be undertaken to establish a contemporary pilot SHD inclusive value chain based on modular micro processing plants (fixed or mobile). In addition to processing infrastructure, advisory services regarding establishing online marketing and business transactions would be provided.

There are examples from other developing countries where ready-to-use modular milk processing plants including pasteurisers and bottling machinery housed in shipping containers have been provided to smaller co-operatives. These modular plants have production capacities up to 12,000 litres per day. They are valued at approximately \$80,000 USD.

Cost: *High* >\$150,000 AUD

Potential benefit: *High*

This intervention would be used as a demonstration of a replicable value chain model that could be implemented across a variety of regions and countries.

Risk: *High*

- Milk ex-farm with high TPC levels is not suitable for pasteurisation. Other options such as extended shelf life would need to be considered;
- The distribution and marketing chain post factory would need significant co-investment and training of staff. It would take a significant period of time for a brand to become established and as such, there would be a considerable monetary loss at the start of the venture and to the SEAD project.

2. Establish local fresh milk supply chains to service coffee outlets and the hospitality sector

Overall Benefit / Cost: *Intermediate*

Approach and Methodology:

The growth in premium coffee outlets in both the Philippines and Indonesia has been substantial. Both of these value chains have specific requirements for milk quality. Steamed milk needs to maintain its frothing value, have a milkfat derived lustre and be free of taints and odours (linked to milking herd feedstuffs). Given today's processing technology, these attributes cannot be met by large companies due to the physical damage created by factory fat/skim separation and excessive pumping of milk. Reconstituted and ultra high temperature (UHT) products are also of inferior quality. There are exceptions however, with Arla manufacturing a high protein barista milk which is available in the Philippines.

In addition to high TPC levels, frothing values have been noted to be problematic for some SHD supply chains servicing coffee outlets in the Philippines. Our observations indicate there is a low tolerance by customers to any milk quality issues in coffee shops, which is driven by the higher prices paid for espresso coffee beverages and therefore customer expectations. A comment by one coffee retailer noted that an education process to focus on product quality was required for SHD farmers. There was also a sentiment expressed by one coffee shop owner regarding the future environmental credentials of its milk supply chain. They see a marketing opportunity for value adding to coffee sales by marketing milk from dairy farms that have good environmental management practices, particularly relating to their carbon footprint.

Our observations would indicate that there is more scope to research this intervention initially in Indonesia rather than the Philippines. While only a perspective, Philippine consumers appear to have lower quality expectations of their coffee. It is unclear whether this is cultural, or symptomatic of low stocks of high quality milk in the Philippines at a competitive price.

Initially, this intervention would be researched as a value chain study to better quantify milk quality parameters, associated premiums and the feasibility of meeting these requirements ex SHD farm.

Cost: *Intermediate*

\$50,000 to \$100,000 AUD

Potential benefit: *Intermediate*

Identification of potential value chains with a focus on potential customers and their quality parameters. There would also be some vetting of SHDs (whether through KUDs/co-operatives, traders) who could potentially service these customers.

Risk: *Intermediate*

- Although the espresso coffee sector is growing, it would be a relatively small market for SHD inclusive value chains;

- The intervention *per se* as a study has minimal risk. We have seen examples in Indonesia where SHDs supply milk directly to coffee outlets in Bogor. This would suggest that further developing this value chain is feasible;
- There is a risk that manufacturing technology may overcome quality constraints seen in large scale processing.

Strategy 3 – Enabling and policy environment

1. Develop a policy paper regarding the use of “fresh” in dairy product branding

Overall Benefit / Cost: *Intermediate*

Approach and Methodology:

In both Indonesia and the Philippines, ambient dairy value chains are dominated by large multinational processors with significant commercial leverage. This situation is further exacerbated by the marketing of ambient UHT treated milk or reconstituted milk as “fresh” milk. This is problematic for local chilled pasteurised or extended shelf life (ESL) supply chains. Having tactical consumer preference and behaviour information is beyond the expertise and resources of most SHD supply chains in both countries.

This activity would initially develop economic models based on consumer surveys, value chain analysis and social impact on SHD value chains of milk labelling policies and regulations with regard to the use of fresh milk branding. Overall, the project will generate policy recommendations to understand the benefit/cost of introducing branding legislation.

Cost: *Intermediate*

\$50,000 to \$100,000 AUD

Potential benefit: *Intermediate*

This intervention would provide new information to both Indonesian and Philippine governments regarding the regulation and enforcement of fresh milk branding policy.

Risk: *Intermediate*

Multinational processors also have SHDs integrated within their supply chains and as such support regional communities. It would be expected that regulation to limit the use of “fresh milk” in branding would have ramifications for multinational business models in both countries through reduced sales but also possibly some reputational damage.

2. Experimenting with contemporary practice change methodologies, communication platforms and capacity building

Overall Benefit / Cost: *High*

Approach and Methodology:

This intervention would have two components. One would be recruiting and developing village level researchers (VLRs) and agribusiness entrepreneurs and the second would be the further evaluation of contemporary practice change approaches in both Indonesia and the Philippines.

Indodairy demonstrated significant impacts from introducing discussion groups, focus farms, online extension delivery and on-farm technology demonstrations. A key success factor in this approach was the employment of degree graduates as VLRs who were upskilled in contemporary dairy farm technology, facilitated regional discussion groups and focus farms, and liaised with local stakeholders. VLRs also played a key role in on-farm research and data collection.

Development and extension methodologies in Australia, New Zealand and Europe are constantly undergoing review and change. Much of this development is focussed on integrating contemporary IT

learning platforms or integrating intermediaries (such as service provider or consultants) within practice change methodologies.

A key conduit for the integration of interventions within value chains are small and medium enterprises (SMEs). SMEs account for the majority of businesses worldwide and are important contributors to job creation and global economic development. We see in other developing dairy industries such as Kenya that women play a key role in the retail milk marketplace. We also see opportunities for next generation dairy service providers to enter value chains. Researching and piloting the development of SMEs linked to successful interventions developed from SEAD is a key outcome.

Cost: High
\$500,000 AUD

Potential benefit: High

Of the five VLRs employed during the Indodairy project, four have gone on to new roles in either dairy RD&E, with milk processors or postgraduate studies. We would see SEAD replicate this with four VLRs appointed (two in each country) over a period of three years. The project would also employ two agribusiness entrepreneurs based on the same approach.

The evaluation and adoption of contemporary practice change approaches used in Australia, such as discussion groups and focus farms, provided significant outcomes in West Java (Indodairy). We cannot see any reason why these benefits cannot be replicated in Central Java and the Philippines.

Risk: Low

The employment of VLRs would come with minimal risk. These staff would be embedded within local project partners. As agribusiness entrepreneurs would be a new approach for the project team, this would have greater risk due to the volatility of commercial operating environments.

The evaluation of practice change methodologies comes with minimal risk.

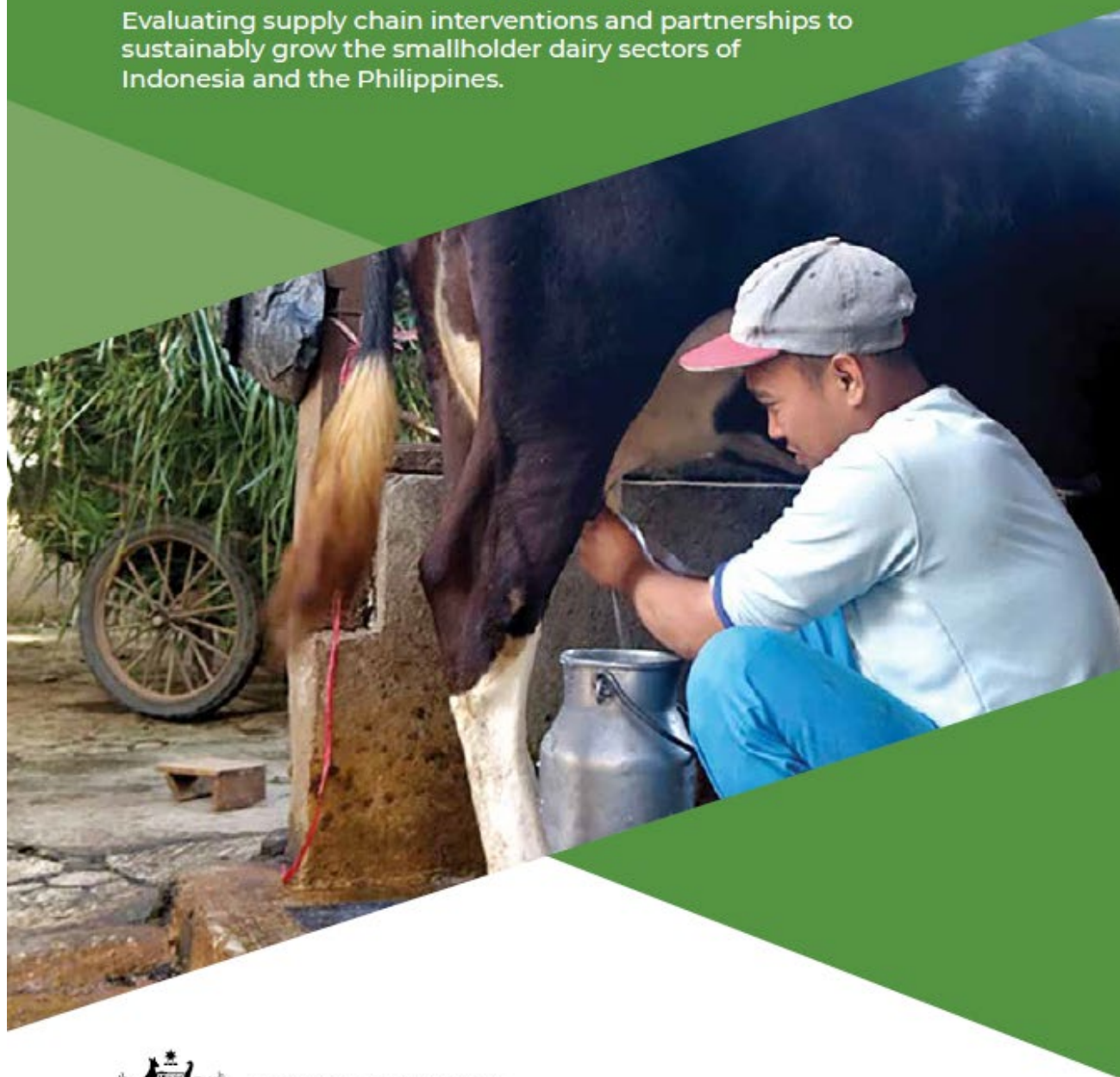
12.12 Appendix 12: Prospectus for potential project partners South-east Asia Dairy (SEAD)

July 2022 to June 2027

PROSPECTUS FOR POTENTIAL PROJECT PARTNERS

South-east Asia Dairy (SEAD)

Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines.



Australian Government

Australian Centre for
International Agricultural Research

JULY 22

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Abbreviations

ACIAR	Australian Centre of International Agricultural Research	RTD	Ready to Drink
ADC	Australasian Dairy Consultants	SEAD	South-East Asia Dairy
DOST	Department of Science and Technology	SHD	Smallholder Dairy
GHG	Greenhouse gas	SME	Small Medium Enterprise
IPB	Bogor University	SSL	Short Shelf Life
NDA	National Dairy Authority	UA	University of Adelaide
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development	UHT	Ultra high temperature
		UNDIP	University of Diponegoro

Introduction

Over the next five years, the South-east Asia Dairy (SEAD) project is seeking industry partners and stakeholders to co-invest in growing small holder dairy (SHD) inclusive value chains in Indonesia and the Philippines.

As you would be aware, small holder dairies have their challenges, but they also have just as many opportunities. These opportunities and the benefits they provide to the Indonesian and Philippine dairy industries, their dairy supply chains, communities and the people of Indonesia and the Philippines can only be realised by investing in their future today.

In both countries, the private sector plays an integral role in SHD inclusive value chains, whether it be providing farm inputs, processing capabilities and/or access to markets and consumers. Their resources, expertise, networks and operations have the potential to deliver sustainable market-based interventions to address many of the challenges facing the SHD sector. We see the private sector co-investing in interventions with a focus on improving farm productivity, product quality and availability, supply chain efficiencies and creating a more conducive enabling environment for SHDs.

Our proposed research strategy is to develop innovative partnerships with collaborative and adaptable organisations (private and government) who will engage and/or co-invest (e.g., markets, capital, expertise, technology, opportunities) in piloting and testing market-based interventions to address development constraints resulting in equitable solutions for all actors in the chain and the broader community. Our vision is for dairy value chain members to become advocates of successful interventions and to foster greater uptake of innovations beyond the project participants and the life of the project.

To date, our past projects have identified a number of key interventions to address a range of technical and supply chain opportunities and constraints in both countries. This prospectus outlines these interventions. We are cognisant that our interventions identified to date are not exclusive and we welcome other strategies, initiatives and technologies within the project's terms of reference.

On behalf of the Australian Centre for International Agricultural Research and our project partners, we look forward to the opportunity to potentially working with your business to grow sustainable SHD inclusive value chains in Indonesia and the Philippines.

Howard Hall

*Research Program Manager | Agribusiness
Australian Centre for International Agricultural
Research*

Dr Brad Granzin

*Project Leader South-east Asia Dairy and
Managing Director Australasian Dairy Consultants*

Professor Wendy Umberger

Project Director South-east Asia Dairy



Background

Demand for high quality, safe and nutritious dairy products in Indonesia and the Philippines is growing. There is also greater consumer scrutiny of production and social attributes (e.g. local, environmental and animal welfare).

Domestic demand is largely met with imported dairy products, primarily supplied by modern multinational processors through formal supply chains, underpinned by high quality standards, advanced distribution infrastructure, ambient product lines and access to internationally traded commodities. Thus, SHDs are at risk if they cannot innovate and upgrade to compete and participate in these modern formal supply or “value” chains.

Indonesia’s national dairy herd was 561,061 in 2019 (Indonesian Bureau of Statistics, 2021). This equates to approximately 187,000 dairy farms (mostly SHDs), based on an average of three cows per farm. These farms are mostly located on Java with this region accounting for 99% of Indonesia’s milk production. In the Philippines, the National Dairy Authority (NDA) estimated in 2018 there were 9,374 dairy cows among 8,691 farmers with Batangas, Isabela and Bukidnon significant dairy producing regions, accounting for 39% of total Filipino milk production (NDA, 2020).

For the SHD sectors in both countries, there is an opportunity for private SHD inclusive value chains to service emerging domestic markets. These chains would be based on chilled short shelf life (SSL) dairy products (e.g. fresh milk, drinking yoghurts and high frothing milk for coffee baristas). This is a point of difference in the marketplace that cannot be easily replicated by ambient supply chains based on imports.

Quality, consistency and logistically competitive milk supply, processing and wholesaling are all required if SHD inclusive supply chains are to capitalise on these opportunities. Previous research has identified approaches, technologies and scope to upskill SHDs, public institutions and private service providers to address opportunities and challenges. Sustainable change requires more than upskilling or interjecting technology. An approach is needed that is contextualized for SHDs to upgrade processes (i.e., increase productivity) and product quality (i.e., hygiene and milk quality) through on-farm change. Chain coordination approaches are also needed that engage and partner with multiple stakeholders, including processors, service providers, and investors who can become advocates of change extending beyond the end date of SEAD in 2027.



An overview of the Philippine and Indonesian dairy industries

In Indonesia, the drinking milk market is estimated at 2.51 billion litres with importation of 1.8 billion litres milk equivalent ingredients or ready to drink (RTD) products. Comparable figures for the Philippines are 28 million litres of fresh drinking milk and 97 million litres of ultra-high temperature (UHT) or reconstituted RTD milk.

Looking forward, SHDs have a role in addressing the low national self-sufficiency in each country but only in value chains which allow for their sustainable sector growth and profitability. Identifying these value chains and overcoming barriers to participation by SHDs are key challenges.

What are the opportunities for SHD inclusive value chains in Indonesia and the Philippines?

