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STRATEGY AND INVESTMENT PLAN FOR SMALLHOLDER DAIRY DEVELOPMENT IN ASIA

A GLASS OF ASIAN MILK A DAY FOR EVERY ASIAN CHILD

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COMMON FUND FOR COMMODITIES
ANIMAL PRODUCTION AND HEALTH COMMISSION FOR ASIA AND THE PACIFIC
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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FOREWORD

After more than half a century of declining real prices for dairy products, there are strong signs of a structural change in the global dairy sector which are conducive for investment in the sector. This is particularly true in Asia where demand for dairy products, growing in line with economic growth and influenced by changing consumption patterns, has increased faster than almost any other agricultural product.

It is also clear that, at this time of unprecedented change in agricultural markets, the shape of these investments will influence the ability of smallholders to participate in this development process. These trends, amidst the recognition that dairying represents one of the fastest returns for many rural dwellers, many of whom are landless, have prompted many governments in the region to place a priority on dairy development as a means for economic growth.

Based on this growing regional interest, APHCA (the Animal Production and Health Commission for Asia and the Pacific), FAO and the Common Fund for Commodities collaborated to develop a blueprint of action for smallholder dairy development. Generated through a participatory process involving representatives from 18 countries from the region, it draws on regional knowledge, from both the public and private sector, and general lessons learned. Aiming to generate support for dairy development, it not only proposes channels through which financial resource mobilization can occur but proposes mechanisms for coordination and communication among regional stakeholders.

It is our hope that this strategy, which is practical and bankable, will provide a roadmap for increased regional discussion and collaboration among policy makers, private sector players in the sector, donors and other stakeholders interested in dairy development. An enabling and evolving framework for sector development needs cooperation and dialogue, with regional knowledge and networking a key ingredient of success. As far-reaching changes in the sector occur over the next decade, this framework is envisioned as the stage upon which dairy development is played as knowledge and communication assure an effective channeling of resources, both financial and human, in the sector.

He Changchui

Assistant Director-General and

FAO Regional Representative for Asia and the Pacific

Table of Contents

Boxes

Asia-Pacific region

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AGA	(FAO) Animal Production and Health Division
AGAL	(FAO) Livestock Policy Branch
AGAP	(FAO) Animal Production Service
AI	Artificial Insemination
APO	Asian Productivity Organization
ASEAN	Association of South East Asia Nations
CFC	Common Fund for Commodities
CLDD	Community Livestock and Dairy Development
DAA	Dairy Asia Association
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FAO	Food and Agriculture Organization of the UN
FAPRI	Food and Agricultural Policy Research Institute
IFCN	International Farm Comparison Network
IFI	International Financing Institution
IFPRI	International Food Policy Research Institute
INGO	International Non Governmental Organization
ILRI	International Livestock Research Institute
LME	Liquid Milk Equivalent
MDG	Millennium Development Goal
M&E	Monitoring and Evaluation
NGO	Non Governmental Organization
OECD	Organization for Economic Cooperation and Development
OFP	Operation Flood Programme
PMT	Project management team
RAP	FAO Regional Office for Asia and the Pacific
RFI	Regional Financing Institution
SAARC	South Asian Association for Regional Cooperation
SDD	Smallholder Dairy Development
SME	Small and Medium Scale Enterprise
SWOT	Strengths Weaknesses Opportunities Threats
TOR	Terms of Reference
US$	United States dollar
TCP	(FAO) Technical Cooperation programme
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Educational Fund
USAID	United States Agency for International Development
VCA	Value Chain Analysis
WDR	World Development Report
WFP	World Food Programme

EXECUTIVE SUMMARY

The Chiang Mai Declaration (February 2008)
A glass of Asian milk a day for every Asian child

Background: *Two-thirds of the world's 800 million undernourished people live in the Asia-Pacific region. Just one daily glass of milk would contribute significantly to improving the nutrition of children in the region, with all the attendant benefits related to health and education. Boosting the productivity of milking animals by just 20 percent could provide the milk required for a daily glass of Asian milk for every Asian child.*

Around 80 percent of milk in Asia is produced by smallholders and there are also tens of millions of traders and dairy entrepreneurs, small and large. The smallholder dairy sector produces multiple benefits for its numerous stakeholders including: (i) poverty reduction though regular family income; (ii) off-farm jobs estimated to be one job per 10-20 litres per day of milk marketed; (iii) environmental benefits through balanced and integrated farming systems; (iv) low energy use compared with industrialized dairy production; and (v) improved household food security and nutrition.

Demand for dairy products in the region has doubled since 1980, and in many countries production has lagged behind demand with the result that import dependency has increased. Imports are estimated at 24 million tonnes in 2007, valued at approximately US$14 billion, and are estimated to supply as much as half the formal dairy sector. The cost of imports has surged recently with the global increase in prices for dairy products. This strong marketing environment provides attractive opportunities for smallholders to improve the productivity of their animals substantially through improved feeding and breeding practices. In so-doing smallholders can contribute towards making the region more food-secure, and helping to achieve the Millennium Development Goals of halving poverty and under nutrition.

The strategy process: *There are many successful business models through which smallholder milk producers have gained sustainable access to markets. The Strategy has been formulated to take advantage of the many opportunities currently available to apply such models across the very wide range of circumstances in the region. The strategy formulation process was supported by CFC, APHCA and FAO and involved a structured, participatory and market-oriented approach to: (i) undertake rapid "lessons learned" studies in nine countries to identify business models and factors that have influenced smallholder participation – both good and bad; (ii) complete three more complete value chain studies in selected countries; and (iii) convene a workshop in Chiang Mai, Thailand, attended by 53 delegates from 18 countries. The workshop formulated the key elements of the Strategy and reached a strong consensus on the way forward.*

Rationale: *The rationale underlying the Strategy is that: (i) rural poverty remains a major problem in Asia and rural-urban income disparities are increasing; (ii) Asian demand for dairy products is growing rapidly and is increasingly supplied by imports, with prices increasing and likely to remain strong; (iii) smallholder dairy development provides an outstanding opportunity to generate* ***regular*** *income and improve rural livelihoods; (iv) a number of commercially competitive smallholder dairy models have been demonstrated, and the dos and don'ts are becoming well understood; (v) there is growing awareness of the importance of agriculture (including dairy) in social and economic development; (vi) well-targeted public investments in the dairy food chain have the potential to leverage significant private investments. However, it is clear that many elements of the enabling environment for smallholder dairy development are lacking and that knowledge networking on a regional basis can support effective policy formulation and mobilize resources for targeted investments in the sector. Consequently, regional stakeholders have called for a comprehensive regional strategy for smallholder dairy development, one which builds on lessons from the region which translates in effective national interventions*

*The strategic **vision** elaborated by the Chiang Mai workshop is: "Asian milk for health and prosperity." The **mission** statement agreed at the workshop is: "Improving the competitiveness of smallholder milk producers to provide more and better quality milk and dairy products to Asian consumers." The vision and mission will be addressed through six strategic **objectives**: (i) a glass of Asian milk a day for every Asian child; (ii) regional self-reliance[1] and heightened dairy food security; (iii) smallholders better linked to markets and enabled to become commercial dairy entrepreneurs; (iv) each link in the dairy food chain becomes more efficient, productive and profitable in a socially and environmentally responsible manner, for delivering affordable milk and dairy products to urban consumers; (v) higher earnings for safer quality milk; and (vi) regional and national recognition of the multiple benefits of smallholder dairy production.*

*In considering the vision, mission and objectives of the strategy, the workshop identified a number of **key strategic priorities which include:***

- *developing human resources and knowledge management in the smallholder dairy sector and its supporting organizations;*
- *better engaging the private sector in both the formal and informal sub-sectors;*
- *supporting the smallholder sector to become more productive and more profitable;*
- *improving the sector's competitive position, including profitability and efficiency on-farm and enhanced competitiveness in dairy product markets, both formal and informal;*
- *positioning smallholder dairy development as an instrument for rural poverty reduction and improved food security and nutrition;*
- *creating an enabling institutional and regulatory framework;*
- *improving the safety and quality of the product through a pricing system which provides strong incentives for farmers and other value chain actors to ensure product quality;*
- *facilitating market access through both formal and informal market channels and better meet consumer needs and affordability;*
- *financing development of the sector, including investments by smallholders, SMEs, cooperatives and corporations, as well as public investments in infrastructure and support services; and*
- *ensuring that the dairy sector develops in a socially and environmentally responsible manner.*

***Strategic pillars:** The Strategy will address the challenges and objectives outlined above through strategic interventions under four mutually reinforcing pillars as prioritised and ranked by the workshop delegates:*

> ***Pillar 1:** Human resource development and knowledge management through: (i) providing smallholders and other value chain actors appropriate skills training; (ii) effective M&E of sectoral development; and (iii) support for regional collaboration in knowledge management through a smallholder dairy network.*
> ***Pillar 2:** Improving the productivity and competitiveness of smallholder milk producers through: (i) preparing a "menu of options" for dairy development models; (ii) selecting dairy development models appropriate for local conditions; (iii) assisting smallholder dairy sector to compete for resources and compete in product markets; and (iv) assisting smallholders to increase milk yields, quality and profitability.*
> ***Pillar 3:** Strengthening the linkages between farmers and consumers to deliver a quality product at a fair price through: (i) improving farmer access to marketing channels; (ii) increasing opportunities for smallholders to access the formal sector; (iii) strengthening price incentives to deliver quality milk; (iv) creating competitive supply chain conditions; (v) creating fair and transparent pricing systems; (vi) diversifying the range of dairy products on*

[1] Self-reliance does not necessarily imply self-sufficiency.

offer; (vii) educating consumers on the nutritional benefits of dairy products; (viii) stimulating consumer demand; and (ix) reducing losses in the dairy chain.
Pillar 4: *Enhancing the enabling environment through: (i) developing a smallholder inclusive policy framework; (ii) creating a legal and regulatory framework conducive for smallholder dairy development; and (iii) supporting the development of a favourable macro-economic framework.*

