



# Dairy development in the Philippines

Visions for the future:  
uniformity and/or diversity,  
community and/or commodity

Hans Schiere

## Project Report



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## **Project Report**

December 2010

Project code 8140003000

Wageningen UR Centre for Development Innovation

## **Dairy development in the Philippines**

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An essay on policy recommendations

Schiere, J.B. (Hans)

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Although milk has been produced and processed in the Philippines for a long time, the country does not have a strong dairy tradition. Climate and ecology are not very favourable for high yields. Moreover, policies have been erratic and the country has not used the momentum towards dairy development like some of its neighbours. This report reviews the current state of the dairy sector, with a view to developing visions for the future. Dairy sector fragmentation is partly due to the fact that the country is an archipelago with different ecological and demographic conditions - good markets and favourable ecology often do not come together. The report analyses selected aspects of production systems, value chains, and management, particularly focusing on roles of public and private sector. The country should a) consider its variation as strength and not as weakness and b) focus (use of its public) resources for development of a dairy sector that mainly produces local milk for local markets, rather than trying to become self-sufficient in milk products that can be imported much more cheaply. The country has much to gain from taking development of its dairy sector seriously. Government should become a facilitator, rather than being directly in charge of services like cattle imports, insemination services, and research & education.

### **Photos**

All pictures were taken by the author except the pictures in photo 6, which come from the Alaminos Goat Farm brochure.

### **Orders**

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# Preface

In 2008 a project was initiated to set up a Livestock Expertise Centre in the Philippines. The project was funded as a Policy Support project by the Ministry of Agriculture, Nature Conservation, and Food Safety of the Netherlands on request of the Royal Dutch Embassies in Manila and Kuala Lumpur. The project was implemented by the Wageningen UR Centre for Development Innovation, in partnership with La Ventana and PTC+ in the Netherlands, and a range of partners in the Philippines.

This policy paper on dairy development in the Philippines and visions for the future reflects the insights gained by the project team during the implementation of the project. The aim of the project was to contribute to the development of the livestock sector in the Philippines and, where possible, to serve as a catalyst of such action elsewhere in the region. It resulted in the establishment of the AgsPart2020 Foundation, an expertise centre for analysis, knowledge exchange, and advisory services in the livestock sector. Since its inception about two years ago, it has conducted a number of studies, training courses and exchange events that have been well appreciated, especially by dairy sector parties.

We sincerely thank all our partners in the Philippines and the Netherlands for their valuable contributions. In particular, we would like to thank Dr. Hans Schiere of La Ventana for his motivating role in the project and for his willingness to collect the lessons learned into this brief. We appreciate the efforts of Dr. Jose Q. Molina, coordinator of AgsPart2020 Foundation, as well as Mr. Ben Molina, Dr. Cesar Sevilla, and Dr. M. Victoria O. Espaldon, board members. Even though development of the dairy sector is not an easy task, we continue to trust in the ability of you and other players in the Philippines to make it happen.

Wageningen, December 2010



Dr. A.J. Woodhill  
Director Wageningen Centre for Development Innovation

# Acknowledgements

From 2006 to 2010 it was my pleasure and work to travel extensively in the Philippines. One of my assignments was to work on livestock development, especially dairy, and establish a livestock consulting centre that we eventually called 'AgsPart2020'. One of my interests in that context was the gamut of relationships between livestock development and the environment, in terms of income, producers-consumers, CO<sub>2</sub> emissions and nutrient flows, as well as social development. Another interest was a drive to identify, develop and apply novel concepts for sustainable livestock development that can carry us from the past into the future. I am convinced that standard skills, methods and approaches in dairy farming, such as milking, hoof trimming etc., are widely enough available in the Philippines. I do feel that many of them need to be redesigned, however, and I feel that they need to be supplemented with new approaches to dairy farming in order to face the future.

Indeed, I feel that the future requires new approaches for meeting challenges not yet seen before at this scale. Examples of upcoming challenges are continued population growth, urbanization, climate change and declining resource availability (including loss of resources such as local ingenuity and breeds, besides oil, fresh water, soil fertility and similar). In that sense I feel that the Philippines as a large but fragmented and varied country stands to gain more from *working with variation* (local products, small to medium-sized markets, mixed farming, a variety of breeds, etc.) rather than from *using standard approaches* (a national breed, a standard housing system, a national milk grid). Large and small farms, as well as both the private and public sectors, have their own roles to play in establishing a healthy, flexible and varied dairy sector based on modern principles of sustainable farming.

The mission of the AgsPart2020 reflects this vision of 'strength from variation'. That centre was initially funded with money from the Dutch embassy in Manila. It was founded largely as result of my visits and meetings with different players in the country's livestock development, dairy in particular. Each of those has their own role to play, and I was fortunate to share time with many of them. It is impossible to mention each and every one but special thanks go to the people of AgsPart2020 itself (Cesar Sevilla, Joey Molina, Ben Molina, Vicky Espaldon and my Dutch colleague Jan van der Lee of Wageningen University and Research Centre). My thanks also to the staff at the Royal Netherlands Embassy (Pit Laquian and Adrie de Roo), as well as to many people at the NDA (Naomi Torreta, Rene de Guzman and later Orkhan Hofer Usman), DairyCon (Danilo Fausto, Tony Manikan and Weng Bautista) and the people of the Bohol group who helped to get the project started. Last but not least, a thank-you to Linda Haartsen for very helpful and thorough proofreading and to Patricia Esmeralda Lemmens for editorial support. This report is long overdue, for which I apologize, but I am looking forward to receiving critical comments to match the personal and challenging style of this report.

December 2010  
Philippines / Netherlands  
Hans Schiere

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## Executive summary

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1. This 'essay' on livestock development and the potential for dairy production in the Philippines is based on impressions gathered during four years of rather frequent travel by the consultant (myself) throughout the country. My role as consultant was providing training on modern livestock development and acting as an adviser identifying possibilities for a livestock development centre. The essay style has been kept informal, visionary and thought-provoking, aimed at triggering debate rather than being comprehensive (which would have required much more time and effort).

2. The consultant has observed that dairy production in the Philippines has proved to be technically feasible, and most practical skills are available and taught (milking, feeding, health, etc.). However, the sector is still small, diverse, fragmented and rather insignificant at a national level. Most milk products are imported from countries where milk can be produced more cheaply. The consultant believes that the Philippines should not aim to be even remotely self-sufficient in terms of milk products. However, the country and individual entrepreneurs have much to gain from developing and supplying the local market for fresh milk. A market survey might be useful for establishing the possible size and segmentation of the local 'fresh' milk market, but potential areas for growth can be found all over.

3. Difficulties abound, but the consultant has chosen to focus on the opportunities that lie hidden within the currently problematic but optimistic sector. Justification at a national scale for dairy farming derives from its potential to generate extra income from less land as population pressure continues to increase, in the possibilities for creating a diversified economy and a more even cash flow, and in the processing capacity that lies idle due to issues that are more management-based than technical. Opportunities also exist in areas such as the reshaping of existing programmes and institutions, in the legislation on fresh milk and local markets, in the reshaping of existing training curricula, in processing capacity aimed at local fresh milk and milk products, as well as in the reshaping of the genetic resource basis.

4. All choices on dairy policy and the use of public funds for development can be summarized in two key statements as follows:

- community versus commodity, i.e. the need to focus on 'proud regional production' of fresh milk for local markets (community) rather than on the production of milk as a bulk product (a commodity) competing with cheap imported milk products.
- diversity versus uniformity, i.e. the need to support a diversified approach for sustainable local development with different programmes for different regions and different kinds of farmers, rather than a standardized approach.

Discussions and decisions regarding these and more technical choices can benefit from using scenario studies that can be carried out at least in part by universities and private sector groups that have the methodology largely available in the Philippines.

5. Programmes for sustainable dairy production in the long run should categorize production systems not only according to agro-ecological regions (as is done to some extent by the NDA dairy zone approach), but also according to size and type of farm (large and commercial versus small and subsistence farms), and according to grazing/stall feeding as well as specialized versus mixed systems. Distinctions according to size and nature of farming are probably more important in that sense than according to the type of animals kept (carabao, goat and cow).

6. Processing and marketing systems should be categorized according to the size of the milk shed, i.e. micro, meso and macro chains. The micro and meso chains in particular offer interesting opportunities for using public funds, for policy support towards sustainable development, and for scenario studies towards

the design of systems for the coming decades. Macro chains are run by larger companies and they need little, if any, extra support. Meso markets for local milk would benefit from government support, e.g. legislation that defines 'fresh milk' as being produced 'in the country'.

7. Different actors have different responsibilities and some suggestions can be made:

- At the farm level, large and small producers should get together and study each other's experiences and experiences from elsewhere more intensely, with a special focus not only on sustainability issues such as farm income, local livelihood, practical farm management issues (calf rearing, livestock housing systems, feeding), but also on (future) use of fossil fuel, clean water, nutrient recycling, erosion control and so forth.
- At the regional and institutional levels, the parties should get together to define the development vision for their region, using a range of scenario studies as mentioned in this report. Training centres should redefine their curricula to include sustainability issues as well as the standard practical skills.
- At the national scale, the private sector should take over responsibility from public institutions, especially in areas such as gene pool management (import of animals or semen, cross-breeding, AI services, herd monitoring), running of dairy associations and processing facilities (not in a good state now, even when at least semi-private). The public sector has to redefine its role by shifting to facilitation of breeding (imports, licences), legislation (reserving the name 'fresh milk' for 'local milk' and/or ensuring reasonable ratios of local milk to imported supplies). The public sector also should use its leverage in universities and higher education to shift curricula into a more relevant and interesting direction in which courses on livestock and dairy farming are taught as a 'vehicle' for sustainable development rather than as a set of practical how-to rules. University programmes can benefit greatly from getting involved in various aspects of product and process quality.

