



# PHILIPPINE DAIRY INDUSTRY ROADMAP 2020-2025





PHILIPPINE  
**DAIRY  
INDUSTRY**  
ROADMAP 2020-2025



Department of Agriculture  
**NATIONAL DAIRY AUTHORITY**

## **The Philippine Dairy Industry Roadmap (2020-2025)**

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Published by:

Department of Agriculture - Bureau of Agricultural Research  
through the UPLB Foundation, Inc.  
in collaboration with the *Philippine Council for Agriculture and Fisheries*

Coordinating Office:

**National Dairy Authority**  
Department of Agriculture  
Diliman, Quezon City, Philippines

Cover & Book Design:

Alphabet Communications Graphics & Print  
Quezon City, Philippines  
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# ACRONYMS AND ABBREVIATIONS

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<b>AI</b>	Artificial Insemination
<b>ATIGA</b>	ASEAN Trade in Goods Agreement
<b>ASEAN</b>	Association of South East Asian Nations
<b>BAI</b>	Bureau of Animal Industry
<b>CALABARZON</b>	Cavite, Laguna, Batangas, Rizal, and Quezon
<b>CEPT-AFTA</b>	Common Effective Preferential Tariff of the ASEAN Free Trade Agreement
<b>CLSU</b>	Central Luzon State University
<b>CME</b>	Cow Milk Equivalent
<b>CMU</b>	Central Mindanao University
<b>COA</b>	Council of Agriculture
<b>COA</b>	Commission on Audit
<b>CPTPP</b>	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
<b>DBP</b>	Development Bank of the Philippines
<b>DepEd</b>	Department of Education
<b>DHI</b>	Dairy Herd Improvement
<b>DPO</b>	Dairy Farming Promotion Organization
<b>DOH</b>	Department of Health
<b>DRM</b>	Dairy Road Map
<b>DSWD</b>	Department of Social Welfare and Development
<b>DTRI</b>	Dairy Training and Research Institute
<b>EU</b>	European Union
<b>FAO</b>	Food and Agriculture Organization
<b>F1</b>	First Filial Generation

<b>FMAPP</b>	Fresh Milk Advocacy and Promotion Program
<b>GAHP</b>	Good Animal Husbandry Practice
<b>GDP</b>	Gross Domestic Product
<b>GMP</b>	Good Manufacturing Practices
<b>HACCP</b>	Hazard Analysis Critical Control Point
<b>IBM</b>	Improve Breeding and Management
<b>IFCN</b>	International Farm Comparison Network
<b>LBP</b>	Land Bank of the Philippines
<b>LGU</b>	Local Government Unit
<b>LME</b>	Liquid Milk Equivalent
<b>MOA</b>	Ministry of Agriculture
<b>MPP</b>	Milk Processing Plant
<b>MTDP</b>	Medium Term Development Plan
<b>NABC</b>	National Artificial Breeding Center
<b>NDA</b>	National Dairy Authority
<b>NDDP</b>	National Dairy Development Plan
<b>NGO</b>	Non-Government Organization
<b>NMDCB</b>	National Milk Drinking Campaign Board
<b>NZ</b>	New Zealand
<b>NIZ</b>	National Impact Zone
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>OML</b>	On Milk Line
<b>PO</b>	Producers Organization
<b>PLA</b>	Pasture Lease Agreement
<b>PCC</b>	Philippine Carabao Center
<b>PNS</b>	Philippine National Standards
<b>PO</b>	Peoples Organization

<b>PSA</b>	Philippine Statistics Authority
<b>RA</b>	Republic Act
<b>RFO</b>	Regional Field Office
<b>RIZ</b>	Regional Impact Zone
<b>RTD</b>	Ready to Drink Milk
<b>SEA</b>	South East Asia
<b>SMFP</b>	School Milk Feeding Program
<b>SMP</b>	Skimmed Milk Powder
<b>SSG</b>	Special Safeguard Mechanism
<b>SUCs</b>	State Universities and Colleges
<b>TRQ</b>	Tariff Rate Quota
<b>UHT</b>	Ultra High Temperature
<b>UNDP</b>	United Nations Development Program
<b>UNAIP</b>	Unified Artificial Insemination Program
<b>US</b>	United States
<b>USDA</b>	United States Department of Agriculture
<b>FAS</b>	Foreign Agricultural Service
<b>VBAIT</b>	Village-based Artificial Insemination Technician



# MESSAGE

The DAIRY ROADMAP 2020-2025 is a new initiative in support of the “New Vision” of the Department of Agriculture aimed at a food secure and resilient Philippines with prosperous farmers and fisherfolks. We need to aggressively pursue development of the dairy industry as it has been proven elsewhere to be a powerful tool for achieving food security, poverty reduction, and economic growth.

Imbedded in this program is the dairy sector transitioning from smallholder semi- subsistence level farming to an industry. This means the supply of raw milk relies fully on commercial dairy farming systems and professionals and inclusive of milk collection, processing and marketing organizations owned by small holders, medium scale and/or large scale dairy farmers. Their membership should follow business approach and are willing to invest in “Dairy as a business” and in knowledge and skills development.

The program also promote sector competitiveness with emphasis on the ability to innovate and invest in best practices, new technologies and business models that enhance efficiency, reduce cost and boost levels of production along the value chain. Development and interventions shall put premium on the identified dairy zones/impact areas giving attention to suitability of dairying based on feed resource and potential access to market.

A handwritten signature in black ink, appearing to read 'Ces G. Dar', written over a light blue rectangular stamp.

**WILLIAM D. DAR, Ph.D.**

**Secretary  
Department of Agriculture**



# FOREWORD

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The Philippines being located in the tropical hemisphere of the world meant that the general climate in the country may not be as suitable for dairying compared to other more temperate regions. Thus, dairy development and production did not immediately strike as a lucrative endeavor to most farmer households. However, through the years, the world came to witness the potential of dairying as a means to reducing global hunger. By laying the right foundations, donning the proper mindset, and tapping various channels and networks that allowed the dairy industry to flourish; milk production now presents huge opportunities for smallholders to generate additional income, and improve their nutrition and general well-being.

Since the establishment of the National Dairy Authority, the agency relentlessly strived to pave the way towards the advancement and development of the Philippine Dairy Industry. Living up to its mandate, the agency contributes to the aspiration and vision of the Department of Agriculture towards a more food secure and resilient Philippines; where those most vulnerable and in need, yet crucial to the realization of such vision, are also able to enjoy the bounties and prosperity it may bring.

This aspiration is borne not without an elaborate plan of action. At its core is the long-term vision of the Dairy Roadmap 2021-2025 – a dynamic and invigorated dairy industry that is at par with the quality and safety standards of the fast-expanding market for fresh liquid milk and other dairy products. In pursuit of the cultivation of a profitable, productive, competitive, and sustainably growing dairy industry, the Dairy Roadmap puts forward six key strategies: (1) Improve dairy animal productivity, (2) Fast-track dairy herd build-up, (3) Expanding market of domestic milk and milk products, (4) Increase private sector participation, (5) Increasing human resources capabilities and capacities, and (6) Increasing LGU Participation in Dairy Development.

With that, we can hope that through this roadmap, the years to come will be purposefully dedicated to augmenting the foundation that has been meticulously laid out, to ultimately provide a good quality of life for farmers and ensuring consumers safe and quality milk and milk products.

A handwritten signature in black ink, appearing to read 'W. Medrano'.

**WILLIAM C. MEDRANO, Ph.D.**  
**Undersecretary for Livestock**  
**Department of Agriculture**



# PREFACE

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This policy endeavors to bridge the gap between modern agriculture and food security through self-sufficiency and income and employment generation. Increasing both income and produce of farmers has always been the goal of the Department of Agriculture and for the domestic dairy community, this is a priority through sustainable, equitable and powerful means.

We believe that the Dairy Road Map is more than the comprehensive instrument that will guide the industry towards sustainable development.

Refined through multi-disciplinary lenses, strategies are identified in this roadmap to advance development of key and crucial areas in the dairy industry and combat problems hindering its development including lack of competitiveness and accessibility of the local dairy market. These strategies will further the economic growth and positive development of the dairy industry.

This roadmap includes strategies, policies, budgetary requirements, implementation, and post-implementation programs that is applicable to different stakeholders of the industry, from the smallholder farms to large scale dairy producers. This roadmap acknowledges the roles of all dairy stakeholders and highlights key approaches for an inclusive dairy development, embodying the OneDA, OneDairy principles. Inclusion of all stakeholders in creating a more resilient dairy industry is key in developing a more resilient Philippines.

A handwritten signature in black ink, appearing to read 'D. Fausto'.

**DANILO V. FAUSTO, DVF Dairy Farm, Inc.**

**Team Leader**

**Dairy Industry Roadmap Development Team**







# EXECUTIVE SUMMARY

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It is the policy of the state to achieve sustainable modern agriculture and food security by helping the agricultural communities to reach full potentials, increasing farmers' income and bridging gap through private-public partnership towards robust agro-enterprises<sup>a</sup>, a policy that is anchored on the AMBISYON NATIN 2040 with the aspiration and collective vision for the Filipinos to have a "matatag, maginhawa, at panatag na buhay". This is completely consistent with the New Vision of the Department of Agriculture for a more "food secure and resilient Philippines with prosperous farmers and fisherfolks".

It is along these lines that the domestic dairy is envisaged to be invigorated as it has been demonstrated elsewhere that it is a sustainable, equitable and powerful tool for achieving economic growth, food security and poverty reduction<sup>b</sup>. Based on the consensus resulting from industry-wide consultations, there is a need to institute a catch up plan to attain the desired outcome of increasing income, reduce poverty and generate employment among farming families.

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a Sagip Saka Act" R.A. 11321

b Dairy's Impact on Reducing Global Hunger

# External Environment

The notion that dairying in hot and humid tropic cannot flourish in view of the unsuitable climatic conditions coupled with the poor quality of tropical forage resources has been argued within the context of temperate conditions where dairying has become commercially viable enterprise. However, there are enough examples wherein dairying in the tropics is feasible, not purely from the point of the milk as a commodity, but rather in the consideration that milk production offers huge opportunities for smallholders

to generate additional income and improve their nutrition and general well-being. Several countries in SEA have harnessed the options to promote milk production in this context.

The Philippines and neighboring countries started dairy development around 1960s with same low level of milk production, except Indonesia with a bit higher volume than the rest. Spike in production in Korea occurred in the 1970s, Indonesia in 1980s, Thailand in mid 1980s and Vietnam in 2000s. Philippines and Malaysia remained almost static during the entire period.

The important lessons from SEA countries with more advanced dairy sector include the following:

- Creating the critical base stock inventory is basic. The approach is to fast track herd build-up and when the critical number has been achieved, slow down. Extension and tech delivery system should be robust and working;
- Consistency in policy and public support must be in place for creating suitable environment for the industry to flourish and to stimulate private participation and investment under a free trade era;
- Fresh milk market development is a must to ensure competitiveness and sustainability of the domestic dairy sector. Fresh milk is highly competitive in domestic market, and prospect for growth in demand is great among young and high income professionals in urbanized communities;
- Support to smallholders is premium even under a growing dairy system industrialization. This is true in developing economy where dairying has been proven to be a vital instrument to alleviate the economic conditions of the smallholders.

# Internal Environment

There are enough legislations as early as 1964 up to the present that pronounced self-sufficiency in milk as a national policy. However, this goal is far from being achieved owing to the inconsistencies in policy environment for the domestic dairy sector to flourish. Because of pro-consumer policies, the general consuming public have been used to less expensive imported milk powder and dairy products, rendering the locally produced milk less competitive, a good formula for discouraging private investment in dairy production.

The dairy industry in the country is dominated by the big companies that rely totally on imported milk powder and dairy products for processing, representing almost 99 percent of the total domestic demand. To date domestic production represents only 1.3% of the national requirements catering mostly the coffee shops and the traditional milk and dairy products market. Nevertheless, this small share to the national requirements is produced by thousands of smallholder producers, deriving employment and additional income from milk sales.

By and large, dairy animals in the country today are derived mainly from government original importations, but the growth in inventory is rather slow, estimated to be only less than 50% of the potentials. Feed base issue and inadequacy in nutritional management largely contribute to poor reproduction and low milk productivity.

Total demand for milk and dairy products is forecasted to be 4,253.6 mil liters (LME) by 2030, and the demand for liquid ready to drink milk (RTD) during the same period would be 323.1 mil liters<sup>c</sup>. The RTD forecast includes the requirements for the school milk feeding program, the projected market for domestic fresh milk, and the market for the RTD imports. In the absence of significant future interventions, the growth in domestic milk production estimated at an annual average growth rate of 4.01 % to reach 40.4a mil lit in 2030 cannot outstrip the estimated average growth rate of 7.41% p.a. of RTD. Unless production enhancing interventions are introduced in the coming years, this would result in further increases in RTD importation or further rise on the use of reconstituted milk powder.

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<sup>c</sup> Projection based on 2002-2019 PSA reports on domestic production and on actual inventory (NDA, 2018) and PCC (2016 PSA survey)

# Dairy Road Map 2020-2025

Given the high competitiveness of locally produced milk in food market, and the magnitude of projected demand for RTD, it makes a lot of sense to target on self-sufficiency in RTD in the next decade. To achieve 100% self-sufficiency in RTD is also translated into a 7.5% overall self-sufficiency in milk and dairy products, and this level is a significant improvement over the current 1.3% level. In order to attain the desired level of sufficiency, interventions to include efforts to fast track the build-up of dairy herd, improvement in animal productivity, and efforts to increase competitiveness of the locally produced milk in a free trade era should be put in place. The real challenge is how to improve financial viability of the dairy enterprise by increasing yields and/or reducing production cost so that there shall be robust private sector investment and participation. The expansion of sustainable school milk feeding program is needed to ensure current and future market of locally produced milk.

Other priority interventions should emphasize on bridging the technology gap, including how to address the issue of feed resource availability, improved breeding and management, product safety and quality, product development and strengthen the dairy business hub. Finally, there is so much need to address improving human resource capabilities and capacities, both the farmers who are the direct players as well as those other entities involved in the development of the dairy sector.

The projected milk production based on the traditional system without any intervention will only meet 35.9b% of the RTD requirements or just 2.36% self-sufficiency by 2025. Improving breeding and management can raise the RTD requirement sufficiency to 48.0% and self-sufficiency to 3.15%. The additive effect of use of sexed semen, even without stock infusion will bring RTD sufficiency to 60.7% by 2025. This level of estimated milk production will also be equivalent to 3.99 % self-sufficiency.

Stock infusion as envisaged in the program can bring almost the same magnitude of effect as the use of sexed semen on the estimated milk production. When all the interventions are set in place, the RTD % sufficiency by 2025 is estimated to be 82.1% and % self-sufficiency is estimated to be a departure from the current 1.35% to 5.40%.

These projections are premised on the assumptions that the policy environment are correct and supportive to domestic dairy sector growth.

In sum, the envisaged attainment of 100% sufficiency in RTD will need about two more years beyond 2025 and this will involve the participation of thousands of existing and new smallholder dairy farmers, milk collectors, processors, wholesalers and retailers. These undertakings will have profound impact on reducing unemployment, increasing income and contribute to nutrition of the vulnerable members of the rural communities.

## Mission

Support the development of innovative, principled, inclusive and high-impact dairy projects and programs to make long-term positive change geared towards the development of the dairy industry. Fostering the leadership of existing and new dairy farmers and other dairy stakeholders towards producing more milk, increasing animal herd, creating more job opportunities in the rural areas and increasing per capita consumption of milk.

## Vision

An invigorated and competitive domestic dairy industry that meets the quality and safety standards of the growing market for fresh liquid milk and other dairy products with the smallholders as major players fully organized along the dairy business hubs by 2025.

## Industry Goal

To strengthen the foundation for more productive, competitive, and sustainable dairy sector by 2025.

# Specific Goals

## **For the Short Term:**

1. Improved average milk production of dairy cattle and buffaloes to at least 46% above the current level
2. Provided livelihood opportunities to 350,000 rural families in dairy producing areas
3. Improve per capita fresh milk consumption by 100% the current level
4. Met 82.0% of liquid milk and attain at least 5.4% self sufficiency

## **For the Medium Term:**

1. Improved productivity, competitiveness and farmer's income
2. Invigorated and sustainable dairy industry
3. Access to safe and affordable milk and dairy products

## **For the Long Term:**

1. Food secure and resilient Philippines
2. Strongly-rooted, comfortable and secure life for Filipinos

# INTRODUCTION

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## Background and Rationale

It is the policy of the state to achieve sustainable modern agriculture and food security by helping the agricultural communities to reach full potential, increasing farmers' income and bridging gap through private-public partnership towards a robust agro enterprises. This policy is anchored on the AMBISYON NATIN 2040 with the aspiration and collective vision for the Filipinos to have a "matatag, maginhawa at panatag na buhay", and is completely consistent with the paradigm of the New Vision of the Department of Agriculture aimed for "A food secure and resilient Philippines with prosperous farmers and fisherfolk".

Along these background, dairy development is envisaged to be enhanced as it has been proven elsewhere that it is a sustainable, equitable, and powerful tool for achieving economic growth, food security and poverty reduction as this provides regular source of income, nutritious food, diversifies risks, improves use of resources, generates on-and-off farm employment and creates opportunities for women. Indeed, dairy development supports UN sustainable development goals (SDG).

Early attempts of the government to hasten dairy development was in the form R.A. 4041 in 1964 that created the Dairy Division at the Bureau of Animal Industry (BAI). This legislation was an institutionalization of the UNDP/Food and Agriculture Organization (FAO) initiative two years earlier that established the Dairy Training and Research Institute (DTRI) at the University of the Philippines at Los Banos (ULPB). Further in 1976, Batas Pambansa 21 created of the Philippine Dairy Corporation (PDC), and then after two decades, PDC and Dairy Division of BAI were fused to form the National Dairy Authority (NDA) under RA 7884. Corollary to the foregoing developments, R.A.7307 created the Philippine Carabao Center (PCC) in 1993 with the mandate to improve income,



nutrition, and general wellbeing of the farming families through the utilization of the huge indigenous draft-type carabao population as the medium in the light of massive farm mechanization program.

In all of these legislations, the articulated policy of the state is to achieve self-sufficiency in milk, although the major objectives are to raise income and improve living standards of traditional small-scale farmers, to improve the nutrition of poor consumers, and to sustain the natural resource base to ensure long-term impact.

In the 2020 Performance Audit by the Commission on Audit (COA) that assessed the state of the domestic dairy sector after about half century of ground works, it was reported that local milk production remained at 1.3% of the country's dairy requirements, and 98.7% are met through importation. This state of milk sufficiency was ascribed to failure to increase the needed dairy herd, constrained mainly by lack of funding support. But the report also recognized the important fact that the lackluster growth of the dairy sector is related to the lukewarm interest of the private sector to invest and participate due to perceived lack of competitiveness and profitability.

Based on the foregoing facts, and based on the consensus resulting from series of industry-wide consultations, it becomes imperative that a catch up plan to address the needs for enhanced dairy sector growth be appropriately instituted in order to achieve the desired outcome of increasing income, reduce poverty and generate employment among the smallholders farming communities.

# Objectives

The long term vision is for the domestic industry to be invigorated and become competitive that meets the quality and safety standards of the growing market for fresh liquid milk and other dairy products with the smallholders as major players fully organized along the dairy business hubs. Within the next five years, the goal is to strengthen the foundation for more productive, competitive, and sustainable dairy sector.

## **These roadmap objectives are as follows:**

1. To provide livelihood opportunities to 350,000 rural families in dairy producing areas
2. To improve average milk production of dairy cattle and buffaloes by at least 46% above the current level
3. To meet 82.0% of liquid milk requirements (regular market and school milk feeding program) and attain at least 5.4% self-sufficiency by 2025
4. To improve per capita fresh milk consumption by 100 % the current level by 2025.



# DAIRY INDUSTRY SITUATION, OUTLOOK, MARKET TRENDS AND PROSPECTS

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## External Environment

### **Global Dairy Industry**

FAO estimate that there are approximately 150 million households around the globe engaged in milk production and with output of 838 million tons of milk in 2019. In most developing countries, milk is produced by smallholders, and milk production contributes to household livelihoods, food security and nutrition.

Some countries in the developing world have a long tradition of milk production, others have established significant dairy production only recently, particularly countries in Southeast Asia (including China) and tropical regions with high ambient temperatures and/or humidity. Increase in their share in global dairy production is mostly the result of increase in numbers of producing animals rather than a rise in productivity per head. In these areas, dairy productivity is constrained by poor-quality feed resources, diseases, limited access to markets and services (e.g. health, credit and training) and dairy animals' low genetic potential for milk production.

Worldwide milk production comes from cattle (81%), buffaloes (14%), and the rest from goats, sheep and camel (4%). In Asia, cattle contribution to milk production is 40% and majority is contributed by buffaloes and goats, India and Pakistan being the main sources

of buffalo milk. In Europe, buffalo contribution is only 3%, mainly coming from Italy. In the coming years, dairy herd is projected to increase by 1.2% per annum mainly in regions where milk yield per cow is low. In the US and EU, the general trend is declining number of animals but increasing herd size per farm and corresponding increase in productivity per animal.

Globally, the dairy industry is undergoing deep structural changes and one of the key drivers for milk production are farm structural changes, which are in turn determined by farm economics and economies of scale. In New Zealand the annual growth rates ranged from 5-10% while in Japan there is a steady decline caused by a generation shift. China on the other hand is characterized by sudden growth and then decline due to challenging farm economics. The USA have already seen more structural change with large farms already account for the majority, with registered increases in milk yield per cow and herd size per farm (IFCN, 2019). In general, milk production in various regions of the world are highly dynamic and diverse. The 3-5% rule indicates that strong regions grow and weak ones decline by this rate every year (IFCN, 2019). In 2019, the highest production is in South Asia, essentially in India and Pakistan.

But it is undeniable that future world milk production may be constrained by climate change and environmental regulations. The unforeseen weather conditions such as drought and flood can greatly affect the grazing-based system that is dominant worldwide. In like manner, emergence of animal diseases threatens the dairy sector in several ways. Upcoming issues are the environmental legislations as Greenhouse gas emission from dairy activities make up high share in some major dairy producing countries. Access to water and waste recycling are another growing concerns.

## **Dairy Development in Neighboring Countries**

The notion that dairying in hot and humid tropic cannot flourish in view of the unsuitable climatic conditions coupled with the poor quality of tropical forage resources has been argued within the context of temperate conditions where dairying has become commercially viable enterprise. However, there are enough examples wherein dairying in the tropics is feasible, not purely from the point of the milk as a commodity, but rather in the consideration that milk production offers huge opportunities for smallholders to

generate additional income and improve their nutrition and general wellbeing. Some countries in SEA have harnessed the options to promote milk production in this context.

Shown in Figure 1 is the trend in milk production for the past 58 years, the selected countries started in 1960 with same low level of milk production, except Indonesia with a bit higher volume than the rest. Spike in production in Korea occurred in the 1970s, Indonesia in 1980s, Thailand in mid 1980s and Vietnam in 2000s. Philippines and Malaysia remained almost static during the period.