Beneficiaries: *Potential direct beneficiaries include some 200 million smallholder families as well as milk producers, collectors, processors, service providers, finance and micro-finance institutions, regulatory institutions and industry associations etc. Consumers, especially children, will also benefit through more and safer dairy products at affordable prices. The Strategy will also target policy-makers and legislators, national dairy bodies and all the actors along the value chain, including larger-scale producers and processors through collaborative arrangements that include smallholder enterprises. The private sector is expressly targeted for its crucial role in providing productivity-enhancing goods and services and market access.*

Implementation and next steps: *The Strategy will be implemented through a ten-year investment plan, estimated to cost around US$ 250 million. The majority of these investments will take place at country, rather than regional level. Nevertheless, the Strategy also supports the establishment of a regional platform for dairy development to link stakeholders around the region through technical, policy and information networking systems. The detailed investment programme will be finalised towards the end of 2008 and will depend on the interest of individual governments and the appeal of the Strategy to investors from the private sector, regional and sub-regional organizations such as ASEAN, SAARC and the International Financing Institutions, Regional Financing Institutions and International Agencies. An immediate action plan has been prepared to support this process. Meanwhile, partners have already committed US$ 15.6 million for key interventions, which will commence immediately. Other public and private sector organizations have also indicated their strong interest in operationalising the Strategy.*

Desired scenarios by 2018: *Implementation of the regional dairy strategy and investment plan shall result in the following outcomes in participating countries:*

1. *Smallholder dairy entrepreneurs networks promote electronic exchange and cross-border visits to enhance smallholder productivity and profitability.*[2]

2. *Smallholders/ cash revenues, feeds costs and wage rates monitored through a jointly developed Dairy Asia Productivity and Profitability Scorecard which feeds into a "best practices" approach to smallholder development.*

3. *Dairy development plans in the region which focus on a dairy development ladder approach to industry development which identifies best farming and optimal enterprise management systems that engage smallholders as milk suppliers and equity holders.*

4. *Local government units actively supporting the daily glass of milk per child supplied at the village level through innovative milk feeding schemes.*

5. *Common testing and product development facilities enabling smallholder dairy enterprises increased access to markets.*

[2] This would include south-south cooperation, particularly including farmer-to-farmer exchanges within Asia, to promote and validate dairy buffalo breeding and carabao milk product technologies which constitutes a potent tool for boosting productivity and returns from the indigenous carabao. The exchanges will be designed to result in robust benchmarking on specific productivity indicators (milk price to feed price ratios, calving intervals, total milk per lactation periods) among producers.

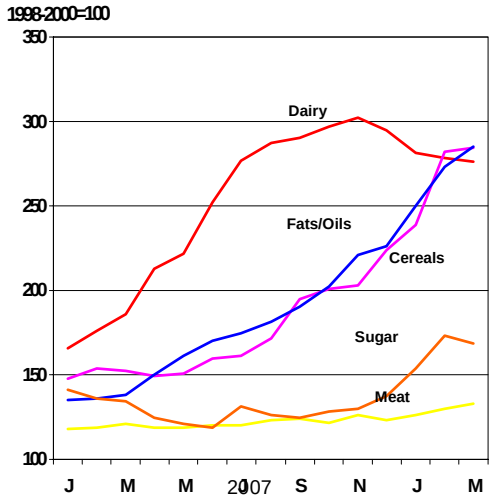
1. INTRODUCTION

1.1 Background

1. Two-thirds of the world's undernourished people live in the Asia-Pacific region. In some densely populated countries almost half of all children are under-nourished.[3] Milk is nature's most complete food providing protein, energy, vitamins and other micro-nutrients, especially calcium for bone building for children and pregnant and lactating women. One daily glass of milk would contribute significantly to raising the nutrition of children in the region, with all the attendant benefits related to health and education. Boosting the productivity of the nearly 300 million milking cows and buffaloes in the region by 20 percent could provide the 50 billion litres of milk required annually for the provision of a daily 200 ml glass for every child between the ages of one and ten.[4] Fortification with strategic micro-nutrients, tailored to local needs – a well-tried, and tested, cost effective technology – could boost the nutritional benefits still further.

2. In the countries of the region, dairying is practised by tens of millions of dairy operators – smallholders, traders and dairy entrepreneurs, small and large. With production gains over the last decade double that of global averages, it is estimated that 80 percent of the region's total annual milk production of 240 billion litres is supplied by smallholders with 1-5 cows. Dairying represents one of the fastest returns for livestock keepers in the developing world by providing regular cash to farmers, especially to women.[5] It enhances household nutrition and food security, fulfils important cultural and social functions as well as creating off-farm employment – as many as one job for each 10 to 20 litres per day of milk processed and marketed (FAO/ ILRI, 2003). Most importantly, smallholder dairying provides a regular source of income and spreads income risk, whereas income from agriculture is seasonal. In countries like India livestock development, in general, and dairy development in particular, are considered key components of pro-poor development strategies. This is mainly because livestock distribution is much more equitable than land distribution. Most rural families in Asia own livestock, including 40 percent of the poorest households.

3. The highest growth in demand for milk and dairy products is in the Asia-Pacific region where consumption has doubled since 1980, contributing more than 60 percent of global consumption gains. Growing demand, prompted by higher incomes and increasing urbanisation, has combined with economic reforms and market liberalisation policies to heighten the import dependency of many countries in the region. Heavy farm and export subsidies and high tariffs in the industrialized countries have discouraged dairy development in countries with more open trading regimes. Consequently developing countries in Asia, where imports have nearly doubled over the past decade to an estimated 24 billion litres of liquid milk equivalent in 2007, have become increasingly dependent on highly competitive, but ever more volatile, global dairy commodity markets. These imports were valued at US$ 14 billion in 2007 and are estimated to supply as much as half the formal or processed dairy market across the region.



4. With the price of internationally traded food staples increasing by over 40 percent in 2007, food price inflation is raising global concerns about food security in many developing countries (FAO, 2008). Of all the staple foods, dairy prices grew the most in 2007 with full cream milk powder and skimmed milk powder more than doubling to over US$ 5 000 per metric tonne by mid-2007, or over 60 US cents per litre of liquid

[3] UN Human Development Report (2007/2008)

[4] It is estimated by the UN Population Division that there are approximately 700 million children in Asia under 10 years of age.

[5] In China the profit-cost ratio of milk production by smallholders is nearly double that of maize and three times that of potatoes (Price Department, National Development and Reform Commission, China [2007]).

milk equivalent. While prices have gradually eased in 2008, it is likely that increased prices for dairy products are here to stay. Commodity projections by the Food and Agriculture Policy Research Institute indicate that milk prices over the next decade will remain 50 percent higher than historical averages.[6]

5. While higher prices portend unprecedented opportunities for dairy development in many Asian countries, it is not clear how dairy operators in the region, and smallholders in particular, are responding to the prospect of better milk prices. Innovative strategies and conducive policies are needed to enhance the competitiveness and market access of smallholder milk producers to take advantage of the new market opportunities.

6. Smallholder milk producers almost always have the capacity to respond quickly to economic signals, received through regular payments for their milk. This is because they feed their animals well below potential, so there is ample scope for rapid increases in milk productivity simply by improving feeding of locally available crop by-products. In so-doing smallholders can contribute towards making the region more food-secure, stimulating economic development through creating jobs, and helping to achieve the Millennium Development Goals of halving poverty and under-nutrition by the year 2015 (box 1).

Box 1
The multiple benefits of enterprise-driven smallholder dairying
Helping to achieve the nutrition, poverty and environmental Millennium Development Goals

(1) 200 million smallholders owning on average one to two cows or buffaloes, or small flocks of goats and sheep, produce 80 percent of the Asia-Pacific region's milk.

(2) Smallholder dairying reduces the incidence of poverty by sustainably increasing regular family income, asset accumulation and social standing (para 28).

(3) Smallholder dairying provides non-farm jobs – one job for every 10 to 20 litres per day of milk collected processed and marketed (para 2).

(4) Smallholder dairying enhances development opportunities for women (paras 40 and 51).

(5) Smallholder dairying sustains the environment by promoting integrated farming and optimising use of local natural resources, including the exploitation of locally generated fodder, feed and crop by-products for feeding animals (para 26).

(6) Smallholders are low energy users in the production of milk compared with producers in the industrialized countries; even lower if the huge energy costs associated with importing milk are taken into account, e.g. (i) for the energy-intensive process of drying liquid milk into milk powder in the exporting country, (ii) for transporting the milk powder and (iii) for converting the milk powder back in to liquid milk (para 27).

(7) The manure produced by dairy animals belonging to smallholders can be used up to three times in integrated farming practice: first to produce bio-gas for cooking and lighting; second to fertilise fish ponds; third, the slurry is recovered from pond bottoms, dried and used to increase soil fertility (box 2).

(8) Smallholder dairying improves household food security and nutrition. One daily 200 ml glass of unfortified cow's milk will contribute the following nutrients to a balanced daily diet for an average five year old child (paras 29-31):

- *Key macro-growth nutrients: protein (21%), calories (8%).*
- *Key micro-growth nutrients: calcium (60%), folic acid/Vitamin B9 (43%), riboflavin/Vitamin B2 (38%), carotene/Vitamin A (23%).*

(9) Many health problems associated with child under-nutrition can be tackled through targeted nutrition schemes simply by low cost fortification of milk with specific deficient micro-nutrients such as iron (helps prevent anaemia), iodine (for proper thyroid function), vitamin A (for the immune system) etc (para 33).

7. There are many successful models, businesses and institutional arrangements where smallholder milk producers have gained sustainable access to markets, and some that are less successful. Given the current opportunities for dairying in Asia, APHCA[7] asked FAO to develop a Smallholder Dairy Development (SDD) Strategy for the Asia-Pacific region to enhance the involvement of smallholder dairy farmers in the rapidly evolving Asian market. The Common Fund for Commodities (CFC) and FAO agreed to fund a fast track project to develop the strategy, which is critical to improving market opportunities for smallholders in

[6] FAPRI projections for agricultural and bio-fuel markets (March 2008). Skimmed milk powder prices, averaging below USD 2 000/tonne over the start of the decade, will remain above USD 3 000/tonne over the 2008-2017 projection period.