## List of abbreviations and acronyms

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AgsPart2020	Livestock Development Expertise Centre ( <a href="http://www.agspart2020.com">www.agspart2020.com</a> )
AI	artificial insemination
carabao	Philippine 'water buffalo'
CDI	Wageningen Centre for Development Innovation ( <a href="http://www.cdic.wur.nl">www.cdic.wur.nl</a> )
community	where milk production has a primarily social function
commodity	where milk production is a primarily economic activity
conservation agriculture	Farming that uses minimum tillage and inputs ( <a href="http://www.fao.org/ag/ca/">www.fao.org/ag/ca/</a> )
DairyCon	Association of Philippine Dairy Producers ( <a href="http://www.dairyconphil.webs.com">www.dairyconphil.webs.com</a> )
FAO/APHCA	Food Agricultural Association of the United Nations/Regional Animal Production and Animal Health Commission for Asia and the Pacific, <a href="http://www.aphca.org">www.aphca.org</a>
fodder	grasses, leaves and straws used as animal feed
footprinting	assessment of the resources required for given type and level of production ( <a href="http://www.footprintnetwork.org">www.footprintnetwork.org</a> )
forage	same as fodder
GAP	Good Agricultural Practices
Life Cycle Analysis	roughly the same as footprinting, assessing all resources required for the production process
paradigm and mindset	roughly the same as mindset: the way of thinking and acting, which can differ not only between old and new science but also between the private and public sectors or between old and young farmers
mastitis	udder infection
NDA	National Dairy Authority ( <a href="http://www.nda.da.gov.ph">www.nda.da.gov.ph</a> )
R&D	Research and Development
SALT	Sloping Agricultural Land Technology
SEAsia	South-east Asia
SESAM	School of Environmental Sciences And Management ( <a href="http://old.uplb.edu.ph/sesam">http://old.uplb.edu.ph/sesam</a> )
suckling	allowing calves to drink from their mother
SWOT	Strength-Weakness-Opportunities-Threat analysis
UHT (milk)	Ultra High Temperature (milk), a form of sterilization
UPLB	University of Philippines, Los Baños ( <a href="http://www.uplb.edu.ph/">www.uplb.edu.ph/</a> )
WUR	Wageningen University & Research Centre ( <a href="http://www.wur.nl">www.wur.nl</a> )

# 1 Introduction

Dairy farming has been present on in the Philippines for more than a century. However, many types of livestock have been kept in the Philippines since early history for transport, ploughing, status, (some) milk, meat, manure production and income. Dairy farming itself has not yet been implemented in the Philippines on a large scale, though, nor is it a traditional practice as in some other countries of the region such as Indonesia, India, or more recently China, Thailand and Vietnam. Indeed, like other countries in the region, the Philippines is not well suited to large-scale dairy production because of the climate and the traditions. But opportunities would be lost if the role of dairy for development was overlooked, primarily opportunities for the production of local fresh dairy foods. The consultant thinks that dairy has an increasing role to play in the Philippines, provided it manages to establish methods of production and processing to suit 21<sup>st</sup> century realities.



The scope of this report is to cover past and present of dairy in the Philippines briefly, focusing on activities for the future. It raises two central questions regarding a) the choice between produce milk as a commodity and/or for the community, and b) the choice between uniformity and variation in dairy development. The report further uses two ways of looking at the dairy chain, one focusing on 'on-farm' milk production and one focusing on the value chain. Only a limited amount of numerical data is provided (table 1), as more would only be repetition of available information and because much of that information is unreliable anyway, due to the rapid rate of change. Last but not least, this report is looking at the future rather than at the past, and the past should not be allowed to cloud the future.

This report has been written as 'essay', as much of the content reflects personal opinion and 'hunches' rather than being the result of comprehensive research that would have been beyond the scope of this assignment. The ideas expressed in this document are the author's alone and they have been phrased in a challenging tone, primarily to trigger debate and action rather than claiming to be the last word: comments are welcome!

Table 1	Basic statistics on the Philippine dairy and general livestock situation (numbers in millions)				
	1968	1978	1988	1998	2008
Buffaloes	4.2	3.0	2.9	3.0	3.3
Goats	0.6	2.3	4.8	6.0	7.3
Cattle	1.6	1.8	1.7	2.4	2.6
Pigs	6.1	6.9	7.6	10.2	13.1
Chickens	68.4	58.9	60.3	137.7	154.3

Source: FAOSTAT



## 2 Characteristics of the sector, past present and future

### 2.1 Dairy in the Philippines: ambiguity and choices

The current state of the dairy sector in the Philippines is ambiguous, to say the least. Milk production has been present in the Philippines for perhaps a century or more, introduced by Spanish and later by the Americans, and the traditional Filipino must have been taking milk from their carabaos and goats for many centuries. The Philippine dairy sector never took off, however, unlike certain pockets of nearby countries like Indonesia, Thailand or the Indian subcontinent. Even so, dairy farming has been proven to be technically feasible in the Philippines, albeit at moderate yields compared to many temperate countries, due to the less favourable tropical climate and lack of a tradition.

Indeed, a number of dynamic entrepreneurs continue to prove nowadays what is possible in terms of milk production, from cows, goats and carabaos (photo 1). In addition, recent surges in demand for fresh milk such as from 'Starbucks-type' coffee-shops have boosted enthusiasm among producers. Also, young people are starting to flock to milk bars and ice cream parlours, and some vendors do not even need to adopt high standards of packaging etc. in order to sell their milk.

Others in the sector are dispirited, however. They complain that most of this has been done and seen before, that imported milk powder will always be preferred over fresh milk because it is so convenient, that not enough dairy animals are available, that imports of live animals are inefficient, and so on and so on. To make matters worse, existing training facilities for dairy production are in poor shape. Moreover, they tend to cater for people who will prefer to emigrate to work as farmhands and milers in countries with (literally) greener pastures such as New Zealand. Some such people see the sector as being in a state of permanent crisis, but the consultant and many others think that the sector deserves the benefit of the doubt, to say the least. The latest generation of entrepreneurs are creative and professional, and the vibrant 'Dairy-Expo' organized by DairyCon testifies to its strength.



Photo 1. Goats are successfully kept for milk at a large farm (Luzon), offering opportunity for poor parts of rural areas (left), with a well-managed dairy herd in arid lowland conditions of Quezon (centre), and an array of dairy products showing that the principles of processing for added value are well known.

The consultant thinks that the dairy sector does indeed have potential, provided a) that it develops into a variety of different production and processing systems rather than a single standardized 'national milk grid' and b) that it is seen as a vehicle for rural development (community oriented). The difference between the top-down Chinese development models and the early forms of Operation Flood in India may serve as an example in that respect. Competition on the (international) commodity market is not an activity that Philippine dairy producers of the immediate future should be gambling on. The most essential question is how the dairy sector can become a vehicle for sustainable development rather than becoming a major milk producer (Steinfeld *et al.*, 2006). This is precisely the topic of the livestock environment courses held at UPLB-SESAM in which the consultant has been involved since 2006; it is also the central mission of AgsPart2020.

## 2.2 Rationales for dairy development in the Philippines

Common arguments in favour of dairy development tend to be the growing demand for milk, especially from well-to-do urban consumers. Another argument is that milk is nutritious food for infants and other vulnerable groups, even if farmers themselves will justify milk production for a mix of mainly economic and cultural reasons. Milk does indeed offer good nutritive value, but alternatives are available (vegetables, soy bean milk, fish), so that the 'milk as a good food' argument is not the main justification for dairy in this report.

Self-sufficiency in terms of milk is another fashionable argument for dairy development that is often heard in meetings around the Philippines. But that justification is also not taken very seriously in this report. Countries like New Zealand and the Netherlands do not aim to be self-sufficient in products like coconut oil and rice. A good case can be raised, however, for the Philippines to be self-sufficient in terms of fresh milk (for the local community). The consultant's view is that no clear reason exists for expending public funds and other resources on the production of processed dairy products (as a commodity) if that milk can be imported more cheaply from other countries, at least for the foreseeable future. Indeed there is a good market for processed products such as powdered milk and UHT milk that cater for a market of 'casual users' such as families who use milk for their tea, for a special dish and so on. No competition is likely in the short term between those two sources of milk, provided that imported milk cannot be marketed as 'fresh milk'. It is even conceivable that growth of imported milk consumption could in the long term serve to establish a stronger market for local fresh milk and vice versa.

Arguments in this report in favour of dairy farming go beyond the commonly quoted ones, e.g.:

- increased population pressure implies a need for greater productivity per unit of land and dairy can be useful in this respect. Integrated crop/livestock systems in particular can provide income opportunities for smaller farmers and extra food for society. This refers to tree systems or cropping systems (e.g. coconut estates, sugar cane farms, pineapple estates) as well as to traditional ranches where beef or calves have become a meagre source of income compared to the potential added value of dairy farming.
- dairy can provide regular income rather than the bumpy cash flows from most crops. It can also provide added value for the community in the form of yoghurts, (fresh) cheeses, milk sweets etc., especially for producers near roads, village markets or schools. A proper (local) structure of the dairy sector can thus permit a flow of income from urban and village conditions back to the farms.
- livestock and especially smaller livestock can be a step towards asset building in poverty reduction programmes, e.g. working up from chickens and goats to larger animals such as dairy cows. Animals can also build assets in terms of education by teaching young people understanding about the relationships between humans and animals or by raising their interest in new forms of farming.

Production of fresh milk and its added-value products for the community therefore makes a lot of sense, especially for the weaker sections. It can supply local communities with pride, regular income and diversified food patterns. It also fits well within a logical evolution of farming systems in countries where land is becoming scarcer by the day, where resources are becoming limited and where uncertainty due to factors such as climate change demands diversified economic activity.

## 2.3 The dairy systems: a quick scan

In terms of numbers and types of dairy farming, the Philippine dairy sector is varied, fragmentary, small and in some cases stagnant. Fragmentation has to do with low levels of organization plus a lack of tradition in dairy production, as well as difficult communications that are partly due to inter-island trade. The variation is a result of differences in climate, soil, distances to markets, and local culture. However, variation, fragmentation and small scale need not be a problem. The challenging question is whether these characteristics can be overcome or whether they can be turned into an advantage. That question can only be answered if the goals of milk production are clearly set, for example by choosing between milk as a commodity and/or for the community.

In terms of overall milk supply, the output of the dairy sector is rather insignificant. Only some 1-2% of national milk consumption comes from local supply, with only a little real growth over past decades in a context where imports of milk products are much cheaper. The sector as a whole comprises some 10-20 larger farmers with 50–150 cows yielding between 4000 and 8000 litres/year, sometimes changing ownership, and some 25 cooperatives supported by the NDA, of which some have more than 500 members that each only produce approx. 300–600 litres daily (that is less than 1 litre per member per day!). Such low yields from the associations are a cause for serious concern, because they suggest that the turnover of these associations is far too low for them to be viable. However, it may be possible to turn such low turnover into a strength, e.g. by reorganizing current setups. Again, this is a challenging question!

The consultant feels that the best development goal for the sector over the coming decades is to make the country self-sufficient in fresh milk, producing milk for the community rather than as a commodity. Unfortunately, even national legislation does not distinguish between 'fresh' milk imported as milk powder and 'fresh milk' produced locally, thus putting local production at a disadvantage. Philippine legislators are missing an opportunity here that is being well used by their colleagues in neighbouring countries. The sector is diverse, with the few large producers mostly near cities in Luzon and a few other islands (e.g. near Davao). The smaller producers are scattered around the country, for instance in the NDA dairy zones. There is even transport of fresh milk from Mindanao<sup>1</sup> to an eager market of coffee shops and milk bars in Manila. Such transport may make economic sense, but its energetic cost is unrealistic and development of local milk farms would make much more sense. Mindanao and the other islands can also develop at least reasonable local markets.

Indeed, milk can be produced everywhere in the Philippines but the climatically more viable (potential) producer regions are high in rainfall and are in cooler hills, e.g. at altitudes of several hundred metres in Bukidnon (central Mindanao), a long way from Manila's markets. Other regions with potential are in lowland and almost semi-arid regions of Quezon, and a great deal could be gained by further studies into the potential for dairy in perhaps (climatically) less favourable areas such as the North-Eastern 'hills' of Luzon, the Visayas and remote areas. The question for such a review would then not be *whether those regions are suitable*, but on *how and in what sense they could be suitable for dairy*. The answer should take account of the changing conditions in rural life and supply of resources that we expect to see in the coming decades (e.g. urbanization, water supply).