**FIGURE 1. MILK PRODUCTION IN THE PHILIPPINES AND SELECTED NEIGHBORING COUNTRIES, 1960-2018**



Table 1 presents comparative data on total milk production, milk yield/cow/lactation, milk production per capita, milk consumption per capita, and estimated cows on the milk line in the Philippines and SEA countries with Australia and New Zealand as the background. Clearly, the Philippines has the lowest milk production/capita owing to the very low inventory of dairy animals and high human population. Lactation yield per cow in the country is not the lowest among SEA countries but is much lower than that in Thailand and Vietnam. The milk consumption per capita in the Philippines of 15.66 lit is 120x higher than the milk production per capita of 0.13 lit, suggesting that a big part of the milk consumption comes from outside sources.

**TABLE 1. MILK PRODUCTION, YIELD/COW, PER CAPITA MILK AVAILABILITY, AND PER CAPITA MILK CONSUMPTION\***

Country	2020 Population Million hd	Milk Production, tons**	Ave Milk/Animal, kg/cow**	Milk Production/cap kg/cap**	Milk Consumption, kg/cap* (2013)	Estimated Cow on Milk Line, hd
Australia	25.49	9,289,000	6,006	364.4	234.4	1,546,620
New Zealand	4.82	21,392,000	4,269	4,438.10	137.25	5,011,009
Cambodia	16.71	242,273	199.3	14.4	3.47	1,215,619
Indonesia	273.52	909,638	1,563	3.32	14.82	581,982
Laos	7.27	61,479	1,395	8.45	2.92	44,070
Malaysia	32.36	43,737	499	1.35	25.28	87,649
Myanmar	54.4	1,105,254	478	20.31	31.48	2,312,246
Philippines	109.58	14,865	2,733	0.13	15.66	5,449
Thailand	69.79	653,928	4757	9.36	29.3	137,466
Vietnam	97.33	936,003	3,179	9.61	16.36	294,433

\*the per capita milk consumption was estimated as liquid milk equivalent (LME), butter excluded; latest data in 2017 is not reliable, perhaps data not complete

\*\*derived from FAO STAT 2018 (latest available data)

NOTE: These figures are only on dairy cattle, buffalo and goat not included (but only minor)

Impressive developments in the dairy industry of selected neighboring countries that started almost at the same time with the Philippines are briefly discussed above. There are quite similarities in the initial approaches and the lessons from these can provide rich insights on how the next move in the Philippine dairy development can be defined. These are:

1. Creating the critical base stock inventory is basic. The approach is to fast track herd build-up and when the critical number has been achieved, slow down.
2. Appropriate feeding and breeding management are indispensable to harness the potentials of the dairy animals. Extension and tech delivery system should be robust and working.

3. Policy and Public support must be in place for creating suitable environment for the industry to flourish and to stimulate private participation and investment under a free trade era.
4. Fresh milk market development is a must to ensure competitiveness and sustainability of the domestic dairy sector. Fresh milk is highly competitive in domestic fresh milk market, and prospect for growth in demand is great among high income professionals in urbanized communities.
5. Support to smallholders is premium even under a growing dairy system industrialization. This is true in developing economy where dairying has been proven to be a vital instrument to alleviate the economic conditions of the smallholders.

## Internal Environment

### **Nutrition, Poverty, and Human Resource Development**

One major issue in the country is high rate of poverty reported to be 19.8% in 2019. That while the report of World Bank indicates that rate of poverty in the country is declining, the current rate still represents some 23.1 million people in poverty, and a large percentage of these are the farmers and the fisher folks. They lack access to productive capital and limited access to market, creating slow economic growth and underemployment. The rural poor have limited options for off-farm employment and have low access to inexpensive financial services.

Poverty and malnutrition are twins. The impact of undernutrition is more felt in early childhood, affecting their ability for normal physical and as well as mental growth. In 2019, one in three 12-23 month old children suffer from anemia while one in three children are irreversibly stunted by the age of 2 (UNICEF, 2019). And stunting rate remain at the 30% level or more among children 3 and 4 years old. Stunting results from long-term nutritional deprivation and it is manifested not only on shortness-for-age, but also in delayed mental development, poor school performance and reduced intellectual capacity. This would perhaps partly explain the bottom of the rank performance of Filipino students in the 2018 Program for International Student Assessment (PISA) done by the Organization for Economic Co-operation and Development (OECD).



To address the issue of undernourishment among children, almost all countries in the world implement school feeding with varying implementation modalities, and such have evolved with levels of development (Bundy et al, 2009). In many school feeding programs worldwide, one defined component of the school meal is the provision of milk. The recently approved legislation in the Philippines, R.A. 11037 “Masustansyang Pagkain para sa Batang Pilipino Act”, takes this form.

Development of school milk programs has been associated with the growth of the national dairy industry in many countries. But the importance of milk and dairy products in schools lies not just in the size of the market itself, but also in its consumers: Children. Children represent an important market, not only because they drink more milk than the adults, but also because dietary habits established in childhood persist into adult life (Griffin, 2005). Thus, children who drink milk and consume dairy products regularly will continue to do so as adults. Therefore, from the point of view of the milk industry as a whole, school children must be considered as tomorrow’s adult consumers, who if they do not develop the habit of

drinking milk, are certainly not going to develop it later in life. The FAO credits the successful school milk feeding program in Thailand for raising the per capita milk consumption more than twelve folds, from 2.4 lit/capita in 1960 to 29.3 liters/capita per year in 2015, and pushing down rates of child malnutrition from 18% to only 5% in 2006.

## **Consumption and Demand Analysis**

### ***Per Capita Milk Consumption Levels***

Based on the 2019 total supply of about 2,993.38 million lit of milk and dairy products (LME), and the human population of 108.1 million, the per capita consumption among Filipinos is estimated to be 27.08 lit (LME), and has not dramatically increased from the 22 lit per capita level in 2000. Similar pattern is clearly indicated in an international comparative data that span from 1960 to 2018 issued by the UN Food and Agriculture in 2019, with a modified method of measures which excludes butter. In said report, Philippines per capita milk consumption was 13 lit/caput in 1960 and remained almost the same in 2017. In 1960, the per capita milk consumption in the Philippines was second to

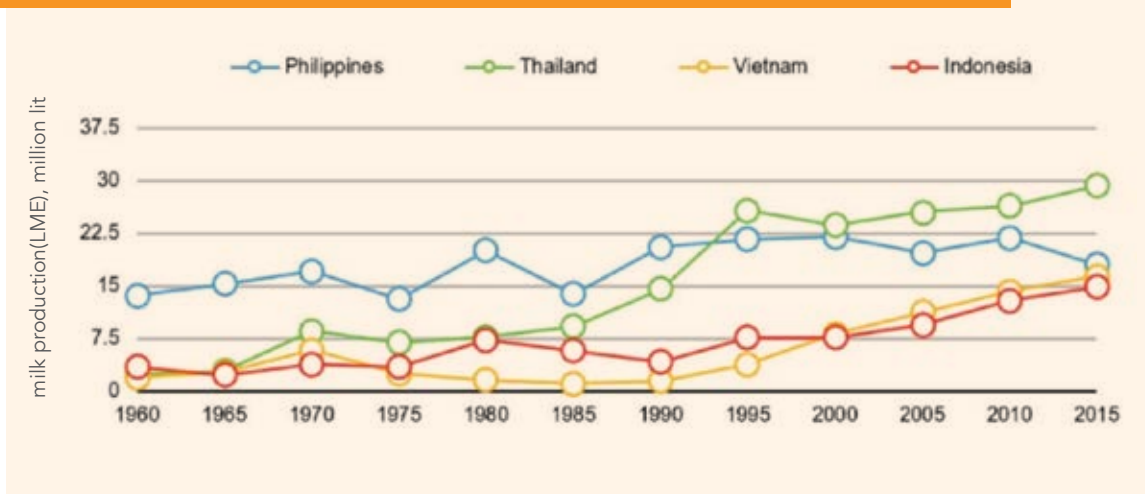
Japan and was much higher than that of South Korea, Thailand, Indonesia and Vietnam. And while that of the Philippines remained almost static over the years, South Korea and Thailand's per capita milk consumption increased significantly and surpassed the Philippines's in the early 1990s.

If consumption of liquid milk will be the measure, then the domestic production of fresh milk plus the imports of ready to drink milk (RTD) are the bases. So in 2019, with the local milk production of 24.38 million liters and the RTD imports of 87.20 m liters.(NDA, 2019, PSA, 2019), the per capita equivalent was 1.02 lit. liquid milk, a figure consistent with those reported by USDA- CLAL.

The domestic fresh milk consumption/capita in the Philippines is only 0.22 lit and is comparatively smaller than that in Taiwan of 17.73 kg, China of 8.97 kg, and India of 56.26 kg as of 2018 (Statista, 2020).

The per capita milk consumption estimated without counting the butter component of the supply is shown in Figure 2, clearly showing milk consumption per capita in 1960 was far higher in the Philippines than Thailand, Indonesia and Vietnam, but remained almost static whereas other countries improved significantly over time.

**FIGURE 2. PER CAPITA MILK CONSUMPTION IN THE PHILIPPINES, THAILAND, VIETNAM, AND INDONESIA**



## Income and Consumption Levels

The potential for domestic milk market growth is driven by population growth and GDP. And while population growth stimulates consumption of traditional dairy products, increased income favors growth in new value-added products. But slow GDP growth will stall consumption of both types of dairy products (Cox and Zhu, 2005).

In the Philippines, the rise in per capita income from US\$ 1,056.00 in 1960 to US\$ 3,021.00 in 2018 with estimated average growth rate of 3.2% p.a. has shown little corresponding increase in per capita milk consumption. In the estimates used in World Bank report where milk equivalents of dairy products exclude that of butter, the per capita milk consumption in 1960 was 13.7 kg, and after more than 50 years, the level barely grew to 15.6 kg in 2013 (World Bank, 2020). The case is starkly different in us

neighboring countries such as Thailand, Vietnam, and Indonesia where GDP grew several folds than the Philippines during the period. In these countries GDP grew from 17.3 to 27.8% between 1960-2015 and growth in per capita milk consumption were 21.8-34.2% (Table 2).

**TABLE 2. CHANGES IN GDP AND MILK CONSUMPTION PER CAPITA IN SELECTED SEA COUNTRIES**

Country	per cap. GDP, US \$			per cap. milk consumption (LME), kg		
	1960	2015	Ave annual change,%	1960	2015	Ave annual change,%
Philippines	1059	2605	9	13.7	15.6	5.5
Indonesia	690	3824	17.3	3.45	14.8	21.8
Thailand	570	5741	24.1	2.46	29.3	34.2
Vietnam	*382	1667	27.8	1.92	16.3	31.4

Source: UN Food and Agriculture Organization, Our World in Data

The slight increase in per capita milk consumption in the Philippines is explained by the higher rate of growth in supply with an average rate of 4.34% p.a. from 2002 to 2017, faster than the human population average growth rate of 1.73% p.a. (USDA FAS, 2018; PSA, 2020). But of course per capita milk consumption remains low, and perhaps this can be due to the fact that only 9.3 to 13.4% of the adults in the Philippines consume milk (Angeles- Agdeppa et al., 2019).

### ***National Demand Estimation***

More appropriately, estimates for demand should consider the growth in human population, the potential effect of urbanization, the effects of dairy alternative products, among others, however, there are very limited updated studies available on hand. Among urban and rural consumers in the Philippines, the indicative difference in terms of milk consumption can be seen on the 2003 FNRI report that showed the daily per capita consumption of milk and dairy products among urban consumers was 10 grams, and 9 grams in partially urban consumers, approximately a 10% difference, explained mainly due to income and household expenditure differences (Valenzuela et al. 2017; Quimba and Estudillo, 2018). Also, the urban consumers, particularly the young age group, have shown growing demand for dairy alternatives, and the competing products is projected to grow at the rate of 10.4 %, a figure so tempting to assume would cancelled out the estimated increase in demand for milk.

### ***Estimated Impact of School Milk Feeding Program***

School milk feeding in the country during the past years is characterized by lack of sustainability and limited funding. Because of this nature, the impact of school milk feeding on the domestic dairy sector is hardly felt. However, with the approval of R.A. 11037, an act that institutionalizes school feeding program for the undernourished children, it is projected that funding support is guaranteed. An important provision in the approved legislation is the inclusion of milk in the school meals under the DepEd program. There is also a new legislation that require milk supplementation to preschoolers to be implemented by DSWD under R.A.11148 , “Kalusugan at Nutrisyon ng Magnanay Act”. The important thing in these legislations is the provision that the milk to be used shall be sourced from domestic producers.

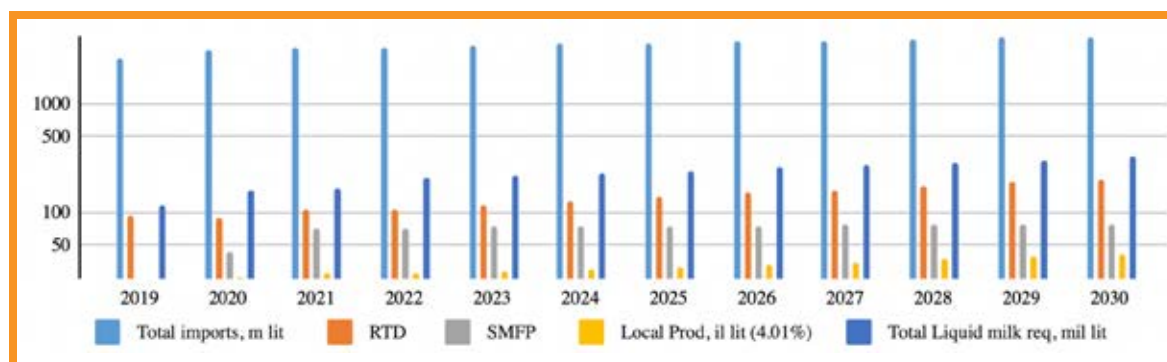
For 2019/2020, DepEd indicated that the number of students scheduled under the school milk feeding is 1.8 million, and the number can increase in subsequent years. However, there is a proposal to amend the law to be able to cover all children from grades 1 to 3, and this will presumably increase the milk feeding recipients to about 3.0 million children per year. Added to this are the children in the day care centers of about 1.2 million to be given 100 ml for 120 days per year. Annual milk requirement of this age group would

be 14.4 million liters. All together, the milk feeding program is estimated to require a minimum of 72.0 mil lit/year by 2022 to reach 79.2 million lit in 2030.

### Summary Findings

National milk requirements is projected to grow at the rate of 2.92% p.a. from 2020 to 2030 to reach a volume of 4,253.6 mil lit (LME) due to increase in population, urbanization, and other factors. The demand for liquid milk is forecasted to reach a volume of 323.1 mil lit by 2030 coming from the growth of the traditional liquid milk market, and the school feeding program with growth rate tied up with the increase in human population (Table 3). The projected increase in demand for liquid milk will have a major impact on the development of the domestic dairy sector since locally produced fresh milk is more competitive in fresh milk market. Young urban consumers having increased income prefer fresh milk and fresh milk-derived products than UHT or reconstituted milk

**TABLE 3. PROJECTED TOTAL AND RTD MILK IMPORTS, LOCAL PRODUCTION, AND SMFP REQUIREMENTS, 2020-2030**



ITEM	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total imports, m lit (GR 4.34 %)	2,657	3,119	3,205	3,322	3,415	3,509	3,606	3,706	3,809	3,915	4,023	4,134
RTD imports, m lit (GR 8.62%)	93.16	88.6	106.3	106.3	116.2	126.7	137.9	149.7	162.1	174.4	189.1	203.5
SMFP (GR 7.59%)	0	43.2	72	72	72.7	73.4	74.1	74.8	76.3	77.7	78.4	79.2
Local Prod, il lit (4.01%)	24.38	25.5	27.9	27.9	29.3	30.7	32.1	33.6	35.2	36.9	38.6	40.4
Total Liquid milk req, mil lit	117.54	157.3	167	206.2	218.2	230.8	244.1	258.1	273.6	289	306.1	323.1

# Supply Analysis and Production Potentials

The supply of milk and dairy products is a function of herd size and its production efficiency. Production efficiency include percent of herd on the milk line, milk yield per animal, calving interval, among other measures. All of these are influenced by appropriate breeding, feeding and management, inputs and support services, market, and price dynamics. The foregoing analysis considers the existing herds of dairy cattle, dairy buffaloes, and dairy goat, taking cues from the past years' herd performance and its drivers.

## Dairy Cattle and Dairy Buffalo Inventories

The government started infusion of dairy cattle in the 70s, consisting of pregnant crossbred Holstein x Sahiwal heifers from New Zealand and Australia, and from the early years until 2019, the dairy cattle infused totalled 4,956 hd. These dairy cattle were given on loan to smallholder dairy farmers in identified Dairy Zones, where participating farmers were organized into dairy cooperatives through which corresponding technical assistance in production, post production and marketing were channelled. According to PSA (2019), the total dairy cattle inventory was 25,858hd, of which 10,595 were the breedable females, representing 40.9% of the total herd (Table 4). In January 2020, additional 1,875hd of pregnant dairy cattle inseminated with sexed semen were imported from Australia (NDA, 2020)

The growth rate in population of the imported dairy cattle over the years was assessed on the basis of the latest inventory of the total herd in 2019. Given the number of the imported breedable female dairy cattle from early 1970s to 2019 with total of 14,956hd (NDA 2020), and the 2019 inventory of breedable females of 10,595hd (PSA, 2019), the average annual inventory growth rate would be clearly negative. However, it appears that the dairy cattle herd has been increasing at a much faster rate than the PSA report. A review of the NDA database as of 2018 indicated that the number of dairy cattle of breeding age was 28,016 hd, composed of 22,184hd cows and 5,832hd heifers. Using 22,184 breedable females as the ending inventory reference, the estimated growth rate of the infused stocks is about 3.0 % p.a. Thus, on this basis, the estimated inventory of breedable females in 2019 would be 28,681 hd.

On the other hand, following the establishment of the Philippine Carabao Center in 1993, organized infusion of dairy buffaloes by the government was carried out between 1994 up to 2014 with a total of 7,573hd mostly from Bulgaria, Brazil, and Italy. Some of the elite animals were kept and maintained as institutional herds from where organized genetic improvement involving selection of superior animals are carried out. From these institutional herds, superior sires are selected and used as semen donors for use in the national artificial insemination and crossbreeding. The rest of the majority of the animals were likewise given on loan to smallholder dairy farmers in the PCC's impact areas throughout the country. As of 2018, the purebred dairy stocks inventory was 18,450hd, total of all ages and both sexes (PCC, 2020). Based on stock infusion of female dairy buffaloes from 1994-2014 (7,573hd), and the breedable female dairy buffaloes of 9,328hd (PSA, 2019), the estimated average annual inventory growth rate of purebred dairy buffalo is 1.9%.

In 2016, PSA conducted actual field inventory of dairy buffaloes in major impact areas of PCC, representing 80% of the service areas, and reported that there were 16,040 breedable females being used for milk production. Translated in 100 % coverage, this would be 20,050hd in 2016, and at the growth rate of 1.9% p.a., the estimated breedable dairy buffalo in 2019 was 21,213hd, composed of purebred and crossbreds produced out of wide scale artificial insemination of the PCC.

In summary, report of the actual field inventory for breedable female dairy cattle in 2019 was 28,681hd and that of breedable female dairy buffalo was 21,213 hd.

**TABLE 4. INVENTORY OF DAIRY ANIMALS, PHILIPPINES, 2019**

Animal Class	Inventory, hd (PSA, 2019)		NDA/PCC/PSA survey 2016
	All ages, both sexes	Breedable females only	Breedable female only
Cattle	25,858	10,595*	28,681**
Buffalo	18,886	9,328*	21,213***
Goat	18,693	9,541*	9,541*
TOTAL	63,437	29,464	58,770

Source: \*PSA 2019; \*\*NDA, 2020; \*\*\*PCC 2020 and PSA 2016 survey (estimated from PSA 2016 survey at 1.9% pa growth rate)

## Production Trends

### *Milk Production Areas*

The National Dairy Authority has established dairy zones based on priorly set criteria having considered suitability for dairy production. There are two operational zones each for the three major islands and the 2018 basic information are summarized in Table 5. Among the dairy zones established, Luzon has 48.7 % of the dairy cows, whereas Visayas has the most number of dairy farmers representing 62.7% of the total. The dairy zones in Mindanao have the least number of farmers but dairy animal ownership per farmer is the highest.

**TABLE 5. NO. OF COOPERATIVES, DAIRY CATTLE FARMERS AND ANIMAL INVENTORY AT NDA-ASSISTED DAIRY ZONES**

Operational Zone	No. of COOP	No. of Province	No. of Farmers	Animal Inventory	No. of Cows
North Luzon	91	6	2,002	11,697	5,246
South Luzon	115	7	1,346	10,811	5,558
Eastern Visayas	77	3	2,104	7,863	4,598
Western Visayas	95	4	4,525	4,512	1,580
Northern Mindanao	63	3	256	6,763	2,639
Southern Mindanao	78	6	330	6,222	2,563
TOTAL	519	29	10,563	47,868	22,184

Source: [www.nda.da.gov.ph](http://www.nda.da.gov.ph)

On the other hand, the programs of the Philippine Carabao Center are set on impact zones and the zones are tied up with the presence of PCC regional centers. The designated National Impact Zone (NIZ) is the province of Nueva Ecija, established to model smallholder buffalo dairying based on heavy partnership with the LGUs. At the NIZ, several primary cooperatives have been organized and these primary cooperatives have been federated.



All over the country there are 12 Regional Impact Zones (RIZ), with 5 RIZs in Luzon, 4 in Visayas, and 3 in Mindanao as shown in Table 6. The impact zones have all the elements for the growth of buffalo-based enterprises.

The population of carabaos in the Table 6 include all ages, all blood lines, and both sexes, and are the subject of artificial insemination using dairy breed semen. The estimated breedable females is 30% of the population. To date there is no accurate account of the number buffalo crossbreds produced from AI and bull loan being used for dairy purpose except the 2016 PSA special survey that covered 80% of the PCC's service area wherein 14,424 buffalo crossbreds and 3,306hd of native carabaos were identified being used for dairying.