[7] APHCA, the Animal Production and Health Commission for Asia and the Pacific, works with local governments, institutions and farmers to develop strategies to tackle livestock problems. Member countries include: Australia, Bangladesh, The countries represented at the workshop were: Afghanistan, Bangladesh, Belgium, Bhutan, China, India, Indonesia, Iran, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand.

the region. The challenge is to ensure that smallholders participate in the opportunities for sector development afforded by the increasing demand for milk and dairy products, ongoing high commodity prices due to low global dairy stocks. There is increasing concern that high consumer prices are not being passed down back down the value chain to producers.

1.2 The strategy development process

8. A structured, participatory and market-oriented approach was adopted to develop the strategy. Rapid lessons learned studies from nine countries provided generic characterisation[5] and identified models and factors that have influenced smallholder participation in dairy food chains – both good and bad. The countries represented three broad categories of smallholder market access: (i) good access (e.g. China, India, and Thailand), (ii) limited access (e.g. Bangladesh, Mongolia, Pakistan), and (iii) marginal access (e.g. Philippines, Sri Lanka, Viet Nam). Three more detailed value chain analyses of selected business models were undertaken in India, Philippines and Viet Nam, incorporating an innovative, structured analytical framework approach to assess the competitiveness of the models. A series of country-level stakeholder validation meetings were also organised.

9. The basic SDD strategy was developed at a workshop held in Chiang Mai, Thailand from 25 to 29 February 2008. Fifty-three delegates participated from the public, private and NGO sectors of 18 countries[8] across the region, including representatives of some of the largest cooperative and private sector dairy companies from the most populous countries.[9] Worksop delegates reached a strong regional consensus on the way forward. During group sessions the vision, mission statement and framework of the regional strategy were first developed; second, relevant thematic areas were elaborated and ranked; and third, the thematic areas were then shaped by delegates as pillars for the strategy. In a final plenary session strategic interventions were identified and prioritised. A list of the workshop delegates and SDD study authors is given in annex 4.

10. The Strategy presented here reflects the outcomes of the workshop.[10] It includes an indicative investment plan, which aims to promote the competitive and profitable involvement of smallholder milk producers in the dairy industries of the Asia-Pacific region. The strategy has been endorsed by delegates to the workshop, APHCA, CFC and FAO. More information about the project, the opportunities and challenges for SDD in the region and the process used to develop the strategy may be found in Annexes 5 and 6. Documents produced by the project are listed in annex 8. Full versions of the studies, workshop papers and presentations, and the workshop proceedings may be found at:
http://www.aphca.org/reference/dairy/chiangmai_workshop_feb08.html

2. SMALLHOLDER DAIRYING DEVELOPMENT

2.1 Dairy for development

11. Smallholder dairy development should be seen as an enterprise-driven approach to livelihood enhancement as well as an instrument of rural poverty reduction. It is not an end in itself and should be considered as part of the rural poverty reduction agenda, recently reinvigorated in the 2008 World Development Report (WDR),[11] which adopts agricultural development as its theme for the first time in 25 years. The title of the report is “Agriculture for Development” and focuses on ways to generate rural jobs by

[8] The countries presented at the workshop were: Afghanistan, Australia, Bangladesh, Belgium, Bhutan, China, Germany, India, Indonesia, Iran, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Samoa, Sri Lanka, Thailand, Viet Nam, United Kingdom and United States of America.

[9] A full list of the workshop delegates and the country study consultants is contained in annex 4.

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[11] World Bank: “World Development Report 2008: Agriculture for Development”. Downloadable from www.worldbank.org

diversifying into labour-intensive, high-value agriculture linked to a dynamic rural, non-farm sector. Smallholder dairy development is an ideal way to achieve this outcome. It is consistent with the concept of a "new agriculture" of high-value products, entrepreneurship and jobs in the emerging rural, non-farm economy.

12. WDR 2008 recognizes that agriculture operates in three distinct worlds: (i) subsistence, (ii) transforming and (iii) urbanized. In each, the agenda differs in pursuing sustainable growth and reducing poverty. Most of the countries involved in this strategic process are in the transforming category, but also have sub national regions in the other two categories. In transforming countries, rapidly rising rural-urban income disparities side by side with extreme rural poverty and rising food prices are major sources of social and political tensions. Addressing these disparities requires a comprehensive approach that pursues multiple pathways out of poverty – shifting to high value agriculture, decentralising non-farm economic activities to rural areas, and providing assistance to help move some people out of agriculture. Dairy development is one of the attractive options for this. In urbanized regions SDD can help reduce remaining pockets of rural poverty if smallholders become direct suppliers in modern food markets and good jobs are created in agriculture and agro-industry. Like "Agriculture for Development", "SDD-Dairy for Development" – should be focused on people, not just milk and milk animals.

13. That said, SDD can not be introduced in isolation, and should recognize how formal (processed) and informal dairy markets coexist and are complementary, serving all levels of producers, traders, processors and consumers, small and large, poor and rich.

2.2 Opportunities and challenges

14. The timing for developing the SDD strategy could not be better. After more than half a century of declining real prices for dairy products, there are strong signs of a structural change in the global dairy sector. This change may overcome one of the long-standing constraints to smallholder dairy development – low prices and profitability, resulting in part from competition from subsidized milk from the industrialized countries – and stimulate commercial incentives to connect farmers to markets. Of course it is not known whether the recent upsurge in prices will persist, but the signs are certainly more encouraging than they have been for many years.

15. There are other reasons for optimism too. Asia is home to a large and rapidly growing population of affluent consumers with either a strong tradition of dairy consumption, or changing food preferences in favour of high value animal products, including dairy products. In most countries there is plenty of room for import substitution provided that local products are competitive in quality, safety and price. There is a vibrant private sector ready to capture commercial opportunities to intermediate in dairy food chains. Moreover, while SDD must be enterprise-driven for sustainability, it also provides opportunities to address the persistent problem of rural poverty by transferring income from affluent urban households to their poorer rural counterparts, and improving food and nutritional security for poor rural and urban households, as highlighted in box 1.

16. Opportunities for SDD in Asia are strongest in the countries, or parts of countries, which are in the transformational stage. With growing political attention to widening income disparities, there are many opportunities to use dairying as a better instrument for development. Because of demographic pressures and land constraints, the agenda for transforming countries for mobilizing pathways out of poverty should include dairy farming and employment in non-farm dairy enterprises. Prospects are good in view of expanding markets for high-value food products, offering an opportunity to diversify farming systems and develop a competitive and labour-intensive smallholder dairy sector. However, it needs to be recognized that there are also some locations where dairying is not the best option. Available resources should therefore be concentrated in situations where the prospects for success are best.

17. The most noteworthy opportunity and challenge for smallholder dairy producers is to share in opportunities afforded by rising demand in the region for milk and dairy products over the next decade. According to recent OECD/FAO projections, milk production in Asia over the next decade is expected to rise by over 60 million tonnes to 277 million tonnes by 2017, an annual increase of 3 percent.[12] Most of the production gain is estimated to be a result of rising cow numbers, rather than yield growth which at less than 1 tonne/animal is one-fifth the levels in developed countries.

[12] OECD/FAO Agricultural Outlook, 2008-2017.

18. However, if history is a useful indicator, it is helpful to assess the validity of previous demand projections. Milk consumption projections in 2020 were calculated by FAO in 1999.[13] These estimated that by 2020 consumption in the Asia-Pacific region would almost double to 231 billion litres of liquid milk equivalent. However, this projection was actually exceeded in half the time, with milk production estimated at 240 billion litres LME in 2007.

19. According to OECD/FAO projections, regional imports of both whole milk and skim milk powder (aggregated) will increase by about 30 percent to 1.25 and 0.9 million tonnes respectively, more than 50 percent of global totals. Rising regional demand, combined with opportunities for import substitution in a market where global prices are expected to average nearly 50 percent higher than the previous decade, affords an unprecedented opportunity for income generation for smallholder milk producers and the entire dairy sector in the region.

20. The future viability of the smallholder dairy sector, however, hinges on its ability to compete with other forms of milk supplies available in-country, in particular from larger national operations and imports. In developed countries, particularly those with land and feed resources, it has been shown that there may be significant economies of scale in dairy production, in the form of cost advantages accruing to increased herd sizes. In parts of Asia, on the other hand, it has been shown that dairy smallholders have cost advantages in producing milk when compared to large-scale producers. Studies in India[14] show higher profits/lt of milk and more efficiencies for dairy operations with less than 10 cows (both including and excluding cost of family labor).[15] To ensure competition with large commercial dairy farms over the long term, however, smallholders will need to increase their efficiency, using best practice production methods to enhance productivity.

2.3 Targeted SDD: the "Dos and Don'ts" of dairy chain business model selection

21. While each dairy market and milk production system has unique elements, there are a number of successful SDD business models in the region that can be adapted and improved upon for local situations. The nine country "lessons learned" studies and the three value chain analysis studies identified many best practices – the dos and don'ts of SDD dairying in terms of competitiveness and market access.[16] While the SDD analytical framework developed by FAO under the project is still a work in progress, it helped to understand the ability of SDD models: to (i) respond to market opportunities, (ii) adapt to evolving market requirements, (iii) address challenges posed by international competition, (iv) provide sustainable livelihoods to value chain participants, and (v) understand the competitiveness of the smallholder dairy enterprise.

22. Selected successful smallholder dairy chain business models in the countries studied include:

(1) Cooperative dairying model: world renowned Anand Pattern model from India and more recent cooperative company models, e.g. Bangladesh, India, Thailand (box 5).

(2) Contract farming model: private sector-smallholder incentive model, e.g. Pakistan (Halla and Haleeb models), Sri Lanka, Viet Nam.

(3) China dairy park model: collective/community dairy cow raising in an investment-driven growth environment (box 6).

(4) Philippines dairy zone model: public-private sector equity partnership (box 7).