- For upstream participants in SSL value chains, high levels of milk bacterial contamination from SHD farms cannot be corrected by processing unless milk is essentially boiled, which has detrimental consequences to the taste and functionality of milk. To correct this issue, change is required on-farm, primarily to water quality and milk harvesting techniques. We have also observed that poor milk hygiene standards in co-operatives exacerbate this problem in Indonesia. The development of low-cost rapid testing methodologies for measuring bacterial contamination of water and raw milk is a priority. This issue is also compounded by ineffective institutional testing arrangements regarding milk quality. This results in an environment where farmers lack incentive (e.g., price incentives for high quality milk or discounts for poor quality) to adopt technologies that provide benefits to the entire dairy value chain.
- Farm gate milk price per litre in the Philippines (\$0.63 USD) is high compared to other countries (e.g., \$0.47 USD in northern Australia). Different market forces exist in Indonesia with farm gate milk price (\$0.33 USD 2017) more closely linked to international commodity pricing. Profit per litre and cow are high (Philippines) or similar (Indonesia) compared to other countries such as Australia, whether small holder or large scale. Growing average SHD herd size from three to 10 milking cows would see SHD farms triple milk supply with an estimated doubling of profit. This

would see SHDs move from being subsistence farms in relative poverty to full time resilient dairy businesses with the capacity to innovate and adopt technologies and to provide financial rewards relative to the rest of the Indonesian and Philippine societies.

- In the process of adopting multiple technologies, farmers are faced with different constraints at various stages of adoption. These constraints include lack of access to information, capital, key inputs and technologies, and improved skills to properly adopt technologies. There are various examples where a technology may lead to productivity gains, but it is not adapted to local conditions. Engaging with key actors that have the capacity and motivation to support change, developing either services within existing value chains or researching the development of SMEs to overcome these barriers, will fall within the project scope of SEAD.
- The environmental credentials of SHD farmer inclusive value chains will need to improve going forward. A challenge is the increasing consumer scrutiny regarding the carbon footprint of dairy value chains globally. Many multinational dairy processors have set a zero-carbon emission target by 2050. The carbon footprint per litre of milk from tropical SHDs is almost double values recorded for temperate large-scale farms. There are immediate opportunities to reduce this footprint by focusing on improving herd productivity through reproduction and herd nutrition. SHD's contribution to water nutrient pollution from effluent is also a challenge, especially where SHDs are geographically concentrated. There is limited awareness across the SHD sector of the current or future global importance of environmental credentials.



Why is new research needed and how will it lead to a solution?

While the public sector has a role with the provision of RD&E, market support and policy, sustainable SHD inclusive value chains are dependent on the strategy and commitment of commercial players and the subsequent power relationships in the dairy chain. Only well-balanced relationships where there is mutual respect and margin share for SHDs will result in the growth of these value chains. To achieve this amongst value chain members requires aligned thinking and business strategies regarding the opportunities, consensus regarding the intervention and alliances to ensure innovations are well researched, effective, sustainable and scalable.

A key conduit for the integration of interventions within value chains are small and medium enterprises (SMEs). SMEs account for the majority of businesses worldwide and are important contributors to job creation and global economic development. They represent about 90% of businesses and more than 50% of employment globally. By their nature, SMEs are agile and responsive and as such are well suited to the

scaling out of value chain interventions to address bottlenecks. We see in other developing dairy industries, such as Kenya, that women play a key role in the retail milk marketplace. We also see opportunities for next generation dairy service providers to enter value chains through providing services. Researching and piloting the development of SMEs linked to successful interventions developed from SEAD is a key research outcome.

Small and medium enterprises account for the majority of businesses worldwide and are important contributors to job creation and global economic development.

Project overview

Australian Collaborating Organisations

Australian Centre for International Agricultural Research (ACIAR) plays a key role in delivering the Australian Government's overseas aid program by organising and funding applied research projects to support the development of productive and sustainable agricultural systems for the benefit of developing countries and Australia.

Australasian Dairy Consultants (ADC) is the lead organisation for South-east Asia Dairy. ADC and its Australian collaborators have extensive experience partnering with private companies, government and universities in Indonesia and in the Philippines. ADC provides technical and project management services focussed on tropical and subtropical dairy systems and supply chains. ADC specialises in fundamental and advanced RD&E of dairy herd feedbase, nutritional and whole farm management across a wide range of environments and systems throughout Australia and Asia. Services are also provided in value-adding post farm gate, with particular emphasis on supply profiles and milk quality.

The University of Adelaide (UA) Centre for Global Food and Resources has an international reputation for creating and applying knowledge on secure and resilient global food and resource systems. It conducts world-class innovative interdisciplinary research, using a whole of systems approach. It addresses economic, policy, agribusiness and social issues affecting global food systems.

Potential Government of Indonesia partners

Bogor Agricultural University (IPB). Established in 1963, IPB is one of the top five universities in Indonesia and is well-known for its contribution to agricultural, science and social policy research in Indonesia. SEAD will closely work with the Business Management division (MB-IPB). MB-IPB has extensive experience in agribusiness

research collaborating with the private sector, and various government institutions including regional governments.

Diponegoro University (UNDIP). Diponegoro University is located in Semarang City, Central Java Province. The University founded in 1956 initially as a private university, but then earned status of public university on 1961. UNDIP has 149 study programs in 11 faculties, postgraduates schools, and vocational school. The Faculty of Animal and Agricultural Sciences has an active dairy science research programme and has recently collaborated with local processors and international partners.

Potential Government of Philippine partners

Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) is one of the sectoral councils under the Department of Science and Technology (DOST). It delivers sustained dynamic leadership in science and technology innovation in the agriculture, aquatic and natural resources sectors.

National Dairy Authority. Created by the National Dairy Development Act of 1995, the National Dairy Authority is mandated to ensure the accelerated development of the Philippine dairy industry through policy direction and program implementation. It is an agency attached to the Department of Agriculture. Its vision is for a profitable, competitive and sustainable growing dairy industry built on financially viable business performance throughout the value chain, providing a good quality of life for farmers and ensuring consumers safe and quality milk and milk products. It achieves this vision by partnering with the private sector through the provision of policy, science-based technical expertise, sound business support and effective management of dairy programmes.



South-east Asia Dairy (SEAD) Project Overview

Aim

By 2027, SEAD will sustainably expand smallholder dairy (SHD) inclusive value chains in Indonesia and the Philippines by capitalizing on the growing domestic demand for short shelf-life dairy products in both countries. This project will deliver more resilient SHD communities, greater market access and margin share, better quality and consistency in finished products, a smaller environmental footprint, and public sectors delivering contemporary policies and services.



Objectives

1. Develop, implement, and measure the success of collaborative multi-stakeholder innovation platforms as a method for networking and engaging with SHD farming households, other value chain actors and SHD sector stakeholders to gain consensus regarding opportunities and challenges, and to identify sustainable SHD value chain interventions.
2. Pilot and evaluate potentially scalable business model interventions and policy strategies which lead to innovative and sustainable smallholder-inclusive dairy value chains.
3. Communicate and build capacity in the SHD sectors, including with industry, policy makers and researchers in Indonesia and the Philippines and materially engage with and contribute to the policy agenda that impacts the dairy sector in these countries.
4. Drive innovation and develop entrepreneurial small and medium-sized enterprises (SMEs) to improve the functioning of smallholder inclusive dairy value chains.

Budget

ACIAR have allocated 4.8 million Australian dollars for this project with equal funding allocated for each country.

Potential interventions that could be researched within SEAD.

STRATEGY 1

Developing sustainable SHD farming systems in Indonesia and the Philippines

Background

Moving from a subsistence small holder dairy (SHD) to a full-time resilient dairy business

Growing a SHD from 4 to 10 cows in conjunction with improved cow productivity can triple the milk production from a farm and lead to significant improvements in profitability. In combination with improved milk quality, increased productivity can open new markets which need larger supplies of milk to be competitive with imported dairy commodities. It also has significant benefits in being able to access capital and reduce transaction costs post farm gate such as transportation and milk processing efficiency. It also generates cash flow to fund investment in on-farm water treatment and milk cooling technology to improve milk quality and herd health. To realise this opportunity requires identifying SHDs who would like to change, improving their commercial focus from supply and quality perspectives and upskilling in farm practices. Having more secure longer term milk supply contracts installs confidence in farmers and agribusiness to invest. Alternatively, access to land, either due to market forces or government policy, is a constraint. Farm development must be able to withstand the impact of climate change, with increasing temperatures, changing rainfall patterns, more droughts and cyclones.

The seasonality of milk supply from SHD limits access to some markets

Low rainfall during the dry season and a lack of supplementary irrigation leads to low forage availability at this time of the year. This limits SHD access to formal SSL markets with all-year dairy consumption e.g., drinking milk markets, coffee retail outlets.



Poor milk quality results in reduced herd productivity, lower farm gate milk price and reduced market access

Pathogen contamination of raw milk restricts access to local SSL markets. This is due to:

- Poorly defined and understood bacterial contamination standards;
- A lack of enforcement of standards during seasons of low milk supply;
- Lack of access to pathogen testing;
- Lack of feedback to individual producers in conjunction with financial incentives to improve quality;
- Lack of cooling infrastructure on farm and within supply chains.

Lowering the environmental impact of SHDs

- There is emerging global compliance to reduce green-house gas (GHG) emissions in dairy systems with many multinational processors setting a zero-emission target by 2050.
- Dairy systems in subtropical and tropical countries produce a third of the world's milk supply but emit over half of the global dairy GHG emissions.
- SHD lack the scale to trade in carbon offsets in current markets.
- The off-farm migration of effluent from dairy farms leads to poor water quality to users and the environment down-stream. This can have a direct effect on other SHD with polluted water leading to more mastitis and higher milk pathogen loads.

Potential interventions

Identify the drivers of change for SHDs who are prepared to grow their business and assist them to identify key management areas to improve profitability.

A fundamental requirement of dairy development is identifying farmers who want to change to improve their business. To identify this segment, the project could initially undertake a baseline study focussed on farmer attitude, intent and key farm profit indicators. Business orientated discussion groups and 1:1 client focused services could then be piloted amongst this demographic.

Upskilling SHDs and service providers to make or assist in step wise improvements on-farm in forage production, quality and utilisation, herd nutrition and health, reproduction and milk harvesting hygiene.

- In conjunction with agribusiness, pilot demonstration sites on SHDs examining forage varieties (especially starch containing) and contemporary fertiliser management. The target of these sites would be to at least double digestible nutrient yield per ha. Integrating effluent into these sites and balancing soil nutrients will be undertaken.
- Pilot through farm demonstrations the impact of forage cutting height on milk yield.
- Evaluate alternative approaches to maximisation of milk income over feed costs through the development and evaluation of basic feed balancing apps and remote diet formulation through the provision of farm captured information and images.
- Upskill SHDs and service providers nutrition management linked to herd reproductive performance.
- Test the feasibility of replacing fresh milk fed to calves with powdered calf formula.
- Develop demonstration farms focussed on herd water supply and quality to increase milk production per cow.





Work with agribusiness and co-operatives to provide more productive cost-effective milking herd concentrates and commodities.

- Imbed a culture of concentrate formulation based on cost-effective nutrients as opposed to low-cost underperforming nutrients.
- Undertake environmental scans (Jakarta and Manila) to identify cost effective protein and energy commodities that could be supplied directly to SHDs for integration into herd rations.

Model the impact of adverse seasons and climate events and pilot the introduction of farm practices to mitigate risk.

Provide farmers and their service providers with evidence-based knowledge, skills and confidence to reduce the risk and exposure to climate variability and extreme weather events utilising sustainable farming systems and practices. The development of a planning resource to estimate the sensitivity of employing a range of strategies will be a crucial component of building this capacity.

Integrate pit silage into SHD feedplans.

This has the opportunity to provide a multi-year feed reserve in the event of drought or excessively wet conditions. Integrating silage into tropical dairy systems poses a risk in terms of mycotoxin poisoning which can impact cow productivity and pose a human health risk with mycotoxins being transferred to milk. As a risk measure, the efficacy of a mycotoxin binder in supplements would also

be evaluated. In conjunction with forage trials, a number of models would be researched:

- Contract growing of maize or sorghum silage crops based on yield and quality incentives;
- Small batch high moisture forage conservation of perennial grasses e.g., Napier utilising specialised high sugar fibrolytic inoculants and supplementing herds with mycotoxin binders.

Reduce pathogen contamination by use of contemporary hygiene practices scaled for SHDs and evaluate on-farm milk cooling technology designed for SHD.

- The project would engage with processors and other co-operatives in Indonesia and the Philippines to scale out its milk quality incentive and pathogen testing pilot delivered in the past Indonesian dairy project.
- Pilot the effect of heating water (initially with gas, then either solar or biogas) used in milking procedures to destroy pathogens and reduce the incidence of mastitis.
- There are commercially available small milk vats especially designed for SHD in other countries. Their feasibility would be evaluated.

Reducing carbon emissions from SHDs.

There are a number of interventions to reduce greenhouse gas emissions per litre from tropical SHD dairy systems. These are:

- Improve cow productivity;

- Feeding science-based methane reducing additives such as 3-nitrooxypropanol;
- Installation of self-contained solar units as a source of electricity for farm use and milk cooling;
- Integrate effluent into soils as a carbon sink, as well as a source of potassium and other nutrients;
- Pooling carbon offsets from SHD to deliver a tradable unit with private carbon traders;
- Utilising liquid effluent as a nutrient source in hydroponic forage production systems.

Potential interventions:

- A demonstration pilot would be delivered utilising portable methane meters to evaluate herd nutritional interventions under SHD conditions;
- A self-contained micro solar system would be evaluated as an energy source for heating water and cooling milk on farm;
- A demonstration pilot would be evaluated using contemporary soil management practices to balance nutrients provided by composted solid effluent. The contribution of carbon from effluent into soil structures will also be accounted for.



Research will be undertaken to develop business models (such as co-operatives) allowing the pooling of carbon offsets with minimal administration cost related to auditing. This would complement research currently underway in the Australian dairy industry.

Liquid effluent is sprayed on pastures in Australia. It is a cost-effective nutrient source and anecdotally has been observed to have positive effects on soil microflora and plant health. Given that some SHDs have no or limited access to land, the development of small hydroponic systems growing high nutritional value perennial tropical legumes such as *Arachis* or *Vigna* spp. offers an option to provide high protein and calcium containing feedstuffs adjacent to a SHD dairy.



STRATEGY 2

Processing to retail value chain improvements

Background

Partnering processors with co-operatives and/or SHD to realise urban market opportunities:

- Many SHD and co-operatives have poor relationships with processors or customers. This is fundamentally driven by the inability of SHDs and co-operatives to supply the right quality milk at the right time in the right volume to SSL markets. Restoring confidence in these relationships by providing the right incentives and feedback to SHDs, supporting co-operatives to focus on hygiene, and SHDs making the appropriate change to their farm is critical to fulfilling this opportunity. Many co-operatives have excess processing capacity;
- While economic growth and urbanisation are high level drivers for the development of formal retail supply chains including chilled diversified SSL dairy products, entry can be problematic due to scale, quality and logistical constraints for SHDs. Similarly, a larger processor may have trouble securing milk supply to service this market.

Overcoming high transportation costs to urban centres by capitalising on local shorter supply chains.

In both Indonesia and the Philippines, the logistics of milk transportation from rural to urban centres, whether in bulk or packaged, can be problematic and costly. The high cost of inter-island transportation in the Philippines limits trade.



Linking local customers to micro-processors producing safe local milk products through the use of online apps and relocatable processing units built by international manufacturers provides an opportunity to shorten the supply chain and lead to greater margin share to SHDs and/or co-operatives.

Servicing the speciality coffee market with high frothing, low taint milk.

In addition to food safety requirements, premium coffee outlets have specific milk quality and supply requirements. The ability of espresso coffees to maintain steam frothing value, have a milkfat derived lustre and be free of taints and odours (linked to milking herd feedstuffs) are key requirements.