Regular imports of live dairy animals (mainly crosses from New Zealand) are costly and they appear to be rather ineffective in enhancing the gene pool of the dairy stock. Rather low numbers of such imported animals and their offspring are seen in the field, again presenting both a problem and an opportunity. The answer is to be found not only in continued imports but also in policies that make it more attractive to maintain existing stock.

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<sup>1</sup> There are stories that (fresh) milk is shipped in from the US (by air?); the consultant cannot substantiate these claims.

Government agencies like the National Dairy Authority and the Philippine Carabao Centre do their part in assisting the sector, partly by organizing dairy associations and/or school milk programmes, even though large-scale impacts of ongoing projects in this field are yet to be seen. A non-governmental organization called DairyCon plays its own part in stimulating the industry, for instance by collaborating with NDA to organize its yearly 'Dairy Expos'. This non-exhaustive list of challenges and sometimes ineffective but well-intentioned actions can be expanded, but these notes do not pretend to be comprehensive. Only a few of these issues will be elaborated in depth, but first we will expand just a bit more on the opportunities.

## 2.4 Opportunities

Low yields, fragmentation, small size, inefficient gene pool management and poor performance of dairy associations may all be seen as problems. The challenge is to ask whether they offer opportunities. The consultant feels that opportunities do exist, for instance because large private entrepreneurs and individual small farmers are showing that milk production is technically feasible. Opportunities also exist in the apparently increasing demand for real 'fresh milk' from coffee shops and in the demand from urban and/or young consumers for added value products such as (locally produced) ice cream, drink yoghurts, candies and the like. Furthermore, opportunities lie in the 'natural' evolution of farming systems from extensive to intensive in which dairy can play a role. Last but not least, and leaving many other issues out of consideration, opportunities are also present in the low utilization (often below 30%) of existing processing capacity of the dairy associations, lying idle waiting for more milk. Opportunities for rapid change do indeed exist, and some of them may be easily within reach if the right measures are taken.

Technical issues such as feeding, breeding, quality standards etc. tend to dominate the debates on dairy development in the Philippines, or it at least seemed that way to the consultant. However, to me as casual observer, the opportunities relating to organizational issues might be bigger than the technical ones, for example:

- high calf mortality need not be a problem in a technical sense, as some producers are showing that good calf rearing is perfectly feasible (photo 2). Measures to improve calf rearing should not merely tell farmers how to rear their animals better. There are opportunities in field research to find out what keeps them from doing a better job while clearly distinguishing between large and small farms, for example. Bucket feeding of calves (even with milk substitute) may be an option for the larger farms with high milk prices, suckling is an option for (smaller) dairy farmers with lower milk prices.
- generally acknowledged persistent low results of continued live cattle imports from New Zealand imply that more effective avenues must be available to improve the situation. Examples could be imports of semen, establishing and/or improving government nucleus farms or by leaving this kind of activities to the private sector as is being done lately. Or a combination.
- complaints to the consultant at a processing centre that the centre's cheeses do not sell well because the size is too large can easily be solved technically by using other moulds. It also suggests that more agile management can make a big difference, while the fact that even unattractively packaged milk sells out quickly shows that there is a potential demand for milk products even in the countryside (photo 2).
- increased pressure on land and the potential of dairy farming for added value could be combined well in large tracts of relatively unused land under coconuts and/or on hillsides. That is another easy target in which organization is often a more important opportunity than lack of technical skills.
- a great deal of discussion focuses on milk yield per cow, rather than on learning from countries like New Zealand where milk yield is maximized by feed availability (mainly roughage) rather than per cow (unlike in most US and European dairy production models). New thinking about optimum milk yield might be as much an opportunity as the technology for high yields (with its associated costs).

Here again, better organization and improved management skills might offer more opportunity than further training on the technical skills of milking, feeding and so on.

It is by no means straightforward, but the consultant's opinion is that failure is certain if organizational problems are confused with technical problem. Failure is even more certain if standard methods are copied without understanding them from conditions that are alien to the Philippines. Failure is also certain if problems are confused with opportunities. Learning from variation within and between other countries, as well as from farmers within the country, offers scope for dairy farming as an additional option for sustainable development. It is also possible to learn from countries with intensive and specialized units that are rediscovering advantages of nutrient recycling in mixed farming systems, or from places in the world that promote a new balance between national milk grids and local food production



Photo 2. Good calf rearing in practice, shown here at the nucleus farm of Ben Molina (left). A great deal can be gained from more attractive packaging (centre). And a sorry case of a cheese of the wrong size in an otherwise interesting array of products

Many of the problems and opportunities listed above are located at the level of individual producers or their associations. An opportunity of different nature and at a higher policy level is that dairy is not yet well recognized as a significant growth sector by the government, although change does seem to be in the air. Governments supported dairy development off and on through the years (Bulatao, 2008), but overall these policies appear to have been inconsistent, and large government programmes such as the genetic improvement schemes have not yielded encouraging results. Changing this by defining or redefining the role and potential of the private and public sectors is another opportunity to produce 'more with less'. If well done, all these actions might trigger critical change so that the sector can become self-sustaining, for example through policy choices:

- redefining legislation regarding 'fresh milk', giving local producers an advantage in the fresh market;
- using dairy farming not only for milk production, but also as a vehicle for local development, via more effective dairy associations and as part of mixed farming;
- designing tailored approaches that avoid the uphill struggle of imitating developments in other countries;
- developing new research agendas and curricula aimed at finding market opportunities (including niche markets) as well as dealing with forthcoming challenges such as shortages of fossil fuels, soil fertility and water scarcity, as well as social factors such as community resilience;
- defining and/or redefining the roles of private and public development agencies, e.g. dairy businesses, DairyCon, universities and training centres, dairy associations and the National Dairy Authority.

A major opportunity will clearly be missed if the potential of dairy farming is lost for the Philippines to indifference and/or by simply copying what other countries do, and/or continuing to do what was done in the past. Repetition of arguments from earlier in this text may be partly due to prior editing, for which I will take the blame. It is also due, however, to interrelationships between these arguments and issues. The arguments below will show that once again.

## 2.5 Policy choice and vision: what do we want?

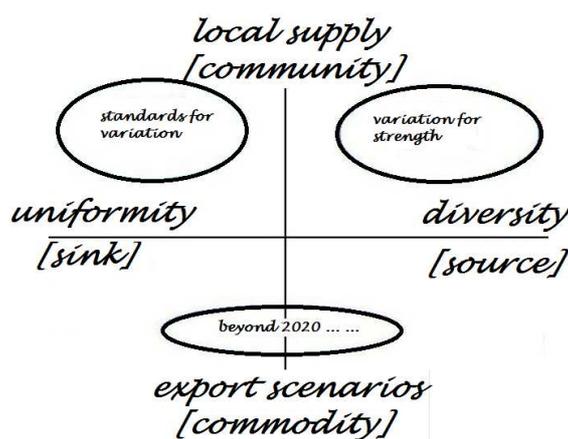
Design of dairy policies depends on visions for the sector (see box 1). Many choices are possible, but only two major ones are proposed here:

- the choice to produce fresh milk for local supply and income (the community approach) versus the choice for export scenarios that aim to produce milk for mass products such as milk powder (the commodity approach). In the consultant's opinion, the export scenario is beyond reasonable reach because milk as a commodity can probably be better produced in temperate countries with plenty of good grassland. The 'community' approach is also followed by larger local producers, especially when they assist collection of milk from smaller local farmers and/or when they market their milk by stressing that it is local rather than anonymous world market milk.
- the choice to adopt uniform versus diverse development, associated here with choosing to be a 'sink' or a 'source' (complicated terms related to the consultant's vision on sustainability). The terms express the idea that a standardized development approach generally requires more use of resources than a diversified development path (see box 1). Standardization requires a uniform environment whereas a diverse system, if well designed, allows adjustment to local conditions and even regeneration of local resources.

### Box 1 Choices for Philippine dairy development

The 'vision quadrant' to the right gives choices for different policy scenarios.

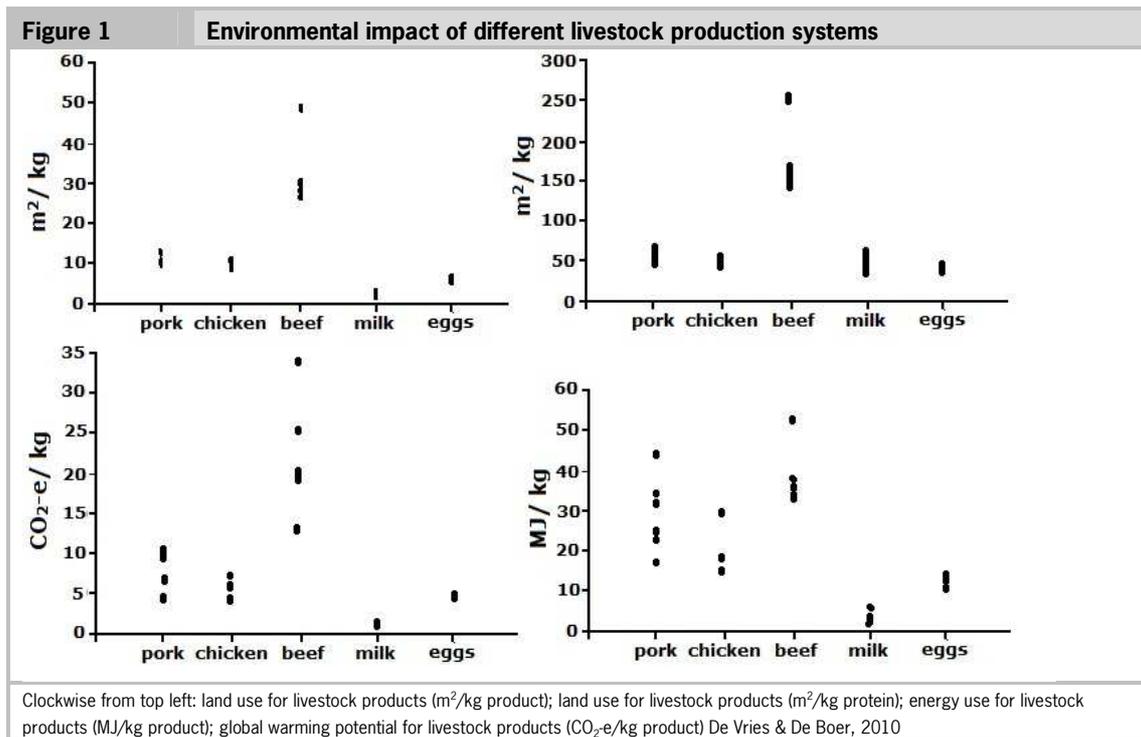
Export scenarios for dairy (as a commodity) do not appear realistic for the Philippines, so the choosing to focus on local supply of fresh milk (for the community) is probably the more relevant side of the vertical axis. Satisfying national and local demand for fresh milk, however, may be tackled in several ways, e.g. by focusing on uniform production systems as well as by focusing on diversity (the horizontal axis). The choice between uniformity and diversity is associated with choosing systems that are either a 'sink' or a 'source'. Standardized systems are considered to be sinks because they tend to cost more natural resources than diverse systems. Standardization has economic advantages, but adapted and diversified forms of dairy and other farming can help regenerate local resources. Such systems can become a 'source' rather than a 'sink' of resources.