(5) Mongolia dairy chain models: comprising six enterprise modules for liquid milk and cheese for each link in the farm-to-consumer food chain.

(6) Bangladesh social and community dairying models (box 2):

Grameen Bank poor people's community livestock and dairying model, part of the environmentally sustainable, integrated crop-fish-livestock model.

Bangladesh: Grameen-Danone Foods NGO-private sector social model.

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[13] Livestock to 2020: The Next Food Revolution (FAO-AGAL, 1999).

[14] FAO's project on Livestock Industrialization, Trade and Social-Health Environment (http://www.fao.org/WAIRDOCS/LEAD/X6170E/X6170E00.HTM).

[15] These calculations of profitability neglect the asset value of the animals, the value of manure, and the use of animals as for traction.

[16] Unless otherwise stated, all figures quoted are from these studies.

(7) School milk models: where local school milk programmes feature strongly in the above models, e.g. Mongolia, Philippines, Thailand (box 3).

23. The appropriateness of a specific model is largely contextual. However, in general, smallholder dairy chain models have not been so successful: (i) where centrally planned approaches are used; (ii) when governments intervene by establishing large public-sector managed dairy processing enterprises; and (iii) where low tariffs facilitated the importation of cheap dairy commodities used as raw materials rather than fresh local milk. More details on the SDD models and competiveness framework may be found in annex 6.[17]

24. The major factors influencing SDD and smallholder dairy chain models drawn from the studies, are summarised below:

(1) Smallholder participation in dairy value chains is straightforward in concept but complex in execution.
(2) Smallholder milk producers must be competitive in order to access markets, i.e. produce top quality milk at affordable prices. In achieving this status, most subsistence smallholder milk producers have progressed to become small commercial dairy farmers.
(3) A strategy of including smallholders requires a deliberate and creative development vehicle that is sensitive to the impact of policies, programmes and activities to smallholders.
(4) Appropriate technical interventions, either on-farm or post-farm, need to be supported by an enabling environment characterised by pro-smallholder policies and institutional support as well as a market structure which ensures fair pricing for quality products.
(5) Smallholder dairy action plans are the vehicles to transform the SDD regional strategy into national action, recognising that the impact of appropriate policies, programmes and activities depends on the local context and, most importantly, the people involved.
(6) The private sector must be fully engaged in development of the regional SDD strategy and in actioning the strategy at country level.

2.4 Graduation from subsistence smallholder milk producer to small commercial dairy farmer

25. As regular earnings from selling milk enhance rural livelihoods appreciably, through: (i) better nutrition, (ii) higher disposable income, (iii) asset accumulation, and (iv) enhanced social standing, the majority of subsistence smallholder milk producers aspire to become more intensive small dairy famers. This graduation process will be fundamental to actioning the strategy and sustaining SDD at country level.

26. The value chain studies tend to confirm that one of the key factors affecting smallholder competitiveness is the evolution of rural wages.[18] Smallholder dairying is labour-intensive and reported to be most profitable when other remunerative options for labour are limited. Dairy competitiveness in developing countries is significantly dependent on the low opportunity cost for labour, with herd sizes tending to rise with rising rural wage rates. This supports the SDD strategy rationale (section 3) that subsistence smallholder milk producers in many areas, particularly those with high wages and land values, will have to scale up to more commercial small dairy farming to remain competitive.

27. The distinctions in regional dairy production systems, structures, markets, as well as consumption patterns necessitate different dairy development ladders and diverse approaches to scaling up. This is particularly in the case in South Asia, a region with a long tradition of smallholder dairy and milk-based consumption patterns, and East Asia, where fluid milk consumption is only recent and dairying systems are a modern introduction. The prevalence of large informal milk sectors in South Asia provide an effective, functional link between farmers and consumers that responds to demand, both urban and rural, for locally produced indigenous products. Opportunities for up-scaling exist and should be explored but the approach doesn't necessitate, as in many East Asian countries, the close and formal linkages with the modern processing sector.

[17] The Bangladesh and Mongolia models form the basis for the FAO promoted MODE (Market-Oriented Dairy Enterprise) SDD model. MODE is a graduated approach to smallholder dairying based on lessons learned by FAO and other dairy development interventions. The approach is characterised by progressive movements towards becoming a successful dairy enterprise.

[18] Dairy Development for the Resource Poor: A Comparison of Dairy Policies and Developments in South Asia and East Africa, International Livestock Research Institute (ILRI) (2008).

2.5 Environmental and social dimensions

28. The multiple social and environmental benefits of smallholder dairying are detailed in box 1 above. Subsistence smallholders and small commercial dairy farmers produce milk as part of mixed farming systems that are, or can be, adapted to optimise the use of locally available resources in an environmentally sustainable way. In traditional ruminant production systems there are opportunities for a reduction of greenhouse gas emissions – lowering the carbon footprint per litre of milk – in particular improved carbon sequestration through better management of pasture and soils, and reduction of methane emissions by improving dairy productivity, and reduction of nitrous oxides by improved manure management. Significant reductions in per unit output of methane emissions can be achieved from rather modest and simple improvements in productivity and underlying technological change.[19]

29. If milk is imported, or recombined from imported components, then the energy consumption is even higher because huge amounts of energy are required. Smallholders are low energy consumers in the production of milk compared with industrialized countries. Other comparative energy and resource-efficient advantages include: (i) the use of animal and human power for producing feed and fodder, (ii) the feeding of crop by-products that do not need additional energy to produce, (iii) relatively low consumption of energy intensive concentrate feed, (iv) the predominance of grazing over stall feeding, (v) keeping animals in low cost sheds or in the open, (vi) the use of human power for milking, and (vii) the use of manure for biogas production for cooking and lighting/heating and for fertilising crops.

30. Smallholder dairying can bring significant social as well as environmental benefits as indicated in section 1. For example the Grameen Bank and Danone social SDD dairy chain models recently piloted in Bangladesh link some of the poorest, landless families to remunerative urban markets using an innovative integrated fish-crop-livestock model. In the process 6 000 landless and assetless families have been lifted out of poverty and under-nutrition, with children being the major beneficiaries.

2.6 Nutritional benefits

31. Though school lunch (milk) programmes are a well-tried and tested means of supplementing child nutrition, they are little used in Asia. Where they are practiced, results have been mixed for promoting SDD. There are three basic school milk models to ameliorate under-nutrition and micro-nutrient deficiency among children: (i) using locally produced milk in countries where milk is traditionally produced, e.g. Mongolia; (ii) using imported milk to establish the milk drinking habit in countries where milk is not traditionally consumed, then switching to local milk, e.g. Thailand; and (iii) using imported milk, e.g. Bangladesh. All three models are used with or without fortification with deficient micro-nutrients such as vitamins A and D and iron.

32. In Thailand, the recent rapid growth in milk consumption has been driven by a highly successful school milk programme that has changed the milk consumption habits of the nation. Begun in 1983, the programme was originally based on imported milk, but later switched to local milk to support domestic smallholder milk producers and processors. Today over six million pre- and primary school children get milk for 230 days a year and milk consumption has climbed from under 5 kg in 1983 to over 40 kg per year.

33. In Mongolia the Government launched a school lunch scheme in 2006. The scheme operates under a public-private sector partnership arrangement with food companies bidding for local authority school lunch contracts. The Government now insists that only domestic produce is used. As described in box 3, local dairy enterprises now distribute processed milk purchased from nomadic herders and local peri-urban households to over 200 000 children.

[19] Livestock's Long Shadow. FAO-AGAL (2007).

Box 2
Grameen Bank integrated social dairy chain models in Bangladesh*

In the late-1990s the Grameen Bank was looking for ways to raise the productivity of over 1 000 fish ponds it manages in partnership with 3 000 very poor landless and assetless families in the north-west of Bangladesh who were earning just 19 US cents a day from their share of fish sales. The solution was a pilot project intervention aimed at adding livestock to the fish farming system: (i) to produce more food available for home consumption and sale, (ii) to provide manure to fertilise fish ponds to improve productivity and (iii) to shift the focus to women. The resultant Grameen CLDD (Community Livestock and Dairy Development) model is a profitable dairy chain model that is part of an integrated, community-owned crop-fish-livestock cluster of family and joint-venture commercial enterprises.

Following training and build up of savings, the families access small commercial loans for livestock and other income generating activities. Loans may be selected for in-calf heifers, cows with calves, store cattle for fattening, goats, pigs, poultry, ducks crops/fodder, milkshaws (rickshaws for transporting milk), and bio-digesters and, more recently, vegetables, fishing gear, social forestry. More than 70 percent of the loans selected are for dairy cows because they return the most in terms of profits, nutrition, asset accumulation and social standing. Once smallholders have four or five cattle, they have enough manure to take out a loan for a bio-digester to produce gas for cooking and lighting. The spent slurry from the bio-digester is then used to fertilise and increase the productivity of fish ponds. Every two or three years the ponds are emptied, the slurry dried and used as crop fertiliser. In this way smallholder dairying has become an important component of an integrated and environmentally sustainable poor peoples' farming system. While in some ways the model is a social dairying model, it is commercial in operation. Over the seven-year life of the pilot project (2000-2006) benefits included:

- *Nutrition: e.g. pre-project no households consumed milk, now all 6 000 households with cows consume between 0.2 and one litre daily.*
- *Earnings: e.g. average earnings from fish and milk increased from 19 to 125 US cents a day, the increase coming largely from milk sales and excludes the sale or value of livestock born, enabled the purchase of other family essentials such as food, schooling, clothes etc.*
- *Household accumulation of physical assets (excluding livestock): up 145 percent and includes tube wells for safe water, improved housing, bio-digesters for clean cooking and lighting, sanitary latrines etc.*
- *Women: the number of direct women beneficiaries increased from under 5 percent to over 60 percent; more than half of the Village Group Chiefs are now women.*

The key lessons for SDD are that: (i) dairying can effectively result in the graduation of smallholder households out of poverty; (ii) community- based pro-poor initiatives provide an effective entry point for dairy development which can be replicated in similar conditions; (iii) these types of models should aim to be promoted and adopted under National Strategies for Accelerated Poverty Reduction and National Livestock Policies (as they are in Bangladesh).