Potential interventions

Develop shorten regional supply chains using communication and support with micro compartmental processing plants

A feasibility study could be undertaken in each country to establish a contemporary SHD to customer pilot supply chain based on modular micro processing plants (fixed or mobile). Key attributes would be supply and quality interventions discussed above. In addition to processing support, additional support regarding establishing online marketing and business transactions could be evaluated.

Establish local fresh milk supply chains to service this market opportunity for coffee outlets, but also the hospitality sector.

- Undertake market research in both countries to clarify the specific quality and supply requirements of milk required for espresso coffee beverages.
- Develop specific processing and SHD operating procedures to deliver on these requirements.

STRATEGY 3

Enabling and policy environment

Background

Poor information about consumer's attitudes towards SSL dairy.

Having tactical consumer preference and behaviour information regarding customer marketing opportunities is beyond the expertise and resources of most SHD supply chains in both countries.

Introducing and imbedding contemporary approaches to Development and Extension

International dairy RD&E organisations such as Dairy Australia, Dairy NZ and Teagasc (Ireland) continually review and improve their development and extension methodology to improve return on investment. Many of these methodologies are similar and are proven to be effective under the operating conditions across these countries despite the different farming systems, terms of trade and farmer demographics.

Potential interventions

Develop a policy paper for national and regional government, subject to relevant legislation.

Undertake a review of relevant policies and regulations, focussing particularly on their ramifications on SHD inclusive supply chains.

Experimenting with contemporary practice change methodologies, communication platforms and capacity building.

The previous ACIAR funded dairy development project (Indodairy) demonstrated significant impacts from introducing discussion groups, focus farms, online extension delivery and on-farm technology demonstrations. A key success factor in this approach was the employment of degree graduates as village level researchers (VLRs) who were upskilled in contemporary dairy farm technology, facilitated regional discussion groups and focus farms and liaised with local stakeholders. VLRs also played an important role in on-farm research and data collection.



Partnering with SEAD

Why should your organisation be engaged in the South-east Asia Dairy (SEAD) project?

Our research has shown that there are common interests and goals between SHDs, co-operatives, governments and the private sector. SEAD provides a platform where stakeholders can come together to communicate goals, collectively agree on a pathway forward and co-ordinate investment and effort. This allows project partners to access technology, resources and knowledge to bring about enhanced productivity and performance that will not only benefit themselves, but other members of dairy value chains as well.

What benefits could SEAD provide to your organisation?

SEAD has a number of benefits for stakeholders and the private sector who are looking to:

- Commercialize innovative technology to improve productivity and/or market access,
- Evaluate and implement new business models;
- Access new milk supply (quantity and quality) to support market growth whether in existing or new markets;
- Improve their environmental credentials;
- Demonstrate responsible sourcing strategies through supporting SHD communities.

If you would like to partner in SEAD, what are the next steps?

For more information, please contact

Project Leader
Dr Brad Granzin
E bradgranzin@ozemail.com.au
P +61 431 197 479

Project Director
Professor Wendy Umberger
E wendy.umberger@adelaide.edu.au
P +61 405 990 465

or ACIAR's Research Program Manager
for Agribusiness
Mr Howard Hal
E Howard.Hall@aciarc.gov.au
P +61 420 531 316



ACIAR

12.13 Appendix 13: Private Sector Engagement Philippines – Progress Report

PROGRESS REPORT

AGB/2021/124 'Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines'

Objectives

In relation to the project conceptualization and development phase of the ACIAR-supported AGB/2021/124 'Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines', the services of the consultant was engaged in general, to "identify and recommend potential private sector partners". Specifically, detailed objectives of the consultant's engagement are as follows:

- Review and identify for initial engagement private sector entities including input providers, agribusiness, co-operatives and processors with potential collaborative, co-investment linkages and comparative advantage;
- Undertake initial online meetings with prospective private partners (at the discretion of the Consultant);
- Recommend and organise meetings for the Lead Researcher with five prospective private sector partners (scheduled for June 2022).

Expected final output of the consultant's engagement are as follows:

- A confidential report regarding the suitability of private sector entities for collaboration measured through a set of criteria, likelihood of a partnership, the type and extent of collaboration, and indicative engagement required to reach a formal partnership agreement; and
- An itinerary for the Lead Researcher to meet with five prospective private sector entities during June 2022.

Methodology

To fulfill the task and deliver the expected outputs, data and information gathering was done through primary and secondary data sources. For primary information, with the help of the consultant's network in the Philippine rural and agricultural development sector, inquiries were made from various experts working in the Philippine dairy sector. These included from the private sector, the academe, national government agencies, other regulatory agencies, local governments, professional and industry organizations, and dairy farmers associations and cooperatives. For secondary information, we reviewed available publicly online reports to include among others the ACIAR supported AGB/2020/120: *Philippine's smallholder dairy: Landscape analysis and research priorities* and from the Department of Agriculture – National Dairy Authority (DA-NDA).

From both primary and secondary sources, an initial list of target private sector partners was prepared. The list contained the name of the organization or company, the relevant officers to be interviewed, and contact numbers and e-mails. Contacts were then initiated through phone calls and social media through Messenger, Viber, and WhatsApp. The Facebook pages of target organizations, if available, were reviewed as well to have an idea of their more recent activities and openness to potential collaboration. While the contract indicated that online meetings will be the primary mode of communication, the consultant is fully cognizant of the limitations of this approach to create interest for private sector participation. Also, all of those contacted would not agree to give their commitment to be part of the project if they are unable to meet the consultant in person. Thus, as much as possible and practicable, the consultant arranged for face-to-face meetings with preference at the organization's offices and facilities.

The visits are also aimed at evaluating the capacity of the potential partner to contribute resources in case they will opt and will be selected to participate in the project.

Travel restrictions posed by the Covid 19 pandemic did not allow the consultant to hold face to face meetings during January up to the middle of March 2022. It was only after March 15 that the consultant was free to travel and meet the potential partners in person. This explains the delay in the submission of the Progress Report which should have been done during the middle of March 2022.

During the face-to-face meetings, information about the Smallholder Dairy Project was shared through a PPT presentation prepared by the Principal Research. To clarify issues and concerns, a Question and Answer session was done during and after the presentation. At the end of the meeting, the potential partners were asked of their interest to join the project. If done onsite, the project presentation and Q & A session was followed with a brief tour of the potential partner's facility.

Progress to Date, 30 April 2022

Results of the visit to potential private sector partners is summarized in the following table:

No.	Organization / Company & Address	Persons Met & Position	Date of Meeting	Interest to Participate in the SHD Project	Remarks
1	Moolk Creamery Corporation, Sampaloc Road, Brgy. Cuyambay, Tanay, Rizal Province	Ms. Cherry Mendoza, Co-Owner & Proprietor	12 March 2022	Highly interested but cannot commit participation during the initial meeting. Need for follow-up meeting with her husband who is the co-owner of the business	Follow-up meeting needs to be scheduled
2	Batangas Development Cooperative (BADACO) Farm – Brgy. Inosluban, Lipa City, Batangas Province Processing Plant – Brgy. Pioquinto, Malvar, Batangas	Ms. Abby de Castro, Accountant & Officer-in-Charge	16 March 2022	Highly interested but needs the decision of the Board of Directors to commit BADACO's participation	Follow-up meeting to be scheduled during May 2022 once a new Board of Directors has been elected and new set of officers appointed by the BOD
3	FarmShare Prime, Brgy. Duhat, Cavinti, Laguna Province	Mr. Bart Teconciang, President & Chief Executive Officer	19 March 2022	Highly interested to participate. Areas of action research recommended: – how to ensure healthy dairy cows through the year-round availability of high-quality feed grass; assistance	

				to small dairy processing facilities to gain Good Manufacturing Practices (GMP) certification	
4	Alaska Milk Corporation (a subsidiary of Friesland Campina), 6 th Floor, Corinthian Plaza Bldg.121 Paseo de Roxas, Makati City, Metro Manila	Atty. Ma. Angela Esquivel, Corporate Affairs Director & Mr. Tarang Gupta, Country Managing Director	22 March 2022	Highly interested to be part of the project. Areas of action research recommended – capacity building for smallholder dairy farmers to improve herd productivity and quality of milk and milk products; improving quality of milk processing facilities; Skilled Artificial Insemination farm technicians to lessen dependence from NDA	Alaska Milk Corporation is highly interested to enter into a 4 to 5 years partnership agreement with the SHD Project. Signing of agreement expected during the grand founding anniversary of the company on September 2022. Need to do the groundwork for the preparation and agreement signing
5	Stagira Farms, Pililla, Rizal Province	Atty. Elias Inciong, Owner-Proprietor	30 March 2022	Highly interested to be a part of the project. Suggested to review the recommendations of the End-of-Project Report of the New Zealand Dairy Project as take-off point for the research priorities of the Smallholder Dairy Project. Recommended consulting with Dr. MJ Detera, formerly of the Project Management Office of the New Zealand Dairy	

				Project for action research agenda	
6	Dairy Daddy Farm, Inc. Sitio Gulod, Brgy. San Isidro, San Mateo, Rizal Province	Mr. Gregorio San Diego, Owner-Proprietor	30 March 2022	Highly interested to be part of the project. Action research agenda recommended: ensuring year-round availability of high quality feed grass for dairy herd; improving manufacturing processes and quality of milk processing facilities of smallholder dairy farms	

Meetings for the Month of May 2022

Herewith is a summary of the meetings scheduled during the month of May 2022.

No.	Organization / Company & Address	Officers to Meet	Date of Meeting	Remarks
1	Katipunan ng mga Kooperatibang Maggagataas, Inc. (KKMI), Brgy. Lamut 2, Calauan, Laguna Province	Mr. Baltazar V. Montiel, Chairman	May 11, 2022	Meeting participants will include chairmen / management representatives of four member dairy cooperatives from Laguna and Quezon Provinces
2	ACES Phil Producers Corporation, Lipa-Ibaan Road, Ibaan, Batangas Province	Ms. Glenda Lita Ersando, President	During the week of May 10-12, 2022	ACES is one of the accredited fresh milk suppliers of the National Nutrition Council and the Department of Education (DepEd) Milk Feeding Program for Schools
3	Hacienda Macalauan, Inc., Brgy. Mabacan, Calauan, Laguna	Mr. Karl Ocampo, General Manager	During the week of May 10-12, 2022	Producer and producer of dairy cow fresh milk and milk products
4	The Laguna Creamery, Brgy. Masaya, Bay, Laguna	Mr. Mark Borja, Owner-Proprietor	During the week of May 10-12, 2022	Producer and producer of dairy cow fresh milk and milk products

5	PALCON Dairy Multipurpose Cooperative, Brgy. Concepcion, Sariaya, Quezon	Mr. Virgilio Ferrer, Chairman	During the week of May 10-12, 2022	The cooperative has been recognized as one of the best performing dairy farmers cooperative in Southern Luzon
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Depending on the results, the consultant will be arranging additional meetings with other potential partners involved in the smallholder dairy sub-sector. Organizations to meet and consult will include big multinational corporations such as Nestle Philippines and San Miguel Corporation – Magnolia Business Unit, other medium and small size private dairy companies in Metro Manila and neighboring provinces, as well as dairy cooperatives and dairy farmers associations in the Southern Luzon and Central Luzon regions.

Concluding Remarks

In our meetings with the smallholder dairy stakeholders, we were advised by the persons we met to work closely and coordinate with the National Dairy Authority. This is to ensure that the NDA will not feel being bypassed in the conceptualization and development stage of the Smallholder Dairy Project. If not yet initiated, the DOST-PCARRD should start liaison work with the NDA the soonest.

Given the highly positive feedback from the organizations we met, there is a need at this early to narrow down on the number of private sector participants of the project. Since the consultant has been reaching out to a number of potential partners, with each one expressing their high degree of interest, given the limited resources of the project, we may arrive at a situation where not all of those who have been approached will be shortlisted and finally chosen as participants. This will unnecessarily create false expectations which may not be good for the image of the Smallholder Dairy Project and the persons who will be involved in its implementation and management, as well as the organizational reputation of the Australian Center for International Agricultural Research (ACIAR), as funding organization.

PICTORIAL REPORT



Visit to Moolk Creamery, Brgy. Cuyambay, Tanay, Rizal Province on March 12, 2022. Met with Ms. Cherry Mendoza, Owner-Proprietor



Visit to Batangas Dairy Cooperative (BADACO) Farm, Brgy. Inosluban, Lipa City, Batangas Province, 16 March 2022



Visit at BADACO Milk Processing Facility, Brgy. Piquinto, Malvar, Batangas Province on March 16, 2022



Met with Ms. Abby de Castro, Accountant and Officer-in-Charge of BADACO. Visible at the back are some of BADACO's milk processing equipment





Visit to Farmshare Prime in Brgy. Duhat, Cavinti, Laguna Province on March 19, 2022. Met with Mr. Bart Tacconciang, President and Chief Executive Officer



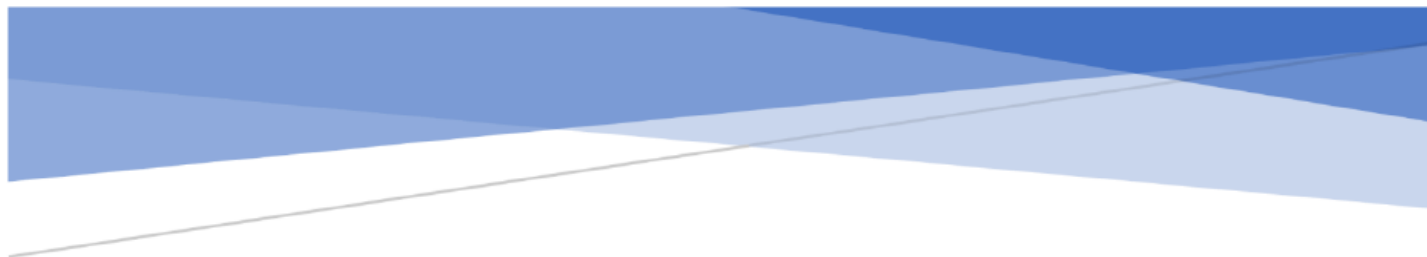


Visit to The Alaska Milk Corporation HQs (a subsidiary of Friesland Campina) at Makati City, Metro Manila on March 22, 2022. Met with Mr. Tarang Gupta, Country Managing Director and Atty. Ma. Angela Esquivel, Corporate Affairs Director



Meeting with Atty. Elias Inciong (center), Owner-Proprietor of Stagira Farms, Pililla, Rizal Province and Mr. Gregorio San Diego (left), Owner-Proprietor of Dairy Daddy Farm, Inc., Sitio Gulod, Brgy. San Isidro, San Mateo, Rizal Province at Starbucks – Tomas Morato, Quezon City on March 30, 2022

12.14 Appendix 14: Private Sector Engagement Philippines – Final Report



FINAL REPORT

AGB/2021/124 ‘Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines’

15 October 2022

Roberto R. Acosta, Ph.D.
rracosta@alum.up.edu.ph

FINAL REPORT

AGB/2021/124 'Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines'

INTRODUCTION AND OBJECTIVES

To assist the project conceptualization and development phase of the ACIAR-supported AGB/2021/124 'Evaluating supply chain interventions and partnerships to sustainably grow the smallholder dairy sectors of Indonesia and the Philippines', the services of a Private Sector Consultant was engaged with the general objective to "identify and recommend potential private sector partners". Detailed objectives of the consultant's engagement are as follows:

- Review and identify for initial engagement private sector entities including input providers, agribusiness, co-operatives and processors with potential collaborative, co-investment linkages and comparative advantage;
- Undertake initial online meetings with prospective private partners (at the discretion of the Consultant); and
- Recommend and organise meetings for the Lead Researcher with five prospective private sector partners (scheduled for June 2022).

Final outputs of the consultant's engagement are as follows:

- A confidential report regarding the suitability of private sector entities for collaboration assessed through a set of criteria, likelihood of a partnership, the type and extent of collaboration, and indicative engagement required to reach a formal partnership agreement; and
- An itinerary for the Lead Researcher to meet with five prospective private sector entities during June 2022.