**TABLE 6. SUMMARY OF PCC IMPACT AREAS**

PC Center	Impact Province	No. of Municipalities	Carabao Population*	Estimated Breedable Females
<b>Luzon</b>				
PCC @ MMSU	Ilocos Norte	21	34,654	10,396
PCC @ DMMMSU	La Union & Pangasinan	63	113,369	34,010
PCC @ CSU	Cagayan @ Isabela	62	182,821	54,846
PCC @ CLSU	Nueva Ecija	27	56,897	17,069
PCC @ UPLB	Laguna & Cavite	51	43,162	12,948
<b>Visayas</b>				
PCC @ USF	Bohol	47	72,314	21,694
PCC @ WVSU	Iloilo	42	92,885	27,865
PCC @ VSU	Leyte	40	121,785	36,535
PCC @ LCSF	Negros Occidental	19	104,025	31,207
<b>Mindanao</b>				
PCC @ CMU	Bukidnon	20	52,511	15,753
PCC @ USM	Cotabato	18	70,951	21,285
PCC @ MLPC	Zamboanga del Norte	25	62,819	18,845
TOTAL		435	1,008,193	302,453

Source: \*PSA 2019

## Trade Patterns (Milk Imports and Exports)

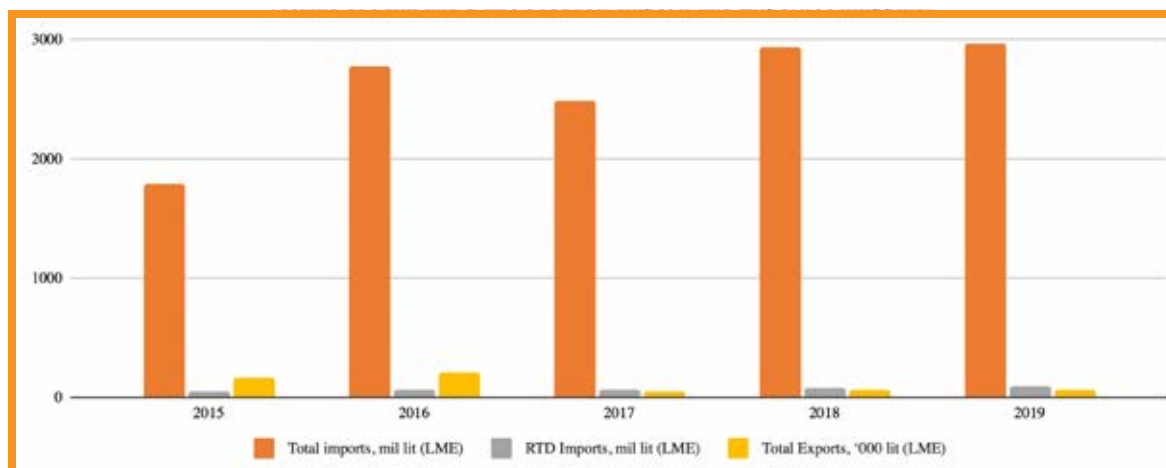
In 2019, Total Milk and Dairy Products imports is reported to be 2,969 m lit in liquid milk equivalent (LME). Major suppliers are New Zealand with 42 % share, USA with 20 % share and Australia with 6%.

Importation consist of about 76.9% milk powder, 14.2% butter, cheese and curd, 2.93% RTD and 5.8% other products. The data from 2002-2015 indicate that the Total milk and dairy importation has an average annual growth rate of 1.6% only. However, during the last five years, total milk and dairy products import rates have increased to an average of 15.87% p.a., and concomitant increase in rates to an average of 14.03% for RTD imports (Table 7). Since the average annual growth rate in local milk production is 4.75% (2002-2019), a rate comparatively lower than the growth in imports, it will only translate into declining level of self-sufficiency in milk. Given the 2019 data with net supply of 2927 mil lit (LME) and a local production of 24.38 mil lit., the self-sufficiency ratio is only 0.83%.

Vorley and Lancon (2016) pointed out clearly that documents are plenty showing that low-cost imports can drive fundamental restructuring of domestic markets. Imports of low cost milk powder have been seen as responsible for failures to establish domestic dairy industries. Processors turn to reconstituting cheap imported powder milk rather than establishing a cold chain between domestic supply and consumption, a case so true in the Philippines.

The domestic fresh liquid milk is classified as ready to drink milk (RTD) and has inherent competitive advantage against the imported RTD in the fresh milk market. In 2019, the domestic milk is 21.8% of RTD market share. Come 2020 onward, the market for RTD is expected to grow as a result of R.A. 11037 and R.A. 11148, requiring investment in milk feeding program among preschoolers and malnourished school children.

**TABLE 7. VOLUME OF MILK AND DAIRY PRODUCTS IMPORTS AND EXPORTS, PHILIPPINES, 2015-2019**



ITEM	2015	2016	2017	2018	2019	Ave Annual Change, %
Total imports, mil lit (LME)	1,793	2,772	2,486	2,939	2,969	15.87%
RTD Imports, mil lit (LME)	42.66	65.6	61.49	79.3	87.2	14.03%
Total Exports, '000 lit (LME)	168.3	211.58	52.34	61.2	65.8	-6.27%

Exports of dairy products on the other hand is indeed very small, only 65,865,000 lit (MLE) against the imports of 2,929,000,000 li (LME) in 2017 (Table 8). There are ten listed exporters composed of big companies such as San Miguel Foods, as well as manufacturers of buffalo milk-based products such as ice cream and fresh cheese, with exports all together valued at US\$ 33,175,000 during 2017.

**TABLE 8. VOLUME AND CLASSIFICATION OF MILK AND DAIRY PRODUCTS IMPORTS AND EXPORTS, 2017, PHILIPPINES**

ITEM (2017)	Skim Milk Powder	Whole Milk Powder	Butter Milk Powder	Whey Powder	RTD	Butter	Cheese	Curd	Others
Import, mil lit (LME)	1,336.9	228.5	287.3	432.4	87.2	262.2	121.9	40.1	172.5
Export, '000 lit (LME)		2,627.64			38.4	2512	1159	0	59,528.20

## Supply Constraints and Threats

**Limitations in Dairy Animals.** The primary constraints on the domestic dairy development is the absence of indigenous dairy animals. And while there were efforts to introduce dairy breeds in the past, the increase in number is rather very slow. To a great extent, the interest to propagate more of dairy animals has not attracted the private investors due to perceived low competitiveness, mainly due to the market dominance of low-cost imported powder milk. The big dairy processors find it more convenient and profitable to import low-cost powder milk instead of being part of the value chain linking with the domestic producers.

Limited number of producers wanting to start dairy production has to depend on importation of stocks. The issue of sourcing of the right breed for the tropical conditions is constrained by the phytosanitary issues such as FMD- free status in the country sources. What are available are crossbreeds of Holstein breed with tropical breed such as Sahiwal, mostly from Australia and New Zealand. The cost the animals from these sources have become expensive due to rise in foreign exchange rate as well as transport cost. In fact, in order to have reasonable cost of transport, livestock vessel should contain a minimum of 1000 head per shipment.

**Land and Feed Resources.** Ruminant animals are mainly forage-based and for this reason land availability is a major factor affecting ruminant animal inventory growth. Among the smallholders, the average land holdings is 1.5 has and this limited area is devoted to crop-based undertakings. Feed resource available are only sufficient to feed few animals even to include the farm by products. On the other hand, commercial cattle sector relies heavily on the availability of larger land areas for forage production, such as corn for silage.

Feed resource will tend to be a major determinant in increasing animal holdings among small holders with limited land area for forage production, particularly in rice producing areas. Forages along irrigation canals, rice paddy dikes, and limited forage areas can meet the volume requirements when the number of animals are still few, however, as the number of dairy farmers and the dairy animals increases, there will be competition for the limited available forage resources. This case is also true for available rice straw after rice

harvest. In fact, in areas where there are high density of dairy animals, the distance from where rice straw has to be sourced is also increasing.

**Geographic Suitability of Dairy Zones.** It is recognized that not all locations are suitable for dairying. Of course other than the issue of feed resource and land availability, high elevation with cooler temperature is the most suitable place to initiate dairy production, locations that are so limited in the country. This is complicated by the issue of access to market. Milk being relatively expensive source of protein, the growing urban areas where income level is high becomes the major market for fresh milk and dairy products. This is the reason for the establishment of peri-urban dairies, but these are set up in hot and humid lowlands. Under this condition, dairy cattle cannot express the full production potential, and to tailor fit suitable animals under the existing conditions entail considerable time and budgetary resource.

**Funding Support (also support for stock infusion).** Public funding in dairy development program, in research, and extension has not been robust as desired despite the fact the livestock contributes as much as 16.2 % to GVA in agriculture. If the program intent is to fast-track dairy herd inventories to meet the objectives of generating jobs and increasing incomes to greater number of rural farming families, there is a need to allocate funding support enough for stock infusion in the manner that the fast growing dairy sectors in our neighboring countries have done. This support can come in different forms, be it a direct importation by the government in favor of the dairy cooperatives for loan in kind, or easily accessible interest-free loans to buy animals, dairy equipment, and establish feed supply system. Limited funding for this purpose has been one of the limitations during the few decades of attempts to develop the sector.

**Ready Market - Expansion and Sustainability of SMFP.** Absence of ready market and good price for local milk are the two main reasons for the lukewarm investment of the private sector in dairy production. This is a result of the protracted exposure of the general consuming public to reconstituted milk powder. In some countries characterized by low liquid milk consumption, the use of school milk feeding program has been a successful instrument in creating a milk drinking population and thus make a sure market for domestic milk, a good case is in Thailand.

Investment in school milk feeding in the country in the past was very limited, albeit not sustained. The new legislation R.A.11037 provide a fresh hope for the domestic dairy sector. Hopefully, funding support for this program shall be sustained and expanded in the coming years.

Our system in the country started the SMFP in 2007 with initial funding of P138 million and covered 261,000 children. By 2015, the SMFP fund was merely P15.0 million and covered only 13,000 children (NDA, 2015). This figure is minuscule against the reported more than 3.0 million undernourished children. In comparison, Thailand started SMFP in 1992 with 279.0 m Thai bath and in 2017, the allocation is US\$ 432.6 or equivalent to P 21.5 billion and to cover more than 8 million children (Phokunakorn, 2017).

**Issue of Profitability and Competitiveness (increasing input cost, little margin, may need economy of scale).** For smallholders that have graduated from subsistence to entrepreneurs and has focused on dairying, the profitability issue is premium. The rising cost of input, particularly concentrate feeds that rely on imported grain, is eating the profit margin of the producers. Use of concentrate feeds is unavoidable in order to meet the nutritional requirements of dairy animals, more so in the tropics where the nutritional value of the forages is low, even more of the farm wastes used for feeds such as rice straw. Because of the declining profit margin, dairy farms in neighboring countries have to resort to increasing herd size for economies of scale, and those smallholders with high cost of production are squeezed out of business.

**Training and Activation of Extension Services.** In countries with established dairy industry, dairying is a family tradition, with the knowledge and experiences in dairying is passed on generation after generation. This is not the case in the country with newly developing dairy sector. Absence of knowledge in dairying is common among smallholders who are used to rearing non-dairy animals by simply tethering. Dairy animals to them is a new animal, requiring entirely different feeding and management protocols.

In the field, the common livestock technicians are those who conduct artificial insemination, deworm, and inject vitamins to animals but are devoid of knowledge and experience in actual dairying. Even formal education in Dairy Science in colleges and universities has not progressed. Unless a program to strengthen the human resources to

implement the dairy program to include farmers, extensionists, researchers and policy people is put in place, the envisaged development of the dairy sector would be slow, if not a failure. This issue is a bit complicated in the sense that learning institutions' initiation of course/degree is decided largely on the basis of demand of the sector or community. In the case of dairy sector, unless there shall be robust development and growth, the perceived demand for graduates in dairy related courses will be limited.

**Milk Quality and Marketing Concerns.** The fact that milk is produced by thousands of small scale dairy farmers, there will be wide variations in the quality of milk at the farm gate, and when the milk from all sources are consolidated, the milk quality of pooled milk will be at stake. Unless strict quality standards are set at the level of the primary cooperatives collecting the milk, the issue of milk quality and safety is difficult to meet. Additional concern relates to the fact that many of the small scale dairy producers are far from the collection centers, and are devoid of simple cooling facilities. It will take few hours from milking time before the milk can reach the collection center, and therefore schemes to prevent the growth of microbial population in the milk during those period must be part of the system.

More importantly, recent developments in the market have emphasized demand for food safety and quality, coupled with the fact that new emerging competing products are being introduced in the market. Therefore, strategies to increase demand for milk and milk-derived products need to recognize the requirements of the growing and urbanized younger generation.

**Absence of Clear Policy and Strict Implementation on Correct Product Labelling is Common.** In the Philippines where the number of supermarkets has quickly expanded in the last decade, the milk and dairy section has one of the longest display shelves filled with UHT milk labelled as "FRESH MILK". The fact that products are presented in chilled counters add to the impression that the milk is indeed fresh despite the fact that UHT process renders the shelf life of the milk long even under room temperature.

In a consuming public so used to reconstituted milk, this mislabelling is not an issue. However, for producers, the fresh milk market is the niche of the domestic dairy in a tariff-free trading environment. The absence of clear definition and strict policy on FRESH MILK labelling, and the practically limited public support to promote fresh milk consumption

deprive the domestic producers of the fair market share. In fact, the growing urban population, expected to be about 60 % of the total in the next 25 years is the growth area for fresh milk market.

**Support on Strengthening Smallholder Producers Organizations is Critical.** In a growing complex market, the access of smallholders is restricted by their inability to respond to the market requirements. Organizing the small holder producers is the way to strengthen their market position to meet the issue of volume, sustainability of supply, processing and packaging, distribution, among others. In order to achieve such state, the smallholders need public support in both human and hardware infrastructures. Most of the failures experienced by smallholder-producers organizations relate to poor leadership and organizational management. Therefore, the extension support should heavily consider inclusion of human resource capacitation focused on organizational leadership, management, business and entrepreneurship, in addition to post harvest processing and marketing. These support are limited in the current system.

**AI Related Matters (Training and Recruitment of AI Technicians).** In order to fast-track the desired herd build-up of dairy animals to meet the growing demand for milk, increasing the number of animals served through AI can be achieved in two ways, the first is to increase the number of AI technicians, and the second is to increase the services per technician.

The current system has the capacity to train 300 AI technicians per year and this translates into about 150 active technicians annually. This is because experience in many years of AI technicians training, 50% of the technicians that underwent training becomes inactive, either they get promoted, or accept job overseas, or are given a different job if they are from the LGUs. And some village based technicians tend to slow down, and eventually become inactive when number of paid services is only limited. Others retire early.

On the other hand, increasing the number of services per technician is not easily achievable, unless a suitable incentive package is put in place. In the case of those technicians registered under UNAIP, the average services per technician/year is 100 and records of those serving carabaos during 2002-2017 has only average of 76 services. Efforts to make the average number of services to double the current level is extremely difficult.



## Summary of Findings

In the absence of significant future interventions, the growth in domestic milk production estimated at an annual average growth rate of 4.01 % to reach 32.1 mil lit in 2025 cannot outstrip the estimated average growth rate of 7.41% p.a. of RTD. Unless production enhancing interventions are introduced in the coming years, this would result in further increases in RTD importation or further rise on the use of reconstituted milk powder.

Given the high competitiveness of locally produced fresh milk in the liquid milk market, and the magnitude of projected demand for RTD, it makes a lot of sense to target on self-sufficiency in RTD in the next decade. To achieve 100% self-sufficiency in RTD is also translated into a 7.5% overall self-sufficiency in milk and dairy products, and this level is a significant improvement over the current 1.3%. And in order to attain the desired level of sufficiency, the needed priority interventions include efforts to fast track the build-up of dairy herd, improvement in animal productivity, and efforts to increase competitiveness of the locally produced milk in a free trade era. The real challenge is how to improve financial viability of the dairy enterprise by increasing yields and/or reducing production cost and gaining assured market support e.g. school milk feeding program so that there shall be robust private sector investment and participation.

Other priority interventions should emphasize on bridging the technology gap, including how to address the issue of feed resource availability, improved breeding and management, product safety and quality, and product development. Finally, there is so much need to address improving human resource capabilities and capacities, both the farmers who are the direct players as well as those involved in the development of the dairy sector.

# ANALYSIS OF THE DAIRY INDUSTRY

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## Farm Income Analysis

### **25-cow dairy cattle module**

The income analysis for a 25-cow dairy cattle module for a 10 year operations is presented below (Table 9). All technical assumptions used in this analysis are derived from actual field data averages. Stocks are assumed to be good quality local born crossbred dairy cattle and are purchased pregnant, inseminated with sexed semen. Management is full confinement with roughage composed of corn silage raised in surrounding land area.

The total investment is estimated to be P2,565,000 to cover stocks, infrastructures, and dairy equipment. Given a farm gate price of P35.00/ liter of raw milk, the operation is estimated to have a Net Present Value of 1,497,936.20, an IRR of 20.72%, a payback period of 5 yrs and 1 month, and a Profitability Index of 1.58.

One major stimulus for cattle dairying is the possibility for a much higher price of milk when procured for the school milk feeding program, with farm gate estimated to range from 50-60 pesos per liter. Moreover, in order for dairy operation to have added income, it is necessary to add value by way of selling the milk as pasteurized milk and processed dairy products.

**TABLE 9. 25-COW DAIRY CATTLE MODULE**

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
<b>Initial Investment</b>												
Stocks, 25 head	-2,125,000											
Infrastructures	-271,000											
Equipment	-169,000											
<b>Annual Stream of Cashflows</b>												
Cash Inflows - Revenues	1,260,000	2,289,600	2,289,600	1,910,400	2,658,000	2,321,400	2,478,000	2,857,800	2,656,800	2,107,800	3,468,600	
Cash Outflows - Expenses	-1,329,450	-1,384,664	-1,722,090	-1,688,810	-1,788,620	-1,794,360	-1,844,070	-1,852,740	-1,856,620	-1,813,440		
<b>Extended future cashflows</b>												
Sale of Animals												2,190,000
Cost to sell (5% of selling value)												-109,500
Net Cashflow	-2,565,000	-69,450	904,936	188,310	969,190	532,780	683,640	1,013,730	804,060	251,180	1,655,160	2,080,500
Non-cash accounts (depreciation)			-44,000	-44,000	-44,000	-44,000	-44,000	-44,000	-44,000	-44,000	-44,000	-44,000
<b>Net Income</b>		-113,450	860,936	144,310	925,190	488,780	639,640	969,730	760,060	207,180	1,611,160	
Annual ROI		-8.26%	60.26%	8.17%	53.39%	26.67%	34.79%	51.36%	40.07%	10.90%	86.74%	

## 5-cow dairy buffalo module

A 5-cow dairy buffalo module is presented below (Table 10) with the assumptions derived from averages of field data/generated by PCC. The dairy buffaloes are assumed to be either local born purebred riverine buffaloes or backcrosses with dairy buffalo blood composition of at least 87.5%.

Buffalo milk has a niche market, particularly for processed dairy products such as Kesong Puti, Pastillas, and premium ice cream. Under normal market conditions, the buffalo milk is priced two times that of the cattle milk per liter.

**TABLE 10. 5-COW DAIRY BUFFALO MODULE**

ITEM	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>REVENUES</b>										
Raw milk Sales		23,300	186,790	344,315	292,905	330,505	462,936	682,440	591,958	614,594
Sales of Animals			46,350	15,913	32,781	50,647	382,560	71,643	73,792	38,003
Other revenues		1,165	11,657	18,011	16,284	19,057	42,274	37,704	33,287	32,629
<b>Unrealized Gain on Change in FV of Biological Assets</b>	100,000	15,000	105,000	65,000	105,000	145,000	160,000	205,000	225,000	280,000
<b>Total Farm Revenues</b>	100,000	39,465	349,797	443,240	446,971	545,211	727,772	996,788	924,038	965,227
<b>EXPENSES</b>										
Total Direct Material	39,171	61,675	86,023	96,085	117,130	146,547	148,928	155,840	197,162	251,541
Direct Labor	21,156	27,503	31,735	33,850	44,429	57,123	63,470	67,701	74,048	95,205
Total Overhead Expenses	14,784	21,320	25,755	30,891	40,462	50,033	56,647	57,661	62,096	75,402
Total Selling and Admin Exp	806	1,048	1,290	1,532	2,106	2,499	2,822	3,144	3,386	4,112
<b>Total Expense</b>	75,919	111,548	144,804	162,359	204,037	256,203	271,867	284,348	336,694	426,262
Farm Net Income	24,080	72,083	204,992	280,880	242,933	289,007	455,904	712,439	587,344	538,964
ROI	31.70%	-64.62%	141.50%	173.00%	119.00%	112.80%	167.60%	250.50%	174.40%	126.40%

# Dairy Value Chain Analysis

The Philippine milk supply chain can be grouped into two, namely, a) the small scale producers, and b) the commercial scale milk and dairy products processors. Domestic milk producers are majority small holders that own dairy animals with holdings not larger than 20 animals per farm. Most of the producers are members of primary cooperatives that collect and process the milk. Some of the primary cooperatives also do direct marketing while others are members of federation of cooperatives that process and market milk and dairy products. The commercial dairy processors on the other hand are importers of milk powder for processing into various dairy products, majority of the products are sold in the domestic market, and a small percentage enter the export market. This group do not buy milk from the local producers at all.

Typical dairy value chain includes the input suppliers, the farmers and their cooperatives, processors, the wholesalers, retailers, and the consumers. Summarized Key value chains of cattle fresh milk has three major segments, the first are the milk producers composed mostly of small scale dairy farmers and commercial dairy farms who do actual care and feeding of dairy animals; the second segment are the collection and cooling points at the village level operated by the cooperatives where harvested milk are pooled, tested and cooled; and the third segment are milk processors that process the milk, and market the milk to local consumers, institutional buyers, and to LGUs/DepEd for school milk feeding program (NDA Planning Unit). The value chain for buffalo milk is practically the same (Lantican et al. 2014).

## Input suppliers

Input suppliers include livestock traders/importers, milk and dairy products importers, agri-veterinary stores, animal health service providers, AI services providers, forage and animal feed suppliers, farm and dairy equipment suppliers. AI services providers are technicians from NGAs (NDA, PCC and BAI), LGUs and village-based AI technicians (VBAITS). VBAITS are private individuals who have been trained and are doing AI service for a fee. The advantage of this scheme is that these technicians are farmers themselves, are servicing the animals within their community, and so access to their service is 24/7, no weekends and no holidays. More developed dairy cooperatives have trained their own AI

technicians and are serving their members. Some established dairy cooperatives are also becoming conduits by banks and government institutions in facilitating access to loans and credits.

The livestock importers source animals from overseas for the national programs, and to a minor extent to supply private dairy farmers requirements for stocks. There are only limited number of livestock importers/ traders into the country. Suppliers of dairy cattle source crossbred Sahiwal x Holstein, Holstein x Jersey and Holstein from New Zealand and Australia. Dairy buffaloes are sourced from Bulgaria, Brazil and Italy, and very minor number from USA. Dairy goats are derived from US, Australia and New Zealand.

Importers of frozen semen of dairy cattle usually source stocks from USA and Canada, whereas frozen semen of dairy buffalo can be sourced from Italy and Bulgaria. Since the establishment of semen processing facilities in the Philippines and the importation of superior dairy buffalo bulls from Bulgaria and Italy, no frozen semen of dairy buffalo has been imported since the last importation in 1996. On the other hand, the milk and milk products importers in the Philippines are 29 companies. In this group, the multinational companies are importers and are also processors, and distribute finished products to the domestic market and to a limited extent to neighboring countries.

## Farmers/Milk Producers

### *Smallholders*

Throughout the country there are 10,563 dairy cattle farmers and 99.2% (10,484) of these are smallholders with total cow holdings of 17,688 hd or an average of 1.68 cows/farmer (Table 11). In 2018, a total of 6,517 cows were on the milk line and these cows produced a total of 9,425,000 liters of milk.