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** Source: Terminal Report. Grameen Bank/UNDP/FAO Community Livestock and Dairy Development Project (Sep. 2007)*

34. The pilot Bangladesh school milk programme started in 2003 and is quite small. It is operated by an International NGO. Originally the milk was imported, pre-packed in UHT cartons; now imported milk powder is reconstituted in a joint venture with a local dairy. The recent National Strategy for Accelerated Poverty Reduction (2006) includes a plan to promote a School Lunch Programme to improve attendance, reduce under-nutrition and generate demand for local produce and catering services through backward and forward linkages. Community participation is to be a key driver and the Grameen SDD model is proposed for providing local milk for the programme.

Box 3
School milk and nutrition
in the Gobi Desert in Mongolia and in rural People's Democratic Republic of Korea

One-third of primary school children in Mongolia are reported to be under-nourished to some degree, especially during spring time following the long harsh Mongolian winter. One daily 200 ml glass of milk would contribute significantly to a school child's daily food needs in terms of body building protein, energy and key micro-nutrients and vitamins (see also box 1).*

With these nutritional objectives in mind, the Government of Mongolia launched a school lunch scheme for primary school children (5 to 10) in 2006. The scheme is operated under a public-private sector partnership arrangement with food companies bidding for local school lunch contracts. Following intense lobbying by the Mongolian Food Industry Association, the Government now insists that only domestic produce is used. Eighty percent of the meals are provided by local dairy enterprises, which purchase the milk from nomadic herders and peri-urban smallholders in the school's locality. 200 g of different processed dairy products are provided on alternate days with bakery products. The scheme boosts cash flow and earnings for the concerned dairies and, in turn, milk producers.

*In some cases the milk is fortified with the micro-nutrients lacking from normal diets. For example, 21 percent of children under the age of ten are reported to be affected to some degree by nutritional stunting (aggravated by Vitamin D and zinc deficiency); 20 percent suffer from anaemia (iron deficiency); 14 percent from iodine deficiency (goitre).**

One of the schools in the scheme, Bayenlig Primary School, is located in a very remote area of the Gobi Desert without electricity. Most of the children are weekly borders and travel to and from school by camel. The school lunch scheme is operated by the Bayenlig Camel Herder Group, which provides a variety of conserved and nutritious camel milk products for the children.

*The school lunch/milk scheme is linked to the generic Mongolia milk advertising and education campaign. In addition to supplying regular nutrition, the scheme also show-cases Mongolian milk and dairy products to tomorrow's customers. The scheme currently covers about 200 000 primary school children across the country.***

*A similar scheme operates at Teajam in DPR Korea. Here school children benefit from drinking yoghurt produced and processed locally from goat's milk.****

** Joint UN Food Security Assessment Mission to Mongolia (FAO/UNICEF/UNDP, April 2007)*
*** Dairy Food Security Project –GCSP/MON/001/JPN (FAO, 2007)*
**** Goat Milk Processing project – TCP/DRK/0168 (FAO, 2004)*

35. Approximately 100 million children in the region are underweight and affected by various kinds of under-nutrition and micro-nutrient deficiencies. Many are stunted, which affects their capacity to develop fully as active and healthy adults.[20] While breast milk is, of course, best for infants, targeted school nutrition schemes for vulnerable children that include fortified milk can help alleviate many forms of under-nourishment and micro-nutrient deficiencies, including those described in box 3 above. Conversely, a small but growing number of children in the region suffer from obesity. A range of milk products can be helpful in tackling obesity and educating younger generations on healthy life choices.

3. ASIA SMALLHOLDER DAIRY DEVELOPMENT STRATEGY (2009-2018)

3.1 Rationale

36. The rationale for the Asia SDD Strategy is summarised as follows:

- Rural poverty remains a major problem in Asia and even in the fast-growing countries, rural-urban income disparities are increasing.
- Asian demand for dairy products is growing rapidly and is substantially supplied by imports in a number of countries.
- Milk and dairy prices are increasing and are likely to remain strong during the strategy timeframe (2009-2018).

[20] ESCAP (2008). Economic and Social Survey of Asia and the Pacific 2008.

- Smallholder dairy development provides an outstanding opportunity to generate income, create employment in rural areas and improve nutrition; all of which contribute to improved rural livelihoods.
- A number of diverse and commercially competitive smallholder dairy chain models have been demonstrated in the region, and the dos and don'ts are becoming well understood.
- There is growing awareness by governments and the international community of the importance of agriculture (including dairy) in social and economic development.
- Well-targeted public investments along the dairy food chain (such as cooling systems) have the potential to leverage significant private investments in dairy production, processing and marketing. They also have the potential to produce environmental benefits through productivity enhancements and reduced animal numbers.
- However, many elements of the enabling environment for smallholder dairy development are lacking.
- This calls for a comprehensive and well focused strategy for a smallholder dairy development strategy in the region.
- The Chiang Mai workshop of February 2008 reached a strong regional consensus on the way forward and described the strategic objectives to be attained and the main thematic areas (pillars) to be addressed.

3.2 Vision

37. The strategic vision elaborated by delegates to the Chiang Mai workshop is:

- Asian milk for health and prosperity

3.3 Mission

38. The mission statement for the Strategy, developed by delegates to the Chiang Mai workshop is:

- Improving the competitiveness of smallholder milk producers to provide more and better quality milk and dairy products to Asian consumers.

3.4 Strategic objectives

39. The strategic objectives, also developed by delegates to the Chiang Mai workshop, are:

- A glass of Asian milk a day for every Asian child.
- Regional self-reliance and enhanced dairy food security.[21]
- Smallholders better linked to markets and enabled to become commercial dairy entrepreneurs.
- Each link in the dairy food chain becomes more efficient, productive and profitable in a socially and environmentally responsible manner, for delivering affordable milk and dairy products to urban consumers.
- Higher earnings for safer quality milk.
- Regional and national recognition of the multiple benefits of smallholder dairy production.

3.5 Key strategic issues

40. During the formulation of the SDD Strategy a wide-ranging set of issues were considered by the Chiang Mai workshop delegates. These include initiatives to:

- develop human resources and knowledge management in the smallholder dairy sector and its supporting organizations;
- better engage the private sector in both the formal and informal sub-sectors;
- support the smallholder sector to become more productive and more profitable;
- improve the sector's competitive position, including competitiveness in dairy product markets and competitiveness for factors of production;

[21] Self-reliance does not necessarily imply self-sufficiency.

- position smallholder dairy development as an instrument for rural poverty reduction and improved food security and nutrition;
- facilitate the creation of an enabling institutional and regulatory framework;
- improve the safety and quality of the product through a pricing system which provides strong incentives for farmers and other value chain actors to improve product quality;
- enhance market access through both formal and informal market channels and better meet consumer needs and affordability;
- finance development of the sector, including investments by smallholders, SMEs, cooperatives, governments, NGOs, community organizations and corporations, as well as public investments in infrastructure and support services; and
- ensure that the dairy sector develops in a socially and environmentally responsible manner.

3.6 Strategic pillars

41. The Strategy will address the challenges and objectives outlined above through strategic interventions under four mutually reinforcing pillars as prioritised and ranked by the Chiang Mai workshop delegates (figure 1). Spanning the duration of 2009 to 2018, the strategy will be practical, bankable and actionable at both regional and country levels and is summarised in the logframe in annex 3.

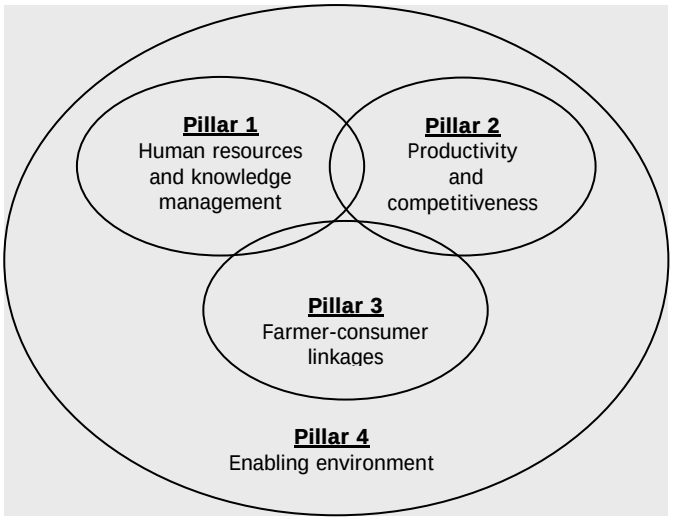

Figure 1: The strategic pillars of smallholder dairy development in Asia

3.6.1 Pillar 1: Human resource development and knowledge management

42. People are the central building blocks of any sustainable development strategy. Considerable human resource development experience exists in the region, supported in many cases by a multiplicity of training institutions. A few countries have successful, hands-on, knowledge-based, vocational training facilities sustained, for example, by incentives provided by the public and private sectors (box 4). Others have developed outreach training systems, including farmer-to-farmer learning, that take training out to smallholders close to their homesteads and farms. This is particularly effective for disseminating improved technologies and promoting hygienic milk production, both vital elements of competitive market access. Taking training into the field also allows more farmers and their families, especially women, to participate.

43. Experience and information sharing will be a key element of strategic pillar 1. An electronic SDD information network, provisionally called ***Dairy Asia***, will be set up as a repository of SDD and other dairy best practices, thus facilitating a transfer of knowledge between countries. Printed materials will be available for dairy operators in rural areas without access to the internet. There is already a wealth of information, advice and materials available for SDD. The focus will be on tailoring these resources to the local dairy chain situation.