METHODOLOGY

To fulfill the task and deliver the expected outputs, data and information gathering was done through primary and secondary data sources. For primary information, enquiries were undertaken with the help of the consultant's network in the Philippine rural and agricultural development sector and from experts working in the Philippine dairy sector. These included from the private sector, academics, national government agencies, other regulatory agencies, local governments, professional and industry organizations, and dairy farmers' associations and cooperatives. For secondary information, we reviewed available publicly online reports to include among others the ACIAR supported AGB/2020/120: *Philippine's smallholder dairy: Landscape analysis and research priorities* and from the Department of Agriculture – National Dairy Authority (DA-NDA).

Using the data gathered from both primary and secondary sources, an initial list of possible private sector partners for consultation was prepared. The list contained the name of the organization or company, the relevant officers to be interviewed, and contact numbers and e-mails. Contacts were then initiated through phone calls and social media through Messenger, Viber, and WhatsApp. The Facebook pages of target organizations, if available, were reviewed as well to have an idea of their more recent activities and openness to potential collaboration. While the contract indicated that online meetings would be the primary mode of communication, the consultant recognized the limitations of the approach to create interest for private sector participation. Also, all of those contacted would not agree to give their commitment to be part of the project if they were unable to meet the consultant in person. Thus, as much as possible and practicable, the consultant arranged for face-to-face meetings

with venue preference at the organization's offices and facilities. The visits were also aimed at evaluating the capacity of the potential partner to contribute resources.

Travel restrictions due to the Covid 19 pandemic did not allow the consultant to hold face to face meetings from January 2022 to mid-March 2022. It was only after March 15 that the consultant was free to travel and meet the potential partners in person. This explains the delay in the submission of the Progress Report which should have been during the middle of March 2022 but submitted one month later on April 30, 2022.

During the face-to-face meetings, information was shared through a presentation prepared by the Principal Researcher. At the end of the meeting, the potential partners were asked regarding their interest to join the project. On several occasions, there was also the opportunity for the consultant to undertake a brief tour of the potential partner's facility.

A Note on the Selection Process of Potential Private Sector Partners

The consultant's contract required for a private sector review and analysis process incorporating the following selection criteria:

1. Legal, reputation and operating principles
 - a. Business history and stability
 - b. Relationship to dairy value chains and government
 - c. Competing interests and the risk they may compromise project outcomes e.g. using imported dairy ingredients in manufacturing
 - d. Values and ethics, particularly in regard to margin sharing
 - e. Legal or reputational risk
2. Strategic and investment alignment with proposed project outcomes
 - a. Business strategy regarding SHD inclusive value chains
 - b. Approach to innovation
3. Resources
 - a. Capacity to co-invest particularly in regard to public good outcomes
 - b. Capacity to scale out interventions
 - c. Expertise and skills
 - d. Linkages and leverage to other value chain members
 - e. Access to finance
4. Collaboration performance
 - a. Track record in business partnerships e.g. joint ventures
 - b. Past participation in development/public good projects
 - c. Business policy regarding intellectual property

Given that the SEAD project is still in the conceptualization and development phase, the consultant deemed the inclusion of the above-named criteria in the selection of potential private sector partners as too stringent. This set of criteria is more appropriate during project implementation and during final selection of private partners wherein a full due diligence check is highly important. Requiring information from potential partners or gathering information from reliable sources to be able to fulfill these criteria may be negatively interpreted, which will lead to non-interest and eventual non-participation. Thus, the consultant decided to select only some of the suggested criteria and supplemented these with other information which can be gathered and observed during the field visits and face-to-face meetings. The consultant put more premium on the potential partners willingness to meet and discuss the project, the interest to learn more as shown by the questions they asked, and the willingness and openness to show their dairy enterprise's assets and resources to a complete stranger. In

addition, we also checked on their former track record as recipients of assistance from other organizations - whether international or local. We put particular attention on whether the private entity has been a recipient of the New Zealand Government Dairy Program, the World Bank-assisted Rural Development Program and Alaska Milk Corporation's Dairy Training and Development Program (known to have properly screened recipients before assistance is granted). Being a beneficiary of The Philippine Government's Department of Trade and Industry's (DTI) SME development assistance through the Common Service Facility Program, was also used in evaluating the suitability of the private sector entity.

OUTPUTS

A. Results of the Visits to Potential Private Sector Partners and Recommendations for Collaboration.

Summarized in Table 1 are the results of the field visits to potential private sector partners done intermittently during the period March to July 2022. Based on the results of the field visits, interviews with the responsible officers, inspection of the dairy enterprise as warranted, and evaluation of the suitability of the private sector entities for collaboration using a set of criteria, eight private dairy enterprises were recommended for inclusion during the seven-days field visit of the ACIAR SEAD team composed of the Research Program Manager for Agribusiness, the Principal Researcher and Project Director, during the week of August 6 to 13, 2022.

Of the ten private dairy enterprises visited, eight are recommended for collaboration with the ACIAR SEAD project, one for conditional recommendation subject to more information gathering and validation, and another was not recommended. Those recommended for visits exceeds by three entities the five prospective private sector entities required by the consultant's contract. This is to allow the ACIAR SEAD team to have a wider pool of private entities from whom to select the final project collaborators.

The following private sector entities are **Recommended for Collaboration**:

1. Alaska Milk Corporation
2. Batangas Dairy Cooperative (BADACO)
3. Kalipunan ng mga Kooperatibang Maggagatas, Inc. (KKMI)
4. Samahan ng mga Maggagatas ng Batangas Dairy Cooperative (SAMABACO)
5. Sta. Maria Dairy Farm, Inc.
6. Farm Share Prime, Inc.
7. Stagira Farm, Inc.
8. Dairy Daddy Farm, Inc.

The private dairy entities recommended for collaboration were visited and the responsible officers were met face to face by the ACIAR SEAD team during August 9 to 13, 2022.

Conditional Recommendation

1. Moolk Creamary Corporation

Not Recommended for Collaboration

1. ACES Phil-Producers Corporation

The consultant also engaged with other dairy processors to arrange for possible visits and face to face meetings with their responsible officers. Unfortunately, they did not return our e-mails, phone calls, SMS messages and social media private messages. While there might be other reasons, we interpreted the non-reply as an expression of non-interest to participate in the SEAD project. The dairy processors were:

1. Hacienda Macalauan, Inc. – owned by the Soriano family – one of the old rich families in the Philippines;
2. Laguna Creamery, Inc.- formerly owned by the family of a former Philippine Senator, but has been bought with majority ownership by the MVP Group – one of the biggest and richest business conglomerates in the Philippines.

B. Recommended Itinerary of Visit by the ACIAR SEAD Team

While the consultant contributed substantially to the arrangement and finalization of the ACIAR SEAD's team's visit, the proposed itinerary had last minute changes. This is because of the conflicting schedules of the private entities with other business concerns. The consultant also arranged the team's visit to the Dairy Training Research Institute (DTRI) of the College of the Agriculture and Food Sciences of the University of the Philippines at Los Banos (UPLB CAFS). Table 2 summarizes the actual travel itinerary during the ACIAR SEAD team visit.

Concluding Remarks

The recent appointment of senior officials at the Department of Agriculture and the resulting movement and departure of officers of their attached agencies, including the National Dairy Authority (NDA), will further delay the discussion and approval of new projects. In addition, while NDA Board has been reconstituted, two are on an Officer-in-Charge (OIC) status, with high probability of being replaced anytime soon. This uncertain status of officials will continue to persist till the end of the year. Further discussion of the SEAD project with the NDA will be greatly affected by these developments.

Compared to other internationally supported dairy projects, the ACIAR SEAD project's approach of a dialogue-based needs and intervention identification process is an entirely unique value proposition. We are referring here to the capital-intensive French and Czech governments dairy sector assistance programs and the World Bank-assisted Philippine Rural Development Program (PRDP). The approach is also complementary to private sector initiatives such as the Dairy Training and Development Program (DTDP) of Friesland Campina's Philippine subsidiary Alaska Milk Corporation, and the more recent potential investment for establishing an integrated dairy processing facility by the Baladna Qatar Public Shareholding Company (QPSC). Since the consultant was able to reach out to several potential partners, who in turn were also visited and met by the SEAD team, with each one expressing their high degree of interest, given the project's AUD 2.4 million investment over a five-year period, we may arrive at a situation where not all of those expressed and validated needs can be addressed. Striking a healthy balance between raised expectations and realistic deliverables through leveraging of SEAD's limited resources with like-minded and more resource-endowed organizations will be one of the keys in the successful implementation of the SEAD project.

Table 1. Results of Visits to Potential Private Sector Partners and Recommendations for Collaboration.

No.	Organization / Company & Address	Persons Met & Position	Date of Meeting	Interest to Participate in the ACIAR SEAD Project / Capacity to Contribute	Recommendation for Collaboration
1	Moolk Creamery Corporation, Sampaloc Road, Brgy. Cuyambay, Tanay, Rizal Province	<ul style="list-style-type: none"> Ms. Cherry Mendoza, Co-Owner & Proprietor 	12 March 2022	Highly interested but cannot commit participation during the initial meeting. Need for follow-up meeting with her husband who is the co-owner of the business	Conditionally recommended for collaboration subject to more information gathering & validation. Unable to conduct follow-up meetings and visit due to inability to find common time.
2	Batangas Development Cooperative (BADACO) Farm – Brgy. Inosluban, Lipa City, Batangas Province Processing Plant – Brgy. Pioquinto, Malvar, Batangas	<ul style="list-style-type: none"> Ms. Abby de Castro, Accountant & Officer-in-Charge 	16 March 2022	Highly interested but needs the decision of the Board of Directors to commit BADACO's participation	Recommended for project collaboration. High interest to join the project given the willingness of the coop's decision-makers to meet and actively engage the ACIAR SEAD team even on short notice
		<ul style="list-style-type: none"> Mr. Edwin Sanchez, Board of Director's in-charge of Business Development and new Project Management 	06 July 2022	Highly interested to be part of the project as the SEAD project might be able to assist in reviving the business of the dairy cooperative which went into a downward spiral under the previous Board of Directors. Areas of research interest – how to grow dairy herd to profitable scale, year-round availability of high-quality forage, assistance to micro-scale individual dairy farms to grow and become a member of the cooperative, new market development. May not have the financial capacity to contribute to the SEAD project, but has the physical and human resources to support	
3	FarmShare Prime, Brgy. Duhat, Cavinti, Laguna Province	<ul style="list-style-type: none"> Mr. Bart Teconciang, President & Chief Executive Officer 	19 March 2022	Highly interested to participate. Areas of action research recommended: – how to ensure healthy dairy cows through the year-round availability of high-quality feed grass; assistance to small dairy processing facilities to gain Good Manufacturing Practices (GMP) certification. May have limited resources but has the physical and human resources, and business experiences to contribute.	Recommended for project collaboration

No.	Organization / Company & Business Address	Persons Met & Position	Date of Meeting	Interest to Participate in the SEAD Project / Capacity to Contribute	Recommendation for Collaboration
4	Alaska Milk Corporation (a subsidiary of Friesland Campina), 6 th Floor, Corinthian Plaza Bldg.121 Paseo de Roxas, Makati City, Metro Manila	<ul style="list-style-type: none"> • Atty. Ma. Angela Esquivel, Corporate Affairs Director • Mr. Tarang Gupta, Country Managing Director 	22 March 2022	Highly interested to be part of the project. Areas of action research recommended – capacity building for smallholder dairy farmers to improve herd productivity and quality of milk and milk products; improving quality of milk processing facilities; skilled artificial insemination farm technicians to lessen dependence from NDA. Have the financial resources to contribute substantially in the ACIAR SEAD project.	Recommended for collaboration. Alaska Milk Corporation is highly interested to enter into a four (4) to five (5) years partnership agreement.
5	Stagira Farms, Pililla, Rizal Province	<ul style="list-style-type: none"> • Atty. Elias Inciong, Owner-Proprietor 	30 March 2022	Highly interested to be a part of the project. Suggested to review the recommendations of the End-of-Project Report of the New Zealand Dairy Project as take-off point for the research priorities of SEAD. Recommended consulting with Dr. MJ Detera, formerly of the Project Management Office of the New Zealand Dairy Project for action research agenda. Has the financial and physical assets and human resources to contribute	Recommended for collaboration. Owner-proprietor can help the ACIAR SEAD project in engaging with decision-makers in the Philippine agriculture governance.
6	Dairy Daddy Farm, Inc. Sitio Gulod, Brgy. San Isidro, San Mateo, Rizal Province	<ul style="list-style-type: none"> • Mr. Gregorio San Diego, Owner-Proprietor 	30 March 2022	Highly interested to be part of the project. Action research agenda recommended: ensuring year-round availability of high-quality feed grass for dairy herd; improving manufacturing processes and quality of milk processing facilities of smallholder dairy farms. Has the financial and physical assets to contribute.	Recommended for collaboration. Being the Chairman of the United Broilers Raisers Association (UBRA), the owner-proprietor can assist the ACIAR SEAD project in engaging with decision-makers.

No.	Organization / Company & Business Address	Persons Met & Position	Date of Meeting	Interest to Participate in the SEAD Project / Capacity to Contribute	Remarks
7	Katipunan ng mga Kooperatibang Maggagatas, Inc. (KKMI), Brgy. Lamut 2, Calauan, Laguna	<ul style="list-style-type: none"> • Mr. Baltazar V. Montiel, Plant Manager & Business Development Manager • Mr. Theodore Tagle, KKMI Chairperson and Chairman of San Pablo Dairy Cooperative (KKMI Coop member) • Mr. Virgilio Ferrer – KKMI Vice Chairperson & Chairman of Palcon Dairy Cooperative (KKMI Coop Member) • Mr. Gregorio P. Maluping, KKMI Board of Directors & Chairman, Samahang Maggagatas ng Batangas Dairy Cooperative (KKMI Coop Member) • Ms. Alicia O. Araguas, KKMI Board Member and Chairperson, Good Shepherd Agricultural Cooperative, • Mr. Narciso U. Bautista, KKMI Board of Directors and Chairman, Salba Dairy Multi-Purpose Cooperative (KKMI Coop Member) • Mr. Marvin Solis, KKMI Board of Directors and Chairman, New Pagsamta Dairy Cooperative 	10 May 2022	Board of Directors coming from member producer cooperatives are Highly Interested to be part of the project whether as KKMI as a whole and/or as individual cooperative participants. May not have the financial capacity but has the physical and human resources to contribute.	Recommended for collaboration both as an Apex Dairy Cooperative and with individual dairy cooperative members
8	Sta. Maria Dairy Farms, Purok 6, Brgy. Malagunlong, Lipa City, Batangas	<ul style="list-style-type: none"> • Mr. Jose Tapay, Owner-Proprietor 	17 June 2022	Highly interested to be part of the project. Specific research interest on cow nutrition to improve dairy herd productivity. Has the financial and physical assets and human resources to contribute.	Recommended for collaboration

No.	Organization / Company & Business Address	Persons Met & Position	Date of Meeting	Interest to Participate in the SEAD Project / Capacity to Contribute	Remarks
9	ACES Phil-producers Corporation, Brgy. Calamias, Ibaan, Batangas	<ul style="list-style-type: none"> • Ms. Glenda Lita Ersando, President 	22 June 2022	<p>Not interested to be part of the project. As business affiliate of one of the Philippines' multi-billion peso asset cooperative which enabled it to invest in the country's largest cow dairy farm (with dairy herd sourced from Australia), having the biggest and most advanced milk processing plant in the Philippines using Australian technology, and ready access to Australian dairy expertise, they think that the SEAD Project will be more beneficial to the Philippine Dairy Industry if assistance is directed to smaller players with not much access to internal and external resources to invest in growing their businesses.</p>	<p>Not Recommended for Collaboration</p>
10	Samahang Maggagatas ng Batangas Dairy Cooperative, # 72 Brgy. Tinurik, Tanauan City, Batangas	<ul style="list-style-type: none"> • Mr. Danilo Magpantay, Vice Chairman, SMB Dairy Coop and Owner-Proprietor, DH Magpantay Dairy Farm 	7 July 2022	<p>Highly interested to be part of the project as a cooperative and as individual dairy farm enterprise. The DH Magpantay Dairy Farm has physical assets and human resources to contribute.</p>	<p>Recommended for collaboration.</p>