In the context of visions for development, the consultant thinks that Philippine dairy sector has in the past often been implicitly commodity-focused, even if the NDA approach reflected considerable attention to the community (Bulatao 2008). What continues to count in much public debate until now is mainly the number of litres of milk and the number of cows rather than aspects such as rural income, stability and/or the nutritional status of the community. Also, teaching curricula tend to appear to focus on animal nutrition and milk hygiene using ideas taken from large scale and often temperate farming conditions, rather than being tailored to Philippine conditions. For the development of locally adapted systems, it is important to rediscover previous work on overall farm development in the Philippines, such as on crop residue feeding. New curricula also need to be designed to face the environmental challenges of the future such as poverty, approaches to lifecycle analysis (LCA), and nutrient cycling.

Another option for Philippine dairy development is a flexible blend of local and international norms regarding animal health, hygiene, sustainable use of feed and water, animal welfare and the environment in general. Much may be unknown, but a large body of knowledge is available. Scenario studies, of which the basics are known at Philippine Universities, can help for example in studying the advantages and disadvantages of small versus large markets, taking lessons from modern footprinting and lifecycle analysis.

Income and vibrant rural life, in that order, may be the first reasons for producing milk. However, real environmental issues are now emerging that were unthought-of only ten years ago. A case in point is that the production of one litre of milk costs somewhere between roughly 300 and 1000 litres of water. That is an awful lot of water for one litre of milk, but it may not be as serious in humid central Mindanao as in dryer areas of Luzon. In fact, each milk region may need its own production system to ensure 'sustainability through diversity'. Together with other challenges such as greenhouse gas emissions from livestock, this requires clear thinking about the design of future dairy systems. Milk has a good record across the board (fig. 1); beef performs poorly and pork or poultry are intermediate. In that context, the consultant has ventured to add a perhaps far-fetched vision of dairy development, i.e. the vision of making dairy a 'source rather than sink', letting dairy farming 'generate' resources rather than 'cost' resources. That choice, again, is closely associated with the choice for variation versus standardization, a prime mission for AgsPart2020.



## 2.6 'If well done': product and process quality

Much advocacy of livestock development, including dairy, used to ignore the fact that livestock can have adverse effects on both the socio-economic and biophysical environments. Such adverse effects can be negligible when the sector and enterprises are small, but they increase when things get bigger. International concerns about the need for sustainable farming, dairy in particular, over the past 20 years

(De Haan *et al.*, 1992; Nell *et al.*, 1992) forced the public and private sectors as much as two decades ago to pay attention to process quality as well as to product quality (box 2).

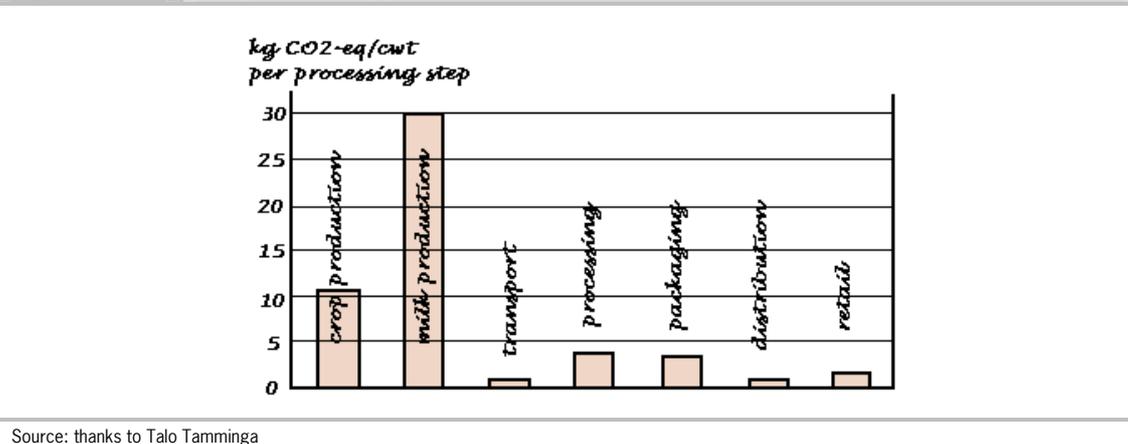
**Box 2 Product and process quality**

The Philippine dairy sector cannot escape the need to pay attention eventually to issues of product and process quality in which:

- product quality refers to aspects such as the composition (fat, protein, non-fat solids, etc.), microbial counts and organoleptic characteristics (smell and taste). Improvements in this respect may be possible and desirable, but the poor performance of many dairy associations may be due to lack of organization rather than to lack of skills and knowledge.
- process quality is a rather undeveloped aspect of livestock production in the Philippines, referring to aspects of footprints, origin of food, aspects of animal welfare (not so urgent in dairy as in intensive pig and poultry but important nevertheless).

All these concerns about sustainability together lead to work on methods known as footprinting, environmental impact assessment, and/or lifecycle analysis as discussed in the previous section. All these boil down to environmental accounting that attempts to establish the resources required for a given product, in this case milk. Another example of such a lifecycle analysis, focusing on the environmental impact of dairy, is given in fig. 2. It shows the relative contributions of each part of the chain to total greenhouse gas emissions, showing that much of the environmental burden is caused by the production of milk, especially when production of feed and fodder is primarily for dairy and the total impact of energy use, fertilizer and other resources is ascribed to dairy alone. Use of crop residues reduces the environmental impact, because the use of water and fertilizer is shared with the production of grain. However, the use of fibrous feed in particular increases CH<sub>4</sub> emissions during digestion. So the use of by-products has specific advantages and disadvantages in terms of the footprint. A great deal of work still needs to be done on these aspects, representing a challenge for the design of sustainable dairy systems (Steinfeld *et al.*, 2006).

**Figure 2 Footprint of dairy production, based on North American conditions**



The footprint of the transport and processing chain is smaller than the footprint for primary production. It is still significant, however, especially if a) milk is produced from crop by-products and b) when the value chain gets longer. Transport is in fact only a rather small part of the total costs, but transport-related footprints due to cooling, freezing, packaging and retailing can be very high. That implies opportunities for local rather than national production. The choice between the community and the commodity approaches therefore gets shifted further in favour of local when seen from a footprint perspective.

## 3 Production systems

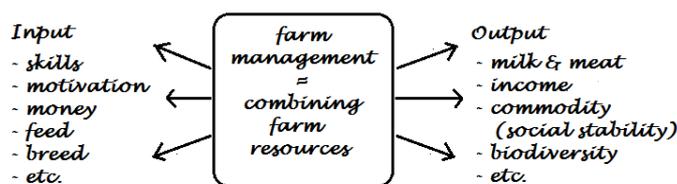
### 3.1 Introduction

The Philippine dairy production and processing systems are a very varied lot. Common characteristics can be found, but the 'average' Filipino dairy farmer does not exist. Nevertheless, this chapter discusses common concerns for farmers of all dairy systems, stressing that it will possibly be necessary to distinguish between farming systems. Differences between goats and carabaos may then turn out to be less important than differences in the size of the operation, access to the market and issues of soil or climate

### 3.2 Variation and similarity in production systems

Despite their variation, all production systems are in fact similar in terms of structure (fig. 3). For example, all farms have to feed and milk, even if the scale, soil and climate differ. Input-output diagrams such as that in fig. 3 can be made for systems at the animal level (cows, goats, and buffaloes), the farm level (mixed, small, large), the village or regional level and the like. The crucial point of this particular diagram is that it explicitly pays attention to social, psychological and ecological values as the inputs and outputs. Inclusion of aspects other than the purely technical is inherent in the policy choice for the community approach and variation where rural income, stability, diversity and biodiversity are also important. Recognition of social and ecological values would be less obvious, however, if milk is produced only as a commodity. Inclusion of social and ecological values also reflects a choice in favour of process quality (box 2).

**Figure 3** An input-output diagram to represent the dairy production system, at the farm level as well as the regional and national levels, and with explicit attention paid to issues of sociology, ecology and economy



### 3.3 The production system at the farm level

The diagram in fig. 3 shows numerous resource flows and outputs of dairy production systems, each representing opportunities for change, including social and cultural change. Even so, many discussions that the consultant witnessed in the Philippines focused on only a few of those aspects. Moreover, the few that are discussed tend to be mainly the technical ones such as genetics, feed and marketing of milk, with relatively little attention paid to social aspects of dairy associations and individual (small) producers. But even within the technical realm, a change may be required towards more integral approaches and away

from feed and breed (as separate issues) only as discussed in chapter 3. Many input and output flows can be discussed, but this report can address only a few. The consultant therefore chose to start with a discussion covering only skills and motivation, loans, feed, breeds (this chapter), then proceeding via their relationships with management (chapter 4) and on to major aspects of processing (chapter 5). Similar discussions are possible on aspects of veterinary care, use of milking methods and gender issues, to name but a few; however, the mandate of this report is not to be comprehensive. The important thing in the choice of topics in this report is that it addresses not only technical but also socio-economic issues in order to balance future discussions about dairy farming for the community.

### 3.3.1 Skills

Much can be done in terms of skill development, but not merely by providing more technical training. Enough basic skills are available at selected farms and in some training centres, but they find it difficult to make ends meet. Many of the skills taught there are based on previous work in foreign countries focusing on practical skills. Attention is often not paid explicitly to work involving local experiences of working with local variation. Indeed, an opportunity is missed if local experience, ingenuity and indigenous farmers' knowledge are lost, especially for the development of smaller farms and for notions of 'milk for the community'. Especially relevant aspects of traditional and local skills are healthcare and management techniques (use of fodder trees, how to sell, when to breed, calf rearing, etc.).

Training for standard skills such as milking, feeding and calf rearing is starting to be done quite capably in collaboration between NDA and 'successful' farmers. Training is also needed in other fields, however, for example on issues like whole farm management (central part of fig. 3). Opportunities are lost if training neglects the relationships between housing/grazing systems and nutrient losses (Chapter 4) or between clean milk production and marketing (Chapter 5). A 'whole farm' perspective is needed for all players, including staff of universities and government. Still, some expertise is available even on whole farm management, with the entrepreneurs' know-how about running dairy farms both large and small. One or two good working sessions between these farmers and government officers/university staff would unlock a potential area of improvement in the sector. Two of such sessions have been held already under the auspices of Dairy Con/NDA and AgsPart2020 in the course of 2009 and more such sessions are recommended.