**TABLE 11. DAIRY CATTLE FARMERS, ANIMAL INVENTORY, AND AVERAGE COW PER FARMER, 2018, PHILIPPINES**

Island	No. of Dairy famers	Animal Inventory, hd	Cow Inventory, hd	Ave cow/farmer
Luzon	3348	22,508	10,804	3.22
Visayas	6629	12,375	6,178	0.93
Mindanao	586	12,985	5,202	8.87

Source: [www.nda.da.gov.ph](http://www.nda.da.gov.ph)

Based on these figures, the estimated average lactation yield per cow is 1,446 lit., and the estimated average milk production per cow per day is 4.82 lit. on a 300-day lactation. These averages may not be as accurate as some of the cows were at the start or at the middle of lactation when recording were cut off, and since the data are presented following calendar year instead of records of the cow's entire lactation period.

Since the early initiatives on domestic dairy development were started in Luzon and in the Visayas, there are more dairy cattle farmers in Luzon and Visayas dairy zones compared to Mindanao although comparatively, Mindanao dairy farmers have bigger herd size. The large grazing areas and the more suitable climate in Mindanao could have allowed dairy farmers to raise bigger number of animals per farm.

Meanwhile, participating farmers in buffalo dairying are concentrated in the Impact Zones designated by the Philippine Carabao Center. The impact zones all over the country are composed of one National impact zone (NIZ) and 12 regional impact zones (RIZ). The National Impact Zone (NIZ) is the rice-based province of Nueva Ecija and has 800 dairy buffalo farmers, all are members of 50 cooperatives and associations. The updated total dairy buffalo inventory is 3,520hd, with original stocks imported from Bulgaria, Brazil and, Italy. In view of the absence of grazing area, animals are reared in confinement, fed with forages harvested from small forage area, from dikes and sideways of irrigation canals, and also crop residues. Average milk production of animals at the NIZ is 4.77 lit/ 280-day lactation with milk fat content that ranged from 7-9%. There are also 12 PCC-assisted regional impact zones (RIZ) with 2,647 dairy buffalo farmers and total holdings of 12,157hd of purebred dairy buffaloes, or average of 4.59 animals/farmer as shown in Table 12.

**TABLE 12. INVENTORY OF DAIRY BUFFALOES AT THE REGIONAL IMPACT ZONES (RIZ)**

Item	Inventory, hd	%	Remarks
Total buffalo Inventory	12,157	100	Purebred buffalo
Breedable females	4665	38.37	% of the total herd
On Milk line	2052	16.87	% of the total herd

Source: PCC Operations Unit

Added to the purebred dairy buffalo raisers are thousands of smallholder farmers rearing crossbred and/ or backcross buffaloes that resulted from AI and bull loan services. However, there is no updated accurate account on how many farmers are using their female crossbred buffaloes for dairying, although the 2016 PSA special survey showed that some 18,030 hd of crossbreds were used for dairy purpose. In fact, in the same survey, some 4,132 native animals were also documented being used for milk production. The results of survey also indicated that the rate of usage of buffalo crossbreds are location specific, with more farmers using the crossbreds for milking in areas closer to market that readily absorbs the produce such as in Bulacan and Nueva Ecija. In communities with no ready milk market, high percentage of female crossbreds are sold to farmers in other communities engaged in buffalo dairying.

### ***Commercial Scale Farmers***

NDA-assisted commercial cattle dairy farms are called Dairy Multiplier Farms (DMF) and are set up to accelerate the production of high quality local dairy animals. In 2017, there were 79 DMF with stocks of 10,107hd, an average animal holdings of 128hd/farm. Of the total animal inventory, 4,496 were cows, and of these 2,991hd were on the milk line. Milk produced during the year was 6.7 million liters equivalent to 2,240 lit/ cow per lactation or average of 7.46 lit/animal/day for a 300-day lactation, a production level comparatively higher than those observed among the smallholders.

On the other hand, commercial size dairy buffalo dairying is exemplified by the institutional herds. There is a national Gene pool with total herd of 501hd, 38.32 % are breedable females. The 12 regional center herds have total inventory of 2,058hd, 30.1% of the herd are breedable females in 2018. The average inventory of regional center herd is 171.5 hd.

PCC has also initiated multiplier farms since 2014 with the main objective of enhancing production of potential dairy buffaloes harnessing the imported stocks. The assumption is that privately operated commercial herds are more efficient than the animals scattered under smallholder system with no uniform management systems. To date there are 5 dairy buffalo multiplier farms with average herd size of 61hd/ farm (PCC Operations Unit).



## ***Dairy Animal Production Efficiency***

**Average Growth in Dairy Animal Inventory.** A closer look at the current dairy cattle and dairy buffalo inventories against the background of all the previous importations, the estimated average inventory growth rate of breedable female of 3.0% for dairy cattle and 1.9% for dairy buffaloes leave much room for improvement. Low level of herd inventory growth is influenced by several factors and major determinant is percent calf crop or the number of calves born as percent of the breedable females. In the 2018 performance report of the dairy cattle herd, the calf crop was 44.54% and can also be mirrored in the number of cows on milk line vis a vis the breedable females which was equivalent to 42.85%. This low percent calf crop can be due to low success rate in AI/breeding, and this measure is also influenced by several factors such as low proficiency of AI technician, poor quality semen, or high percentage of cows with inactive reproductive organs. Often taken for granted by farmers is the nutritional inadequacy which not only impact on reproduction and health but also on milk production. The compounding effect of these various measures is prolonged calving interval, and therefore high production cost per liter of milk.

**Average Milk Production.** There is wide gap in average milk yield/day between the commercial dairy cattle herd and the smallholders (7.46 lit vs 4.82 lit) based on the 2018 performance. Gap also exist between dairy buffaloes reared at the institutional herds and the smallholders although the magnitude is only small (4.9 lit vs 4.59 lit). These figure demonstrate the difference on the level of management between the two systems, but the real challenge is how to improve milk production above these levels to achieve a reasonable profitability as noted in the manner some well managed dairy cattle farms with average milk yield of 20 lit/day have attained. Likewise, there are some dairy buffalo institutional herds with average milk production of 7.0 liters per day. Or perhaps scheme has to be developed and promoted on how to reduce production cost significantly given the current level of production.

To view the dairy cattle milk production profile in a different perspective, a revisit of the 2018 performance figures suggest that about 41.95% of the lactating cows have average milk yield above 7.0 lit/day, 29.3% have average milk yield of 4.2-4.8 lit/day, and 26.87%

have average between 2.81-3.43 lit/day. And in terms of dairy zones where location of multiplier farms have not been factored out, South Luzon farms had the highest average lactation yield of 2,527 lit equivalent to an average of 8.59 lit/day in a 300-day lactation. Following in the ranking is Northern Mindanao with average lactation yield of 2,108 lit or average of 7.02 lit/day. The lowest in the rank is Eastern Visayas farms with average lactation yield of 845 lit or 2.81 lit/day. Under a condition where production level is beyond being able to generate profit margin, It would be difficult to see the sustainability of dairy operations.

### ***Feed Resource***

After the dairy animals, feed can be considered the most important in the dairy value chain. As pointed out elsewhere, there is no sufficient grazing land in the Philippines, except in some communities in southern Luzon and in Mindanao. Smallholder dairy farmers, particularly in rice-based production areas raised animals in full confinement, and feeding is the typical “cut and carry” system. Upon participation in the dairy development program, these farmers were required to allocate a portion of their agricultural land for forage production, most common grass planted is Napier (Pachong variety. Some farmers also plant forage legumes. Many dairy farmers also allow their buffaloes to graze on rice fields after rice harvest until the next planting season. Also during this period of the year, the rice straws are collected and form an important source of roughage to dairy buffaloes, supplemented with concentrate feeds.

The recently concluded NDA-managed Phil-New Zealand project on pasture development promoted planting of imported grass varieties suitable for cut and carry and for grazing as well such as Mombasa, Humidicola, and Bracharia. This initiative demonstrated the possibility of establishment of good and sustainable sources of forage for dairy animals under local conditions.

Corn silage is also becoming common source of feeds among commercial herd operations. Some farm owners with sufficient land area are planting corn for this purpose, while others rent available land for corn production for silage. Recently, there are also enterprising individuals and coops engaged in corn production for silage and market the same to commercial farms.

Few years ago, there were also dairy cattle farmers who opted to rent coconut areas, plant suitable grass under coconut and successfully graze dairy cattle. This system has very interesting prospects considering that dairying under coconut has been proven suitable in many countries, and that in the Philippines there are some 3.4 million hectares of coconut plantation, an area even bigger than that planted with corn.

Feed availability and feed quality are the most common concerns among smallholders. This observation is clearly shown in large gaps in milk production and reproduction efficiencies between smallholders vs the commercial producers. Other than reduced milk yield, poor nutrition also results in ovarian inactivity that leads to failure to come to estrus and failed breeding. This is the reason for relatively prolonged calving intervals and reduced profitability in dairy operation. Therefore, proper nutritional regimen is very important to achieve the optimum performance, particularly for the imported animals.

### **Milk Collection and Cooling Facilities**

The common practice among dairy farmers is to milk their animals two times a day, one in the morning and another in the afternoon. The morning milk is transported to collection center right after milking while the afternoon milk normally is kept in the cooling facilities at home, and then is included in the following morning milk delivery/collection. In some areas, the farmers transport the milk directly to the collection center while in others, milk collectors do the job. Many dairy buffalo farmers transport their milk in 2-gal plastic containers, mainly because the volume of milk from their animals is only small, and also due to absence of suitable aluminum milk containers. Since the raw milk are exposed to ambient temperature in these kind of containers, and as the interval between milking and collection/delivery to the collection center increases, there is a possibility for increased microbial load in the milk. Common also among smallholders is the absence of milk cooling facilities at the farm. These factors affect the quality of milk being presented at the collection center.

Milk collection is common in the villages owing to the fact that location of small dairy herds is wide and thinly spread, and that the milk volume from individual farmer is rather small. It is logical for a collector to collect milk from several farmers and the consolidated volume delivered to customers and/or processors instead of the individual

farmers transporting the small volume of milk to collection center. There are two types of milk collectors, the independent collector, and the cooperative-employed collector. Independent milk collectors are often informal traders who collect milk from several farmers, and after achieving certain volume deliver the milk directly to consumers and to small scale processors. The coop-employed milk collectors are either member or non-member of dairy cooperatives who collect milk from cooperative members, and deliver the milk to the coop collection and processing centers. The common practice is that the collector is paid on the basis of the volume of milk collected.

To ensure milk quality, milk test is mandatory at the collection center, and milk price is quality dependent. As good quality milk commands higher price, it serves as a good incentive for the dairy farmers to practice hygienic and good milk handling procedures. Only quality A milk is used for the liquid milk market, the rest are for processing into other milk products.

As part of the dairy development program, dairy cooperatives are assisted by NDA and PCC to set up collection, cooling and processing facilities to provide important link to processors and/or consumers. Cooling facilities play very important role in preserving the milk quality. In the dairy zones established by NDA, there are 91 collection and milk processing centers, 45 of these are classified as milk processing plant (MPP) and 46 are Home-based processing plant (Table 13). There are also 8 additional milk processing facilities in impact areas assisted by PCC. All these installations serve as collection centers and processing centers as well.

**TABLE 13. MILK COLLECTION AND PROCESSING FACILITIES BY DAIRY ZONES, 2020, PHILIPPINES**

AREA	MPP	Homebased Plant	Total Plant	Total Cap lit./day	Total Cap (312-day yr)	*2018 Milk Prod, '000 lit	%MPP Utilization
North Luzon	7	6	13	56,200	17,534,400	2382	13.58%
South Luzon	18	15	33	45,700	14,258,400	6405	44.92%
Visayas	8	5	13	13,700	4,274,400	2086	48.80%
North Mindanao	6	0	6	33,800	10,545,600	3555	33.71%
South Mindanao	6	20	26	15,100	4,711,200	1697	36.02%
<b>Total</b>	<b>45</b>	<b>46</b>	<b>91</b>	<b>164,500</b>	<b>51,324,000</b>	<b>16125</b>	<b>31.47%</b>

## Processors and processing facilities

Generally, there are two types of milk processors in the country, the first are the dominant, well developed companies that import milk powder and other dairy products, and the second are the comparatively small processors that process the locally produced milk, a volume that barely reach over 1 % of the total milk and dairy supply in the domestic market.

Import-dependent processors are many and the big 5 companies that take some 86% of the business include Nestle (Phil), Alaska Milk, Kraft Foods (Phil) Inc, Yakult Phil. Inc., and San Miguel Pure Foods Co. Inc. There are some 20 other competing companies that take the rest of the market share. Given the magnitude of their operations, their ability to use new technologies to produce new dairy products at a cheaper price, and their huge marketing systems with the capacity to penetrate the domestic market, leaves the local products very small room to compete.

On the other hand, processors of locally produced milk are small and are only able to process milk into limited traditional milk and dairy products. These processors are classified into three groups, namely a) independent processor, b) cooperative/association-based processor, and c) institution-based processor.

Notable among locally produced milk processors are those in buffalo milk business, producing milk candy, commonly called pastillas, and the fresh cheese, commonly termed Kesong Puti. Liquid milk products include pasteurized milk and coco milk. Summary of the processors and processing facilities contained in the VCA for buffalo milk in Regions 1-4 are shown in below (Table 14).

**TABLE 14. SUMMARY OF BUFFALO MILK PROCESSORS AND PROCESSING FACILITIES IN REGIONS 1-4**

Dairy Processor		Type of Processing Facility	
Type	Number	Kitchen Type, No.	Modern, No.
Cooperative-based	10	9	1
Independent	16	14	2
Institutional-based	3	2	1
TOTAL	29	25	4

Source: Lantican, et al., 2014

In the 2014, about 89.4% of raw buffalo milk in Regions 1-4 were sent for processing and the rest were sold as raw milk to informal traders. Processed milk were in the form of fresh pasteurized milk (43.2%), choco milk (17.7%), pastillas (28.6%), and white cheese (10.3%). There is a distinct product focus by region, for example, Pastillas were processed mostly in Regions 2 and 3, whereas kesong puti were produced mostly in Region 4 (Lantican et al., 2014). Demand for pastillas processing in Region 2 has grown bigger than the region's capacity to produce, and so fresh buffalo milk from region 3 augments the deficit.

The institutional processor in Region 3 is Milka Krem, operated under the umbrella of the Philippine Carabao Center. Its main role is to help the smallholder dairy farmers market excess milk beyond their capacity. Many of the smallholder cooperatives in Nueva Ecija has their own collection and processing facilities, and are also able to add value to the raw milk from their members. However, in the season when most of the dairy animals are on the milk line, the volume of milk available is beyond the absorptive capacity of the cooperative's market. During this period, Milka Krem serves as the shock absorber, buying whatever excess milk the cooperatives cannot market on their own.

As a processing facility, Milka Krem has the capacity to process 1000 lit/hr, and therefore at an 8-hr plant operation, it can process 8,000 liters of milk per day. Added facility is the batch type facility at PCC @ CLSU with the capacity of 300 lit/hr. Both of the facilities currently are operating less than 30% of its capacity.

The available value chain analysis for dairy cattle is limited to CALABARZON conducted in 2014, and a more detailed analysis but only focused in Batangas was carried out for the RDIDP project in 2015. A related small study on milk supply chain in Davao City has also been done (Ricalde et al. 2014).

In 2014, dairy cattle milk in CALABARZON were produced by 194 farmers who were members of 9 cooperatives. The cooperatives collect the milk from the members and sent the milk to 9 processors, although a small percentage of the milk were sold to informal buyers at the farm gate. BAC was the biggest among the processors, its share in the total milk for processing was about 64%, followed by KKMI (18%), and Hacienda Macaluan (13.2%). In fact, even today, BAC absorbs all the milk produced in Batangas and nearby provinces, and even reached as far as Nueva Ecija, Bulacan, and Mindanao

to source additional volume to fill in the requirements of its institutional buyer. That while its processing facility has the capacity of 1,000 liters/hour, its operation is 16 hours to accommodate the volume 13,000 liters/ day.

The processing facility in KKMI has the capacity to process 1000 lit/hr, and based on the 2014 data and 8-hr plant operations, it operated 50% less than its capacity. Similarly, the processing facility of BADACO has the capacity of 1,000 lit per hour, but only process 800 lit/day, and therefore underutilized.

Milk processing facilities throughout the country are summarized in Table 16. Almost 50% of the facilities are home-based and has smaller capacities than the facilities tagged as MPP. The geographical distribution of these milk processing facilities are tied up very well with the geographical distribution of dairy animals. Using the NDA reported 2018 milk production as bases for estimation of utilization rate of the milk processing plants, the estimated over all utilization is 31.4%. Facilities in North Luzon is least utilized while those in the Visayas are used more. This is completely in agreement with the technical report of a Swedish consultant who noted that the processing facilities in the country is only used 30% of its capacity due to lack of milk in the production zones where these facilities are established (Schiere, 2010).

## **Marketing Actors**

### ***Domestic Consumers***

Domestic consumers are the households in the rural and urban communities as well as the institutional buyers such as hotels, restaurants, schools, hospitals and others. Fresh milk is procured as pasteurized milk for daily consumption mostly from dairy cooperatives and retailers. Majority of the buffalo milk are procured for processing into fresh white cheese, milk candy or for ice cream. There are two commercial companies in the Philippines that buy buffalo milk direct from producers, and process and distribute buffalo milk ice cream. There are also growing Indian communities in the country that prefer to buy buffalo milk-derived Indian type cheeses.

### ***Milk Traders and Retailers***

Informal traders purchase milk direct from the producers and consolidate milk from several farmers and then resale the milk to small scale processors. At times when more volume is demanded by small scale processors, informal traders also procure milk from the dairy cooperatives. Their added service is collecting the milk at the farm gate, and thus producers need not spend efforts and time delivering the milk to dairy cooperative collection center.

Generally informal milk traders pay the milk on collection but at a price a bit lower than the delayed payment level paid by the cooperative, and often they do not care so much of milk quality. Milk is transported in 20 lit and and/or 40 lit aluminum milk cans, and depending on the distance from source to the cooling facility, the milk is exposed to ambient temperature during transport. They operate in the rural areas as well as in urban areas. Their role in the milk value chain is indeed significant as is true in other smallholder dairying setting (FAO, 2011a, SNV, 2013).

There are few formal traders who buy raw milk from commercial producers and dairy cooperatives, pasteurize the milk, and deliver to institutional buyers. Demand for milk quality and safety by institutional buyers prompt these formal traders to be also strict in milk quality testing prior to accepting milk for processing.

In Calabarzon, coffee shop market is the biggest for fresh milk. Milk produced in other areas such as Bulacan, Nueva Ecija, Bukidnon and other parts of Mindanao are also sourced to augment the growing demand of the coffee market being served by Batangas processor/trader. This increasing demand for fresh milk emanates from the growing number of coffee shops in Metro Manila and other urban areas. For example, Starbucks has some 360 stores, Seattle's Best has 135 stores, Bo's Cafe has 91 outlets as of 2019. These companies are in the aggressive expansion mode while new entrants have already added to the long list of coffee outlets.



## Income and Profit Margin Analysis

### *Farmers Gross Income*

**TABLE 15. INCOME OF DAIRY BUFFALO FARMERS IN REGIONS 1-IVA, 2014, PHILIPPINES**

Region	Gross Income	Total Cost	Net Income	Net Cash Income
1	194,154	-89,449	104,705	32,674
2	217,379	-86,849	130,531	31,029
3- NIZ	460,599	-176,717	283,882	194,506
3-RIZ	344,069	-98,945	245,124	115,584
4a	276,596	-93,872	182,724	107,022
Ave	298,559.40	-109,166.40	189,393.20	96,163

Source: Lantican, et al., 2014

Smallholder buffalo-based dairy farmers in Regions 1-4 have average ratio of 1:1.7 cost vs income with cash income representing 50.77% of the net income. Income from milk sales represents 40-60% while increase in animal inventory represents 30-50% of the income. Under this set up, the major cost contributors are labor representing 20-55% whereas feeds and concentrates represents 15-35% (Lantican, et al, 2014).

VCA in dairy buffalo indicated that for sales of fresh pasteurized buffalo milk, farmers received 47% of the profit, 35% for processors, milk collectors and wholesaler-retailers have 11% and 7% profit share, respectively (Lantican, et al. 2014). For processed buffalo milk such as pastillas, white cheese, processors get higher profit share than the farmers.

## Profit Margin

The results of the survey among buffalo-based smallholder dairy farmers in Luzon indicate that the farmers get a higher share of the profit in marketed milk, followed by processors. Milk collectors get 11% of the profit margin while the retailers get 7% (Table 16).

**TABLE 16. FINANCIAL POSITION OF VC PLAYERS PER LITER OF BUFFALO MILK, REGIONS 1-4, PHILIPPINES**

Player	Product	Cost (PhP)			Selling Price (PhP)	Profit (PhP)		Margin to retail price (PhP)	
		Total unit cost	Added unit cost	% added unit cost		Unit Profit	% Profit	Unit margin	%
Farmer	Raw milk	18.3	18.3	35	48.8	30.4	47	48.8	42
Milk collector	Raw milk	55.2	6.4	12	62.3	7.1	11	13.5	12
Processor	Fresh Milk	84.4	22.2	43	107	22.6	35	44.7	38
Retailer	Fresh Milk	112	5	10	117	5	7	10	8
Total			51.9	100		65.1	100	117	100

Source: Lantican, et al., 2014

However, it appears that profit margin varies depending on the product for market as shown in the Table 17. But generally in most of the products sold in the market, the processors have a bigger share of the profit margin than the farmers.

**TABLE 17. PROFIT MARGINS FROM PASTEURIZED FRESH MILK, CHOCO MILK, AND WHITE CHEESE BY VARIOUS PLAYERS IN THE DAIRY BUFFALO VALUE CHAIN**

VC PLAYER	Product Being Marketed		
	Pasteurized Milk	Choco Milk	White Cheese
Farmer	47	28	37
Milk Collector	11	0	0
Processor	35	55	49
Wholesale/retailer	7	17	14

Source: Lantican, et al., 2014

Among the cattle dairy farmers in CALABARZON-Region IV-A the cost structure of smallholders and processor in a 2014 VCA are shown below (Table 18).

**TABLE 18. COST STRUCTURES OF DAIRY CATTLE MILK PRODUCERS AND PROCESSORS, CALABARZON, 2014, PHILIPPINES**

ITEM	Dairy Farmer	DMF	Milk Processor
Cost	19.33	15.82	47
Sales	24	24	55
Profit	4.67	8.18	8
% Profit	19%	34%	15%

Source: NDA Operations Unit

## Enabling Environment

### *Institutional Actors and Supporting Organizations*

#### *Implementing Institutions*

The National Dairy Authority is the lead agency of the government for development of the domestic dairy industry. It was created in 1995 under R.A. 7884 in the pursuit of national self-sufficiency in milk and dairy products vital in the attainment of self-reliant and independent Philippine economy in the provision of proper nutrition and generation of employment opportunities. NDA sustain the dairy development programs initiated by the Philippine Dairy Corporation as well as that of the Bureau of Animal Industry through the establishment of dairy zones, build-up of dairy herds, organization of dairy cooperatives, and provision of assistance in marketing and enterprise development.