Box 4
Enterprise-oriented vocational dairy training in Mongolia*

Like other food industries in Mongolia, the dairy industry collapsed during the rapid change form state-run to market economy in the 1990s. During this period the country went from self sufficiency to over 95 percent dependency on imported processed milk and dairy products. When the dairy revival programme started in 2004, there was no vocational training available for dairy operators (milk producers, service providers, technicians, milk traders, milk processors, service providers, food inspectors etc) in Mongolia. A permanent capacity building facility – the National Dairy Training Centre – was established within the campus of the Food Technology College, under the Ministry of Education. Six basic training modules were developed, one for each of the modules in the Mongolian dairy chain model. The Centre is equipped with: (i) state-of-the art adult learning and teaching aids, (ii) a commercial demonstration dairy plant, (iii) a mobile outreach training unit and (iv) a dairy product development facility, (v) a milk and dairy products quality control laboratory and (vi) a small technical library and course administration office.

Existing staff from the College were re-trained as core vocational trainers to run short residential and outreach courses. Other specialists from the private and publics sectors were also trained as key trainer-members of the Dairy Training Team, led by the College Training Manager. They also act as advocates out in the field for the training programme, now part of the current ten year National Dairy Programme (2007-2016). The demonstration dairy is run on a semi-commercial basis and currently provides milk and dairy products to 600 school children in Ulaanbaatar under the Government's School Lunch Programme.

Outreach training focuses mainly on enhancing milk production, productivity, including milk producer Organization, feeding, breeding and clean milk production, and involves tailoring the training session to each location. Taking training out to dairy operators in the field enables more farmers and their families, especially women, to participate. By the end of 2007, more than 2 000 dairy operators and technicians had attended training courses. The business plan for the Centre for 2008 aims to increase income to sustain the programme from sponsored trainees, milk sales and small annual allocations from the College budget. Course sponsors to date include the State food regulatory and inspection agencies, the National Dairy Programme and other donor projects such as the USAID Gobi Initiative project.

The key lessons for SDD are: (i) the importance of tailoring training to the local situation centred on practical demonstrations of innovative, modern technologies and equipment in a commercial setting; (ii) enterprise-oriented training provides incentives for trainers as well as trainees and (iii) the importance of outreach training for milk productivity enhancement.

**Source: Dairy Food Security Project –GCSP/MON/001/JPN (FAO, 2007*

44. The interventions and major activities under the human resource development and knowledge management pillar include, *inter alia*:

(1) Preparing an inventory of dairy training institutions and materials in the region, identifying those most suitable for SDD.
(2) Developing state-of-the-art, vocational training courses for SDD best practices and models, including course materials and practicals, which are sustainable and provide incentives for trainers and trainees.
(3) Establishing a regional SDD-focused capacity building programme at the vocational Dairy Training Centre in Chiang Mai, Thailand.
(4) Setting up the ***DairyAsia*** Knowledge and Information Network hosted initially by APHCA.
(5) Actioning SDD training programmes and information networks at country level.
(6) Sponsoring enterprise-to-enterprise exchanges that would allow detailed comparison of practices and operating results among participants.
(7) Developing a Coaching Program that would include a pool of successful smallholder dairy entrepreneurs and plant managers who can be tapped as trainers or visiting coaches for promising smallholder dairy enterprises.
(8) Increasing the number of qualified plant managers, quality control and product development officers and AI technicians to be made available to growing enterprises.

3.6.2 Pillar 2: Improving the productivity and competitiveness of smallholder milk producers

45. To gain profitable access to markets, smallholders must produce milk efficiently. In the past, most of the private sector smallholder business models focussed on the off-farm links in the dairy chain, thus neglecting farm level constraints. On the other hand, some successful SDD models, especially the

cooperative model, incorporate elements such as input services, loans, animal insurance schemes, milk collection systems, remunerative pricing, daily or weekly milk payments etc to reduce risks for dairy operators (box 5). However, the investment needed to create a one or two cow (or buffalo) unit is beyond the capacity of most poor rural households.[22] The regional strategy and country action plans will therefore incorporate innovative financing packages, including livestock insurance to mitigate risk, and recognize that strategies requiring on-going donor or direct Government recurrent expenditure beyond the initial start up period are not sustainable.

46. High prices in international markets and the need to establish linkages to local milk supplies are prompting the private sector to focus on the entire dairy chain, not just processing and distribution. The key constraints to improving productivity and profitability of milk production are common across the region, namely: (i) feed availability (ii) shortage of improved stock, (iii) insufficient knowledge for raising management skills, and (iv) access to affordable credit. Raising productivity also needs to be matched by initiatives facilitating entrepreneurial knowledge, business linkages, and know-how to ensure competitiveness.

47. The overriding success indicator for strategic Pillar 2 will be how many subsistence smallholder milk producers scale up to become small commercial dairy farmers. The target will be one million over the ten year strategy period. The strategy will focus on making animals more productive, not on increasing numbers. The major activities include, *inter alia:*

(1) Describing in detail and publishing a "menu of options" (catalogue) of the best SDD dairying practices and models focussed on improved returns for smallholders.
(2) Selecting the dairy development models most appropriate for local conditions.
(3) Advocacy for the smallholder dairy sector to sustainably compete for resources and finance.
(4) Assisting the smallholder sector to compete in product markets, in particular through creative linkages with private sector which result in fair and renumerative returns.
(5) Increasing milk yields, quality and profitability through making productivity enhancing input services (feed, stock, animal health, management skills) readily accessible and affordable and reducing milk chain losses. .
(6) Facilitating the sourcing of appropriate technology, equipment and supplies among dairy enterprises in the region. (It was particularly useful for the Philippines to be able to access supplies from Thailand and to consult Thai dairy practitioners on various aspects of dairying.)
(7) Actioning pillar 2 at country level.

[22] While the pillars and SDD Strategy focus on cows and buffaloes, the most important milk animals for the majority of smallholder milk producers in Asia, it will also recognise in the national action plans the huge importance of other animals milked by smallholders in many countries such as yaks, camels, goats, sheep and horses, especially in the central Asian region and, for example, Bhutan, China (Tibet Autonomous Region), Mongolia, PDR Korea, Pakistan, Nepal etc

Box 5
The Indian Anand pattern dairy cooperative business model in transition

The world-renowned Anand Pattern dairy cooperative model was developed over a number of years starting soon after the partition of India in the late-1940s. The model was supported by charismatic and visionary leaders who introduced three basic innovations. The model is village-based and bottom up. Smallholders are organized into primary village level dairy cooperatives which collect milk in the morning and evening. Payments are made on a dairy, weekly or monthly basic according to members' wishes. Secondary, the model is three-tire and vertically integrated; the village dairy cooperatives are federated into district cooperatives which collect, process and market the milk. In turn, these are federated into State-level cooperatives that provide the interface with the State Government policy regulatory framework. The three-tiered dairy cooperative model provides competitive access to remunerative urban markets.

By the late 1960s the model was sufficiently validated to introduce the third innovation, the setting up of the Operation (Milk) Flood Programme (OFP) under the National Dairy Development Board, founded in 1970. The OFP, was (and is) a single commodity programme aimed at monetizing food aid (mainly butter oil and skimmed milk powder) as a tool for socio-economic development. The EU and WFP provided the food aid, the World Bank the finance and FAO and the World Bank the technical assistance.

Today, India is the largest milk producer in the world, having overtaken recently the USA, and is now self-sufficient in milk and dairy products. Nearly 13 million smallholders and their families were empowered through the OFP cooperatives which also spawned a vibrant dairy industry that not only market processed milk at affordable prices for urban consumers, but also manufactures and exports high-quality dairy equipment as well as dairy expertise. The model works best in India, Through parts the model have been successfully exported and adapted to other countries in the region.

Dairy is currently the number one commodity in India, with an output value of US$ 30 billion (2004-05), almost equal to the joint output value of rice and wheat, the two key commodities of India. The incredible success of the model encouraged the private sector to invest in dairying. The cooperative sector now faces stiff competition and is starting to loose ground to more nimble competitors that are not encumbered by restrictive cooperative legislation or the high overheads associated with providing milk production inputs services at village level. For the first time, cooperative membership is falling, down to 11.5 million, in 2001/2002 compared with 12.9 million in 1999/2000.** The cooperative sector is responding by adapting its business model and legislation to the New generation Dairy Cooperative model. Cooperative forms of enterprises can now be registered as producer companies under the Company laws and are thus not encumbered by government bureaucracy.*

The three key lessons for SDD are: (i) enabling State and national-level policies, (ii) the catalyzing role played by the international community which, under current conditions, would be limited by funding as well as lack of access to food aid; and (iii) the impact of liberalizing policies to encourage competition which leads to highly "successful" models needing to adapt to modern, fast moving market situations.

**FAO (2008). Asia smallholder Dairy Strategy Project (CFC/FIGMDP/16FT). Strengthening dairy value Chains in India.*

*** Agro-industries characterization and appraisal: Dairy in India. Agricultural Management, Marketing and Finance Service, FAO (2007)*

3.6.3 Pillar 3: Strengthening the linkages between farmers and consumers to deliver a quality product at a fair price

48. Over 80 percent of the milk and dairy products sold in the region are marketed through informal channels, although processed (formal market) milk and dairy products are gaining ground rapidly in transforming countries such as China, India, Iran and Thailand. Informal channels generally keep transaction costs low, and service nearby lower-income consumers. Many countries in the region produce a wealth of traditional products, which often command very high prices. Some countries have turned traditional products into high added-value niche products (e.g. Bangladesh, India, and Mongolia). However, urban consumers invariably become more discerning in terms of quality and safely and aspire to western style products and quality standards, purchased from western style supermarkets.

49. Each link in the dairy chain must be profitable. The links in the chain will differ according to the model used and the location, but will usually include: (i) milk producer organizations, (ii) service providers (feeding, breeding, health, management, credit etc), (iii) milk collectors and transporters, (iv) milk processors, and (v) product distributors. Strengthening the linkages along the dairy chain means not only capacity building (pillar 1) and increasing profit per milk animal (pillar 2), but includes other factors such as improving and maintaining safety and quality and minimising milk losses. Although milk is highly perishable, there are well-tested technologies and systems for getting milk safely and affordably from farm to consumer. Box 6 illustrates an SDD model in China that has adapted collective dairying in a rapidly growing (product output estimated up 22.5 percent in 2007) but highly competitive market situation.