Available expertise can in fact be the basis for training future dairy farmers but in many cases the training tends to ignore available skills. Skills drain away if they are not constantly upgraded to suit new conditions and market demands. Upgrading is necessary and possible through study tours, seminars (as organized by DairyCon), active exchange of farmers' knowledge (as by NDA) and active redesign of R&D as well as academic curricula for more sustainable farming. That includes attention to issues of (small-scale) marketing, dealing with climate change, social resilience, water use efficiency and the like (box 2). Those issues may seem far-fetched for day-to-day management, but they will affect the sector sooner or later and the sector can choose to be proactive rather than reactive.



Photo 3. Existing dairy farms with quite reasonable management (left and centre) and potential for dairy production under coconuts (right), all in Mindanao.

### 3.3.2 Money, loans and motivation

Subsidies are out of fashion in national and international development, but alternatives are available to make the dairy sector more viable. Development of dairy farms (smaller ones in particular) can be self-sustaining and not need support programmes if a) prices and marketing are right (a challenge for the dairy associations!), b) gradual development (good artificial insemination) is chosen rather than crash programmes (cattle imports), and c) motivation is part of the curricula, in addition to teaching technical skills.

Active pricing policy for a viable national dairy sector is difficult, given current economic thinking. More subtle policy could start, however, with policies that favour production and marketing of local fresh milk, while continuing to enjoy cheap milk or milk powder for consumers who cannot (yet) be reached by local (fresh) milk producers. Many countries in the SE Asia region supported local milk production that way, e.g. by linking import quotas for milk powder with measures to support local fresh milk production. What is happening now in the Philippines is that a) imported milk products are sold locally as so-called 'fresh milk', b) existing processing facilities operate far below capacity. Both issues could be turned into opportunities as government might more actively define or redefine fresh milk as locally-produced milk and associations could pull their act together. Part of the low throughput of the societies seems to be due to poor management and poorly designed payment schemes, which cause farmers to only deliver left-over milk. The cooperative thus becomes a dumping ground for milk with high processing costs per litre, rather than a self-sustaining centre for development. The consultant is sad to note that many milk associations do not seem capable of pulling their act together; a matter of organization rather than of technical assistance.

Crash programmes tend to have deleterious long-term effects for small farmers in particular; crash programmes exist in many shapes and sizes but import of dairy animals and their placement at small farms is a case in point, putting undue stress on such families, technically and economically. Around the world, it is particularly the smaller farmers who tend to day unduly in such cases for subsidized imports in crash programmes importing large dairy cattle. It would be nice to see the Philippines become an exception to that rule. Importing live animals is a risky proposition and smaller farmers often have to pay, rather than getting the benefit. Cheaper but slower processes such as using AI may bring more benefit in the long term, even if something needs to be done to ensure proper AI infrastructure, which at this moment appears to be working less well than it should.

Motivation goes beyond teaching technical issues. The consultant feels that teaching needs to be set in a framework of larger goals that motivate those trained. For academic students, this could be the need for rural development, the need for pride in local produce, the need to address the challenges of climate change and declining resource availability. Work on lifecycle analysis and scenario studies provides an opportunity to effect change. For farm trainees and farmers, it could be motivating to set the training in a context of 'good income' (even if that may sound cynical when people are looking for training in order to go abroad!). Reshaping of curricula at universities and training centres offers opportunities to reinvigorate staff, trainees and the farming community alike. More practical skills such as milking and hoof care continue to be needed, but only in the context of such larger goals.

### 3.3.3 Feeding

National policy could distinguish more explicitly between major production systems, not least when addressing issues of animal feeding. Region-specific policy is mentioned off and on as background in meetings, but it does not seem to take hold as a leading theme in discussions. Such zoning of different regions for animal feeding programmes could distinguish between for example, favourable climates such as in central Mindanao (Bukidnon), hotter but still wet coastal areas where climate and forage quality are insufficient for high-yield cows, and regions with dry seasons where feed conservation and/or use of crop

residues is especially useful. Each of those regions has its own specific optimum feeding regimes, and scenario studies could help to identify specific problems, opportunities and development programmes better.

For example, and in the consultant's opinion:

- silage might play a role, though possibly only in wet and cool climates with relatively short dry season near markets, urban ones in particular. Silage is not likely to be relevant in regions with low rainfall and regions with prolonged dry seasons that are a long way away from markets.
- in areas close to the markets<sup>2</sup> it can be more profitable to buy concentrated feeds from the city than to make silage (increased distance to the city tends to imply lower produce prices and higher prices of inputs such as feed).
- rice-growing areas may not be perfect dairy regions (hot and no pasture) but they do have a feed supply that can be taken into account. Previous work on crop residues as done by UPLB may offer yet unrealized potential. Looking at the use and quality of rice bran is also a good topic for scenario studies.

By modifying teaching, research and development efforts according to the specific zone, the effectiveness of work can be increased. Here again, much if not all information on feed and fodder is already available. The trick for policy is to trigger R&D towards better understanding of these technologies in terms of food security (facing the uncertainties of climate change), nutrient cycling (slurry management and nitrogen capture), erosion management and community aspects. Again, scenario studies can play a crucial role in this kind of studies.



Photo 4. Crop residue feeding is not new, especially where draught animals are kept in mixed farming systems and when cattle graze along the roadside (the traditional systems left and centre). Crop residues in the form of straw continue to be relevant, and also in the form of tree leaves that grow as a by-product of trees meant to control erosion on sloping land.

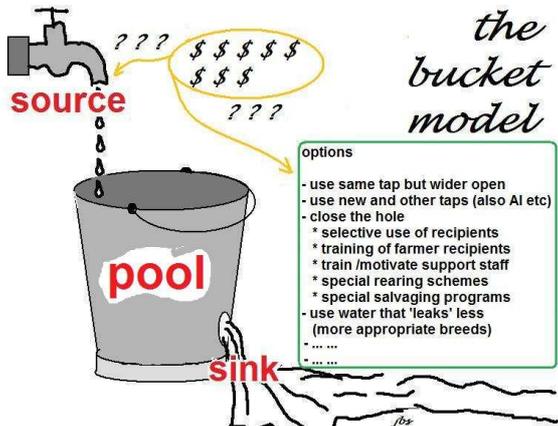
### 3.3.4 Breeding

The breeding situation is rather stagnant and not much gain of genetic material is likely (box 3). However, some change seems to be in the air after many years of being focused on imported cattle (cross-breeds) from New Zealand. There is still some quibbling about which animal is needed for 'the Philippines as a whole'. The aim is to establish a special Philippine breed, assuming a 'standard' cow for average farmers. The alternative supported by the consultant is to aim for a broad and varied genetic base that permits a choice of animals according to the region and farmers' preference. Some of that alternative is increasingly and more publicly being discussed, with Jerseys and Brown Swiss and their crosses being named as alternatives besides Holstein-based animals.

Fortunately, there is also a move to involve local entrepreneurs in the production of local breeding stock, away from the focus on government-controlled breeding. The role of former ranches and fattening lots in the production of locally adapted dairy animals or crosses fits the need for more privately led programmes in dairy cattle improvement. Government action to provide farmers with better breeding stock and semen may have to shift from actual production of better stock to facilitation of import and AI and other services.

<sup>2</sup> Distance to the market is a matter of physical distance (kilometres to the market) and of socio-economic distance. For example, a small farmer in Quezon may find it harder to access the Manila market than an entrepreneur in Bukidnon, who can even freeze milk to be transported to Manila.

Some of this is discussed here and there, but clearer choices may be required. So far, imports of live animals tend to have had little net effect on the gene pool. The consultant tried to fathom the 'internal logic' of gene pool improvement by summarizing it in the bucket model of box 3, with probably greater losses than gains of genes.

Box 3	The 'bucket model' applied to management of genetic resources in the Philippine dairy sector
<p>Management of dairy genetic resources in the Philippines looks like a bucket with a tap (source) that runs water (genes) into a bucket with a huge hole (sink) on the bottom. The imported genetic materials cost a lot of money via live crossbred animals rather than via semen and/or embryos, as well as bringing in only half the dose of genetic quality that is available in semen. The quality of the (cross-breed) imports is disputed all through the islands, and loss (=sink) of genes seems to be high. Combining an expensive but small 'source' with a large 'sink' implies difficulties maintaining the pool; these are apparent as you travel around the country. Gene 'loss' in this way is probably as large as gene 'gain'.</p>	<div style="text-align: right; font-style: italic;">the bucket model</div>  <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>options</p> <ul style="list-style-type: none"> <li>- use same tap but wider open</li> <li>- use new and other taps (also AI etc)</li> <li>- close the hole               <ul style="list-style-type: none"> <li>* selective use of recipients</li> <li>* training of farmer recipients</li> <li>* train /motivate support staff</li> <li>* special rearing schemes</li> <li>* special salvaging programs</li> </ul> </li> <li>- use water that 'leaks' less (more appropriate breeds)</li> <li>* ... ..</li> <li>* ... ..</li> </ul> </div>
<p>Options for increasing the 'source' are to open the 'tap' further, e.g. by additional expensive live animal imports (not preferred). Additional options are to consider other ways of importing genetic resources like artificial insemination and/or embryo transfer (for selected farms). Last but not least, better use of existing 'nucleus herds' and breeding stations - whether private or public - is top priority to reduce the loss of genes. Potential nucleus herds now starting to be used are at current and former ranches and beef stations, probably better run by the private than by the public sector.</p> <p>Options to close the sink (the hole in the bucket) are to choose recipients more selectively, to prepare/train/motivate recipients and support staff better, to adopt special rearing schemes and/or to design better calf salvaging programmes (photo 5).</p> <p>Other options for reduced 'leakage' (less 'sink') are to use more appropriate animals, in other words to use 'water that leaks less'. That is a strange metaphor, implying that you should use genes that do not 'drain' away too easily by using more rustic breeds and better management. Current imports recognize this by focusing on importing cross-breeds, but surprisingly little attention appears to be paid to using rustic pure breeds such as Jerseys and Brown Swiss.</p>	

Policy options for better gene pool management include actions on calf salvaging, training farmers, choice of resistant breeds, use of nucleus herds or subsidy schemes for calf rearing. None of these alone is the answer and combinations of different approaches may be suggested, depending on the farming system to be considered. For example, gene pool management is different for a large ex-rancher than for a community of subsistence farmers. The importance of possible methods of calf rearing was elaborated in a session with various people from the dairy sector (photo 5 and table 2).