The Philippine Carabao Center established under R.A. 7307 in 1993 compliments the initiatives of NDA by way of transforming the indigenous carabaos to be producers of milk and meat through crossbreeding with the dairy buffalo genetics. PCC has established gene pool of purebred dairy buffaloes from where superior sires are selected as semen donors for use in the national carabao upgrading program. PCC's frontline service is the provision of superior dairy buffalo genetics through artificial insemination, and training of AI technicians and support to buffalo-based enterprise development, activities which are research-based in general.

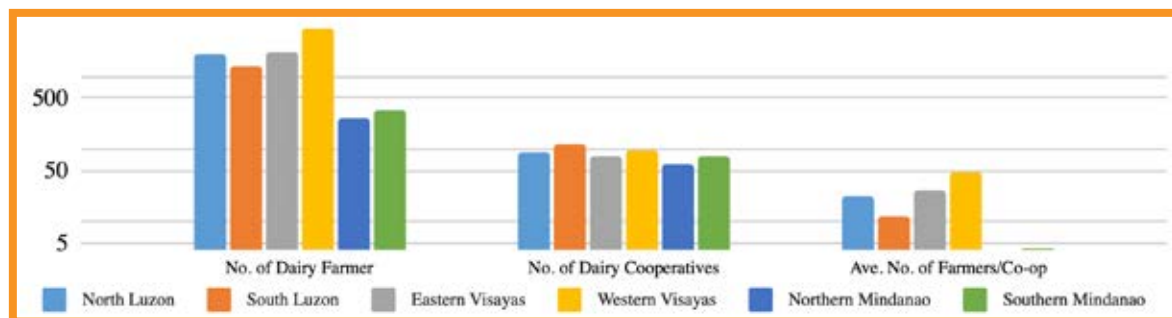
The role of the Bureau of Animal Industry in dairy development in the early years has been transferred to the NDA. Today BAI serves as the coordinating entity in the Unified artificial insemination (UNAIP), with its semen processing facilities producing frozen dairy cattle semen, and supplying the same to LGU and other AI technicians in all regions of the country. UNAIP consolidates reports of artificial inseminations in dairy cattle, carabaos, beef cattle and goat.

### Private Sector Association

Dairycon - Dairy Confederation of the Philippines is the first national organization of smallholder dairy farmers formed by original five dairy federations. Dairycon conduct annual Dairy Congress and such serves as a forum for various dairy groups to come together to see the latest in dairy technology, dairy equipment, products, and discuss new developments and other issues.

The dairy cattle raisers throughout the country are members of some 519 dairy cooperatives. Some cooperatives are well developed and has more membership whereas some have limited membership as shown in the 2018 summary below (Table 19).

**TABLE 19. NUMBER OF COOPERATIVES OF DAIRY CATTLE FARMERS, 2018, PHILIPPINES**



AREAS/ZONES	No. of Dairy Farmer	No. of Dairy Cooperatives	Ave. No. of Farmers/Co-op
North Luzon	2,002	91	22
South Luzon	1,346	115	11.7
Eastern Visayas	2,104	77	27.3
Western Visayas	4,525	95	47.6
Northern Mindanao	256	63	4.06
Southern Mindanao	330	78	4.2

Source: NDA Operations Unit

**NEFEDCO**- is a federation of primary cooperatives of buffalo dairy farmers, mainly in Nueva Ecija being the national impact zone of the PCC's development program. Its main role is to assist the various primary cooperatives members in processing and marketing of the buffalo milk. It has established storage and processing facilities, accepts milk deliveries from members, process milk into various dairy products and serve as wholesaler/retailer as well.

### **Research and Extension and Information Institutions**

Several research-related institutions are listed on the Table 20. The institution in the country solely dedicated to dairy research, training and extension is Dairy Training and Research Institute (DTRI) under the umbrella of UP system, located at UP Los Banos, Laguna. DTRI was established in 1962 through assistance from UNDP to serve as a specialized research, training and extension unit for dairying. Through the years, however, DTRI's ability to carry out its original purpose has been constrained by funding as well as system's structure.

**TABLE 20. LIST OF INSTITUTION/AGENCIES INVOLVED IN DAIRY-RELATED RESEARCH AND EXTENSION, PHILIPPINES**

Institution/Entity	Research	Extension	REMARKS
Dairy Training and Research Institute (DTRI)	x		Administratively under the umbrella of UP @ Los Banos
Dairy Training and Research Institute (DTRI)	x		Research funding agency under DA
Philippine Council for Agriculture and Fisheries Resources Research and Development (PCARRD)	x		Research funding agency under DA
Agricultural Training Institute		x	Under the umbrella of DA
Philippine Carabao Center	x	x	Research and extension mainly on carabao dev and biotechnology
State Colleges and Universities (SCUs)	x	x	Research and extension is only a part of its major function of instruction
Local Government Units (LGUs)		x	Involved mostly in animal health and AI services
DA Regional Field Units (RFUs)		x	Involved mostly in animal health and AI services
Bureau of Animal Industry	x	x	Extension services in support of national programs

State Colleges and Universities also carry the role to do research and extension on top of its main role in instruction. In fact, some universities operate their institutional dairy farms, albeit mostly for college instruction rather than focus on the dairy as an enterprise and use the same as medium for training dairy entrepreneurs. And while the number of SCUs in the country are many, conversely there are limited number of teaching staff with adequate training on dairying, and thus very few institutions offer degree in dairy science.

The Philippine Council for Agriculture, Fisheries and Natural Resources Research and Development (PCARRD) by its nature does not conduct but rather fund research, and its Livestock Division is cognizant of the needs of the dairy sector in the Philippines. Likewise, the Bureau of Agricultural Research (BAR) provide funding for research and has supported important dairy-related research in the past.

### ***Local Government Units***

LGUs have important roles, first is in the provision of first line service to the farmers in the form of extension services. Many LGUs have full time livestock technicians and/ or veterinarian participating in doing animal health related services. There are also livestock technicians trained to do artificial inseminations in their service areas. The business enabling roles of LGU comes in several forms such as participating by cost sharing in school milk feeding program when fund for the purpose was not yet regularly provided by the national government. Moreover, some LGUs passed Ordinances for allocation of fund for buy back of dairy animals for boil up dairy inventories in their respective communities. Examples of this initiative are San Jose City, Nueva Ecija (Ordinance No. 012-34), Alaminos, Pangasinan (Ordinance No. 170-2013) and San Agustin, Isabela (Ordinance No. 2008-05).

### ***Financial Service Providers***

The two main financial service providers for dairy production in the country are Land Bank of the Philippines (LBP) and the Development bank of the Philippines (DBP). In the desire to enhance the dairy program development, the National Dairy Authority initiated special credit windows with these two major banks.

**Development Bank of the Philippines (DBP)** in partnership with NDA tailored a credit facility for dairy projects entitled “Sustainable Agribusiness Financing Program for Dairy Industry” for smallholders. The program defines smallholder dairying as an operation with base herd of 20-25 cows, a size of operation deemed appropriate to generate adequate income as a specialized enterprise. The program imposes interest rate of 8-10%, depending on the perceived risk upon evaluation of the bank. If a conduit is used in credit-availment say a cooperative, the interest can go up to 18-20% due to service charges.

**Land Bank of the Philippines (LBP)** - Landbank-NDA MILK Program - Masustansyang Inumin Para sa Likas na Kalusugan (MILK) program was launched in 2013 with the objective of improving domestic milk production thus reducing import dependency through provision of credit and technical support to industry players. NDA will provide P30.0 million as guarantee fund to cover all risks, except fraud, on all loans issued by LBP under the program. The interest rate adopts the regular LBP rate, with loan ceiling of LBP equivalent to 80% of the total project cost. The common issues among the borrowers under the program is the difficulty of meeting the LBP requirements, and the long processing period for the loan.

**Department of Agriculture** also redesigned a facility for smallholder farmers featured by fast, convenient and affordable credit termed PRODUCTION LOAN EASY ACCESS (PLEA) PROGRAM. Other than its simplicity, easy access and affordable credit, it synchronizes the provision of support services such as free insurance, extension and marketing. PLEA is non-collateralized and harness the cooperatives, co-op banks, organizations and NGOs as conduits. It has a maturity period of 2-10 years and with interest of 6%/annum. In fact, the interest rate is used to cover the services of the conduit entity and thus there are no other service charges that would make the interest rate higher than 6%. The program pegged the maximum loanable amount to P150,000.0

## Regulatory and Policy Framework

### ***Dairy Development Act***

The declaration of national policy on dairy development to achieve self-sufficiency in milk to improve health and standard of living of the Filipinos has been articulated early enough in 1964 under R.A. 4041 entitled “An Act to Develop the Dairy Industry”. This policy is reiterated under Batas Pambansa 21, “Dairy Development Act of 1979” when the national government created the Philippine Dairy Corporation to enhance the dairy development in the country. The same policy is maintained and clearly declared in R.A. 7884, the legislation that created the National Dairy Authority in 1995.

### ***Food Safety Act:***

In August 2013, Republic Act No. 10611 “The Food Safety Act of 2013” was signed into law. The Act strengthens the food safety regulatory system in the Philippines that protects consumer health and facilitates market access of local food and food products. The law also sets standards for food safety from harvest to manufacturing, processing, handling, packaging, distribution, marketing, food preparation, and up to consumption.

Under this law, the DA is responsible for food safety in the primary production and post-harvest stages of the supply chain. The DOH will be responsible for the safety of processed and prepackaged foods, both locally produced and imported, and the conduct of epidemiological studies. Local government units (LGUs) will monitor the compliance with food safety standards of food businesses such as slaughterhouses, dressing plants, wet markets, supermarkets, school canteens, restaurants, catering establishments, as well as street food sales. The Department of the Interior and Local Government, in collaboration with the DA and DOH will supervise the enforcement of food safety and sanitary rules and regulations. A Food Safety Regulation Coordinating Board was created to monitor compliance with the law, coordinate management and planning during food safety emergencies, and establish policies and procedures for coordination among agencies involved in food safety.



### ***Good Animal Husbandry Practices Program (GAHP)***

Realizing the need to establish a farming management practice that provides greater confidence in consumers' expectations that animal products and by-products are safe and fit for human consumption, while ensuring the welfare of both farm workers and animals without any degradation to the environment, the Philippine National Standards (PNS): Code of Good Animal Husbandry Practices (GAHP) was developed in 2008.

With the Republic Act 10611 or the Food Safety Act of 2013 approved into law on August 23, 2013, and with its implementing rules and regulations through a Joint Administrative Order 2015-0007 between the DA and the Department of Health (DOH) signed on February 20, 2015, the Bureau of Animal Industry (BAI) was appointed as the Food Safety Regulatory Agency responsible for food derived from animals. With this, the GAHP Certification Program was formally transferred from the now Bureau of Agriculture and Fisheries Standards (BAFS) to the BAI on January 2017.

At present, the management of the GAHP Certification program is under the Animal Health and Welfare Division (AHWD) of the BAI. There are a total of 87 trained GAHP Inspectors from the BAI and from the 16 different DA - Regional Field Offices (RFO) all over the country.

### ***Hazard Analysis and Critical Control Points (HACCP)***

Companies involved in the manufacture, processing or transportation of food products, high hygienic standards are of paramount importance. The concept of Hazard Analysis and Critical Control Points (HACCP) is guided by established regulatory requirements for the food industry. HACCP certifications aim to systematically identify any factors that might present a potential health risk to consumers, allowing chance to avoid hygienic hazards or lower their risk to acceptable levels. The certification is based on the Codex Alimentarius, an international code of conduct for the industry.

### ***Access to Extension Services and Technologies***

Local government devolution greatly affected the extension service on livestock. When the function on livestock development and extension were given to LGUs, there is no devolution of funding. And since priorities of the LGUs are limited on livestock development, the devolved AI technicians became generalist, and this resulted in reduced focus on livestock related services.

But granted that there are available field technicians to do the service, most of the field staff lacked the necessary technical training and field experience dairying to effectively deliver the desired services to the farmers.

Recent developments on the enforcement of the Mandanas- Garcia Ruling, the LGUs will be provided with the budget that can be used for capacity building and retooling activities to perform the devolved functions.

### **Tariff and Trade Regulation**

#### ***Tariff on Milk and Dairy Products***

The country's participation in Uruguay Round in 1994 to establish "a fair and market-oriented trading system" in agriculture by eliminating the so called "trade barriers and trade-distorting support to agriculture" calls for tariffication of all non-tariff barriers and the progressive reduction of tariffs over the years. Under the negotiation, the Philippines was allowed to impose 18.0 % tariff on milk and dairy products. However, the Philippines opted to apply only 3.0 % tariff as a pro-consumer policy.

This stance was followed by the country's signing to the Asian Australian New Zealand Free Trade Agreement (AANZFTA) that allowed entry of milk and dairy products from major exporting countries such as Australia and New Zealand tariff-free effective 2019. Similar conditions are contained in the India ASEAN Free Trade Agreement (IAFTA). Of course the ASEAN Trade in Goods Agreement (ATIGA) that became effective in 2010 and replaced the Agreement on Common Effective Preferential Tariff of the ASEAN Free Trade Area (CEPT-AFTA) also allowed duty free trade covering milk and dairy products.

On the other hand, Tariff Schedule for Most Favored Nation (MFN) on dairy products are contained in EO 20 and covered the period 2017-2020. EO 20 was overtaken by EO 23 that extended the tariff rate reduction on some products including dairy. Specifically, tariff for butter was reduced from 7% to 5%, buttermilk from 3 % to 1%, and cheese from 3% to 1%. These concessions will remain in place until December 21, 2020.

To date the aggregate tariff rates applied on imported dairy products is 2% and the details are shown on the next page (Table 21).

**TABLE 21. AGGREGATE TARIFF RATES APPLIED TO DAIRY PRODUCTS, 2019, PHILIPPINES**

Dairy Products	Tariff Rate
Cheese	6%
Evaporated milk	5%
Cream	5%
Condensed milk	5%
Liquid Milk (RTD)	3%
Curd	3%
Butter/Butterfat	2%
Skimmilk Powder	1%
Wholemilk Powder	1%
Buttermilk/Buttermilk Powder	1%
Whey Powder	0%
Others	7%

Source: PSA and National Dairy Authority

### ***Mislabelling of Milk Products***

The competitive advantage of locally produced milk is lodged on its being fresh. Fresh milk is premium milk and its market is growing in urban communities, particularly among highly salaried young professionals. And since shelf life of fresh milk is only 7 days at best, no company will find it competitive to bring in real fresh milk from overseas sources. However, since the general consuming public has been used to reconstituted milk, and of late UHT milk, the big milk processors mislabel such as “fresh milk” . In local supermarkets, mislabelled “fresh milk” occupy long shelves, with some UHT milk are even displayed in chillers while most are lined in shelves at room temperature. Examples of these products are shown on Figure 3.

**FIGURE 3. EXAMPLES OF MISLABELLED “FRESH MILK” PRODUCTS IN LOCAL SUPERMARKETS**



## Upgrading Interventions

Milk presents good commercial opportunities for smallholder farmers, considering the competitiveness of the fresh milk in the domestic market, and also because the value chain for fresh milk is relatively short and not characterized by sophisticated levels of brokerage. This means that farmers can directly deal with buyers, both informal and informal traders and processors. Having identified the gaps in the entire value chain, the needed interventions in order for farmers to harness the full potentials of their dairy operations is summarized on the next page (Table 22).

**TABLE 22. SUMMARY OF RECOMMENDED INTERVENTIONS ON ISSUES IDENTIFIED IN VCA**

Recommended Interventions	Specific Upgrading Objectives	Challenges	Expected Outcomes
<b>Strategic Component: Increase Milk production</b>			
<b>Increase Herd Build Up</b>			
Front load stock infusion	<ol style="list-style-type: none"> <li>1. Attain critical number of dairy stocks to enhance herd growth and production</li> </ol>	<ol style="list-style-type: none"> <li>1. Funding support for stock infusion in public funds may not be readily available.</li> <li>2. Special credit window for dairy dev program with low or zero interest need to be developed</li> </ol>	<ol style="list-style-type: none"> <li>1. Faster increase in dairy stocks</li> <li>2. Faster increase in milk production</li> <li>3. More farmers are benefitted and will generate more income</li> </ol>
Improve quality and quantity of AI services	<ol style="list-style-type: none"> <li>1. To train more AI technicians to increase AI diffusion to produce more dairy animals</li> <li>2. To retrain AI technicians to improve success rate</li> <li>3. Implement calf production (calves on the ground) contract</li> </ol>	<ol style="list-style-type: none"> <li>1. Low number of active AI technicians after training (about 50%)</li> <li>2. Density of breedable female animals is thin</li> <li>3. To target 2x this average (76/ Tech/year in PCC; 100/tech/year under UNAIP will take extra efforts</li> </ol>	<ol style="list-style-type: none"> <li>1. Faster increase in production of dairy stocks</li> <li>2. More farmers can benefit thru milk production from additional stocks</li> </ol>

Recommended Interventions	Specific Upgrading Objectives	Challenges	Expected Outcomes
<b>Strategic Component: Increase Milk production</b>			
<b>Increase Herd Build Up</b>			
Focus on rearing replacement heifers	1. To ensure that female calves born are reared properly and be used as replacement heifers	Assured market and better price for island born heifers	1. Hasten increase in dairy stocks at least cost 2. Beneficial to local dairy farmers being the source of replacement heifers , thus more income, instead of importation
Directed backcrossing	To harness the growing number of 50:50 crossbred females to upgrade to 75:25, then 82.5:12.5 to be able to contribute to increase in dairy stocks	1. Identification and tagging of crossbreds and locating the same for Ai service 2. Low % of crossbred owners milk their animals	1. Faster and High efficiency system of increasing potential dairy animals without stock infusion 2. More crossbred owners will use their backcrosses for milking
Reduce pre and post weaning mortalities	To be able to save for future use the calves born, particularly the females. These are products of long gestation period involving time and cost	Weak extension services	Increase income of dairy farmers
Use of sexed semen	To fast track the production of more female calves from 50:50 to at least 85:15 ratio to increase the dairy stocks	1. High cost of sexed semen 2. Need to retrain AI technicians on the use of sexed semen 3. Reduced fertility rate compared to use of traditional unsexed semen	Faster rate of build- up of dairy stocks More farmers can raise animals for dairying
<b>Increase Milk Productivity</b>			
Implement wide scale DHI	1. To monitor performance of all dairy animals and be able to select best performing for expanded breeding and to cull out less productive animals. 2. To monitor animal performance and recommend institute corrective measures for better performance	Low density of dairy animals making milk sampling and test costly Enticing dairy farmers to participate in DHI Need for faster feedback to farmers on status and needs of their animals	Improvement in milk productivity per animal Higher income for dairy farmers Reduction in reliance on imported milk and dairy products
Improve extension services	To ensure that the appropriate feeding and management practices are adopted by dairy farmers for better animal productivity	Limited number of suitable training facilities with expertise	Improve production and reproduction of dairy animals Better income for dairy farmers
Aggressive feed resource dev program	To ensure that dairy animals meet nutritional requirements for high production and reproduction	Limited land for forage production Seasonality of moisture for sustained forage /feed production	Improved animal performance and productivity Higher income for dairy farmers

Recommended Interventions	Specific Upgrading Objectives	Challenges	Expected Outcomes
<b>Strategic Component: Improve Milk Quality and Safety</b>			
Improve cold chain	To reduce losses post production as milk as a product is highly perishable	Lack of cold handling facilities from farm to processing center	Reduce losses due to milk spoilage and poor milk quality Improved income of dairy farmers Increased availability of fresh milk Improved quality and safety of milk and dairy products
<b>Strategic Component: Improve Competitiveness and Sustainability</b>			
Expand SMFP	To guarantee sure market for the domestic milk and develop future demand for fresh milk	Expanded and sustainable of public funding for school milk feeding program	Expansion of domestic dairy sector Increased income for more farmers Reduce incidence of malnutrition among school children
Aggressive promotion of fresh milk consumption	To increase per capita consumption of milk, particularly fresh milk, to expand share of the domestic milk in the milk and dairy market	Palate of general consuming public accustomed to reconstituted milk and milk powder Growing demand for dairy alternatives	Growing demand for dairy alternatives Better nutrition for the consuming public
Reduce production cost	To increase profit margin of dairy farmers and to keep them in the dairy production business	Rising cost of concentrate feeds and other production inputs	Increase profit margin among dairy farmers More farmers enticed to engage in dairying
Promote dairy hub development	To improve link of smallholders farmers to market with assured profit margin	Additional Investment in facilities for collecting, cooling, bulking and processing of milk Organizing and management of dairy hub	Smallholder farmers are guaranteed market and price for their milk Smallholders have stronger bargaining position in the complicated market
<b>Strategic Component: Improve Human Resources</b>			
Train dairy farmers	To ensure that dairy farmers are following appropriate dairy production and post production practices	Smallholder farmers are resource/ cash deficit and investing on inputs to meet the requirements of dairy animals is often least priority	Dairy farmers have better understanding on how to make the dairy operations more profitable in the longer term
Train dairy extensionists	To ensure that extension agents are well versed with the correct dairy production practices when they go out to extend services to dairy farmers	LGU technicians are multi-tasked, and since the number of available technicians is limited, focus on dairy extension is often compromised	More highly qualified extension persons directly interacting with dairy farmers in the field
Install Dairy Science Courses in selected Universities	To be able to produce adequately trained graduates on dairy science that can be engaged in research, training and extension	Current limited technical competencies in Dairy Science in some prospective universities.	More warm bodies with technical competencies in dairy science to be engaged in the dairy industry
Improve coordination among key implementing agencies	To improve program implementation, attain better efficiency, and higher chance of achieving targets	How to have one strong coordinating office to orchestrate the moves of all the participating agencies	More efficient use of available resources and time, and attainment of desired targets/objectives

# Competitive Analysis

## Price Competitiveness

Prices of RTD milk in Manila supermarket including the commercial brands and the locally produced fresh milk are presented in Table 23. The commercial brands of RTD are available in one liter sterilized Tetra Pak carton in UHT form with price range from P74.00 to P94.00 per liter. The leading brands are labelled as “FRESH MILK”, although by strict technical definition, it cannot be classified as such.

On the other hand, the price of imported UHT in bulk is P38.75/liter, whereas the prices of skim milk powder and whole milk powder, when converted into liquid UHT equivalent are P26.42 and P32.14/liter, respectively.

Locally produced milk, available in pasteurized fresh form in plastic bottles, carry price that ranges from P85.00 to P110.00/liter. In a consuming public that is used to low-priced reconstituted powder milk, the locally produced milk cannot compete price wise. This is particularly true for those consumers that have no ready access to refrigeration facilities such as those in remote rural areas.

Based on the 2019 total milk and dairy supply, the share of the RTD milk was only 4.3%, and of this domestic fresh milk represented only 20.74%. What is interesting is that during the period 2015-2019, the growth of imported RTD was on the average of 15.65%, whereas the average growth in local production was only 3.94%.