50. The key regional success indicator for strategic Pillar 3 will be the substitution of imports with quality domestic milk at affordable prices. The major activities include, *inter alia:*

(1) Improving farmer access to marketing channels, formal and informal.
(2) Increasing opportunities for smallholders to access the formal sector.
(3) Creating competitive supply chain conditions.
(4) Creating fair and transparent pricing systems with incentives to deliver quality milk.
(5) Diversifying the range of dairy products on offer.
(6) Educating consumers on the nutritional benefits of local dairy produce.
(7) Stimulating consumer demand in those countries with very low per capita milk consumption levels.
(8) Reducing losses (qualitative and quantitative) in the dairy chain.
(9) Designing and establishing common facilities and networks of resources at national and regional level that would enhance quality control and product development, with potential cost sharing by smallholder enterprises.
(10) Actioning pillar 3 at country level.

Box 6
The Chinese Dairy Park Collective SDD Business Model – Investment Driven Growth

China has one-fifth of the world's population, but only 4.4 percent of total world output of milk. However, between 2000 and 2006, gross output of milk and dairy products quadrupled to 33.6 million tonnes. Over the past two decades per capita consumption of milk has grown from less than 2 kg to about 20 kg with urban consumption about eight times rural consumption, reflecting the widening income gap between town and country. 1.5 million smallholders (98 percent of milk producers) managing up to 20 cows produce two-thirds of domestic milk supplies with four-fifths of these having less than 5 cows.

While the world market for milk grew by just 1.2 percent on average over the period 1991 to 2004, China's dairy market grew by a massive 16 percent annually. However, the gap between supply and demand is widening and is met by imports, which totalled some 2.4 million tonnes of LME in 2007, 7 percent of consumption.*

*The phenomenal growth in milk production has largely taken place in the three northern provinces of Hebie, Heilongiang and Inner Mongolia, which by 2006 were producing 52 percent of national milk output, up from 18 percent in 1985. In these provinces smallholders are reported to earn more income from dairying than from growing crops as the profit-cost ratio of milk production by smallholders is nearly double that of maize and three times that of potatoes.***

Starting out as very small companies in the late 1990s, it is not surprising that two dairy companies from the Inner Mongolian Autonomous Region, Yili and Mengniu, are now the largest in the country, each having grown their turnovers from a few million US dollars annually to well over one billion US dollars by 2007. Due to the huge recent investments in milk processing across China since the late 1990s, it is estimated that by 2003 processing capacity exceeded demand by about 30 percent. This tended to sharpen competition among the three leading processors and farmgate prices were, and still are, depressed. Since then most of the spare capacity is now better utilised as demand continues to accelerate (up 22.5 percent in 2007). But farmgate prices have hardly moved. The reasons are difficult to ascertain. However, it is understood that price collusion by the large dairy companies enables them to restrict prices. To keep costs low and improve milk quality, China's processors have set up a number of community-based units or Dairy Parks where smallholders keep and milk their cows. Cow numbers in the Parks range between 300 to over 1 000, which are financed either by the processors, the local authority or smallholders themselves

The key lessons for SDD are: (i) the availability of cheap land and labour in the Northern Province stimulated low cost milk production; (ii) the policy of supporting dairying from local taxation and allowing capital to be raised from the Hong Kong stock market enabled rapid expansion; (iii) the selection of capital intensive UHT milk by the processors (note, not the market) enabled rapid expansion without the usual expensive cold chain; (iv) price collusion and participants captive to the dairy park model enable restrictive producer milk pricing; (v) policies and investment have focused on the processing side with lending to producers generally focused on loans for breeding animals; and (vi) policies supporting producer investment further up the chains, such as in chilling systems, would allow smallholders to have a stronger negotiating power with the processors .

** 3A Business Consulting / Shainwright Consulting & Research Group (February 2006)*
*** Price Department, National Development and Reform Commission, China (2007)*

3.6.4 Pillar 4: Enhancing the enabling environment

51. Smallholder dairy development can be successful under a wide range of situations, but the approach and interventions need to be tailored to the local situation. It has to be recognized that in some cases certain systems, or in fact SDD systems in general, may not be feasible. Key success factors are linked to the nature of risk inherent to dairying. The risks and opportunities (differentiated by market demand, production practice, geography, and access to markets, inputs and services) are also influenced by more macro or broader issues such as trade regulations, government agriculture and investment policies, and institutional support.

52. The key elements of the enabling environment for the development of all agro-businesses are well known and expanded in more detail in annex 7. The main aims of Pillar 4 are to identify and promote institutions and policies that are critical to enhancing the bargaining power, market access, and incomes of small farmers. These necessary ingredients for "making markets work", must be identified and clearly articulated in national and sub-national dairy development initiatives.

53. It is essential to strategically incorporate national and sub-national actions and interventions within the regional strategy. This requires a long-term vision based on a detailed awareness of the realities of each country. A few countries have introduced some of the legal and regulatory elements conducive to SDD under their overall agriculture development policy frameworks, with a few introducing specific dairy policy frameworks, e.g. India, Mongolia, Philippines (box 7). Others do not promote dairying specifically, e.g. Bangladesh, China.

54. The overarching success indicator for strategic pillar 4 will be explicit recognition by senior decision makers/governments of the role of SDD in agricultural development policies and programmes. The major activities include, *inter alia*:

(1) Articulating a smallholder inclusive policy framework.
(2) Identifying and supporting condusive legal and regulatory frameworks.
(3) Advocating for a favourable macro-economic framework.
(4) Developing a plan of action and advocacy support for ensuring an enabling environment for SDD.
(5) Creating a platform for identifying and mobilizing the necessary financial services and supportive infrastructure.
(6) Linking government nutrition programs to smallholder dairy producers as suppliers.
(7) Actioning pillar 4 at country level.

Box 7
Enhancing the SDD enabling environment – the Philippines Dairy Zone Model

Public-private sector collaboration to enhance the enabling environment for smallholder dairy development in the Philippines was initially spurred by wavering government support for the local industry. This initiative is characterized by a strong enterprise orientation that focuses on reducing dairy groups' dependence on government support.

The one billion US dollar Philippines dairy market is dominated by importer-processors who import mainly milk powder and hold 99 percent of the market. The remaining one percent is handled by local producer-processors. Although Filipinos are generally considered non-milk drinkers, per capita milk consumption is growing and currently stands at 19 kg per annum.

The local milk producer-processor sector is small, comprising 13 000 families and some 300 dairy enterprises. For many years development of the sector stagnated following the Government policy of the 1980s of importing all dairy requirements. More recently, the National Dairy Development Act of 1995 created the National Dairy Authority, which was given the responsibility of reversing earlier policy and promoting dairying.

Pursuing its mandate, the NDA successfully introduced the Dairy Zone Model. Essentially it is an enterprise-driven model that transforms smallholders into dairy farming entrepreneurs. Zones consist of around 100 smallholders with about 300 dairy animals located in adjacent villages served by a processing plant located within a 30 km radius of an urban centre capable of absorbing 300 to 500 litres per day. This enables economies of scale for dairy input and output service providers. The model works well in peri-urban and in remote rural Island areas, providing good returns for all the participants who share in the value added in the dairy chain, e.g. producer (26%), collection centre (3%), processor (25%), wholesaler (8%) and retailer (39%). Alongside the NDA is the Philippine Carabao Center (PCC)[23] that focuses on the indigenous water buffalo as a source of high-value milk. The PCC, particularly at its National Impact Zone, assists smallholders to produce more milk and enhance their capacity to operate as dairy enterprises at farm and processing levels.*

The key SDD lessons are: (i) regular income from milk is the single biggest incentive for smallholder milk producers, (ii) a strong dairy enterprise is the most important requisite for farmer inclusion in the dairy market, boosted by collaboration among big and small milk producers, (iii) technical support along the entire dairy chain, especially related to milk quality, is vital for a stronger market share and (iv) indigenous dairy products provide the highest return. In addition, there are opportunities to promote south-south cooperation, particularly including farmer-to-farmer exchanges within Asia, to promote and validate dairy buffalo breeding and carabao milk product technologies which constitutes a potent tool for boosting productivity and returns from the indigenous carabao. These animals, being native in the tropics, happen to belong to millions of farmers who stand to benefit from improved technologies and better enterprise organization.

** FAO (2008). Asia Smallholder Dairy Strategy Project (CFC/FIGMDP/16FT). Smallholder-based Enterprise Models in the Philippines Dairy Sector – a Value Chain Approach.*

3.7. Beneficiaries

55. The SDD strategy is designed with the explicit objective of transforming and scaling up smallholder milk producers in rural communities. Potential direct beneficiaries include some 200 million smallholder families, or nearly 1 billion people. Women dairy operators play a leading role in the sector in nearly all countries in the region. However, when scaling-up occurs and returns increase, men often take over and women are often left behind. Within the target group, special emphasis will be placed on the empowerment of women by ensuring they have equal opportunities under all the strategy pillars, but especially under strategic pillar 1. At least 50 percent of trainees participating in SDD training at country level will be women.

56. The majority of the actors in SDD dairy value chains are private entrepreneurs: milk producers, collectors, processors, service providers, finance and micro-finance institutions, regulatory institutions and industry associations etc. While the strategy is focussed on smallholder milk producers, urban consumers and specifically children will benefit through the availability of more and safer dairy products at affordable prices. The strategy will also target policy-makers and legislators, national dairy bodies and all the actors

[23] PCC is an internationally recognized lead institution in the genetic improvement of the dairy buffalo. It maintains a gene pool and a modern laboratory run by a team of experts that pursues experiments on breeding and fertilization to enhance the productive traits of the animal.

along the value chain, including larger scale milk producers and processors. The private sector is expressly targeted, partly because it was not sufficiently involved in earlier development efforts, but also for its crucial role in providing productivity-enhancing goods and services and market access. Daily contact with rural households through milk collection provides the opportunity for daily delivery of dairy input supplies as well as other basic daily household needs.