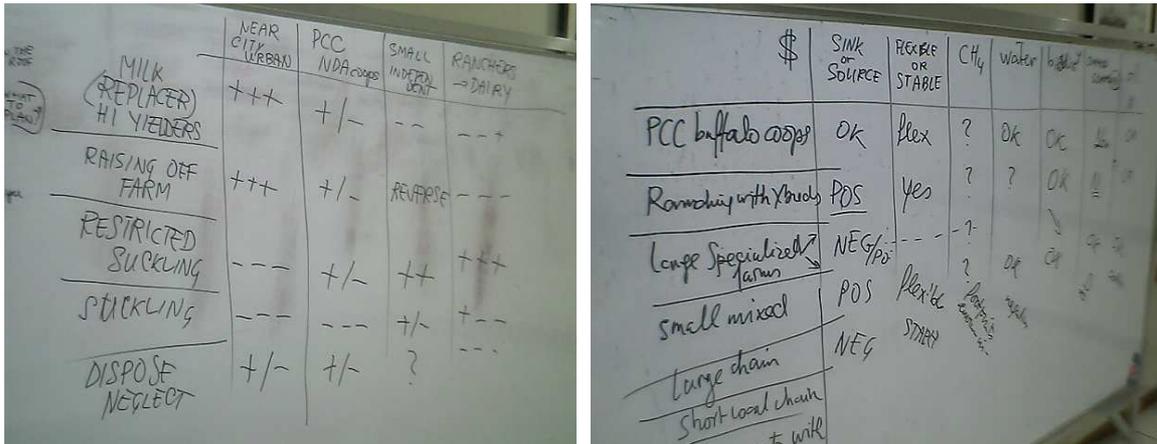


Photo 5a/b. Design of intervention matrices with participants of a DairyCon/NDA/Agspart2020 meeting in Manila (June 2009), an example of scenario studies for development priorities.

<b>Table 2</b>		<b>An intervention matrix for more efficient calf rearing with interventions in the left hand column being ranked for their suitability for the different farming systems that are shown in the columns</b>			
	<b>Near urban regions</b>	<b>Dairy associations (PCC/ NDA)</b>	<b>Small independent producers</b>	<b>Ranchers who shift to dairy</b>	
Milk substitute	+ / -	- -	- -	- -	
Raising off farm	+ + +	+ / -	- -	- - -	
Restricted suckling	- - -	+ / -	+ +	+ + +	
Suckling	- - -	- - -	+ / -	+ - -	

Note: this sketch is based on photo 5a as an example of what can be done in meetings between farmers and development agents to create tailor-made developments. Use of milk substitutes as mentioned in the top left row is at this moment still uneconomic, but times may change. Pluses (+) indicate opportunities; minuses (-) indicate that the 'technology' is not feasible.

## 4 Management: combining the parts

### 4.1 Understanding the whole

The central box in fig. 3 represents the management of the farm, focusing on how to combine use of 'inputs' (social and technical) and the method of processing of 'outputs' (including so-called 'waste'), as well as ways that crops, animals and family labour can contribute. Many examples of work on such combinations can be quoted, from labour management, via design of livestock housing systems for nutrient management and calf rearing methods, through to design of optimum herd composition and crop rotation.

### 4.2 Combining 'feed and breed' on mixed farms

One example of optimized livestock and crop combinations in mixed farms is given in table 3, based on Indian conditions. Plenty of other such scenarios exist on a range of management options and Philippine R&D used to lead this kind of work in the region (Devendra & Sevilla, 1995). The consultant recommends more work on such scenarios by government and universities, in collaboration with groups such as DairyCon and Agspart2020. The scenario studies should be carried out primarily to create better understanding of management options and to be better able to make region-specific and farm-specific recommendations. The basic result of table 3 is that aiming for high yields (above some 10-12 litres/animal/day) results in reduced income from the total farm. Results of such scenario studies would be different for the different regions and farming systems, with notable differences between small and large farms. However, the basic conclusion would stand: combining crops and animals will increase farm income only if the farm manager aims for maximum yield from the combination rather than for maximum yield from the parts.

<b>Table 3</b>				
<b>Optimum crop combinations, herd size and production at different individual cow production levels, with a basic ration of straw and a small fixed area of good quality fodder</b>				
<b>Individual Production (L/day/cow)</b>	<b>System Production (L/day)</b>	<b>Herd size (cows/farm)</b>	<b>Cotton (ha) See note 1</b>	<b>Total income from milk and crop sales (Rs./day/farm)</b>
0.3	1.0	3.5	0	10.5
2.0	5.1	2.5	0	22.2
4.0	7.8	1.9	0	30.4
6.0	9.5	1.6	0	35.4
8.0	10.6	1.3	0	38.9
<u>10.0</u>	<u>10.6</u>	<u>1.1</u>	<u>0.4</u>	<u>39.1</u>
12.0	10.4	0.9	0.8	38.9
16.0	6.6	0.4	1.0	27.6

Note 1: total area is 1 ha, i.e. 0 ha cotton implies 1 ha sorghum, 0.4 ha cotton implies 0.6 ha sorghum etc. with the total remaining 1 ha of crop land.  
Note 2: cows are 'tropical' cows and a milk yield of 10 litres for a small tropical animal of 350 kg is comparable with 20-25 litres for a larger 'temperate' cow. Note 3. Rs is Indian Rupees, at that time 1 US\$ ~ 25 Indian Rupees. Source: Patil 2006.

## 4.3 Livestock housing and grazing systems for income and nutrient management

At least three major issues determine the optimum combination of for example housing, feeding and processing. Other important factors such as tradition have been left out here. These are beyond the scope of this report, which focuses on:

- availability of money and available construction materials, with great differences between small cash-strapped subsistence farmers on the one hand and larger farmers with money to invest and often with better relationships in business and construction circles on the other. In all the extensive material about constructions, the consultant found little if any distinction between guidelines for small and large farmers, or on cost prices of different housing systems for either small or large farmers.
- climate, availability (=cost) of labour and decisions to be made about farm processing or only milking affect the type of housing and/or animals. There may well be extensive material available about different construction methods and farm layouts, but discussions often focus on either the 'New Zealand System' or 'stall feeding' without working towards a systematic comparison of the advantages and disadvantages for either small or large farmers (table 4). In that vein, zero grazing in particular may be a better option for small farmers and stall feeding may be better than grazing due to the higher nitrogen losses in grazing systems.

Table 4 Differences between small and large farmers in terms of feeding systems		
	Small, Resource-Poor Farmers (RPF)	Large, Resource-Rich Farmers (RRF)
<b>New Zealand system (grazing)</b>		
Labour requirements are low	Less income generating	Opportunity for RRF
Extensive use of land	Difficult for RPF, requires a lot of land	Opportunity for RRF with a lot of land
Difficult for mixed systems	Perhaps some trees & legumes	No real concern for RRF
Low nutrient recycling	Difficult for cash RPF	RRF can buy nutrients
<b>Stall feeding with cut and carry</b>		
Easy to use crop residues	Important for mixed system of RPF	Not relevant for RRF
Can allow nutrient recycling	Relevant for poor RPF	Not a problem (yet) for RRF
Does not require much land	RPF can use land for crops	Not a big issue for RPF
Higher labour requirement	Labour income opportunity	RRF has to hire a lot of labour, which implies labour problems

Roughly speaking, almost all nitrogen ingested and excreted by an animal can be lost through the urine and faeces via evaporation and/or leaching, leaving virtually none in the system. This is shown below in a (greatly simplified) scenario calculation:

***Nitrogen ingested and excreted can be calculated as follows using ballpark figures<sup>3</sup>:***

*One high-production dairy animal of 500 kilograms on good feed eats 3% of its bodyweight per day*

*That is 15kg dry matter/day with at least 15% crude protein, i.e. 2.25kg protein*

*2.25kg protein/day equals 0.36kg nitrogen/day (protein contains 16% nitrogen)*

*0.36kg nitrogen/day equals 131kg nitrogen per year*

*131kg nitrogen per year is the equivalent of the nitrogen in 285kg urea (say 10 bags)*

*Of these 10 bags only some 2 bags end up in the milk*

*Some 3 bags end up in the manure (with some residual effect on the land)*

*Some 5 bags get lost via leaching or evaporation*

*Only 20% of the nitrogen is therefore used and the rest gets lost; poor performance indeed.*

<sup>3</sup> Such ballpark figures are approximations. Details can be obtained from AgsPart2020.

## 5 Dairy chains, sales and processing

### 5.1 Sales and processing: the value chain

Sales of milk and other products sustain farm life and rural livelihoods. This part of the chain, i.e. processing and sales, is represented at the right-hand side of fig. 4. Past development programmes often focused on production. The left hand side was discussed in chapter 3. More recent programmes tend to focus even more on processing and sales, i.e. on the development of the entire chain (fig. 4)<sup>4</sup>. Such chains can vary in length, i.e. they can be as short as two (a micro-chain between farmer and neighbour) and as long as from anonymous farmers via national and international chains to anonymous consumers (macro chain).

On-farm processing is possible for small producers, e.g. fresh white cheese. On-farm processing can also perfectly well be done by larger producers and/or by dairy associations (photo 6). Milk can then be processed into a larger range of products with a higher value such as yoghurt, desserts, cheeses and the like to bring in higher prices. Many such products are in principle available in the country. This section lists some observations on marketing and processing that the consultant noted while travelling the country. AgsPart2020 is now doing some chain studies, but no special chain study was carried out by the consultant himself. It is however clear that markets and chains come in different types, sizes and shapes. The consultant stresses the need to look for development of micro and meso chains as well as macro chains in the Philippines.