Table 2. Actual Travel Itinerary, ACIAR Southeast Asia Dairy (SEAD) Program, August 08-13, 2022, arranged, facilitated & participated by Consultant

Date and time	Activities /Persons Met	Address
Mon Aug 8, 2022		
1:00 PM to 2:00 PM	Travel to Laguna	
2:00 PM-4:00 PM	Meeting with Dr Reynaldo Eborra and DOST-PCAARRD Colleagues	DOST PCAARRD (Jamboree Rd, Los Baños, Laguna)
Tues Aug 9, 2022		
8:30 am - 9:00 am	Travel to Brgy.Mamurik, Tanauan City, Batangas	
9:00 am - 1:00 pm	Meeting with Mr. Danilo Magpantay, Owner - Proprietor of D.H. Magpantay Dairy Farm and General Manager, Samahang Maggagatas ng Batangas Cooperative (SAMABACO), Mr. Gregorio P. Maluping, Chairman and other officers of SAMABACO and Tanauan City LGU	SAMABACO's Office, Brgy. Mamurik, Tanauan City, Batangas
1:00 pm - 2:00 pm	Travel Back to Makati	
Wed Aug 10, 2022		
6:00 am - 8:30 am	Travel to UP Los Banos	
9:00 am - 11:00 am	Meeting with Dr. Elpidio "Pidz" Agbisit, Dean of the College of Agriculture and Food Science (CAFS), UP Los Banos, Dr. Lilia Fernando-Corpuz - Associate Dean for Research & Extension, and Dr. Dong Angeles, Director, UPLB CAFS-DTRI and other staff	Dairy Training and Research Institute, College of Agriculture and Food Science UPLB, College, Laguna
11:00 am - 1:30 pm	Travel to Cavinti, Laguna & Lunch along the way	
1:30 pm - 3:00 pm	Farm visit and Meeting with Mr. Bart Taconciang, CEO, Farm Share Prime, Brgy. Balo, Cavinti, Laguna	Farm Share Prime Farm, Brgy. Balo, Cavinti, Laguna
3:00 pm - 5:00 pm	Travel from Farm Share Prime to JET Hotel, Lipa City	
6:00 pm - 7:30 pm	Meeting with Mr. Juan "Sonny" Lozano, Chairman, Mr. Joe Alilio, Vice Chairman & Mr. Edwin Sanchez, Board Member in-charge of Business Development, of the Batangas Dairy Cooperative (BADACO)	
Thu Aug 11, 2022		
5:30 am - 6:00 am	Travel from JET Hotel to Sta. Maria Dairy Farm	
6:00 am - 8:00 am	Farm Visit & Meeting, Mr. Jose "Joey" Tapay, Owner-Proprietor, Sta. Maria Dairy Farm, Inc.	Sta. Maria Farm, Purok 6, Brgy. Malagunlong, Lipa City, Batangas
8:00 am - 8:30 am	Travel from Sta. Maria Dairy Farm back to JET Hotel	
8:30 am - 9:30 am	Late Breakfast & Hotel Checkout	
9:30 am - 10:00 am	Travel from JET Hotel to Batangas Dairy Cooperative (BADACO) Milk Processing Plant, Brgy. Piquinto, Malvar, Batangas	
10:00 am - 12:00 noon	Plant Visit & Meeting with Ms. Abby de Castro, Accountant & Office Manager, and Mr. Mark, Plant Manager, BADACO Milk Processing Plant, Malvar, Batangas	BADACO Milk Processing Plant, Brgy. Piquinto, Malvar, Batangas
12:00 noon - 2:00 pm	Lunch enroute	
2:00 pm - 2:30 pm	Lunch place to KKMI Processing Plant, Brgy. Lamot 2, Calauan, Laguna	
2:30 pm - 4:00 pm	Plant Visit and Meeting with Mr. Baltazar V. Montiel, Business Manager, and other Officers of the Kalipunan ng mga Kooperatibang Maggagatas, Inc. (KKMI), KKMI Processing Plant, Brgy.Lamot 2, Calauan, Laguna - Mr. Theodore Tagle - Chairman, Virgilio Ferrer - Vice Chairman, Marvin Solis - Board of Directors (BOD) Member, Narciso U. Bautista, BOD Member, Gregorio P.Maluping - BOD Member, Alicia O. Araguas - BOD Member, Rizalina Anggay - Board Secretary	KKMI Milk Processing Plant, Brgy. Lamot 2, Calauan Laguna

4:00 pm	Return to Makati	
Fri Aug 12, 2022		
7:00 am - 9:00 am	Travel from SEDA Hotel, Makati to Dairy Daddy, Inc. Montalban, Rizal	
9:00 am - 11:00 am	Farm Visit & Meeting, Mr. Gregorio San Diego, Owner-Proprietor, Dairy Daddy, Inc.	Dairy Daddy, Inc. 101 Col. S. Cruz St., Brgy. San Rafael, Montalban, Rizal
11:00 am-12:00 noon	Travel to Antipolo City, Rizal	
12:00 noon - 1:30 pm	Lunch Meeting, Atty Elias "Bong" Inciong, Owner-Proprietor, Stagira Farms	Robinsons Mall Antipolo, Antipolo City, Rizal
1:30 pm	Return to Makati	
Sat Aug 13, 2022		
9:30 am - 11:00 am	Meeting with Mr. Wendell Balderas, Dairy Development Manager, Alaska Milk Corporation	SEDA Hotel, Makati



Meeting with the Board of Directors of the Kalipunan ng mga Kooperatibang Maggagatas, Inc. (KMMI) at the KMMI Milk Processing Facility and Main Office in Brgy. Lamut 2, Calauan, Laguna on May 10, 2022



The Kalipunan ng mga Kooperatibang Maggagatas, Inc. (KMMI) Milk Processing Facility and Main Office in Brgy. Lamut 2, Calauan, Laguna visited on May 10, 2022



Meeting with Mr. Jose Tapay, Owner-Proprietor of the Sta. Maria Dairy Farm at Purok 6, Brgy. Malagunlong, Lipa City, Batangas on June 17, 2022





Meeting with Ms. Glenda Lita Ersando, President of the ACES PhilProducers Corporation at the corporation's Dairy Farm and Milk Processing Facility at Brgy. Calamias, Ibaan, Batangas on June 22, 2022





Meeting with Mr. Edwin Sanchez, Board of Director in-charge of Business Development and new Project Management of the Batangas Dairy Cooperative (BADACO) at the BADACO Dairy Farm, Brgy. Inosluban, Lipa City, Batangas on July 06, 2022



Meeting with Mr. Danilo H. Magpantay, Owner-Proprietor of D.H. Magpantay Dairy Farm, and Vice Chairman and General Manager of the Samahang Maggagatas ng Batangas Cooperative (SAMABACO) at Brgy. Tinurik, Tanauan City, Batangas on July 07, 2022

12.15 Appendix 15: Future engagement with potential Indonesian private sector partners



Future engagement with potential Indonesian private sector partners

SEAD (South-east Asia Dairy)

June 2022





PT. Mitra Asia Lestari

About PT. Mitra Asia Lestari

PT. Mitra Asia Lestari is an independent management and project consulting firm committed to sound research, effective & strategic advice and promoting partnerships for the benefit of all stakeholders.

Office 8 level 18-A, Jl. Jend. Sudirman Kav 52-53
Sudirman Central Business District (SCBD)
Jakarta 12190, Indonesia

Email: contact@mitraasia.com
Web: <http://www.mitraasialastari.com/>





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1. Introduction

In a previous report, it was stated that the incentives for the private sector in supporting SHDs, relates to the increasing domestic demand for good quality fresh milk. Dairy processing companies provided credits, training and other facilities through village cooperatives or KUDs (Mitra Asia Objective 1c&d - 2022). These private-sector programs are anticipated to improve the livelihoods of SHDs as well as overall, develop the Indonesian dairy industry.

For the larger AGB/2021/124 project, planned from July 2022 to June 2027, the aim is to develop pilot and scale-up commercially viable, sustainable smallholder inclusive dairy value chains in Indonesia. Companies with potential prospects for future project collaboration and investment will be selected in a process incorporating the following selection criteria:

- 1) Legal, reputation and operating principles
- 2) Business history and stability
- 3) Relationship to dairy value chains and government
- 4) Collaboration performance

Five (5) Indonesian dairy processing companies were selected using the above criteria, as prospects for collaboration and co-investment partners (Mitra Asia Lestari, 2022). The five prospective companies will be invited to collaborate on the project, which will have the following objectives:

- Pilot and evaluate inclusive business models and policy strategies.
- Identify and assess commercially viable approaches to reduce the environmental footprint.
- Evaluate effective ways to scale-up successful approaches to build capacity with industry, policymakers and researchers in Indonesia.

(SEAD, 2022)

Furthermore, the project interventions and research areas will be divided into three categories:

1. Pre-farm gate

- Identify the drivers of change for SHDs who are prepared to grow their business and assist them to identify key management areas to improve profitability.
- Introduce farm milk supply incentives that will provide commercial benefits for supply chain partners.
- Upskilling SHDs and service providers to make or assist in step wise improvements on-farm in forage production, quality and utilisation, herd nutrition and health, reproduction and milk harvesting hygiene.
- Work with agribusiness and co-operatives to provide more productive cost-effective milking herd concentrates and commodities.
- Model the impact of adverse seasons and climate events and pilot the introduction of farm practices to mitigate risk.
- Integrate pit silage into SHD feed plans.



- Reduce pathogen contamination by use of contemporary hygiene practices scaled for SHDs and evaluate on-farm milk cooling technology designed for SHD.
- Reducing carbon emissions from SHDs.

2. Post-farm gate

- Partnering processors with co-operatives and/or SHD to realise urban market opportunities.
- Establish local fresh milk supply chains to service this market opportunity for coffee outlets, but also the hospitality sector.

3. Enabling and policy environment

- Undertake a review of relevant policies and regulations regarding the branding of ambient temperature dairy lines, focussing particularly on their ramifications on SHD inclusive supply chains.
- Experiment with contemporary practice change methodologies, communication platforms and capacity building e.g. employment of village-level researchers.

(SEAD, 2022)

2. List of Potential Private Sector Partners

2.1 PT Nestle Indonesia

Address: Arkadia Green Park, Tower G, 11th Floor Jalan Letjen TB Simatupang Kav 88 Kebagusan, Pasar Minggu, Jakarta Selatan, DKI Jakarta 12520, Indonesia
Phone: +62 21 5086 6000
Contact: Mr Rudi Syahrudi – id.syahrudi@id.nestle.com
Position: Director for Milk Procurement and Dairy Development

Background

With around 3,400 employees, Nestle operate three factories that process approximately 650,000 litres of fresh milk daily from farmers producing liquid drinks (Milo) in Karawang, West Java; milk products (Bear Brand) in Kejayaan Pasuruan East Java and the third factory in Batang, East Java and will be the second facility to produce the Bear Brand liquid milk and ready-to-drink beverages Milo and Nescafé to fulfil growing demand. The new Batang factory receives supplies of fresh milk from KUDs in the western part of East Java i.e. Ponorogo, Tulungagung, Pacitan and Magetan. Nestle also operates a fourth factory that does not require milk as it processes coffee (Nescafe) and spices (Maggi) in Lampung, South Sumatra.



Outcomes from consultation activities

Criteria	Information obtained from interviews
Likelihood of a partnership	There is a high likelihood that Nestle would enter into a partnership with SEAD.
Type and extent of collaboration	<p>Nestle is interested in both the pre-farm gate as well as the post-farmgate interventions of the SEAD project. With the former, Nestle has been and is still looking at various feed alternatives that will deliver the improvement in the quality as well as the quantity of fresh milk. With its post-farm gate interest, Nestle has partnered with SHDs through cooperatives predominantly in East Java since 1975 by providing technical as well as other assistance to increase productivity and improve the quality of fresh milk.</p> <p>As an example of their proactive initiatives for communities and environmental sustainability, Nestle has built access to clean water in dairy farming areas in East Java, which not only supports these farms but also surrounding communities. Since 2010 Nestlé Indonesia has helped build 8,400 biogas domes to process cow dung into renewable energy used for cooking and lighting. In addition, the slurry produced from the biogas processing process can be used as organic fertiliser to increase the fertility of animal feed fields.</p>
Approach and further engagement required to reach a formal partnership agreement	Since Nestle operates its dairy processing predominantly in East Java and only recently in Central Java, they require some clarification from SEAD as to the relevancy of the project's focus on West Java. Nestle claims that currently, East Java produces 70% of the fresh milk in Indonesia and if the project can also include East Java, it will make a huge impact on Indonesia's dairy industry. The top priority at the moment for Nestle is how to combat the foot & mouth disease (FMD) that is gripping Indonesia's cattle farming.



2.2 PT Indolakto (Indofood Group)

Address: Jl. Raya Bogor KM.26,6 No.6, Pekayon, Pasar Rebo, Jakarta Timur, DKI Jakarta 13710
 Phone: +62 800 170 8888
 Contact: Mr Sonny Effendi – sonny.effendhi@indomilk.com
 Position: Chief Operating Officer

Background

This company was previously named PT Australia Indonesian Milk Industries, which is a 50:50 joint venture between NV Marison and the Australian Dairy Corporation, now named Dairy Australia (Hansard 1981; Tirto 2018). After being taken over by Sudono Salim and the Salim Group, this company then produces milk under the Indomilk brand and the company is named PT Indolakto, under the auspices of Indofood Nutrition which also oversees the Indoeskrim ice cream brand (now Indofood Ice Cream).

PT Indolakto has built five dairy processing factories in Jakarta, West and East Java and recently formed a new joint venture company, called Arla Indofood Sukses Makmur (parent company of PT Indolakto). The shareholding composition of the joint venture will be 51% to be owned by Arla Foods and 49% by Indofood Sukses Makmur. The joint venture will process and market organic dairy products from domestic milk production by SHDs.

Outcomes from consultation activities

Criteria	Information obtained from interviews
Likelihood of a partnership	There is a high likelihood that Indolakto would enter into a partnership with SEAD.
Type and extent of collaboration	<p>PT Indolakto is interested in both pre and post-farmgate interventions. Their current and past activities involve carrying out programs to empower local dairy farmers. Indolakto plays an active role in improving human resources for breeders and cooperatives, increasing the dairy cattle population, facilities and infrastructure, and sustainable feed management (Indolakto, 2022).</p> <p>The priority programs carried out by Indolakto include Good Farming Practices and good fresh milk handling, increasing cattle ownership in farmers, and feed sustainability. Indolakto is also working to implement digitalization in partnership programs with cattle breeders and cooperatives (Kontan, 2020).</p>



<p>Approach and further engagement are required to reach a formal partnership agreement</p>	<p>Indolakto requires clear documented advice on their role and responsibilities in the project before committing to any agreement. This would make it easier to obtain approval from the Board of Directors and to formalise the agreements by their legal department.</p> <p>They have also enquired about the possibility of expanding the project to Central Java as they work exclusively with the KUD at Boyolali, Central Java. Indolakto also works exclusively with KUDs in Bogor, Garut and Ciwedey in West Java and will not work with other KUDs that supply milk to their competitors.</p>
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2.3 PT Frisian Flag Indonesia (FFI)

Address: JL. Raya Bogor KM 3, Pasar Rebo, Jakarta Timur, DKI Jakarta 13760, Indonesia
 Phone: +62 800 182 1406
 Contact: Mr Andrew Saputro – andrew.saputro@frielandcampina.com
 Position: Dairy Development Manager

Background

FFI is one of the largest dairy companies in Indonesia that produces nutritious milk under the brands FRISIAN FLAG®, FRISO®, SUSU BENDERA®, and OMELA® for children and families for almost 100 years since 1922. FFI is part of one of the largest dairy cooperatives in the world, FrieslandCampina, based in the Netherlands. They employ more than 2,000 employees throughout Indonesia and have two production facilities in Pasar Rebo and Ciracas, East Jakarta.