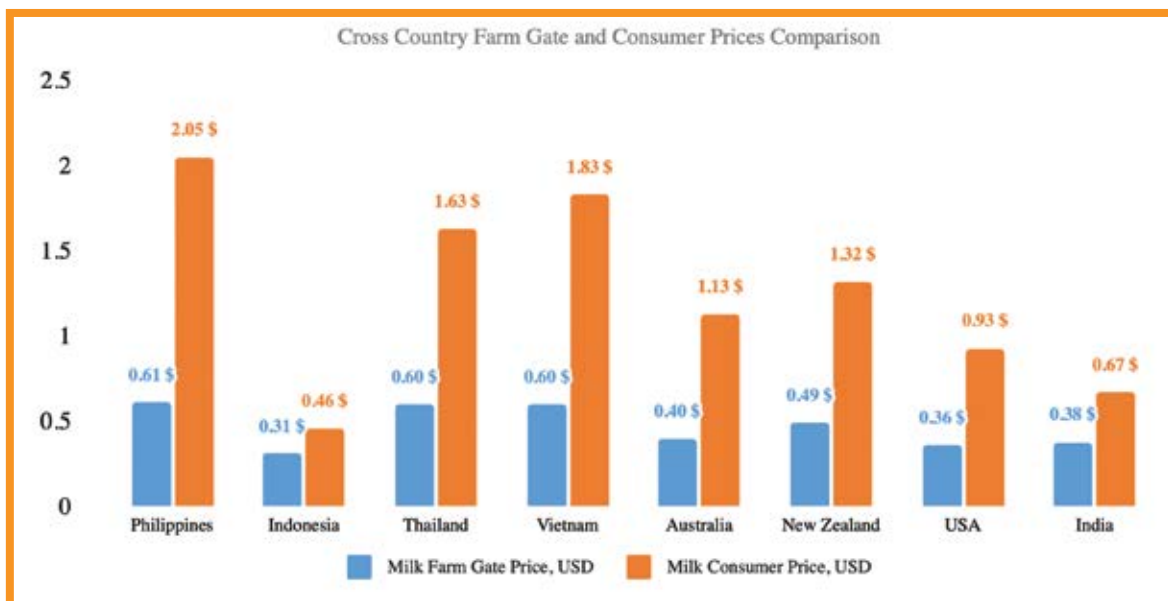
**TABLE 23. COMPARATIVE PRICES OF IMPORTED AND DOMESTIC MILK IN METRO MANILA MARKET**

ITEM	Price/liter*	Remarks
Imported RTD milk ( bulk price, CIF)	38.75	based on bulk purchase
Imported powder milk ( bulk price, CIF), estimated RTD equivalent		
Skim milk powder	26.42	based on bulk price of 102.48/kg, UHT is 26% SMP
Whole milk powder	32.14	based on bulk price of 123.00.kg, UHT is 26% of WMP
Retail/supermarket prices of RTD milk (Manila supermarket)		
Domestic, fresh milk, pasteurized	85-110.00	Manila supermarket prices
Commercial RTD milk, UHT/reconstituted*	74.00-94.00	Manila supermarket prices, average of 16 commercial brands of RTD

\* Source: NDA Planning and SM supermarket online, Oct 2020.

A review of the farm gate prices of milk in selected Asian countries as well as those milk exporting countries indicate that the Philippines has the highest farm gate price as well as consumer price as shown in the Table 24. Farm gate price of milk in Indonesia is almost half that of the Philippines, whereas those in USA and Australia is only 59% and 65 % that of the domestic milk farm gate price.

**TABLE 24. CROSS COUNTRY FARM GATE AND CONSUMER PRICES COMPARISON**



Country	Milk Farm Gate Price, USD	Milk Consumer Price, USD	% Difference of farm gate price to consumer price
Philippines	0.61 \$	2.05 \$	70%
Indonesia	0.31 \$	0.46 \$	33%
Thailand	0.60 \$	1.63 \$	63%
Vietnam	0.60 \$	1.83 \$	67%
Australia	0.40 \$	1.13 \$	65%
New Zealand	0.49 \$	1.32 \$	63%
USA	0.36 \$	0.93 \$	61%
India	0.38 \$	0.67 \$	43%

Source: IFCN 2018 Report



## Quality Standards and Comparison

### a. *Fresh Milk vs Powder milk*

While powdered milk and fresh milk both contains the same kinds of essential vitamins and minerals, the latter has more B-complex vitamins- including vitamins B-5 and B-12. Vitamin B5 aids in keeping cell membranes healthy. Vitamin B12 supports efficient oxygen transport within the arteries. The body requires small amounts of these B vitamins each day for optimum health. Fresh milk also contains slightly more phosphorus and selenium than reconstituted milk. These are critical in enzyme function. These nutrients also support cellular metabolism, improve thyroid functions and maintain health cell membranes. Moreover, most people prefer the taste of fresh milk than reconstituted powdered milk because fresh milk has richer and complex flavor. On the other hand, powder milk has longer shelf life and does not require refrigeration.

### b. *Raw Milk, Pasteurized Milk and UHT Milk*

Raw milk is milk from dairy animals that has not undergone any processing, while pasteurized milk is raw milk subjected to pasteurization temperature of 75oC for 15 minutes, while UHT is raw milk subjected temperature of 135oC for 2 seconds. Analyses of nutrient composition and microbial parameters of bovine raw milk from pasteurized milk and UHT milk are shown in the Table 25. For all the parameters tested, there is no significant difference except for an increase in Urea level and decline in microbial parameters as the treatment temperature increases (Pestana et al. 2015).

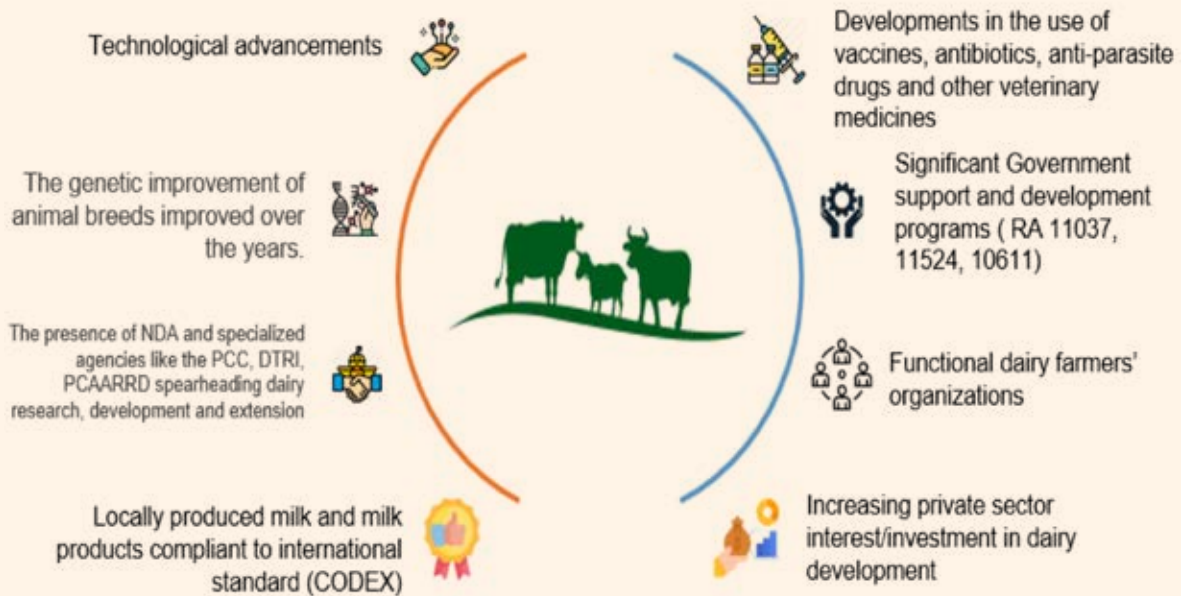
**TABLE 25. PROXIMATE AND PHYSICOCHEMICAL COMPOSITION AND MICROBIAL PARAMETERS IN RAW, PASTEURIZED AND UHT BOVINE MILK**

Parameter	Raw Milk	Pastuerized Milk	UHT Milk
Moisture (g/100g)	88.2	88.73	88.65
Protein ( g/100g)	3.2	3.19	3.2
Total fat (g/100g)	3.5	3.07	3.15
Lactose (g/100g)	4.28	4.25	4.27
Total solids (g/100g)	12.06	11.54	11.56
Free-fat dry extract ( g/100g)	8.47	8.47	8.41
Urea (mg dL-2)	17.37	21.57	25.57
Somatic cell count ( 1000/ml)	619.79	365.33	59.08
Total bacterial count ( 1000 UFC mL-1)	6470.21	1047.58	1031.83
n	12	12	12

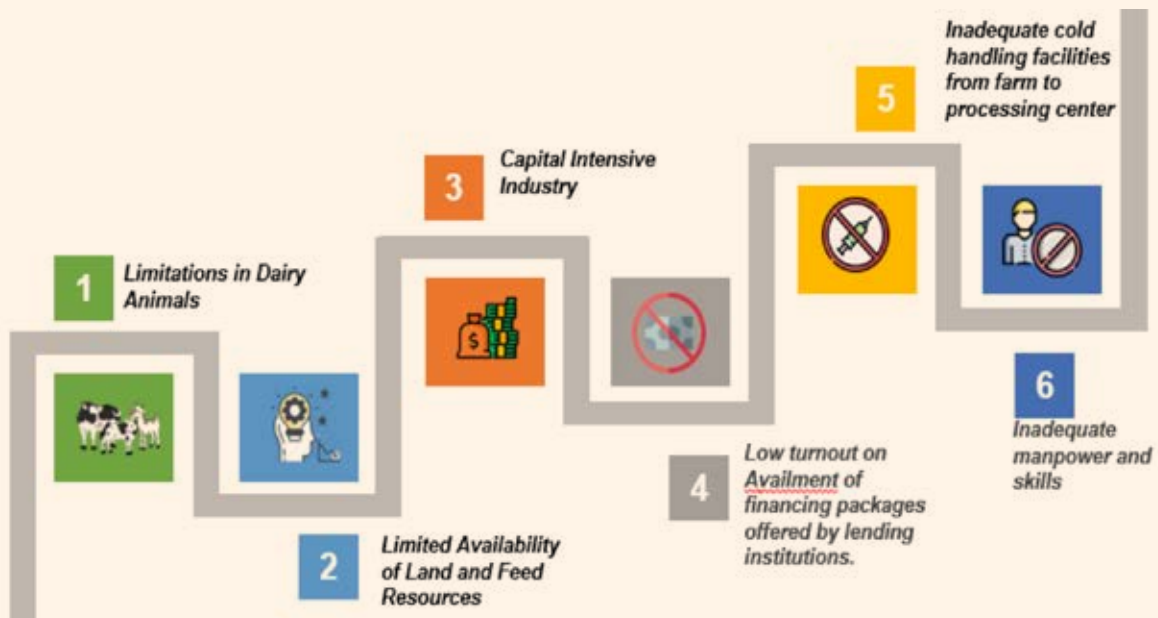
Source: Pestana et al. 2015, American Journal of Food Technology, 10:265-272

# SWOT ANALYSIS

## Strengths



## Weaknesses



# SWOT ANALYSIS

## Opportunities



## Threats



Climate Change



Land conversion



Ageing dairy farmers



Cheaper import substitutes



Anti-milk and meat propaganda campaign

# TARGET SETTING

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The important guiding principles in the course of sub-sector development are as follows:

- a. Sector Competitiveness** - Enhanced competitiveness goes hand in hand with the ability to innovate and to invest in/or apply best practices, new technologies and business models that enhance efficiency, reduce cost and boost levels of production along the value chain.
- b. Dairy Sector Transitioning** - the sector should transform from smallholder semi-subsistence level farming to an industry. This means the supply of raw milk relies fully on commercial dairy farming systems and professionals and inclusive milk collection, processing and marketing organizations. These organizations could be owned by smallholders, medium scale and/or large scale dairy farmers. Their membership should follow business approach and are willing to invest in “Dairy as a business” and in knowledge and skills development.
- c. Dairy Zone/Impact Zone Focus** - development and interventions shall put premium on the identified dairy zones/impact areas giving attention to suitability of dairying based on feed resource and potential access to market.

The physical targets for each of the action program are shown on the next page (Table 26). The presentation of targets is grouped under Herd Build up, Productivity Improvement, Enterprise Development, and Human Resource Capacitation.

**TABLE 26. PHYSICAL TARGETS, 2020-2025**

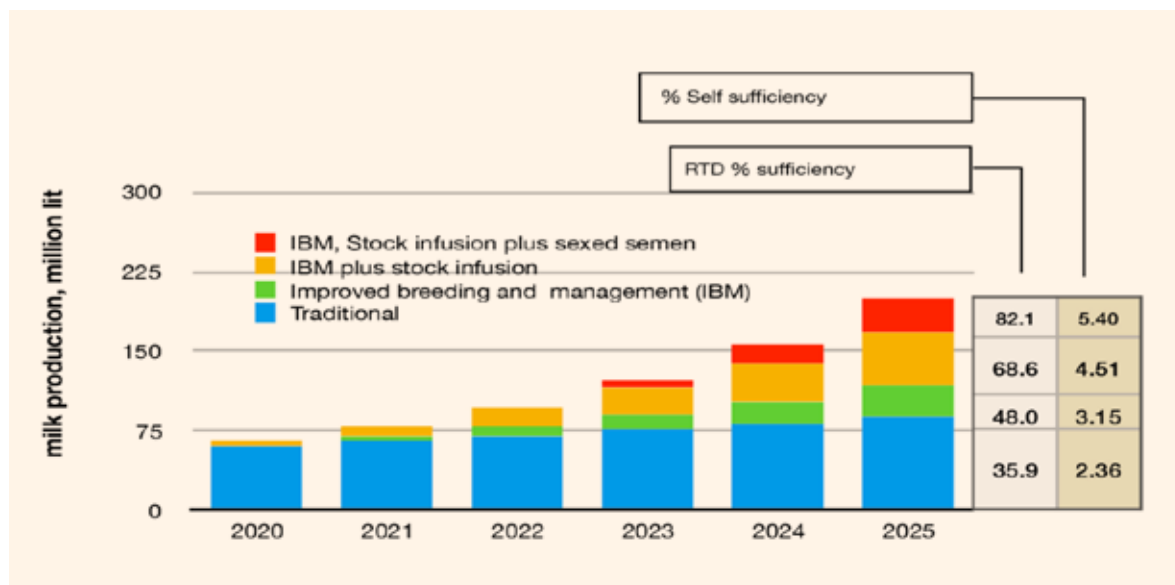
ACTION/ PROGRAM	Description/ Activity	2020	2021	2022	2023	2024	2025	TOTAL
<b>Herd Build-Up</b>								
Stock Infusion	Cattle	300	4,000	4,000	4,000	4,000	4,000	20,300
	Goat	2,750	2,000	2,000	0	0	0	6,750
	Upgrading non dairy cattle	30,000	30,000	30,000	30,000	30,000	30,000	180,000
	Dairy Cattle bred*	12,979	19,172	27,470	37,170	48,508	61,763	207,062
	Indigenous carabao bred	77,672	88,990	100,168	111,190	122,038	132,692	632,750
	Dairy buffalo bred*	9,655	10,813	12,110	13,563	15,190	17,012	78,343
Internal Herd build- up	***Dairy cattle buy back	170	2,358	2,077	2,551	3,145	3,866	14,167
	***Dairy buffalo buy back (all female)	525	2,183	2,495	2,806	3,118	3,430	14,557
	Additional AI Tech for Training	403	86	354	247	264	285	1,639
	Dairy farm/ calf rearing farm established*	1	2	2	2	2	2	11
<b>Productivity Improvement</b>								
Dairy Herd Improve- ment	Milk laboratory established	1	1	1				3
	Data Processing facility established	1	1					2
	Animal Registry system	1						1
	Forage Propagation Center and Promotion	0	1	2	2			5

cont'd ►

ACTION/ PROGRAM	Description/ Activity	2020	2021	2022	2023	2024	2025	TOTAL
<b>Enterprise Development</b>								
Support to enterprise	Dairy hub established	1	1	1	1			4
	Milk processing facilities established/ accredited	10	10	10	10			40
	**School Milk feeding, students coverage, million	2	3	3.04	3.09	3.14	3.18	17.45
	Support to credit window	0	1	1	1	1	1	5
Milk quality and safety assurance program	Compliance to all regulatory standards	farm and products	farm and products	farm and products	farm and products	farm and products	farm and products	farm and products
Milk Promotion/ advocacy	Improving consumption of locally produced milk	5	10	10	10	10	10	55
R and D	Improving efficiency, profitability, and sustainability	10	10	15	20	20	20	95
<b>Human Resource Capacitation</b>								
Capability and com- petency im- provement	Dairy farmers	30,000	30,000	30,000	30,000	30,000	30,000	180,000
	Dairy Technicians	300	300	300	300	300	300	1,800
	Dairy Entrepreneurs	2,000	2,000	2,000	2,000	2,000	2,000	12,000

## Additive Effects of Various Interventions on Milk Production

Shown in the graph below are the estimated additive effects of the various interventions on overall milk production ending 2025. There are three major interventions, namely, a) improved breeding and management (IBM) resulting from the DHI with enhanced extension services, b) use of sexed semen for directed backcrossing thru artificial insemination, and c) stock infusion.



The statistical models for the forecast of requirements for milk and dairy products for the period 2020-2025 based on the data from 2002-2019. Increases in RTD imports were noted to spike starting in 2016 onward thereby a significant increase in projected RTD imports in 2020 to 2025. Based on these best fitted models, the forecast volumes of RTD imports, domestic milk production, and total milk and dairy imports were determined, and are the references for estimation of % self-sufficiency as well as RTD requirements percent sufficiency.

Incorporated in the projection of milk production is the increase in breedable female inventory, having used the actual NDA 2018 database, a figure much higher than the official report of PSA 2019. Also considered are the large inventories of buffalo crossbreds as reflected in the 2016 PSA special survey of dairy buffaloes, and the conversion of buffalo milk into cow milk-equivalent.



Average annual growth rates in inventories of breedable females from 2002-2019 is 3.0% in dairy cattle and 1.9% in dairy buffaloes while the estimate average annual growth rate in inventories of breedable females when subjected to improved breeding and management (IBM) without the use of sexed semen is 9.05% in dairy cattle and 7.0% in dairy buffaloes, and with the use of sexed semen is 19.28 % and 14.20%, respectively.

The projected milk production based on the traditional system without any intervention will only meet 35.9% of the RTD requirements or just 2.36% self-sufficiency by 2025. Improving breeding and management (IBM) can raise the RTD requirement sufficiency to 48.0 % and self- sufficiency to 3.15 % by 2025. IBM results in higher calf crop, low mortalities, higher rate of heifer retention, and higher milk yield per animal. Increasing higher impact of IBM is projected after 2025 onward.

Stock infusion as envisaged in the program can bring almost the same magnitude of effect as the use of sexed semen on the estimated milk production. When all the interventions are set in place, the RTD % sufficiency by 2025 is estimated to be 82% and % self-sufficiency is estimated to be a departure from the current 1.35 % to 4.5-5.4 %. Use of sexed semen results in higher inventory growth rate in female animals. Increasing impact of sexed semen on milk production is also seen after 2025 onward.

# STRATEGIES AND POLICIES

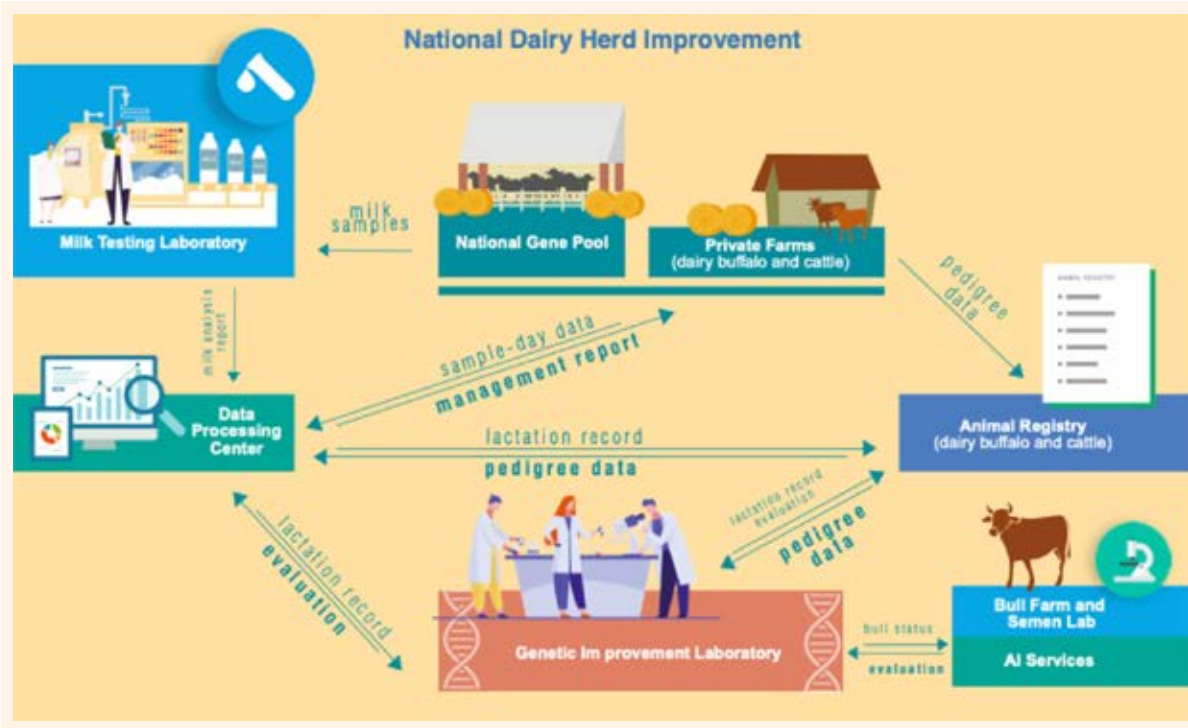
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The Key Result Areas and Strategies are presented below. The primary focus is to improve the dairy value chain to cover efficiency, effectiveness and inclusiveness in milk production, processing, and marketing, and secondly, to address systemic issues such as herd build-up, promotion of interventions and support to innovations in practical skills, feed and fodder supply, milk quality, and development of policy and regulatory environment.

## Improve dairy animal productivity

### **Implement Industry Wide Dairy Herd Improvement Program (DHI)**

This initiative shall harness the already existing dairy animals reared by thousands of dairy producers dominated in number by the smallholders. The objective of improving productivity in these animals will take considerable time as it will entail not only the dairy animals per se but also the dairy farmers. Among dairy animals, improvement in genetic potentials will need continuing selection and usage of selected animals generation after generation. Expression of the genetic potentials, however, is largely influenced by environment, mainly nutrition and management, and these items are under the control of the dairy farmer. Therefore, the envisaged DHI shall address the animal aspect by way of selection of good genetics, and also change in the behavior of the farmers through systematic and organized extension program.