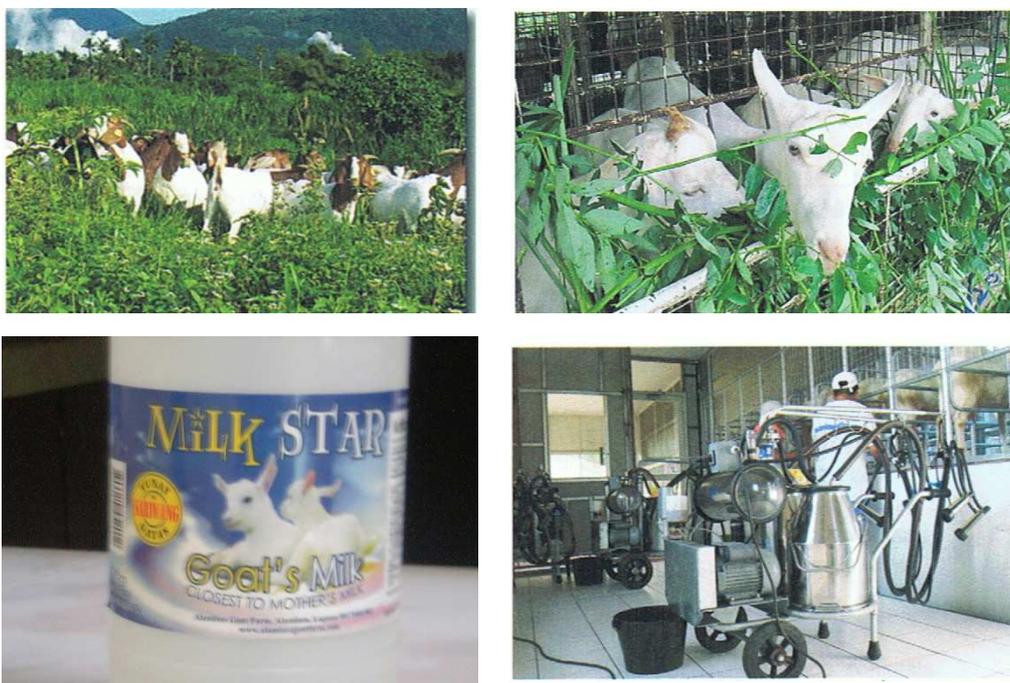


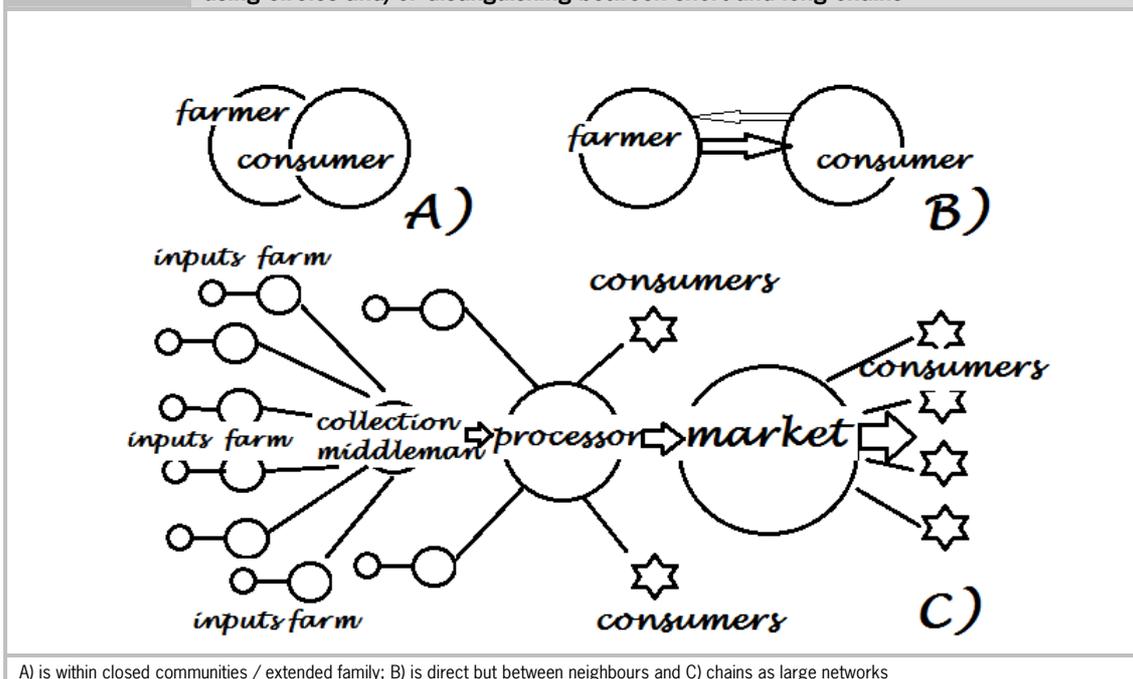
Photo 6. The Alaminos Goat Farm in Luzon, the first commercial dairy goat farm in the Philippines with a BFAD licence to operate, showing the technical feasibility of such an enterprise. Clockwise from top left: 'Boer' dairy goats on fine tropical pasture, grazing and housed (feeding on tree leaves), accompanied by good hygienic milking and processing, and goat's milk on supermarket shelves.

<sup>4</sup> Actually, NDTRI started dairy processing some 40 years ago.

## 5.2 Different chains and niches

The consultant is not aware of any comprehensive study in the public domain that clearly distinguishes between types of milk consumers in a quantitative way. But business and some government offices must have that sort of information. The point here is to stress differences between markets and market niches. Distinguishing between markets and consumers avoids useless discussion and ill-targeted programmes. You might well suppose - and hope, for example - that mothers in poor families will continue to use milk powder based on milk that is produced cheaply in New Zealand. Nevertheless, young urbanites might well be convinced to buy locally branded and processed 'fresh' milk products (photo 7).

**Figure 4** Value chains come in various shapes and sizes, often shown as a 'chain of arrows' or using circles and/or distinguishing between short and long chains



The consultant did not try to locate reports about different chains, but guesses can be made about differences based on for example:

- use of local versus imported milk.
- traders who collect milk from large and small farmers to be processed and marketed directly to consumers versus producers who market their milk directly.
- type of consumers (urban elite, poor families, single mothers with growing children and even farm people themselves) and/or coffee shops or supermarkets with high purchasing power and exacting standards.
- type of milk, ranging from cow and carabao milk to goat's milk, from fresh to imported milk, and from good to very poor quality milk.



Photo 7. Information about quality on a box of reconstituted milk that has no right to be called 'fresh' (left); a group of young college students in central Luzon relishing added-value products (ice cream) from real fresh and local milk as a "fashion food" (right).

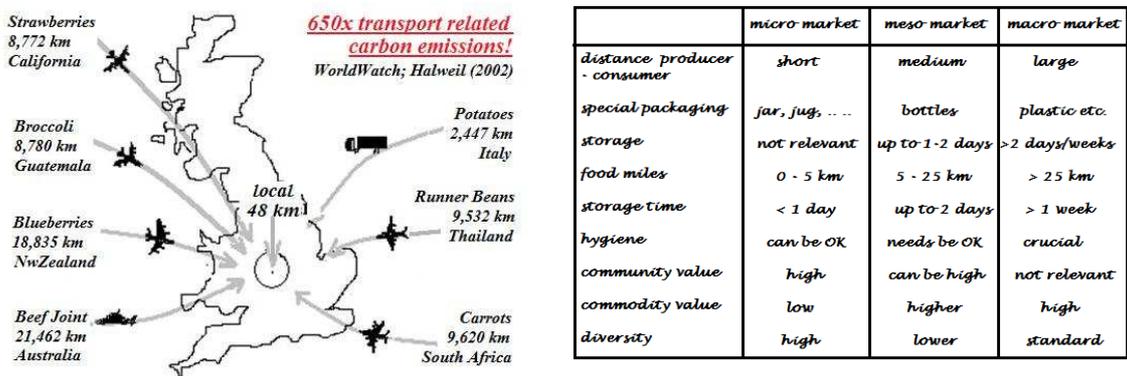
The scale of the market chain is, in the consultant's opinion, the overriding factor in policy discussions on the development of markets up to and beyond 2020, being much more important than differences between carabaos, goats and cows. The importance of scale lies in issues of resource use and income distribution. Large-scale chains tend to drain income from the countryside at the expense of using more energy – fossil energy in particular - for transport, cooling, storage, processing and retailing. Larger chains generally also imply a lesser share of profit for smaller producers from the total added value, unless the smaller farmers can manage to fulfil a series of certification measures such as those for 'local', 'organic' and/or 'fair trade', which is not a very realistic option for them (even where it can be done). This report therefore focuses on a discussion of three types of value chains using scale as distinguishing factor:

- the *micro market*, with dairy farmers who sell directly to local consumers at the farm gate and/or local outlet in a one-to-one relationship where consumers know the producers, where the scale is very local, and where certification and quality control are a direct part of the producer-consumer linkage.
- the *meso market*, where farmers market a pooled product, via dairy associations and/or local middlemen, potentially important in creating pride in local produce. Meso markets are characterized by greater anonymity between consumer and producer. Meso markets can operate at the provincial or island level. However, they are costlier than micro markets due to higher requirements for quality control and storage, even if they may result in higher added value for those who control the chain. Some local milk now finds its way onto supermarket shelves via the meso market.
- the *macro market*, where large operators run the market and consumers do not know who produces the milk and in what way (in the Philippines, most of the milk for the macro market comes from outside the country).

Different scales imply differences in quality control and the associated expenses, with higher requirements for more anonymous, larger and more remote markets. Especially here, there could be a role for the government in creating tailored certification procedures with different rules for micro and meso markets than for macro markets. Differences in scale also imply differences in terms of (local) ownership and/or footprint. Exceptions to the rule exist, but larger scale tends to cost more in terms of resources, providing an opportunity for the micro and meso scales rather than for macro chains (box 4).

**Box 4 Scale of markets and issues of community and/or community or uniformity and/or diversity**

The subtitle of this report refers to choices between ‘community and/or commodity’ and ‘uniformity and/or diversity’. And indeed, the size (scale) of the market has large policy implications for both these choices. Larger scales can have advantages in terms of economics and food safety. However, they have disadvantages too, as shown in the left hand figure below showing local versus international food supply for ‘an average Sunday meal’ in the UK (based on Halweil, 2002). The transport-related CO<sub>2</sub> emissions of macro markets are 650 times larger in this case of an ‘imported’ Sunday meal - a point that should also be taken for the milk markets. Conditions in the UK are different from the Philippines, but similarities must exist. Magnitudes may be different, but the principle must be the same: larger scales may be more profitable for companies and countries as a whole, but larger scales do tend to use more resources while shifting income from companies with rural bases to urban ones. The micro and meso scales can thus have advantages for resource use and rural wellbeing in the long term, an important issue for policy, research and teaching that works on sustainable futures.



The high carbon emissions in the left-hand figure are ‘transport-related’, but note that they are not associated with shipping alone. The hidden point, as tentatively indicated in the right-hand diagram is that:

- in technical terms, the larger scale implies more sophisticated processing, storing and quality certification schemes as well as higher risks in terms of legal responsibility, recall and the like, as indicated in the right hand figure above. Smaller producers/associations can better handle local variation but they generally exert less control in the larger chains, implying that control of the chain shifts from local to national level or even higher.
- a larger scale in socio-economic terms implies that only larger companies (or farmers and/or producer associations) can run the larger schemes, thus taking a relatively larger share of the added value. Milk then becomes a commodity and the shift of production to large rather than small farmers/entrepreneurs implies a hidden shift from community to commodity, as well as from diversity to uniformity, i.e. to dairy becoming a sink rather than a source.

### 5.3 Opportunities for the different chains

In the consultant’s opinion, public resources should not be used to develop large-scale macro markets of imported milk; these are already efficiently handled by large companies. Nevertheless, much public funding and policy tends (inadvertently) to favour macro chains over meso and micro chains. Opportunity for public and private action does therefore exist in terms of support for meso and micro markets. That may be quite a challenge, with clear choices needing to be made ‘community and/or commodity’ and ‘diversity and/or uniformity’.

The large imported milk market has a role to play, especially for those who believe in diversity (as is the case with the consultant). Macro markets are also here to stay, at least for the short and medium terms. As said before, the clamour for the Philippines to be self-sufficient in milk sounds like aiming for self-sufficiency in coconut oil in New Zealand or the Netherlands. Other countries have an overall competitive

advantage in terms of milk production. They also may produce milk with much lower footprints than the Philippines (a topic for scenario studies using lifecycle analysis). Nevertheless, Filipino farmers can produce local fresh milk with a low footprint and improve their livelihood, depending on mode and place of production. This is the reason to stress the notion of milk for the community and be sceptical about production of milk as a commodity (even if exceptions may serve to prove the point).

Opportunities for development of micro and macro value chains, i.e. marketing local milk products, therefore lie in their niche for producing low-footprint fresh milk for the community. Opportunities for development in this area lie with the private sector, while public agencies like the NDA can act as facilitator e.g. by continuing to support dairy associations - provided the latter take a more businesslike attitude. The public sector can also support the development of micro and meso markets by redesigning food safety measures, as well as by stimulating scenario studies on footprinting and the social impact of these chains. The public sector can further facilitate development of the chain by redefining 'fresh milk', doing what other countries have done.