An innovative intervention introduced by FFI is the Digital Milk Collection Point (MCP) with the aim to keep the number of Total Plate Count (TPC) or bacteria contained in milk as low as possible. With this system, SHDs will get a fair price of milk in accordance with the quality of milk produced.

Outcomes from consultation activities

Criteria	Information obtained from interviews
Likelihood of a partnership	There is a high likelihood that FFI would enter into a partnership with SEAD.



<p>Type and extent of collaboration</p>	<p>For the pre-farmgate interventions, FFI's recent interest has been partnering in the SIDPI project (2016 – 2020), with IPB, Wageningen University and dairy cooperatives in West Java, funded by the Netherlands government, focussing on sustainable agriculture.</p> <p>In the post-farmgate sector, FFI has developed a partnership through cooperatives, with farmers since 1996 predominantly in West Java. In the last 4-5 years FFI initiated programs such as the Farmer2Farmers (F2F), Young Farmer Academy (YFA) and the Milk Collection Point (MCP) program in Pangalengan.</p> <p>FFI was also involved in the development of the Dairy Village in Subang West Java, through a partnership program with PT Perkebunan Nusantara (PTPN) VII, and North Bandung Cattle Breeders Cooperative (KPSBU) Lembang West Java, the Government of Indonesia and the Netherlands government. The development of the Dairy Village is expected to change the mindset of farmers, namely from traditional farming methods to modern economic farms.</p>
<p>Approach and further engagement are required to reach a formal partnership agreement</p>	<p>All FFI products are in powder form, which according to the presentation (SEAD, 2022), is considered as 'commodities shelf-life products' and not 'fresh and short shelf-life products', which the project wishes to focus on. FFI requires clarification from SEAD on relevancy. Like the other dairy processors that we interviewed, FFI is currently very concerned with FMD.</p>



2.4 PT Ultrajaya Milk Industry Tbk.

Address: Jl. Raya Cimareme 131, Padalarang, Bandung, Jawa Barat 40552, Indonesia
 Phone: +62 22 8670 0700
 Contact: Mr Brendan Wilkins
 Position: Operational Manager

Background

From a dairy operation in the 1950s, PT Ultrajaya has grown dramatically to become one of Indonesia's leading producers of dairy products and other ready to drink beverage products. PT Ultra Jaya is a pioneer in ultra-high temperature (UHT) processing in Indonesia and the largest UHT milk company in Indonesia with a market share of 42 per cent in liquid milk products (Ultrajaya, 2022).

Ultrajaya itself has a 60-hectare cattle farm, with 3,300 head of cattle in West Java called Ultra Peternakan Selatan Bandung (UPBS). The business can supply 43 tons of fresh milk every day to its factory in the West Bandung area (SWA, 2014). Nonetheless, Ultrajaya also utilises milk directly from SHDs, thus forming what is commonly called in the Indonesia agriculture sector the 'Nucleus-Plasma' model, with a 'safety-net' of supply from their own dairy farm (Ultrajaya, 2022).

Distribution ranges from Sumatra to Papua which includes more than 30 distributors, and 125,000 retail stores throughout Indonesia. Ultrajaya is still more focused on developing its domestic business (95%). The rest is in the form of exports to America, Australia and Africa (SWA, 2014).

Outcomes from consultation activities

Criteria	Information obtained from interviews
Likelihood of a partnership	The company is not in a position to make any decisions on collaboration with outside parties or organisations due to the current foot & mouth disease (FMD), which is spreading throughout Java, if not Indonesia.
Type and extent of collaboration	Ultra Jaya is not the only processor that is concerned with the current FMD, other processors during the interview have also expressed the same concern, especially when they feel that the intervention by the Indonesian Government is not effective.
Approach and further engagement required to reach a formal partnership agreement	During conversation, the Operations Manager of Ultra Jaya mentioned that it would be irresponsible for any organisations to undertake any collaborative projects at the moment, as it can only increase the spread of the FMD.



2.5 PT Cisarua Mountain Dairy (Cimory)

Address: Rukan Taman Meruya, Kompleks Meruya Utara, Kec. Kembangan, Jakarta Barat, DKI Jakarta 11620, Indonesia
Phone: +62 21 387 4630
Contact: Mr Bayu Pamungkas – pamungkas.bayu@cimory.com
Position: Dairy Plant Manager

Background

Cimory is an Indonesian food and beverage manufacturer, with a leading market share in premium yoghurt products and sausages. Founded in 1993, the Group currently produces processed meat, dairy and egg-based products, sold under various brands including Cimory, Kanzler and Besto. Cimory's products are distributed through multiple channels, including modern and traditional retailers, Food Service and direct selling markets. Cimory is based in Jakarta with manufacturing facilities in West Java, Central Java and East Java (Cimory, 2022).

As covered in the report 'Evaluation of NGO, industry, government SHD programs and review of investments by dairy companies in Indonesia' (Mitra Asia Objective 1c&d, 2022), Cimory is a good example of SEAD's successful collaboration with the private sector, where there was strategic alignment regarding a key issue (milk quality) within a value chain and between their business values and project outcomes, in this case processing fresh milk from SHDs and redistributing profit through bonuses (ACIAR, 2020).

During the COVID-19 pandemic when most businesses were struggling to survive, Cimory expanded and went public, attracting significant investment from the Asia Development Bank (ADB), who subscribed to around 19.4 million shares, worth 59.9 billion Indonesian rupiah (\$4.2 million), as part of the initial public offering (IPO) on the Indonesia Stock Exchange (ADB, 2021).

In a previous project, IndoDairy which is the project phase 1 indicated that it took a long time to develop rapport with Cimory (i.e. five meetings), it only truly took effect once there was alignment with Cimory's business strategy and operational resources. It was also important that their business values and project outcomes also be aligned, in this case processing fresh milk from Indonesian farmers and redistributing profit to SHDs through bonuses. Integral to this engagement was the provision of technical services from the public sector (IndoDairy, 2012).

An initial conversation has been established with the newly appointed Dairy Plant Manager, Mr Bayu. The manager stated that Cimory welcomes further collaboration with the SEAD project. The manager shared that Cimory faced some challenges at the beginning of IndoDairy. The challenge is mainly about coordination and communication within the company, not with the project. However, they have managed it very well.



The manager highlighted that Cimory has a very good understanding of the project. With the experiences they have gained during IndoDairy, the continued involvement of Cimory will hopefully succeed the SEAD project.

3 Key Activities and Output Assumptions

In ensuring the success of the larger AGB/2021/124 project, certain assumptions must be made, as follows:

- Private sector partners have the willingness, resources and incentives to implement the intervention as planned.
- Private sector partners are pro-active, open to change, and able to respond to changes in the operating environment during implementation.
- Key team members remain committed, and have the time, willingness and capacity to play their agreed role in the intervention.
- SHDs are willing to be involved in the intervention, attend training and promotion events, and receive technical assistance.

4 Suggested Itinerary for Lead Researcher

Below suggested visit itinerary for the SEAD Project commencing on August 2022:

Jakarta Program	
Sunday, 14 August 2022	Dr Brad Granzin, SEAD Lead Researcher arrive in Jakarta Hotel: TBA
Monday, 15 August 2022	
09.00	Meet PT Mitra Asia Lestari team at Hotel Lobby
09.15	Depart Hotel for PT Frisian Flag Indonesia <i>(time allocated with the assumption the hotel is located in the Simatupang area, which will take 15 – 30 mins by car to PT FFI)</i>
10.00 - 11.30	Meeting with PT Frisian Flag Indonesia <i>Venue: PT FFI Head Office, Jl. Raya Bogor KM 5, Pasar Rebo, Jakarta Timur, DKI Jakarta 13760, Indonesia</i>
11.35 – 12.35	Lunch Enroute



13.00 – 14.30	Meeting with PT Indolakto <i>Venue: PT Indolakto Head Office, Jl. Raya Bogor KM.26,6 No.6, Pakayon, Pasar Rebo, Jakarta Timur, DKI Jakarta 13710, Indonesia</i>
15.05	Return to hotel
Tuesday, 16 August 2022	
08.30	Meet PT Mitra Asia Lestari team at Hotel Lobby
08.35	Depart Hotel for PT Cimory <i>(time allocated with the assumption the hotel is located in the Simatupang area, which will take 1 – 1.5 hrs by car to PT Cimory)</i>
10.00 - 11.30	Meeting with PT Cimory <i>Venue: Rukan Taman Meruya, Kompleks Meruya Utara, Kec. Kembangan, Jakarta Barat, DKI Jakarta 11620, Indonesia</i>
11.35 – 13:35	Lunch Enroute
14.00 - 15.30	Meeting with PT Nestle Indonesia <i>Venue: PT Nestle Indonesia Head Office, Arkadia Green Park, Tower G, 11th Floor Jalan Letjen TB Simatupang Kav 88 Kebagusan, Pasar Minggu, Jakarta Selatan, DKI Jakarta 12520, Indonesia</i>
15.35	Return to hotel
Wednesday, 17 August 2022	
Dr Brad Granzin, SEAD Lead Researcher depart Jakarta for Central Java	
Friday, 19 August 2022	
09.00 - 10.30	Online Meeting with PT Ultrajaya <i>(zoom link will be provided once the meeting confirmed)</i>
Dr Brad Granzin, SEAD Lead Researcher depart for Australia	



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12.16 Appendix 16: Itinerary and minutes from meetings: Sunday August 7 to Tuesday September 6, 2022

Australian delegation:

- Mr Howard Hall: Agribusiness Program Manager, Australian Centre for International Agricultural Research (ACIAR);
- Dr Brad Granzin: Managing Director Australasian Dairy Consultants;
- Professor Wendy Umberger: Executive Director Centre for Global Food and Resources; Professor, Agricultural and Food Economics;
- Hazel Aniceto: Philippines Country Manager ACIAR;
- Mirah Nuryati: Indonesia Country Manager ACIAR.

1. **Sunday 7 August, 2022. Agriterra. Location: SEDA Hotel Manila, Philippines.**

- a. Australian team: Howard Hall; Brad Granzin;
- b. Agriterra: Philip (Phil) Morey;
- c. Phil is the Agriterra Regional Manager for Vietnam, Philippines and Indonesia;
- d. Agriterra is currently undertaking consultancies for Alaska Milk regarding suitable co-ops to engage with the view of securing milk supply;
- e. Agriterra is funded by the Dutch Government;
- f. Phil's main role is to secure 2.5 million Euro for consultancies over the next five years;
- g. See Footnote a. for more information regarding Agriterra's consultancy with Alaska Milk;
- h. Actions: Consult with Phil regarding status of Agriterra consultancies.

2. **Monday 8 August, 2022. Foodlink Advocacy Co-operative. Location: ACIAR Country Office Australian Embassy, Manila, Philippines.**

- a. Australian team: Howard Hall; Brad Granzin; Hazel Aniceto; Mara Faylon;
- b. Foodlink Advocacy Co-operative: Anton Simon Palo and Mercedita Rosetes;
- c. ACES Corporation (linked in through a co-op) has the majority of the school milk programme;
- d. Discussion was had regarding engaging with the National Dairy Authority (NDA). The primary objective is to consider what is the value proposition for their engagement and participation in the South-east Asia Dairy (SEAD) project. SEAD could possibly support NDA to develop their staffs skills in farm technology;
- e. Metro Pacific Group lead by Manuel Velez Pangilinan (MVP) has purchased Carmen's Best Ice Cream. Debra Jan is their business manager;
- f. Within the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD), there is a Board of Investment which provides investment for new incentives.

3. **Monday 8 August, 2022. Richard Sisson, Deputy Head of Australian Mission. Location: Australian Embassy, Manila, Philippines.**

- a. Australian team: Howard Hall; Brad Granzin; Hazel Aniceto;
- b. Discussed Koomi yoghurt chain and young entrepreneur John Michael Hilton. Rapidly expanding to 100 stores in the Philippines.

4. **Monday 8 August, 2022. Department of Science and Technology (DOST) The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD). Location: Paseo de Valmayor, Timugan, Economic Garden Los Baños, Laguna, Philippines.**

- a. Australian team: Howard Hall, Brad Granzin, Hazel Aniceto, Roberto Acosta;
- b. PCAARRD: Dr Reynaldo Eborá – Executive Director; Dr Synan Baguio - Director, Livestock Research Division (LRD); Dr Ernesto Brown - Director, Socio-Economics Research Division (SERD); Dr Lilian Bondoc – Director, Policy Coordination and Monitoring Division (PCMD); Ms Princess Ani - Supervising Science Research Specialist, SERD; Ms Theresa Lantican – Science Research Specialist, SERD; Mr Stephen Mendoza, LRD;

- c. PCAARRD tabled a presentation regarding various potential project initiatives for SEAD;
- d. Discussed makeup of NDA board. All projects need to be approved by the NDA board;
- e. NDA and PCAARRD are still in transition post-election;
- f. Discussion had in meeting regarding challenges with heifer importation. Discussed various reproduction strategies;
- g. Carabao. Can these be included in SEAD? Have advantage over cows due to their high components for cheese manufacturing, particularly mozzarella;
- h. Outcomes from SEAD – need to be practical, impact and research focussed (Howard);
- i. Co-ops – need to engage with larger co-ops first. Avoid any challenges with smaller co-ops with high reliance on NDA funding;
- j. Actions:
 - i. Need to develop a draft proposal (in addition to the ACIAR process) for consultation with PCAARRD and NDA by the end of the year if not sooner;
 - ii. Need to have clarity regarding Roles and Responsibilities;
 - iii. Capacity building in NDA is an opportunity. Developing their skills as artificial insemination (AI) technicians would be of interest.

5. Tuesday 9 August, 2022. Samahang Maggagatas NG Batangas Co-operative. Location: Brgy. Tinurik, Tanauan, Batangas, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Hazel Aniceto; Roberto Acosta;
- b. Attendees: Greg Malupang (Chairman); D.H. Magpantay; Mr Dallelo Alupa (General Manager). A local government veterinary officer was also in attendance;
- c. The co-op has 40 members. Total milking herd is 125 cows. Mr Danny is the largest farm with 50 milking cows. Produces 11-12 litres per cow per day; Mr Greg has 11 cows in total with three milking cows (8 to 10 litres per cow per day);
- d. There are problems with the longevity of Australian imported heifers (pure breed Friesians). They have high mortality rates, especially when compared to NZ heifers (Friesian Jersey cross). A possible cause of heifer deaths within 100 days may be linked to quarantine (lack of vaccination/disease exposure). NDA still require payment (160,000 PHP per head) regardless, even if the heifer dies;
- e. Action: Undertaking an analysis of the Australian heifer importation value chain to understand the cause of high mortality (from Australian farms through to Filipino SHD farms) is a possible project;
- f. Opportunities/challenges raised by co-op members:
 - i. Feed availability and quality;
 - ii. Herd health – mastitis and availability of veterinary chemicals;
 - iii. Urbanisation;
 - iv. Breeding and reproduction;
 - v. Environment;
- g. Feed. Mr Danny farms 30 ha with maize triple cropped annually. Ensiles at 75 days (as opposed to normal practice of 100 days plus Australia/USA). Typical yields of 25 tonnes per crop (as opposed to 40 tonnes Australian dryland). On a per ha basis, he applies 56 kg of nitrogen (N), 56 kg of phosphorus (P) and 56 kg of potassium (K) per crop using a mixed fertiliser. Comparable fertiliser rates in Australia would be 300 kg N, 90 kg P and 100 kg K. Uses Vietnam seed. It was noted later during a farm visit that harvested maize silage had a low proportion of kernels and that kernels contained low levels of starch. A possible research project could be looking at alternative maize silage management options, particularly regarding seed, fertiliser and harvesting interval;
- h. Milk price is 34 PHP per litre. They supply to the secondary co-op Kalipunan ng mga Kooperatibang Maggagatas (KKMI). Milk quality analyses completed include components and bacterial scans. An examination of the weekly results from one farm showed that milk quality of dry versus wet months were similar which raises questions regarding the accuracy of results (A similar observation was made in IndoDairy in Pangalengan where posted total plate counts (TPC) results at the co-op were the same for all

SHDs. Do co-ops avoid conflict with suppliers (and therefore differential payments) by keeping all milk quality results consistent?;

- i. The co-op also had a blueprint for the development of a community farm. Was funded from the World Bank Rural Development Programme;
- j. Farmers expressed an interest in undertaking a study tour to other dairying regions in Philippines e.g. Mindanao;
- k. It was also noted that the New Zealand (NZ) dairy development project has created a network amongst farmers;
- l. Visited Mr Danny's farm. Has herd in good condition with contemporary technology e.g. sprinklers and timed fans. Also grazes Mulato II, a legacy of the NZ project.