An organized industry-wide genetic improvement imbedded in the National Dairy Herd Improvement Program (DHI) shall be implemented and sustained in order to improve milk productivity. This will entail industry-wide selection and utilization of best genetics generation after generation, to be complimented with the infusion of best genetics from outside sources. This will include regular milk tests, milk analysis, data analysis, and feedback system. As component of development requirements are the establishment of milk analysis laboratories, data processing facility, and establishment of Dairy Animal Registry.

The system shall also include organized extension services in the form of on-time feedback to the dairy farmers on the recommendations for improvement of management resulting from the regular milk test and data analyses in the DHI. Extension services of dairy experts is part of the system. This will entail advisory and extension services to improve feeding and nutritional regimen, shortening of calving interval through early rebreeding postpartum, reducing calf mortality, proper rearing of replacement heifers, among other practical items. DHI scheme and components are summarized below.

**Intensified Feed Base Development Program.** The program shall intensify efforts in the development of feed base. Included in this program is the promotion on the production and utilization of forage and silage, alternative feed sources, and optimum feeding regimen directed towards improvement in milk productivity. Activities under this program are as follows:

**Improved Fodder Seed Production Program.** Seed is critical input to enhance the productivity of fodder crops. To ensure supply of quality seeds to the farmers, production will be enhanced at the Forage and Pasture Experiment Station at Milagros, Masbate. It shall also ensure supply of forage planting materials for distribution to interested dairy farmers nationwide.

**Green Fodder Production Enhancement Demo Plots in Dairy Zones.** With the limited land under fodder cultivation, there is a need to focus to improve productivity of fodder crops. Setting up appropriate demo plots in strategic locations in dairy zones have been proven effective in encouraging dairy farmers to adopt improved fodder production.

**Corn Silage Production and Commercialization.** Through silage making large quantity of green fodder during period of plenty can be preserved for longer period without significant loss of quality and palatability. Good quality silage fed to dairy animals can reduce the requirements for concentrate feeds and thus can potentially reduce cost of feeding. NDA recommends that dairy farmers must have a buffer stock silage that will be sufficient for about 6 months to be used in case of emergencies. It will be made sure that the quality of silage produced is at the optimum to maximize its nutrients.

**Demonstration of Dairying Mixed with Plantation Crop.** There are large hectares of plantation crop such as coconut that can be developed as grazing lands for dairy cattle and can play an important role in the lives of rural people raising dairy animals. Fodder production from such lands can be enhanced substantially by introducing suitable pasture grasses and legumes. An integrated approach of raising dairy cattle on improved pasture under coconut will improve overall productivity of such land as have been shown elsewhere.

**Crop Residue Enrichment & Densification.** Crop residues form bulk of basal diet of ruminants in the tropics. Crop residues are not uniformly available across the country; some areas are surplus while some are deficit on regular basis. For such locations crop residues can be fortified with feed ingredients like copra cakes, rice brans, grains, molasses, and minerals and then densified into blocks or pellets to save on storage and transport costs. Also balanced ration in the form of complete diet or total mixed ration as per need of animals can be supplied for improved productivity.

**Concentrates:** Proper concentrates of key components in the feed formula for cattle will also be provided to ensure that necessary nutrient requirement are given to dairy animals.

## Fastrack Dairy Herd Build-Up

One major limitation in the country is the absence of indigenous dairy animals. Efforts of the government to initiate dairy development was carried through the introduction of dairy genetics, both of cattle and water buffalo, and lately dairy goat, albeit only in limited quantities. The other route of development is through crossbreeding the indigenous animals with the dairy genetics, however, this is a long process, punctuated by the very thin density of breedable animal population per farm, needing more than 20-35 years to come up with critical number of suitable dairy animals. To hasten herd build-up, several approaches are to be implemented as follows:

**Stock Infusion.** The program is to front load infusion of dairy cattle and dairy goat in the number of 20,300hd and 6,750hd, respectively from 2020-2025. Additional dairy buffalo can also be considered. These dairy animals shall be imported pregnant and inseminated with sexed semen resulting in more female offspring. Given appropriate breeding and feeding management, the infused animals can significantly increase in inventory and can contribute profoundly to milk production.

**Directed Backcrossing and Sexed Semen Usage.** This is deliberate efforts of locating, tagging, and breeding all existing female crossbreds, particularly F1 crossbreds (50:50) buffalo and dairy cattle, with the purebred dairy breed genetics to produce backcrosses with blood of dairy breed equal or greater than 75%. In order to fast track the attainment of the

targets in terms of female dairy animal inventories and in milk production, the existing AI system shall use sexed semen. Under this scheme, AI technicians shall be given additional incentives on the basis of number of female backcrosses produced on the ground.

Sexed semen for artificial insemination has been in commercial use in dairy cattle elsewhere resulting in about 85.0 % female offspring. The same technology shall be applied to domestic dairy cattle, dairy buffalo, and dairy goat in the wide-scale artificial insemination. This is estimated to increase female offspring ratio from 50:50 to 85:15, an increase equivalent to about 70.0%.

Sexed semen of dairy cattle is already commonly traded internationally, mostly coming from US and Canada, and to some extent EU. That of dairy buffalo is not that common but there are few European semen companies with sexed semen from elite dairy buffalo sires. The other option is to install semen sexing facilities to make sexed semen available from sires tested to best perform under local condition.

**Expansion of the Artificial Insemination Services.** Artificial insemination services shall be expanded from the current diffusion rate of 7.9% to as much as 30% of breedable female animals. It is projected that the current AI system shall prioritize the directed backcrossing program, and so the expansion of AI services to produce more crossbreds (50:50) shall involve training additional AI technicians. In the course of AI Intensification and expansion, AI services shall target on areas with denser animal population. This expanded coverage shall result in about 4 folds increases in the production of crossbred animals.

Efforts shall also focus on improving AI efficiency that shall result in increases in number of offspring and reducing calving interval. Likewise, increasing services per technician from the current 76-100 to 150-200 services/year through incentive schemes can bring significant increases in the production of potential dairy animals.

**Rearing of Replacement Heifers and Buy Back Scheme.** Replacement heifers are the future milk producers. But in the past years, proper rearing of replacement has not been given serious attention by smallholder farmers and has been one major reason for slow growth in inventory of dairy animals. To attain the desired level of replacement heifer availability, smallholder dairy farmers shall be trained and shall be given incentives in the

form of ready market and good price for replacement heifers, a kind of program diverting the investment in herd build up from relying on foreign sources. This will also require the dairy farmers to get enrolled in the DHI in order that there is sustained monitoring and extension services, added to the need to ensure the genetics of semen being used for AI.

Scheme to procure locally produced suitable dairy animals shall be made available in order that extra animals not anymore needed by dairy farmers can be saved for dairying instead of these animals ending up to slaughter house. These animals shall be given on loan to interested farmers in the dairy zone

## Expanding Market of Domestic Milk and Milk Products

It is now clear that domestic dairy sector growth is market driven. Private investment in dairying will only be robust if there is a defined and clear market that would absorb the locally produced milk at a reasonable profit margin for the producers. But the desired growth has not been achieved since the local market is dominated by the cheap reconstituted milk powder, and lately of imported UHT which are mislabelled as 'FRESH MILK'. Therefore, it is very important that appropriate measures be instituted to allow a fair market share for the locally produced fresh milk, and thus result in growth of the domestic dairying. Measures along this line are as follows:

**Harness to the Fullest the School Milk Feeding Program.** The approval of RA 11037 that incorporates the school milk feeding among malnourished children created a very important market for domestic milk, and thus constitute a major stimulus for enhanced dairy development. In partnership with DepEd and DSWD, the school milk feeding program shall be fully harnessed and efforts shall be directed in order to expand the SMFP coverage not only to malnourished school children but to all school children in the elementary grade. Introducing the children to fresh milk not only provide them the needed nutrition but also is a sure way of developing the future consumers of fresh milk.

**Fresh Milk Advocacy and Promotion.** Locally produced milk are sold as fresh milk and the average during last 5 years is that it occupies 25% of the liquid milk market. The rest

of the liquid milk market is shared by imported UHT and the reconstituted milk powder. The import of RTD milk (non-fresh) is forecasted to increase at an average annual rate of 9.44% from 2020-2025 while the local production is projected to grow at an average of only 4.7 % during the same period. At these growth rates, and with the inclusion of the requirements for the school milk feeding program (SMFP), the local milk will be only 13.15% of the liquid milk market while the imported liquid milk (non-fresh) is projected to be 86.85% by 2025. If 82 % sufficiency in RTD is to be attained by 2025, it is therefore extremely important that program be instituted so that a greater share of liquid market be filled up with local milk. This important undertaking shall be addressed in partnership with National Nutrition Council-DOH, DepEd, NDA, PCC, the Dairy Confederation of the Philippines, and finally with the Congress of the Philippines.

**Legislation of FRESH MILK Labelling.** Locally produced milk is marketed as fresh milk and it is premium. Reconstituted milk powder as well as UHT milk are not fresh milk by any measure. Many of the micro elements and vitamins in the fresh milk are lost during high temperature processing, and in milk powdering. However, to date there is no existing rule on FRESH MILK labelling in the domestic market.

Therefore, FRESH MILK labelling is a very important policy issue that should be in the priority agenda. In this respect, FRESH MILK Advocacy and Promotion Program (FMAPP) shall be instituted aimed at creating heightened awareness and demand for fresh milk.

**Improving Hygienic Quality of Milk.** Losses and collection costs could be reduced considerably if the hygienic quality of raw milk would be improved. Educating and giving incentives for farmers as well as improving transport and cooling management practices all can minimize losses and thus reduce cost of milk transport and handling.

Implement dairy GAHP, GMP and HACCP -To meet the increasing consumer demand for quality and safe milk and dairy products, the full implementation of GAHP, GMP and HACCP shall be enforced industry- wide. Capacity building concerning food safety issues related to raw milk and milk processing shall be instituted so that regulations can be enforced effectively.



# Increase Private Sector Investment/ Participation

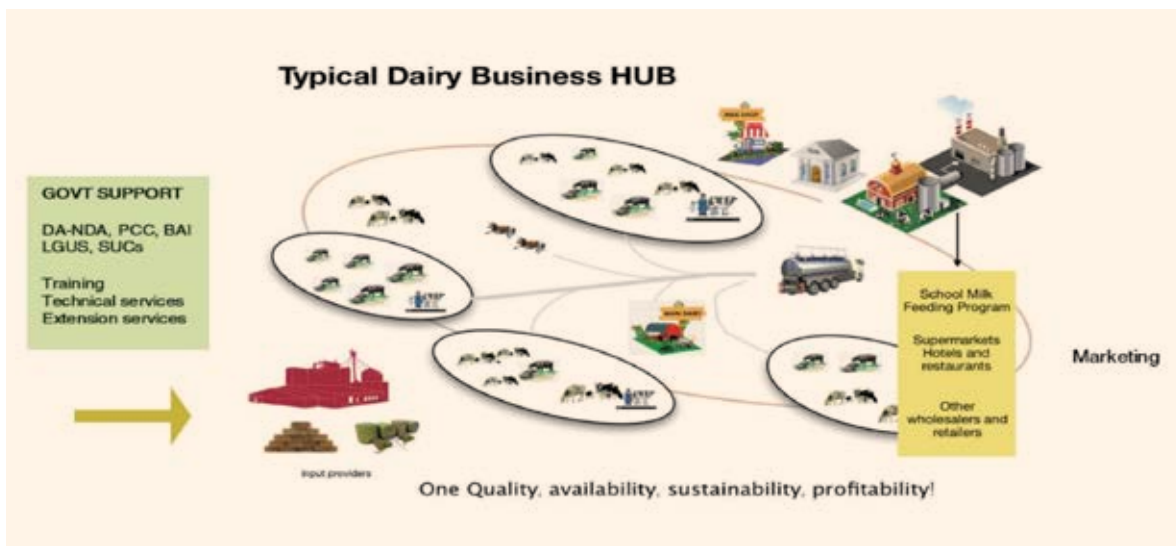
A private-led dairy development assumes that clients are expected to take the lead, to invest in interventions that are focused on improving efficiency and competitiveness, and to run their operations as profitable businesses. The role of the government under this set up is to create a favorable and conducive enabling environment in terms of fiscal and other policies that assure investment and healthy competition by the private sector. This also includes enforcing quality standards across the industry, and investing with the private sector in practical dairy training and education. Interventions this area are as follows:

**Access to Input and Credit.** Private investment in dairying in response to the various stimuli, to include assured ready market in the form of the school milk feeding program as well as related incentives packages are expected to increase significantly. This expected growth in interest in the private sector would necessitate easy access to available special credit window for dairy development, particularly for the procurement of animals, establishment of animal infrastructures, and of dairy equipment. A special interest-free credit window for dairy development shall involve expansion and modification of the existing programs with Landbank of the Philippines (LBP) and Development Bank of the Philippines (DBP). This can be in the form of zero-interest credit facility for dairy development, with the cost of money on the account of the government program. So instead of the government directly investing huge amount for animal importation, and support to development of post-production infrastructures, it shall be the private sector that shall invest thru their access the interest-free loan.

**Incentives to production and post production.** Public support shall be provided in the form of subsidy to common processing facility, technical support for the acquisition of animals from outside sources as well as technical support in terms of research on important industry issues including improving product and product development.

**Investment portfolio.** Investment portfolio to guide the potential investors on the profitability of dairying and related enterprises shall be made available as part of the public support.

**Support to Establishment of Dairy Business HUB.** To meet the increasing demand for milk and dairy products is huge challenge since smallholder dairying generates low volume of milk and are scattered thinly over large areas, and being so is less attractive to private sector agribusiness partners. This being the case, the program shall support collective action to create economies of scale both in marketing the milk and in providing inputs and services thru establishment of Dairy Business Hub. Dairy business hubs are collective farmer-owned/managed milk collection, chilling, and processing businesses from which farmers may also gain access to other services they need for their dairy enterprises. These dairy business hubs have proven to be a potentially strong platform for improving smallholder dairy farmers' access to markets and inputs. The dairy business hub concept is summarized below.



A dairy hub consists of an economically active producer organization/s (PO) and the set of business relationships and linkages with other public and private agribusiness partners that provide dairy-related inputs, milk market outlets and other services such as extension and farmer advisory services, and financing services. Input and service providers find it profitable to offer their services through the hubs, thanks to the economies of scale the hub generates.

Membership in the hub include dairy cooperatives, dairy producers, associations, medium and large scale dairy farmers. Produce from all the members are collected, chilled and process under a common facility and marketed under one brand, one quality. The company markets the products to institutional buyers and wholesalers including the national milk feeding program. The company also deals with input providers such as feed manufacturer or feed ingredients suppliers in case the company operates its own feed processing facility. All services and other auxiliary services can also be under the hub management.

# Increasing Human Resources Capabilities and Capacities

## Capacitating the implementing Agencies

The field extension staff of government agencies such as the NDA, PCC and BAI shall be capacitated to meet the program requirements. This will include capacities to train field dairy extension in government such as the LGUs and in the private sector. Emphasis shall be on trainings of farm advisors (who will train farmers), on application of participatory extension methods, and on introduction of new innovations that results in improved farmers management. Also training on data collection on technical parameters (cow fertility, cost of feeding, breeding calendar, milk yields, calving date) and simple economic data at the farms that could provide more information on cost of production, etc. The basic starting point should be to develop options and activities for improvement jointly with the farmers.

## Capacitating the Private Sector

Among the private sectors, assistance shall be in the form of training provision on organization and leadership as well as on entrepreneurship. Empowerment of cooperatives through capacity building of members, board members, and managers is very important. Training the coop leadership can act quicker on matters related to milk collection and milk quality, milk pricing, organization, among others.

Focus shall also be on issues like planning, access to finance, and business attitudes. Coops shall also be encouraged to improve their competitive position through good service delivery systems and shall be attuned to the market or have strong ambition to create a product with high added value. These activities are essential and contribute significantly to improving the dairy value chain. With the recent partnership of NDA with TESDA, more trainings will be conducted to develop the capacities of our dairy farmers in the future. When dairy farmers are well-equipped with knowledge, the management of their dairy farmers are likely to improved, productivity of the farm is improved and income increases. NDA will also be closely cooperating with the Cooperative Development Authority (CDA) to capacitate our cooperatives in organizational development.

## **Establishment of Dairy Training and Research Center in Selected SUCs**

Learning Institution/s with already existing dairy training and research facilities shall be supported to strengthen their dairy related programs. Additional Institutions shall be identified and shall be supported for the establishment of dairy training and research center to cater to the needs of adjacent dairy zones.

Knowledge institutions shall also be involved in research at various steps in the dairy value chain and defining options to improve. They could participate in design and monitoring process for selection of innovations to be tested. Project monitoring could involve identifying success and failure factors during project lifetime, and finally, they can also be involved in seminars and information dissemination activities.

Degree courses on Dairy Science and related fields. Selected Institutions shall also be encouraged and supported to strengthen competencies of their technical staff in order to be able to offer degree courses on dairy science. Focus shall not only be on science of how to in production as well as in product development but also on the broader issues of what's and whys.

## **Farmers School Establishment**

Within the dairy zones and impact areas, Farmers School shall be established to train primarily those farmers interested to go into dairying. The Farmers School is an actual dairy farm setting where best practices are applied and where the operations are in active business mode. This means that the farm operation is in positive income, self-sustaining and from where all the basics in actual profitable dairying can be learned by interested farmers. Farmers on training shall undergo actual dairying that covers all practical aspects of feeding, breeding, animal health, management, and the dairying business. Practical skills include rearing of calves, hygienic milking and milk handling, forage production and conservation, deworming, vitamin supplementation, care of cows during calving, care of cows after delivery, among others. The Farmers School can be some selected lead dairy farmers' farm that meet required set criteria.

## Dairy Impact Zones

The implementation of all the development activities revolves around the Dairy/Impact Zones. Premium in the dairy zone is the presence of major market GRID, namely, Metro Manila and Bagiuo in Luzon, Metro Cebu in the Visayas, and Metro Davao and Cagayan de Oro in Mindanao. Dairy Business Hubs shall be linked to the major market grids as shown in Figure on the next page.

One important recent development is the school milk feeding program that would allow market of milk in areas not so close to the market grid, this following the concept of use the milk for the SMFP where it is produced.



# Increasing LGU participation in Dairy Development

LGUs which has given support to dairy activities and has included dairy in their provincial Priority Commodity Investment Plans will be given priority in accessing the different dairy programs. An orientation and promotion of the various dairy programs will be conducted to entice other LGUs to venture into dairy activities. The Mandanas-Garcia ruling will give additional funds to LGUs which can possibly support their farmer-constituents who are into dairying and those who are prospective dairy farmers. can utilize their budget in improving capacities of LGU extension workers in dairy technology. LGUs can provide dairy inputs in terms of land, facilities, equipment and machineries, capacity building and market development

# BUDGETARY REQUIREMENTS

The summary of budget requirements covering the period 2020-2025 has a total of P8.9 billion as shown in Table 27. The budget for the School Milk Feeding Program are not included in this summary since such are assumed as built-in at the DepEd and DSWD budget outlays being the implementing agencies.

**TABLE 27.A. BUDGETARY REQUIREMENTS (IN MILLION PESOS) 2020-2025**

ACTION/ PROGRAM	Description/ Activity	2020	2021	2022	2023	2024	2025	TOTAL
Good Quality stock Production (GQSP) Program	AI of cattle	43	49	58	70	81	95	396
	AI of buffaloes	88	100	113	129	142	155	727
	AI tech Training	12	3	11	8	8	9	51
Herd Infusion Program (HIP)	Dairy cattle		600	600	600	600	600	3,000
	Dairy goat		240	240	240			720
Dairy animal replacement program (DARP)	Buy back of animals		340	342	401	469	547	2,099
	Dairy farm/calf rearing farm established*		20	20	20	20	20	100
Dairy Herd Improvement	Milk laboratory established		35	35	35	15	15	135
	Data Processing facility established		25	15	15	15	15	85
	Animal Registry system		35	12	12	12	12	83
Feed Resource Development	Forage Propagation Center and Promotion		20	40	40	20	20	140

cont'd ►



ACTION/ PROGRAM	Description/ Activity	2020	2021	2022	2023	2024	2025	TOTAL
Support to enterprise	Dairy hub established		15	15	15	15	10	70
	Milk processing facilities established/ accredited		150	150	150	150	18	618
	Support to Credit		30	30	30	30	30	150
	Support to SMFP, no of pupils c/o DepEd and DSWD	2 B	3 B	4.5 B	4.5 B	4.5 B	5.7 B	24.2B
	Compliance to all regulatory standards	3	3	3	3	3	3	18
Milk Promotion/ Advocacy	Improving milk consumption (Pesos, million)	10	15	15	15	15	15	85
R and D	Improving efficiency, profitability and sustainability		30	30	40	40	40	180
Human Resource capacitation	Dairy Farmers	30	30	30	30	30	30	180
	Dairy Extentionists	6	6	6	6	6	6	36
	Dairy Entrepreneurs	10	10	10	10	10	10	60
<b>TOTAL, Million Pesos</b>		<b>202</b>	<b>1756</b>	<b>1,775</b>	<b>1,869</b>	<b>1,681</b>	<b>1,650</b>	<b>8,933</b>

**TABLE 27.B. BUDGETARY REQUIREMENTS THAT CAN BE PRIVATE FUNDED (IN MILLION PESOS), 2020-2025**

ACTION/ PROGRAM	Description/ Activity	2020	2021	2022	2023	2024	2025	TOTAL
Good Quality Stock Production (GQSP) Program	AI of cattle	22	25	29	35	41	48	198
	AI of buffaloes	44	50	57	65	71	78	364
Herd Infusion Program (HIP)	Dairy cattle		300	300	300	300	300	1,500
	Dairy Goat		120	120	120			360
Support to enterprise	Dairy hub established		8	8	8	8	5	35
	Milk processing facilities established/ accredited		75	75	75	75	9	309
	Compliance to all regulatory standards	2	2	2	2	2	2	9
Human Resource capacitation	Dairy Farmers	15	15	15	15	15	15	90
	Dairy Entrepreneurs	5	5	5	5	5	5	30
<b>Total, Million</b>		<b>101</b>	<b>878</b>	<b>888</b>	<b>935</b>	<b>841</b>	<b>825</b>	<b>4,467</b>

**TABLE 27.C. FUND SOURCE, 2020-2025**

ACTION/PROGRAM	Description/Activity	Possible Fund Sources
"Good Quality stock Production (GQSP) Program"	AI of cattle	General Appropriations Act. Official Development Assistance, Local Government Unit and Private Investment
	AI of buffaloes	
	AI tech Training	
Herd Infusion Program (HIP)	Dairy cattle	General Appropriations Act. Official Development Assistance, Local Government Unit and Private Investment
	Dairy goat	
Dairy animal replacement program (DARP)	Buy back of animals	General Appropriations Act. Official Development Assistance, Local Government Unit
	Dairy farm/calf rearing farm established*	
Dairy Herd Improvement	Milk laboratory established	General Appropriations Act. Official Development Assistance, Local Government Unit
	Data Processing facility established	
	Animal Registry system	
Feed Resource Development	Forage Propagation Center and Promotion	
Support to enterprise	Dairy hub established/ accredited	General Appropriations Act. Official Development Assistance, Local Government Unit
	Milk processing facilities established/accredited	General Appropriations Act. Official Development Assistance, Local Government Unit and Private Investment
	Support to Credit	Credit Facilities by government banks and other agencies such as the Philippine Credit and Insurance Corporation
	Support to SMFP, no of pupils % DepEd and DSWD	Primarily from the Department of Education (DEPED) and Department of Social Work and Development (DSWD)
	Compliance to all regulatory standards	General Appropriations Act. Official Development Assistance, Local Government Unit and Private Investment
Milk Promotion/ Advocacy	Improving milk consumption (Pesos, million)	General Appropriations Act. Official Development Assistance, Local Government Unit

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ACTION/PROGRAM	Description/Activity	Possible Fund Sources
R and D	Improving efficiency, profitability and sustainability	General Appropriations Act, Official Development Assistance, Research Institutions (Bureau of Agricultural Research, The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DOST-PCCARRD), Local Government Unit
Human Resource capacitation	Dairy Farmers	General Appropriations Act, Official Development Assistance, Local Government Unit and Private Investment
	Dairy Extensionists	General Appropriations Act, Official Development Assistance, Local Government Unit, Other agencies (ATI, TESDA)
	Dairy Entrepreneurs	General Appropriations Act, Official Development Assistance, Local Government Unit and Private Investment

Aside from the above-mentioned sources of funds for the implementation of the dairy roadmap, the NDA is also one of the mandated agencies to implement the Republic Act (RA) No. 11524 or the Coconut Farmers and Industry Trust Fund (CFITF) Act. The act was created to help coconut farmers raise their incomes, alleviate poverty and achieve social equity. Republic Act 7884, on the other hand, aims to develop and disseminate appropriate smallholder based-dairy technology; improve livelihood opportunities and increase income level through dairying and enhance the nutritional intake of children and pregnant and nursing mothers through the promotion of locally produced milk and milk products.