Indeed, the future of micro and meso markets is in the hands of private entrepreneurs. Some of these do a commendable job already, even if more policy support could be useful. Dairy associations also have a special role to play in the development of local milk markets. There is potential for large gains there, considering the following mix of observations and suggestions:

- local plants often appear to be operating at less than 30% of their capacity, i.e. equipment is waiting to be used.
- the technical staff of these plants know the basics of processing but they often seem to lack the administrative support to do a good job, i.e. reinvigorated management could have big impact.
- school milk programmes help to increase throughput of these units, but ways need to be found to trigger these associations into becoming self-sustaining businesses rather than being kept alive by school milk programmes.
- some reasons given for low sales are that packaging materials are not available or even that cheese moulds are too small. These are opportunities for improved management, as most of these problems depend on administrative goodwill rather than on technical intervention (another point made earlier).
- members do not appear keen to deliver much of their milk to the associations. The consultant thinks that only excess milk (of lower quality?) is handled by the associations, which thus serve as a 'dump'. Dairy producers (members of the association) may thus market their best milk as much as they can via private channels.
- there seems to be potential for local dairy product markets, given the eagerness of students and other consumers to buy the milk products from milk bars, even though these are not always very well managed.
- the notion of local milk and milk products under a local brand appears to be a promising way of adding value in the micro and meso chains of the associations, appealing to pride in local produce and/or the community (another point made earlier!)

## 5.4 The roles of government, entrepreneurs and farmers

The narrow self interest of milk importers may make them want to ensure imports of foreign milk into local markets by repressing local fresh milk production. However, the consultant thinks that production of local milk could actually be an opportunity for importers by making milk products a more generally accepted consumer item. In that sense, and trying to identify roles for different players in the field, the consultant can envisage policy actions where:

- large importers could do local producers (and themselves) a favour by helping to develop micro and meso market operations, perhaps even as a form of Corporate Social Responsibility. The

consultant is actually aware of such an intention on the part of one of these importers; however, that initiative got stalled in mutual distrust and/or other priorities.

- government could introduce legislation reserving the term 'fresh milk' for locally produced milk, and/or tying import quotas to amounts of fresh locally collected milk. The consultant was even told that such legislation exists but that it is failing to be enacted.
- the private and public sectors together, e.g. with assistance of groups like DairyCon and AgsPart2020, might join forces to do work on separate quality certification approaches for the macro, meso and micro markets respectively. Government can assist in funding such programmes to be carried out by universities and/or the private sector.
- work on footprinting with regard to differences between micro, meso and macro markets can help define priorities for action in the development of these markets and avoid spending public money on wrong policy.

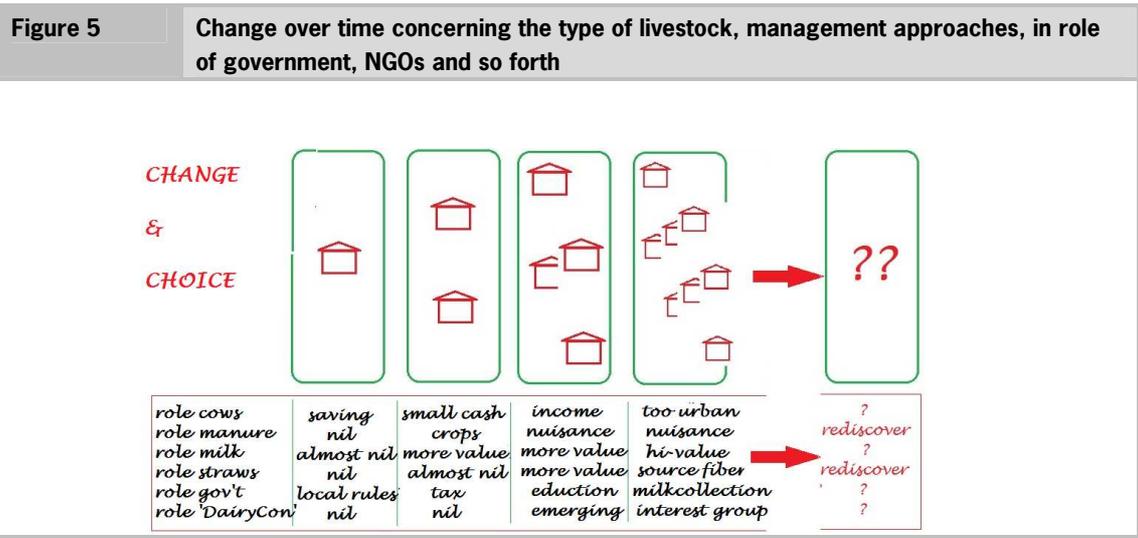
## 6 Concluding comments: challenges and visions

This report discusses problems and opportunities for the different dairy production systems that exist and/or that can be developed in the Philippines. It stresses the need to distinguish between farming systems, to gain strength from diversity and to make dairy a 'source rather than a sink'. It also stresses the need to use dairy development in the first place for the community rather than as a commodity. Given the culture and climate of the Philippines, milk as a commodity can better be shipped in as milk powder than produced locally. Production of local fresh milk is, however, technically and ecologically possible, and strategic government involvement should help to make it economically attractive. Distinction between dairy farming systems is more relevant when based on climate, distance to the city, economic status of the owner and scale of operation than on differences between cows, goats and carabaos. An example of such a distinction is given in table 5. Further work on this is recommended with regard to other policies and development programmes, e.g. on social and ecological issues, to be supported by groups like AgsPart2020, DairyCon or others from the private and public sectors.

<b>Table 5 Distinguishing (policy) recommendations for small and large farmers: a sketch to trigger discussion for further work</b>		
<b>'Technology'</b>	<b>Resource-Poor Farmers</b>	<b>Resource-Rich Farmers</b>
Special concentrates	Not likely to be useful?	Likely to be useful!
Calf rearing	No cash, so not relevant	Should have cash, should be keen
Type of market	Local and personal (India did it for large milk sheds)	Anonymous and remote
Milk tank (cooling on site)	Almost impossible (even if Brazil does it at the community level)	Logical step for individual farmers
Silage making	Possible but not very feasible due to short-term horizon of small farmers	Possible and feasible for certain climates (rather short dry season)
Source of nitrogen	Legumes and excreta	Fertilizer, concentrates
Import cow (on 'loan')	It is done (but strong doubts)	Possible, and why not (if it pays)?
Calf rearing	Suckling	Bucket feeding

Dairy systems can be distinguished by looking at change over time. The diagram in fig. 5 illustrates such changes and choices regarding production and processing systems over time, symbolized by the boxes that have 1, 2 and more families to feed as time proceeds in roughly 20-30 year jumps (one generation). It then lists issues such as the role of public and private institutions, prevailing production methods, ruling paradigms (= mindsets) and the like at the left-hand corner with their change over time proceeding from left to right. Scenario studies and 'expert' meetings (including farmers!) can help to shape and quantify the advantages and disadvantages of particular policy choices further in terms of economics, ecology and role for society.

Change over time also applies to existing forms of production that are either under stress from change already or that suffer off and on as global and more local markets fluctuate. Examples of such systems that are likely to change soon include areas under coconuts, peri-urban farming and/or beef cattle ranches. Beef ranches and fattening units in particular have a role to play in the development of dairy and the consultant is pleased to see that they are already getting involved in breeding and training issues!



The future of policy, training, and research and development (R&D) should not focus on mere repetition of sufficiently well-known technical details like milking, hoof-trimming and mastitis control. The future of development lies much more in for example the design of a variety of diverse systems, each with tailor-made recommendations for feeding, housing and calf rearing for large and small farmers separately.

Work on the design of different farming systems can be the topic of study at training centres and universities. Modern approaches such as scenario studies, footprinting and lifecycle analysis are becoming more mature and they are very useful in establishing modern threats and opportunities for business and public policy. These scenario studies can use examples from spreadsheets, SWOTs, decision matrices, linear programming or multi-agent programs and they offer potential for a great deal to be gained. Issues for scenario studies are for example the effect of large and small farms on income distribution when milk is used as for the community rather than as a commodity, use of water, oil and nitrogen, differences between economic reasoning and dairy farm planning in small and large farms, environmental aspects such as CH<sub>4</sub> and greenhouse gas emissions, fodder production and conservation. Examples of livestock serving rather than harming the environment – acting as a source rather than as a sink - are available, also in the Philippines. They may be far-fetched, but they are also insufficiently researched to be written off, covering aspects such as erosion control, water catchment, promoting sustainable mixed farming, reinvigorating community life via the micro and meso chains.

There is also scope for scenario work and policy studies in the field of processing systems and their scale. The presumed disadvantages of the small scale in terms of hygiene and public health may turn out to be misconceptions and/or problems that are rather easy to remedy. Advantages of larger scales may also be offset by their disadvantages in terms of footprints, effect on community and the like. The micro market, the meso market and the macro market all have specific advantages and disadvantages. Combining the large and the small may ultimately offer synergies e.g. with the 'importers of the commodity' ultimately profiting from a larger local awareness of 'milk for the community'. The consultant would see the search for such synergy rather than getting stuck in arguments about 'competing interests' as a challenge.

Last but not least, actual development of the sector depends on the private sector, facilitated by the public sector. Government agencies like the NDA may shift their work on direct imports towards facilitation of breeding and gene pool management. It might be better for them to concentrate on developing independent AI and veterinary services instead of continuing to try to do this under government

administration. Probably the best three services that government could do to support the private sector in Philippine dairy and livestock development are to a) ensure protection for local producers by reserving the name of 'fresh milk' for locally produced milk, b) actively support research on legislation that distinguishes rules for micro, meso and macro scale markets, and c) help draw attention to future management issues regarding sustainability (process quality) rather than traditional skills such as milking, feeding and breeding.

Ultimately, decisions on management and skill development in dairy production and processing production are to be based on choices regarding the vision of dairy farming in the Philippines. The choices are many, but are summarized here as choosing between uniformity and/or diversity and between commodity and/or community.

The consultant has been lucky enough to be part of the discussions on dairy development in the Philippines over the past four years. He thinks that the Philippine dairy sector can gain most by building up 'strength from diversity' and is looking forward to seeing what happens over the coming years.

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Although milk has been produced and processed in the Philippines for a long time, the country does not have a strong dairy tradition. Climate and ecology are not very favourable for high yields. Moreover, policies have been erratic and the country has not used the momentum towards dairy development like some of its neighbours. This report reviews the current state of the dairy sector, with a view to developing visions for the future. Dairy sector fragmentation is partly due to the fact that the country is an archipelago with different ecological and demographic conditions - good markets and favourable ecology often do not come together. The report analyses selected aspects of production systems, value chains, and management, particularly focusing on roles of public and private sector. The country should a) consider its variation as strength and not as weakness and b) focus (use of its public) resources for development of a dairy sector that mainly produces local milk for local markets, rather than trying to become self-sufficient in milk products that can be imported much more cheaply. The country has much to gain from taking development of its dairy sector seriously. Government should become a facilitator, rather than being directly in charge of services like cattle imports, insemination services, and research & education.

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