6. Wednesday August 10, 2022. University of Philippines Los Banos (UPLB). Location: Lopez Ave, Los Baños, Laguna, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto; Roberto Acosta;
- b. UPLB: Dr. Elpidio Agbisit, Dean of the College of Agriculture and Food Science (CAFS); Dr Lilia Fernando, Associate Professor and Associate Dean for Research and Extension, Crop Biotechnology Division, Institute of Crop Science (ICropS) – CAFS; Dr. Amado Angeles, Director, Dairy Training and Research Institute (DTRI) and Professor at Institute of Animal Science – CAFS; Mr Gerard Guadayu, DTRI; Mr Angelo Tapia, DTRI; Dr Enrico P. Supangco, Executive Director, UPLB Foundation Inc;
- c. There are already multiple projects linked between PCAARRD and UPLB. This includes research with carabao, forage quality and genetics. UPLB are the lead agency for a NZ funded greenhouse gas (GHG) project involving Roger Hegarty;
- d. Collaboration with other universities: Cagayan State; Visayas; Central Mindanao; plus two other universities;
- e. Also have projects linked to economics (Dairy Enterprise Development);
- f. Does ACIAR need to establish and Memorandum of Understanding (MOU) with UPLB?
- g. Look to develop a list of potential projects – socialise and meet with Dr Angeles;
- h. UPLB expressed an interest to collaborate with other SEAD universities;
- i. Action – send proposal to UPLB asap. Get DTRI to send through concept note asap.

7. Wednesday August 10, 2022. Farm Share Prime. Location: Balo, Cavinti, Laguna, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto; Roberto Acosta;
- b. Farm Share Prime Bart Augusto Taconciang (CEO);
- c. Small training institute offering TESDA accredited training. 4.8 ha in size with small dairy herd and replacements. Also houses other species;
- d. Partnering with Alaska Milk to offer NC2 training (Animal Production – Ruminants 25,000 PHP cost over 30 days). Some minimal training with dairy cattle;
- e. The farm also undertakes some small scale processing and direct sales.

8. Wednesday August 10, 2022. Batangas Dairy Cooperative (BADACO) Co-operative. Location: JET Hotel Lipa City, Batangas, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto; Roberto Acosta;
- b. BADACO Co-op: Mr Juan P. Lozano (Chair); Mr Jose Alilio, Jr (Vice Chair); Mr. Edwin Sanchez, Manager;
- c. The co-op has 23 members which collectively own a 200 cow farm;
- d. Also looking to build second 25 cow community farm;
- e. Servicing coffee shops and also directly to consumers with fresh products, particularly in condominiums. Use local re-sellers;
- f. Also run own training programme with graduates finding roles overseas.

9. Thursday August 11, 2022. Sta. Maria Dairy Farm, Inc. Location: Purok 6, Brgy. Malagunlong, Lipa City, Batangas, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto; Roberto Acosta;

- b. *Owner: Mr. Jose "Joey" Tapay, Owner-Proprietor;*
- c. Visited farm – part grazing, part mixed feeds system with 70 milking cows;
- d. Average milk production is 12.7 litres per cow per day;
- e. Mixed diet comprises of maize silage, brewers grain; mineral/vitamins; tofu waste. Works with local nutritionist. Cows graze signal grass. Paddocks appeared sparse with low plant population;
- f. Also raised issue regarding high mortality with Australian imported heifers. No post-mortems have been completed. The issue of heifers not being vaccinated for tick fever was discussed;
- g. Has a closed herd and sells heifers to other farmers;
- h. Farm also supplies milk to Carmen's Best ice cream.

10. Thursday August 11, 2022. Kalipunan ng mga Kooperatibang Maggagatas, (KKMI). Location: Brgy.Lamot 2, Calauan, Laguna, Philippines.

- a. *Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto; Roberto Acosta;*
- b. *KKMI: Mr. Baltazar V. Montiel, Chairman. Other Chairs of Secondary Co-ops;*
- c. KKMI is a secondary co-op which is supplied milk from seven co-ops comprising of 200 farms. Farm size varies from 5 to 100 cows. Testing includes alcohol precipitation; bulk density; fat and protein; methyl blue bacterial loads (6, 4 and 2 hours). Pay premiums based on quality. Price ex co-op (or farm) is 32.5 PHP per litre or 34 PHP ex KKMI factory.
- d. Processes around 2000 litres per day;
- e. Services Metro Manila to restaurants, food service, coffee shops and manufacturers;
- f. Discussed challenges working with supermarkets regarding returns due to short shelf life (7 days) and long payment terms (e.g. six months);
- g. Farmers services – used to make concentrates but not viable;
- h. Has processing capacity up to 12,000 litres per day. Process fresh milk, kesong puti, flavoured milk;
- i. General discussion regarding market opportunities. Filipinos are generally impulse buyers. Price points are a major issue;
- j. It costs 1,000 PHP p.a. to join the co-op. 60% of profit is paid back to members. Has support from the Philippine Development Programme;
- k. Opportunities/challenges:
 - i. High feed/fodder prices;
 - ii. A large scale local commercial farm is reported to be producing 32 litres per cow per day. Typical production from SHDs is 10 – 12 litres per cow per day;
 - iii. Most farmers who supply are serious farmers. There are a few mixed operators;
 - iv. There are some women groups involved in marketing and dairying.

11. Friday August 12, 2022. Dairy Daddy, Inc. Location 101 Col. S. Cruz St., Brgy. San Rafael, Montalban, Rizal, Philippines.

- a. *Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto; Roberto Acosta;*
- b. *Dairy Daddy: Owner Proprietor - Gregorio San Diego;*
- c. Mixed farming operation with 160 cows, 55 milking. Currently producing 9 litres per cow per day. Uses cut and carry Napier grass with tofu waste and brewers grain;
- d. Services School Milk Feeding Programme (SMFP) for 16 days a year. Is problematic in that is a tender process and often short notice is provided to supply milk. Only 10% of inputs into SMFP is from fresh milk with the balance from reconstituted commodities;
- e. A lack of market opportunities has seen this farm reduce feed inputs to reduce milk production;
- f. The owner also has an offsite business called Farm to Fork in a local town. This sells fresh milk products, pastilles and a crème dessert, all based on dairy. Other commodities are also sold through the business;
- g. Highly focussed discussion regarding that government intervention is needed to address the high input costs of dairying.

12. Friday August 12, 2022. Stagira Farms Inc. Location: Robinsons Place, Sumulong Highway, L. Sumulong Memorial Circle, Antipolo, Metro Manila, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto; Roberto Acosta;
- b. Stagira Farms: Atty Elias "Bong" Inciong;
- c. Dairy farmer at Sitio Matagbak, Brgy. Bagumbayan, Pililla, Rizal. Total farm size is 56 ha. Land price is valued at \$132,000 per ha;
- d. 77 cows with 13 milking. Mix of Holstein and Holstein Friesian;
- e. Milk production of 8 to 10 litres per cow;
- f. 10 hectares of improved pastures. Grazing herd, no cut and carry;
- g. Buys concentrate from Sorosoro Ibaba Development Cooperative (SIDC). Feeds 5 to 7 kg per milking cow per day;
- h. Feed costs are 7 PHP per kg maize silage; 21 PHP per kg concentrate and 22.5 PHP per kg corn grain;
- i. Participated in NZ dairy development project;
- j. Has low mortality and disease in herd;
- k. Has five staff;
- l. Supplies processor in Rizal. Produces cheese and kefir;
- m. Has own brand – Stagaria Farms which produces fresh milk and ricotta cheese. Used to manufacture ice cream. Wife and daughter involved in marketing. Also has online sales.

13. Friday August 12, 2022. Visum Ventures. Location Bondi and Bourke, Makati, Manila, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger; Hazel Aniceto;
- b. Visum Ventures: John Michael Hilton;
- c. This meeting was scheduled by Austrade during the mission;
- d. Visum Ventures is a company with multiple brands and food outlets;
- e. Of interest was the company's Koomi fresh yoghurt shops. Milk for yoghurt manufacturing is currently sourced from a large dairy farm in Mindanao. Milk powders are also used during manufacturing;
- f. A new yoghurt factory is currently being built outside of Manila.

14. Saturday August 13, 2022. Alaska Milk (AM). Location SEDA Hotel Manila, Philippines.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger;
- b. Alaska Milk: Wendell C Balderas, Public Affairs and Dairy Development Manager;
- c. AM is a locally owned subsidiary of Royal FrieslandCampina (RFC) (bought in 2012). It has traded for 50 years in the Philippines;
- d. AM started the Dairy Training Development Corporation. It has agreements signed with DTRI and NDA;
- e. It has sourced milk locally over the last 5 to 10 years;
- f. It has funded 300 farmers to complete training (Farm Share Prime) over 2022'23;
- g. It has established the Philippines Netherlands Development Centre in collaboration with DTRI;
- h. Currently funding a consultancy with Agriterra (see Phil Morey email);
- i. Would like SEAD to meet with the RFC Global Dairy Development Team;
- j. Looking to reduce the use of plastic across the business (Plastic Positive – provides third party auditing);
- k. Action: Send Wendell an electronic copy of the prospectus.

15. Monday August 15, 2022. Dane Roberts DAFF Agricultural Councillor, Lulu (PRISMA), Fitri and Mirah, Australian Embassy Jakarta Indonesia.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger;
- b. Foot and Mouth Disease (FMD). Update provided regarding vaccination programme with 1.5 million doses distributed;
- c. Professor Wiku (head scientist Covid-19 response) is leading the control programme;
- d. There are currently 300,000 to 500,000 active infections. More information can be found on siagapmk.crisis-centre.id;

- e. Bali is the focus of the control programme. East Java has had the most cases, with 70% of dairy farms affected. This has led to a 30% long term decline in milk production;
- f. The culling of heifers has a long term negative impact on genetic gain;
- g. Discussion was had regarding the challenges concerning heifer importation with a recent tender failing;
- h. Under the Indonesia Australia Partnership on Food Security in the Red Meat and Cattle Sector, cattle have been provided to villagers, along with some feed resources;
- i. Lumpy Skin Disease (LSD). To date, this has only been detected in Sumatra, not Java;
- j. There is a backlog in desktop audits for businesses to be registered traders for dairy imports;
- k. There is a policy in development by the GOI to allow Jersey heifer importation.

16. Monday August 15, 2022. Nestle. Location: Indonesia Head Office, Arkadia Green Park, Tower G, 11th Floor Jalan Letjen TB Simatupang Kav 88 Kebagusan, Pasar Minggu, Jakarta Selatan, Jakarta, Indonesia.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger, Dian Yuanita W (MT Mitra Asia Listari; MAL);
- b. Nestle: Rudi Syahrudi. Head of Milk Procurement & Dairy Development;
- c. 25 years' experience working with SHDs in India, Sri Lanka and East Java (12 years as Head of Dairy in East Java). Is an agronomist by training;
- d. Ida Royani is the head of Milk Procurement and Dairy Development in East Java. There are 14 staff involved in dairy development;
- e. GHG reduction is a focus with an objective to reduce 2025 emissions by 30% (baseline 2018);
- f. Nestle works with 35 co-operatives in East Java;
- g. Dairy Development Programme:
 - i. Focusses on various technical disciplines including cow comfort and housing;
 - ii. Has a theme of Back to Basics – does not try to over complicate farm improvement programmes. Things are kept simple, affordable and profitable;
 - iii. In 2014, Nestle developed and implemented *ad libitum* watering systems for milking cow herds. This was implemented on 20,000 out of 26,000 farms;
 - iv. Farm improvements are funded through a capital contribution from Nestle, with farmers paying back a balance from milk revenue;
 - v. Nestle developed a budget chopper. Normal price was 25 million IDR. Developed a cheaper version for 2.5 million IDR, with a subsidy for SHDs of 1.5 million per farm. Nestle have currently sold 6,000 choppers;
 - vi. Nutrition – introduced Dwarf Napier and high protein concentrates (subsidised);
 - vii. Introduced halters (as opposed to nose ties) and introduced cattle exercise areas to housed systems;
 - viii. Also have introduced fans (note that some of these have been used in homes that did not have one);
 - ix. Forage tree introduction – Indigofera and Calliandra;
 - x. Slurry pits for waste use on forage crops;
 - xi. Centralised raising of heifers in community rearing centres. Has been supported by an NGO;
 - xii. Overall, there has been double digit growth in milk production in East Java;
- h. There was a general discussion regarding options for recovery post FMD. FMD has seen a 15% reduction in the East Java herd. There has also been panic selling. Milk supply in June was down 50%;
- i. Nestle has been providing a nutritional supplement (molasses) to improve herd immunity;
- j. The two main strategies implemented to recover from FMD relate to increasing the milk of remaining livestock, then exploring options to replace culled livestock (e.g. live imports, sexed semen, ETs). Brad will send Rudi some concepts in the coming weeks.

17. Monday August 15, 2022. Indolacto (IL) (owned by IndoFood). Location: Head Office, Jl. Raya Bogor KM.26,6 No.6, Pekayon, Pasar Rebo, Jakarta Timur, Jakarta, Indonesia.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger, Dian Yuanita W (MAL);
- b. Indolacto: Bwanna Surya (Head of Fresh Milk Development and Services);
- c. IL has been sourcing milk since the early 1990s. Milk quality is an issue. A problem noted is farmers milking three times a day with night milk being left unchilled. Water adulteration is also an issue;

- d. Sources milk across Java (West (WJ), Central (CJ) or East (EJ)). Pre FMD, intake was 250 tonnes per day. Today it is 150 tonnes per day (100 tonnes EJ, 25 tonnes CJ and 25 tonnes WJ). IL partners with 16 co-ops with intakes of between 1 to 110 tonnes per day. IL has five factories receiving milk (two EJ, three WJ). Demand for farm gate milk is high with ex-factory prices of 9000 Rp/L and 6500 Rp/L ex farm gate;
- e. IL produces fresh milk products and repackages powdered milk from imports;
- f. Development projects:
 - i. Organic fresh milk project with Arla and Denmark government;
 - ii. Increase cow ownership in SHDs;
 - iii. TPC reduction;
 - iv. 2023 – SCC reduction programme;
 - v. Farmer training programmes (practices, accounting, infrastructure);
 - vi. Delivered training to one coop in CJ and two in WJ;
 - vii. Has one collection centre in CJ;
- g. Discussion was had regarding the Association for Milk Processing. Its membership includes Nestle, IndoMilk, Ultra Jaya, Danone and Frisian Flag. Meetings are being held frequently to discuss FMD.