With this act, the National Dairy Authority will be given allocations for the implementation of projects on farm improvements integrating coconut farming with dairy farming. Annual fund releases from the CFITF will give 10% for farm improvements that will be shared equally between the NDA, the High Value Crops Development Program for coffee and cacao, and BAI's Native Animal Program.



# PROGRAM IMPLEMENTATION, MONITORING AND EVALUATION

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To effectively implement the DRM 2020-2025, a Dairy Development Board (DDB) shall be created. The DDB shall be chaired by the Secretary of Agriculture, to be represented by the Undersecretary for Livestock, with membership to include the Administrator of the National Dairy Authority, Executive Director of the Philippine Carabao Center, Director of the Bureau of Animal Industry, and one representative each of the Dairy Business Hubs (DBH) of Luzon, Visayas, and Mindanao. NDA shall serve as the DDB Secretariat.

There shall be quarterly meetings of the DDB to assess the progress of program implementation and to address pressing operational constraints. Year-end meetings shall be carried out as a way of monitoring the progress of the program, and also to plan for the ensuing operational year. Annual Reports shall be prepared copy furnished the Committee on Agriculture of both the Senate and the House of Representatives, DBM, and COA.

Responsibilities of the concerned agencies/entities are defined in the Table 29.

At the end of the 2023 and 2025, evaluation of the implemented program shall be carried out by PCAF/ third party

# IMPLEMENTATION PLAN

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## Vision

An invigorated and competitive domestic industry that meets the quality and safety standards of the growing market for fresh liquid milk and other dairy products with the smallholders as major players fully organized along the dairy business hubs by 2025.

## Goals

To strengthen the foundation for more productive, competitive, and sustainable dairy sector by 2025.

## Objectives

1. To provide livelihood opportunities to 350,000 rural families in dairy producing areas;
2. To improve average milk production of dairy cattle and buffaloes by at least 46% above the current level;
3. To meet 82% of liquid milk requirements (regular market and school milk feeding program) and attain at least 5.4% self-sufficiency by 2025;
4. To improve per capita fresh milk consumption by 100% the current level by 2025.

**TABLE 28.A. PHYSICAL TARGETS**

ACTION/ PROGRAM	Description/ Activity	2020	2021	2022	2023	2024	2025	TOTAL
<b>Herd Build-Up</b>								
Stock Infusion	Cattle	300	4,000	4,000	4,000	4,000	4,000	20,300
	Goat	2,750	2,000	2,000	-	-	-	6,750
Internal Herd build-up	Upgrading non dairy cattle	30,000	30,000	30,000	30,000	30,000	30,000	180,000
	Dairy Cattle breed	12,979	19,172	27,470	37,170	48,508	61,763	207,062
	Indigenous carabao breed	77,672	88,990	100,168	111,190	122,038	132,692	632,750
	Dairy buffalo bred*	9,655	10,813	12,110	13,563	15,190	17,012	78,343
	***Dairy cattle buy back	170	2,383	2,077	2,551	3,145	3,866	14,167
	***Dairy buffalo buy back (all female)	525	2,183	2,495	2,806	3,118	3,430	14,557
	Additional AI Tech for Training	403	86	354	247	264	285	1,639
	Dairy farm/ calf rearing farm established*	1	2	2	2	2	2	11
<b>Productivity Improvement</b>								
Dairy Herd Improvement	Milk laboratory established	1	1	1				3
	Data Processing facility established	1	1					2
	Animal Registry system	1						1
Feed Resource Dev Program	Forage Propagation Center and Promotion	-	1	2	2			5

cont'd ►



ACTION/ PROGRAM	Description/ Activity	2020	2021	2022	2023	2024	2025	TOTAL
<b>Enterprise Development</b>								
	Dairy hub established	1	1	1	1			4
	Milk processing facilities established/ accredited	10	10	10	10			40
Support to Enterprise	**School Milk Feeding Students coverage, million	2.00	3.00	3.04	3.09	3.14	3.18	17.45
	Support to credit window	-	1	1	1	1	1	5
Milk quality and safety assurance program	Compliance to all regulatory standards	farm and products	farm and products	farm and products	farm and products	farm and products	farm and products	farm and products
Milk Promotion/Advocacy	Improving consumption of locally produced milk	5	10	10	10	10	10	55
R and D	Improving efficiency, profitability, and sustainability	10	10	15	20	20	20	95
<b>Human Resource Capacitation</b>								
Capability and competency improvement	Dairy Farmers	30,000	30,000	30,000	30,000	30,000	30,000	18,000
	Dairy Technicians	300	300	300	300	300	300	1,800
	Dairy Entrepreneurs	2,000	2,000	2,000	2,000	2,000	2,000	12,000

**TABLE 28.B. FINANCIAL TARGETS**

ACTION/ PROGRAM	Description/Activity	2020	2021	2022	2023	2024	2025	TOTAL
Good Quality stock Production (GQSP) Program	AI of cattle	43	49	58	70	81	95	396
	AI of buffaloes	88	100	113	129	142	155	727
	AI tech Training	12	3	11	8	8	9	51
Herd Infusion Program (HIP)	Dairy cattle		600	600	600	600	600	3,000
	Dairy goat		240	240	240			720
Dairy animal replacement program (DARP)	Buy back of animals		340	342	401	469	547	2,099
	Dairy farm/calf rearing farm established*		20	20	20	20	20	100
Dairy Herd Improvement	Milk laboratory established		35	35	35	15	15	135
	Data Processing facility established		25	15	15	15	15	85
	Animal Registry system		35	12	12	12	12	83
Feed Resource Development	Forage Propagation Center and Promotion		20	40	40	20	20	140
Support to enterprise	Dairy hub established		15	15	15	15	10	70
	Milk processing facilities established/ accredited		150	150	150	150	18	618
	Support to Credit		30	30	30	30	30	150
	Support to SMFP, no of pupils c/o DepEd and DSWD	2 B	3 B	4.5 B	4.5 B	4.5 B	5.7 B	24.2 B
	Compliance to all regulatory standards	3	3	3	3	3	3	18
Milk Promotion/ Advocacy	Improving milk consumption (Pesos, million)	10	15	15	15	15	15	85
R and D	Improving efficiency, profitability and sustainability		30	30	40	40	40	180
Human Resource capacitation	Dairy Farmers	30	30	30	30	30	30	180
	Dairy Extensionists	6	6	6	6	6	6	36
	Dairy Entrepreneurs	10	10	10	10	10	10	60
<b>TOTAL, Million Pesos</b>		<b>202</b>	<b>1,756</b>	<b>1,775</b>	<b>1,869</b>	<b>1,681</b>	<b>1,650</b>	<b>8,933</b>

**TABLE 28.C. RESPONSIBLE ENTITY**

KRA	STRATEGY/ ACTIVITY	RESPONSIBLE ENTITY	REMARKS
Dairy Animal Productivity Improvement	Implement National Dairy Herd Improvement Program	PCC, NDA and dairy producers associations/ cooperatives	PCC will serve as the lead entity in close coordination with NDA. PCC and NDA will have their respective milk testing laboratories, Data Processing Center shall be under the responsibility of PCC. Feedback to farmers is a joint undertaking of PCC and NDA in close coordination with the cooperatives and producers' associations. Dairy Animal Registry is to be initiated by PCC but is a joint and collaborative efforts with NDA.
	Intensified feed base development	NDA, PCC, BAI RFUs, and dairy producers associations/ cooperatives	NDA shall be the lead entity with PCC and BAI cooperating in the implementation. BAI's Feed Resource Development Center at Milagros, Masbate will be the main seed production facility while the 12 PCC Regional Center shall ensure availability of forage planting materials. Research aspect shall be at the leadership of PCC in coordination with concerned SUCs.
Fast track Dairy Herd build-up	Stock Infusion	NDA, BAI , PCC and the private sector	Facilitation and technical support for stock infusion of dairy cattle and goat shall be under the responsibility of NDA with the support of BAI relative to animal health and quarantine aspects. PCC will be responsible for facilitating dairy buffaloes importation in the event that stock infusion will be pursued.
	Directed backcrossing and use of sexed semen	PCC, NDA, BAI, RFUs, LGUs and VBAIT	PCC shall lead this important program, particularly on water buffalo in collaboration with LGUs and VBAITs. NDA shall ensure program focus on dairy cattle. PCC shall be responsible for the provision of facilities for semen sexing in collaboration with BAI, including semen distribution.
	Expansion of Artificial Insemination services	PCC, NDA, BAI, RFUs, LGUs, SUCs	PCC in collaboration with BAI shall lead in training additional AI technicians. Implementation of this program shall be coordinated thru UNAIP with PCC, NDA, RFUs, LGUs and VBAITs supporting.
	Rearing of replacement heifers and buy back scheme	NDA, PCC, producers association and cooperatives	NDA and PCC shall aggressively pursue on carrying the extension efforts on this program. Both agencies shall ensure availability of funding support for the buyback scheme

KRA	STRATEGY/ACTIVITY	RESPONSIBLE ENTITY	REMARKS
Expanding market for domestic milk and milk products	Harness to the fullest School Milk feeding Program	NDA, PCC, DepED, DSWD, dairy producers associations and cooperatives	NDA shall lead in the implementation of SMFP in close coordination with DepEd and DSWD and PCC and dairy producers, associations and cooperatives. NDA shall also lead in collaboration with DepEd in expanding the SMFP to cover all elementary students to ensure funding support sustainability and expansion.
	Fresh milk advocacy and promotion	NDA, PCC, DTI, dairy producers association and cooperatives	NDA shall lead in collaboration with PCC and DTI in ensuring legislation of correct labelling of FRESH MILK, and in the promotion of consumption of fresh milk. Producers associations and cooperatives shall help in monitoring the strict compliance in correct FRESH milk labelling.
	Improving hygienic milk quality	NDA, PCC, BAI, dairy producers association and cooperatives	NDA and PCC in cooperation with BAI and respective producers associations and cooperatives shall carry out training and extension services in compliance to GAHP, GMP and HACCP in dairy production and processing.
Increasing human Resources Capabilities and Capacities	Capacitating implementing Agencies	NDA,PCC, ATI, SCUs, DAP, etc.	NDA and PCC shall closely work in collaboration with appropriate entities in capacitating their respective field staff on training extensionists engaged in dairy production and dairy- related businesses
	Capacitating the private sector	NDA, PCC, SUCs and producer associations and cooperatives	NDA and PCC in collaboration with appropriate SUCs and other entities shall work on capacitating the private sector and LGU Dairy Development technicians in relevant aspects of dairy production and dairy-related business
	Establishment of Dairy Training and Research Centers	NDA, PCC, CHED, SUCs	NDA and PCC in collaboration with CHED and appropriate SUCs shall identify and support the establishment of additional dairy research and training center in the dairy zones.  Both agencies shall also work with CHED and appropriate SUCs in crafting suitable dairy science courses/programs.
	Establishment and operation of farmers school	PCC and NDA, dairy producers associations/ cooperatives	PCC and NDA shall identify and support the establishment/operation of farmers' school in collaboration with dairy producers associations and cooperatives and LGUs.

# INDUSTRY CLUSTER GOVERNANCE NETWORK

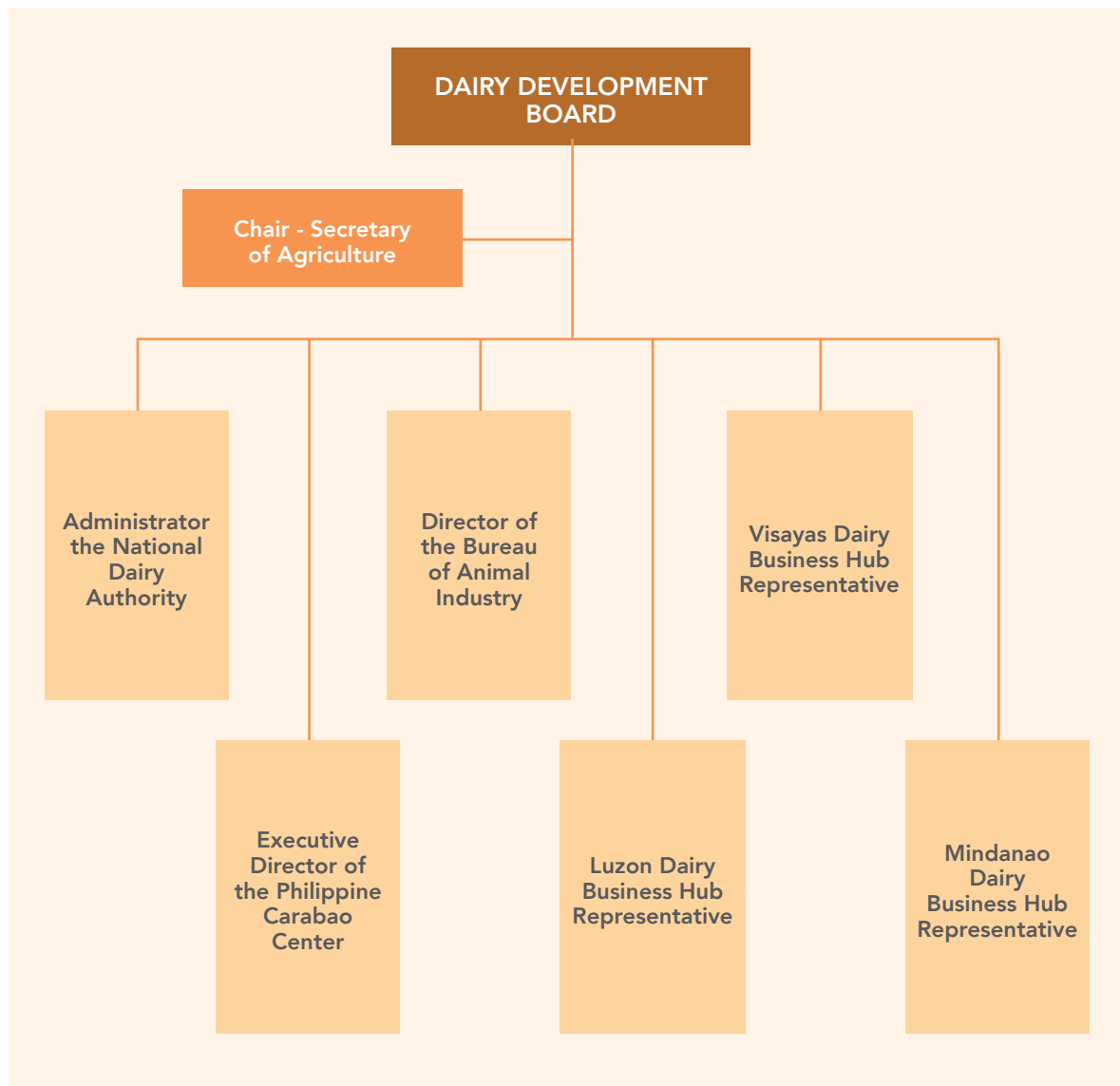
Institutional Actors and Supporting Organizations that will contribute to the implementation of the Roadmap targets are as follows:

**TABLE 28.D. INSTITUTIONAL ARRANGEMENT**

Agencies Involved	Roles/Purpose
Department of Agriculture	Provide policy support to dairy activities and projects.
Department of Education	Facilitate funding of Milk Feeding Activities
Department of Social Welfare and Development	
TESDA, ATI, CDA	Training on extension workers, farmers, farm owners
DOST, FNRI, SUCs	Research and Development
LGUs	Provide funds for dairy projects, extension workers, land for dairy facilities, logistics
Department of Finance	Provide funds for coconut dairy projects
Philippine Coconut Authority	Coordination on Coconut Dairy Project
Land Bank, Development Bank of the Philippines	Availability of credit facilities
Dairy Confederation of the Philippines	Provide support to dairy projects, promote dairy projects to farmer members

# Monitoring and Evaluation

A Dairy Development Board (DDB) shall be created. The DDB shall be chaired by the Secretary of Agriculture, to be represented by the Undersecretary for Livestock, with membership to include the Administrator of the National Dairy Authority, Executive Director of the Philippine Carabao Center, Director of the Bureau of Animal Industry, and one representative each of the Dairy Business Hubs (DBH) of Luzon, Visayas, and Mindanao. NDA shall serve as the DDB Secretariat. Quarterly meetings, annual meetings will be conducted to assess the progress of implementation.



The National Dairy Authority shall be the lead agency in the implementation and monitoring of the Dairy Commodity Industry Roadmap. The DA's Planning, Monitoring, and Evaluation Division (DA-PMED) and the Banner Program Committees of the Philippine Council of Agriculture and Fisheries (PCAF) shall be responsible for the monitoring and evaluation of all roadmap implementation plans. Monitoring and evaluation of the plans will be part of the implementing agencies regular assessment activities. The PCAF and SPCMAD shall also be responsible in monitoring of Foreign Funded Projects.

**TABLE 29. RESPONSIBILITIES OF VARIOUS IMPLEMENTING AGENCIES/ENTITIES**

KRA	STRATEGY/ACTIVITY	RESPONSIBLE ENTITY	REMARKS
Dairy Animal Productivity Improvement	Implement National Dairy Herd Improvement Program	PCC, NDA and dairy producers associations/cooperatives	PCC will serve as the lead entity in close coordination with NDA. PCC and NDA will have their respective milk testing laboratories, Data Processing Center shall be under the responsibility of PCC. Feedback to farmers is a joint undertaking of PCC and NDA in close coordination with the cooperatives and producers associations. Dairy Animal Registry is to be initiated by PCC but is a joint and collaborative efforts with NDA.
	Intensified feed base development	NDA, PCC, BAI, RFUs, and dairy producers associations/cooperatives	NDA shall be the lead entity with PCC and BAI cooperating in the implementation. BAI's Feed Resource Development Center at Milagros, Masbate will be the main seed production facility while the 12 PCC Regional Center shall ensure availability of forage planting materials. Research aspect shall be at the leadership of PCC in coordination with concerned SUCs
	Stock Infusion	NDA, BAI, PCC and the private sector	Facilitation and technical support for stock infusion of dairy cattle and goat shall be under the responsibility of NDA with the support of BAI relative to animal health and quarantine aspects. PCC will be responsible for facilitating dairy buffaloes importation in the event that stock infusion will be pursued.
Fast track Dairy Herd build-up	Directed backcrossing and use of sexed semen	PCC, NDA, BAI, RFUs, LGUs and VBAIT	PCC shall lead this important program, particularly on water buffalo in collaboration with LGUs and VBAITs. NDA shall ensure program focus on dairy cattle. PCC shall be responsible for the provision of facilities for semen sexing in collaboration with BAI, including semen distribution.
	Expansion of Artificial Insemination services	PCC, NDA, BAI, RFUs, LGUs, SUCs	PCC in collaboration with BAI shall lead in training additional AI technicians. Implementation of this program shall be coordinated thru UNAIIP with PCC, NDA, RFUs, LGUs and VBAITs supporting.
	Rearing of replacement heifers and buy back scheme	NDA, PCC, producers association and cooperatives	NDA and PCC shall aggressively pursue on carrying the extension efforts on this program. Both agencies shall ensure availability of funding support for the buyback scheme to



KRA	STRATEGY/ACTIVITY	RESPONSIBLE ENTITY	REMARKS
	Harness to the fullest School Milk feeding Program	NDA, PCC, DepEd,DSWD, dairy producers associations and cooperatives	NDA shall lead in the implementation of SMFP in close coordination with DepEd and DSWD and PCC and dairy producers associations and cooperatives. NDA shall also lead in collaboration with DepEd in expanding the SMFP to cover all elementary students to ensure funding support sustainability and expansion.
Expanding market for domestic milk and milk products	Fresh milk advocacy and promotion	NDA, PCC, DTI, dairy producers association and cooperatives	NDA shall lead in collaboration with PCC and DTI in ensuring legislation of correct labelling of FRESH MILK, and in the promotion of consumption of fresh milk. Producers associations and cooperatives shall help in monitoring the strict compliance in correct FRESH milk labelling.
	Improving hygienic milk quality	NDA, PCC, BAI, dairy producers association and cooperatives	NDA and PCC in cooperation with BAI and respective producers associations and cooperatives shall carry out training and extension services in compliance to GAHP, GMP and HACCP in dairy production and processing.
	Capacitating implementing Agencies	NDA,PCC, ATI, SCUs, DAP, etc.	NDA and PCC shall closely work in collaboration with appropriate entities in capacitating their respective field staff on training extensionists engaged in dairy production and dairy-related businesses
Increasing human Resources Capabilities and Capacities	Capacitating the private sector	NDA, PCC, SUCs and producer associations and cooperatives	NDA and PCC in collaboration with appropriate SUCs and other entities shall work on capacitating the private sector and LGU Dairy Development technicians in relevant aspects of dairy production and dairy-related business
	Establishment of Dairy Training and Research Centers	NDA, PCC, CHED, SUCs	NDA and PCC in collaboration with CHED and appropriate SUCs shall identify and support the establishment of additional dairy research and training center in the dairy zones. Both agencies shall also work with CHED and appropriate SUCs in crafting suitable dairy science courses/
	Establishment and operation of farmers school	PCC and NDA, dairy producers associations/cooperatives	PCC and NDA shall identify and support the establishment/operation of farmers' school in collaboration with dairy producers associations and cooperatives and LGUs.

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