18. Monday August 15, 2022. PT Cimory. Location Citeureup No.101, Sentul, Kec. Babakan Madang, Kabupaten Bogor, Jawa Barat, Indonesia.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger, Dian Yuanita W (MAL);
- b. Cimory: Ibu Rithoh, Dairy Service Manager of PT Cimory; Kristiadi Wijaya, Head of Dairy Quality Control of PT Cimory;
- c. Cimory have a number of processing sites across Java:
 - i. Sentul – yoghurt, ultra-high temperature (UHT);
 - ii. Semara Central Java – yoghurt;
 - iii. East Java;
- d. Also looking to have plant-based milk by 2023;
- e. FMD has reduced intake by 25%. WJ has been hit the worst.
- f. Quality continues to be a problem with SHDs while their large supplier at Sukabumi has better quality;
- g. Discussed IndoDairy project at Giri Tani KUD (GT). In 2019 avg TPC from GT was 2 million. Today it is 1 million after the projects intervention;
- h. In terms of a new project, Cimory would prefer for SEAD to work with co-ops that exclusively supply them (Giri Tani and Cianjur);
- i. It costs Cimory about \$3 per sample for a Bactoscan (TPC);
- j. Working on quality premiums paid by Cimory, a new project would have to deliver water heating to a maximum cost of \$1.40 per day to a SHD.

19. Tuesday, August 16, 2022. Institut Pertanian Bogor (IPB)/Bogor Agricultural Institute. Location Bogor, Indonesia.

- a. Australian team: Brad Granzin; Wendy Umberger, Dian Yuanita W (MAL);
- b. IPB: Arief Daryanto; Sahara; Wahida Maghraby; Vyta Hanifah;
- c. Had informal discussion with IPB team regarding the conclusion of IndoDairy and the background of SEAD. IPB agreed to participate in the new project.

20. Tuesday, August 16, 2022. PT UltraJaya (UJ) Milk Industry. Location: Online.

- a. Australian team: Brad Granzin; Wendy Umberger, Dian Yuanita W (MAL);
- b. UJ: Sabana Prawirawidjaja (President Director); Haryano Hendranata (Smallholder Dairy Manager);
- c. UJ headquarters are located in Bandung, West Java;
- d. General discussion was had regarding how to improve SHDs finance, hygiene and cooling chains. UJ are currently working with 40 SHDs;

- e. Focus on rebuilding after FMD will be a key focus. SHD farms are currently being paid \$1,000 per cow culled due to FMD infection. Chair was recommending a soft loan from Australia to rebuild the national herd. Overall 4,000 cows are required to replace those culled;
- f. Discussion was also had regarding using sexed semen to accelerate rebuilding but also accelerate genetics;
- g. Other opportunities/challenges related to:
 - i. Water supply;
 - ii. Supply of feed and concentrate;
 - iii. Sanitation;
 - iv. Vaccination protocol of cows in quarantine.
- h. Further policy work is needed to limit the importation of dairy ingredients to allow local supply to be more competitive;
- i. Increasing milk production a few litres per cow per day would make a substantial change to overall milk production.

21. Thursday, August 18, 2022. Ria. Location: Gumaya Tower Hotel, Jl. Gajahmada No.59-61, Kembang Sari, Kec. Semarang Tengah, Kota Semarang, Indonesia.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger, Mirah Nuryati;
- b. Ria has a degree from Diponegoro University (UNDIP) completing a coursework Master of Agricultural Science in 2015;
- c. Ria worked on a NZ Aid project (IDEA). Some successful examples of practice change from the project were teat dipping (albeit iodine solution was provided). Magnesium oxide pre calving was provided to farmers to assist with calcium mobilisation in early lactation. Mulato (Brachiaria hybrid) was also introduced by the project which resulted in increased milk production per cow. Forage yields however were not as high as with elephant grass, which disappointed some farmers. The GOI also provided Indigofera at this time providing a complex extension environment. SHDs also received training in cleaning milk machines and mastitis management from NZ quality assurance consultants;
- d. The project had a strong extension and networking focus;
- e. Generally, there are limited GOI staff in Central Java (CJ), with staff rotations every year;
- f. Compared to East and West Java, Central Java is dominated by milk traders, with relatively few KUDs;
- g. The fresh milk market in CJ is small but growing;
- h. CITA Nasional is a large processor in CJ, also receiving milk from SHDs as well. They also assist SHDs with corn silage;
- i. Cimory is also present in CJ, sourcing milk from Boyolali (1.5 hrs away). Squeeze bottle yoghurts are their main products;
- j. KUDs (names may need to be checked in country):
 - i. Anduni Luhuni – 1000 farmers;
 - ii. Mojosongo – 100 farms;
 - iii. Pesat – 100 farms. Historically had low quality milk, but offered payment systems based on quality (A,B and C). Each farm was tested through their small milk laboratory. Corn silage was also trialled ;
- k. Many of the CJ farms are at higher altitudes;
- l. Frisian Flag and Diamond also source milk from CJ;
- m. Most farms have 2 to 4 cows;
- n. Some local brands are also sold by KUDs;
- o. FMD has impacted milk supply in the region;
- p. Typical farm gate price in CJ is 6000 IDR/L with average production of 10 litres per cow per day;
- q. Typical diets of farms in CJ are based on elephant grass, tofu waste and concentrate;
- r. Local farmers and Cargill supply milking herd concentrates;
- s. Nestle has a new factory opening in 2023 at Batang;
- t. The project (IDEA) tried to get young farmers involved but found this problematic;
- u. IDEA had on-farm sites demonstrating corn silage and elephant grass silage;
- v. Also had demonstration sites regarding providing water *ad libitum*;

- w. SHD herds experience heat stress from October to April;
- x. There have been pilots trialled with communal barns. SHDs are concerned about stock theft within communal facilities;
- y. Sudirman University has a National Breeding Farm.

22. Thursday, August 18, 2022, Diponegoro University (UNDIP). Location: Jl. Prof. Soedarto No.50275, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah, Indonesia.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger, Mirah Nuryati;
- b. UNDIP: Dr Dian Harjanti; Professor Ir. Bambang Whep;
- c. Faculty of Agricultural Science and Animal Science:
 - i. Animal Science;
 - ii. Food technology;
 - iii. Agro-economic technology;
 - iv. Agribusiness – graduate.
- d. See promotional video on YouTube;
- e. Has joint projects with UPLB, China, Denmark;
- f. Dean – Professor Bambang. 104 faculty members;
- g. Would like to have a MOU with University of Adelaide (UA);
- h. Overall the supply and quality of milk in Central Java is low;
- i. IDEA project with NZ Aid and Ministry of Agriculture. Had eight focus farms within seven districts; Comprised of baseline studies and workshops;
- j. 2018. UNDIP established a dairy laboratory with access to milk testing equipment. This facility offers testing to farmers;
- k. The SEAD team met with the Manager of CV Cita Nasional (CN) - milk processor in Central Java with a modern system:
 - i. Manufacture milk, yoghurt and cheese. Processes 15,000 litres per day. Also uses skim milk powder (SMP) and whey in manufacturing;
 - ii. CN has a 250 cow farm – free stall. 17 litres/cow/day. Only Holstein Friesian but have some Jersey semen. 4,250 litres of milk from own farm;
 - iii. Feed Pakchong (Napier) grass. 1.5 ha farm;
 - iv. CN purchases milk from KUDs, with 30 supply farms. The poor quality of SHD milk is the main issue. KUDs (or SHDs) deliver milk direct to factory. There is no refrigeration ex-farm;
 - v. CN also works with a local milk trader;
 - vi. CN undertake specific gravity and alcohol testing of farm supply.
- l. Details regarding a KUD supplying CN. Supplies 2500 – 4000 litres per day;
- m. FMD. Has caused a 25 to 75% decline in supply. Increase in spontaneous abortions;
- n. IDEA project outcomes:
 - i. Improved milk production and quality. Increase in SHD revenue;
 - ii. Practice changes in feed management, associated technology and methane mitigation. There is still considerable variation in nutrient quality of milking herd diets;
 - iii. Agribusiness:
 - Undertook social network analysis;
 - Improving farmer welfare;
 - Study on value chain – links to FMD;

23. Thursday, August 18, 2022. PRISMA. Location: Gumaya Tower Hotel, Jl. Gajahmada No.59-61, Kembangari, Kec. Semarang Tengah, Kota Semarang, Indonesia.

- a. Australian team: Howard Hall; Brad Granzin; Wendy Umberger, Mirah Nuryati;
- b. PRISMA: Teddy Kristedi; Ferdinandus Rondong
- c. Main activities linked to dairy are capacity building and access to market;
- d. Feed companies. PRISMA have networks linked into technical skills in the private sector;

- e. Has evidence of 30% increased income due to project activities;
- f. PRISMA – Phase 2. 2019 – 2023. Will know in Sept/Oct 2022 whether there is a Phase 3.

Post Mission meeting

24. Tuesday, September 6, 2022. Frisian Flag (FF). Location: Online.

- a. Australian team: Brad Granzin, Rahayu Maulandari (MAL); Dian Yuanita W (MAL);
- b. Andrew Saputo (Corporate Affairs) and Pak Akmad (Dairy Development Programme Manager);
- c. Brad gave an overview of ACIAR and SEAD project objectives and scope. Discussion was had regarding the importance of private sector collaboration in the context of intervention legacies;
- d. FF work with 20,000 SHDs across Indonesia. They have recently commissioned a new factory in Jakarta; FF has delivered a number of SHD development projects over the last ten years regarding herd nutrition and sustainability. They are currently delivering a project focussed on empowering women dairy farmers;
- e. The majority of the meeting focussed on the current FMD outbreak:
 - i. FF have seen herd mortalities of 5 to 15%. Milk supply ex-farm has decreased by 20 to 50%;
 - ii. Current control measures were discussed, with the continual focus on vaccination as a control measure;
 - iii. FF are interested in future collaboration regarding SHD recovery from FMD. General discussion was had regarding ongoing higher level strategies and interventions to support repopulation. It was noted that Australian heifers currently cost 50 million IDR ex farm Indonesia;
 - iv. Subject to project timing, completing a damage assessment across SHD farms could be a SEAD intervention to identify potential recovery options more clearly;
 - v. In addition to heifers, general discussion was had regarding reproduction, nutrition and replacement technology and skill development that could potentially have roles in the FMD recovery phase.
- f. Going forward, FF are interested in discussing further collaboration. The timing of the ACIAR approval process was discussed, with the intent for SEAD to start implementing activities in early 2023. Subject to the ACIAR approval process, the SEAD leadership team will look to engage with FF during late November/early December 2022.

Footnote

a. ALASKA-NDA-AGRITERRA COLLABORATION FOR DAIRY DEVELOPMENT IN THE PHILIPPINES

The Philippines imports bulk of its daily dairy products as domestic production does not meet the country's dairy demand. This dependency on imports is an area that the National Dairy Authority (NDA), an agency attached to the Department of Agriculture (DA), wishes to address. It therefore made the development of the Philippine dairy industry a priority.

In the partnership, the NDA identifies the dairy co-operatives that need strengthening, Alaska funds the activities that need to be undertaken, and Agriterra undertakes the following:

1. Scoping of participating co-operatives ;
2. Assessment an identification of gaps in the operations of participating co-operatives in the areas of governance, financial management, value chain, and;
3. Conduct of 2 types of trainings depending on the need of the co-operatives .

The project covers 5 co-operatives :

COOPERATIVE	ADDRESS	Members with Herds	Total Herd of Members	Ave. Daily Volume (Liters)
Palcon Multi-purpose Cooperative	Sariaya, Quezon	41	300	800
Samahang Maggagatas ng Batangas Cooperative (SAMABACO)	Tanauan City	8	339 (150 dairying)	737.5
Good Shepherd Agriculture Cooperative (GSAC)	Magdalena, Laguna	2	34	50
Agricultural Cooperative of Tigaon	Tigaon, Camarines Sur	3	36 (22 dairying)	20-30
Guinaban Multi-purpose Cooperative	Ocamapo, Camarines Sur	2	34	50
San Isidro Development Cooperative (SIDEKO)	Naga City	4	33	36

12.17 Appendix 17: SEAD overview – presentation



What are the opportunities for smallholder dairies in Indonesia and the Philippines?

- **Developing fresh and short shelf-life product value chains:**
 - The value chain opportunities are in **fresh short, not commodities. shelf-life products.**
- **Improving the processing sector:**
 - **High freight costs** are a challenge for some SHD inclusive value chains;
 - **Improved signals and feedback from processors and co-operatives** to SHDs regarding the quality and quantity of milk they need to service markets;
 - **Co-operatives and associations** and their low daily milk processing throughput drives **high overhead costs** and limits the markets they can service. They need to improve their co-ordination and collaboration.
- **Growing smallholder dairies:**
 - The fundamentals for growth of the SHD sector are strong. **There are a multitude of ways to improve milk production per cow and improve farm productivity.**
- **The enabling and policy environment:**
 - **Lowering the carbon footprint** of SHD.

SEAD - Project objectives

- ***Pilot and evaluate inclusive business models and policy strategies*** to enhance access to inputs, services and farm-gate prices for SHD men and women, leading to increase efficiency, profitability and equity.
- ***Identify and assess commercially viable approaches to reduce the environmental footprint*** and negative environmental externalities from smallholder dairy production.
- ***Evaluate effective ways to scale-up successful approaches, build capacity*** with industry, policy makers and researchers in Indonesia and the Philippines and materially engage with and contribute to the policy agenda that impacts the dairy sector in these countries.

South-east Asia Dairy

Slide 3

SEAD - Project overview

Timing: November 2022 to November 2027

Budget: 4.7 million AUD (ACIAR)

Aim: To develop, pilot and scale-up commercially viable, sustainable smallholder inclusive dairy value chains in Indonesia and the Philippines.

Status:

- Consulting with project partners, both government and private sector;
- Developing project framework and expenditure.

South-east Asia Dairy

Slide 4

Project design

- We see SEAD providing a platform where stakeholders with common interests and goals to grow the small holder dairy sectors in either Indonesia or the Philippines can come together to agree on pathways forward and to co-ordinate investment and effort.
- SEAD offers stakeholders an opportunity to:
 - Develop and access contemporary RD&E and business strategies, whether pre or post farm gate;
 - Evaluate and implement new business models;
 - Access new milk supply to support market growth;
 - Improve the environmental credentials of SHD inclusive value chains.

South-east Asia Dairy

Slide 5

Potential interventions and research areas – Pre farm gate

- Identify the drivers of change for SHDs who are prepared to grow their business and assist them to identify key management areas to improve profitability.
- Introduce farm milk supply incentives that will provide commercial benefits for supply chain partners.
- Upskilling SHDs and service providers to make or assist in step wise improvements on-farm in forage production, quality and utilisation, herd nutrition and health, reproduction and milk harvesting hygiene.
- Work with agribusiness and co-operatives to provide more productive cost-effective milking herd concentrates and commodities.
- Model the impact of adverse seasons and climate events and pilot the introduction of farm practices to mitigate risk.
- Integrate pit silage into SHD feedplans.
- Reduce pathogen contamination by use of contemporary hygiene practices scaled for SHDs and evaluate on-farm milk cooling technology designed for SHD.
- Reducing carbon emissions from SHDs.

South-east Asia Dairy

Slide 6

Potential interventions and research areas – Post farm gate

- Partnering processors with co-operatives and/or SHD to realise urban market opportunities:
- Establish local fresh milk supply chains to service this market opportunity for coffee outlets, but also the hospitality sector.

South-east Asia Dairy

Slide 7

Potential interventions and research areas – Enabling and policy environment

- Undertake a review of relevant policies and regulations regarding branding of ambient temperature dairy lines in both countries, focussing particularly on their ramifications on SHD inclusive supply chains.
- Experiment with contemporary practice change methodologies, communication platforms and capacity building e.g. employment of village level researchers

South-east Asia Dairy

Slide 8

Collaborating Organisations in consultation

Philippines

- **Lead organisation:** Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
- **Key partners:**
 - National Dairy Authority
 - University of Philippines Los Banos
 - Private sector - Currently meeting with co-operatives, processors and agribusiness

Indonesia

- **Lead organisation:** University of Diponegoro
- **Key partners:**
 - IPB
 - Private sector - Currently meeting with co-operatives, processors and agribusiness

Australia

- The University of Adelaide (UA) Centre for Global Food and Resources
- Australasian Dairy Consultants

Where to from here?

- We would appreciate any feedback on our project outcomes, methodology and potential interventions;
- Are you interested in knowing more about SEAD and potentially partnering?
- What more information would you like to know to progress your involvement?