4. INDICATIVE INVESTMENT AND IMPLEMENTATION PLAN

4.1 Design criteria

57. The main challenge for the SDD strategy is to craft an investment plan that will be implemented for the benefit of Asia's millions of actual and potential smallholder dairy operators, and the consumers they supply; and to action the strategy for use in country situations. At this stage it is only feasible to draft an outline that focuses on immediate activities based on already known commitments by stakeholders. The detailed investment programme will be finalised towards the end of 2008 and will depend on the interests of individual governments and the appeal of the strategy to investors from the private sector, regional and sub-regional organizations such as ASEAN, SAARC and the International Financing Institutions (IFIs), Regional Financing Institutions (RFIs) and International Agencies.

58. The foundation of the indicative Investment and Implementation Plan (IIP) is based on the SDD Strategy. For practical reasons, common design criteria are used for framing its components. A ten year timeframe is adopted, spanning 2009 to 2018, though some activities will start immediately in 2008. SDD involves investments in livestock and dairy chain infrastructure, which take time to achieve critical mass, especially for new entrants, who may have to borrow capital to build their enterprises. The IIP is divided into regional and country level sub-programmes, which will be implemented in parallel for optimum impact. A dual track approach will be used, with immediate and longer-term interventions. While the IIP has been reviewed and adopted by the Chiang Mai workshop delegates, it will be necessary to develop the proposed investments into detailed, fully costed project proposals in collaboration with potential investment partners. An immediate action plan for 2008 covering this process is set out in annex 1.

59. In essence the SDD Strategy and the IIP must be practical, bankable and actionable; and a roadmap to enable localized, targeted and tailored investment approaches.

4.2 IIP summary and timeframe

60. The IIP is summarised in the table below and outlined in more detail in annex 2. The proposed oversight (M&E) arrangements are also set out in this annex. These include an SDD Task Force, facilitated by FAO, to guide the implementation of the SDD Strategy. Members of the Task Force are drawn from APHCA member countries and represent the broad constituency of public, private and NGO SDD stakeholders who attended the Chiang Mai workshop.

	Projects	**Indicative Budget (US$ million)**	**Implementation Plan (2008-2018)**										
			08	09	10	11	12	13	14	15	16	17	18
Sub-programme 1: Regional Investment and Implementation Programme (IIP-1)													
1.1	*DairyAsia information network	0.06											
1.2	SDD regional centre, Thailand	5.00											
1.3	Dairy Asia Association	2.00											
1.4	SDD greenhouse gas emission	2.00											
1.5	Unidentified	.94											
	Sub-total	**10.00**											
Sub-programme 2: Country Investment and Implementation Programme (IIP-2)													
2.1	*Rapid SDD milk productivity projects	10.50											
2.2	*Pilot school milk	0.45											
2.3	*Piloting National SDD Action Plans	0.05											
2.4	*National SDD action plans	4.50											
2.5	SDD country project – 20 countries	200.00											
2.6	Unidentified	24.50											
	Sub-total	**240.00**											
	Total	**250.00**											

* Funding agreed in principle

4.3 Indicative financing

61. Of the total proposed budget of US$ 250 million, 90 percent will be invested at country level. As indicated above, the detailed investment and implementation plan will be constructed during 2008 when the extent of stakeholder interest is ascertained. Private sector investors include all non-government and IFI/RFI investors, i.e. milk producers, milk traders, milk processors etc.

- Private sector US$ 150 million (60%)
- Public sector US$ 50 million (20%)
- Donors US$ 50 million (20%)
- Total US$ 250 million

ANNEX 1

IMMEDIATE ACTION PLAN FOR 2008

ASIA SMALLHOLDER DAIRY DEVELOPMENT STRATEGY AND INVESTMENT PLAN

Activity		Responsible	Timeframe/Deadline								
			Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Endorsement of Asia SDD Strategy/IIP by FAO and CFC	FAO (AGAP/AGAL)									
2.	Set up and run Dairy Asia information network	FAO (AGAP/AGAL)									
3.	Gauge interest in, set up and run Dairy Asia Association	FAO (AGAP/AGAL)									
4.	Set up and run APHCA Asia Dairy Task Force	FAO (AGAP/AGAL)									
5.	Meet and commit prospective investors	FAO (AGAP/AGAL)									
6.	Formulate key priority projects*	FAO (AGAP/AGAL)									
7.	Formulate other priority regional and country projects	FAO (AGAP/AGAL)									
8.	Visit selected countries on request to formulate SDD action plans and projects	FAO (AGAP/AGAL)									
9.	SDD Strategy endorsed by APHCA at 32nd Annual Session, Sydney, Australia	FAO (AGAP/AGAL)									
10.	Finalise SDD Investment Programme and Action Plan for 2009 Plan	FAO (AGAP/AGAL)									

* Includes: (i) Chiang Mai SDD Regional Centre; (ii) Rapid FAO TCP projects; (iii) School milk; (iv) National SDD action plans.

ANNEX 2

INDICATIVE INVESTMENT AND IMPLEMENTATION PLAN

1. Design Criteria

1. The main challenge for the SDD strategy is to craft an investment plan that will be implemented for the benefit of Asia's millions of actual and potential smallholder dairy operators, and the consumers they supply; and to action the strategy for use in country situations. At this stage it is only feasible to draft an outline that focuses on immediate activities, some of which stakeholders have committed to. The detailed investment programme will be finalised towards the end of 2008 and will depend on the interest of individual Governments and the appeal of the strategy to investors from the private sector, regional and sub-regional organizations such as ASEAN, SAARC and the International Financing Institutions (IFIs), Regional Financing Institutions (RFIs) and International Agencies.

2. The foundation of the indicative Investment and Implementation Plan (IIP) is based on the SDD Strategy. For practical reasons common design criteria are used for framing its components. A ten year timeframe is adopted spanning 2009 to 2018, though some activities will start immediately in 2008. SDD involves investments in livestock and dairy chain infrastructure, which take time to achieve critical mass, especially for new entrants, who may have to borrow capital to build their enterprises. The IIP is divided into regional and country level sub-programmes, which will be implemented in parallel for optimum impact. A dual track approach will be used with immediate and longer-term interventions. While the IIP has been reviewed and adopted by the Chiang Mai workshop delegates, it will be necessary to develop the proposed investments into detailed, fully costed project proposals in collaboration with potential investment partners. An immediate action plan covering this process for the remainder of 2008 is set out in annex 1.

3. In essence the SDD Strategy and the IIP must be practical, bankable and actionable; it must be a roadmap to enable localized, targeted and tailored investment approaches.

2. Main components

2.1 Sub-programme 1: Regional Investment and Implementation Programme

4. The Regional IIP-1 consists in the main of interventions for immediate implementation to support the preparation of country level activities (IIP-2) and includes the following components. The indicative budget is US$ 10 million.

IIP-1.1: DairyAsia Knowledge Centre and Information Network
(could be combined with IIP-1.2 and IIP-1.3)[24]

Starting date: immediate (April 2008)
Duration: 3 years; then self-financing
Objective: Sharing knowledge and information about SDD in Asia among Asian countries
Description: Network is being set up immediately, initially hosted and funded by APHCA; later transferred to Asia Dairy Association/Asia SDD Centre (see below)
Budget: US$ 60 000; APHCA has committed US$ 20 000 annually for the next three years to establish the network; after which it will be funded by those countries who find it useful and the proposed Asia Dairy Association
Implementer: APHCA Secretariat and FAO-RAP

[24] The first three projects (IIP-1.1, IIP-1.2 and IIP-1.3) could be combined under one umbrella project – see project proposal IIP-2.4 below.

IIP-1.2: SDD Regional Centre Project
(could be combined with IIP-1.1 and IIP-1.3)

Starting date: January 2009
Duration: 5 years
Objective: Establishing a regional a SDD-focused capacity building and support facility at the vocational Dairy Training Centre in Chiang Mai.
Description: The Department of Livestock Development, Ministry of Agriculture and Cooperatives of the Thailand Government has offered the Centre as a SDD hub for the region. Thailand and Chiang Mai are convenient because of their central location in the region and comprehensive network of communications, transport facilities and hospitality.
Budget: US$ 5 million; Government of Thailand Trust Fund (others – ASEAN, EU)
Implementer: DLD/Thailand, APHCA and FAO

IIP-1.3: Dairy Asian Association (DAA) Project
(could be combined with IIP-1.1 and IIP-1.2)

Starting date: January 2009
Duration: 3 years
Objective: Setting up a demand-driven regional dairy group
Description: Will have a small secretariat combined with/based at the Chiang Mai Regional SDD Centre. The membership base will include Asian dairy firms, dairy institutions, supporting service industries and suppliers, who would fund the DAA. Tentative outputs for the DAA are:

- SDD promoted at regional and national levels through appropriate regional and national institutions;
- consumer awareness and education campaigns about Asian milk and dairy products;
- possibility of generic branding and labelling explored through existing certification schemes and generic promotion and advertising of Asian milk and dairy products;
- active lobby for improved policies conducive to SDD with regional trading blocks such as ASEAN, SAARC on the regional dairy policy agenda;
- inter-regional trade in Asian dairy products increased (regulations, standards, certification etc)

Budget: US$ 2 million; funding opportunities to be explored through various funding mechanisms
Implementer: ASEAN and FAO

IIP-1.4: Greenhouse Gas Emissions and SDD Project

Starting date: January 2009
Duration: 4 years
Objective: Exploring ways and means of mitigating the effect of SDD on greenhouse gas emission
Description: Collaborative "action research" project with Bangladesh (Grameen Bank), China (Mengniu), India (National Dairy Development Board) and FAO-AGAL/RAP.Tentative outputs:

- carbon footprint of a litre of milk produced under selected SDD models in Asia determined;
- best practices for mitigating the effect of SDD on greenhouse gas emissions developed and validated;
- best practises build into the SDD Regional Centre knowledge-building and information-sharing and training programmes.

Budget: US$ 2 million (GEF/FAO Trust Fund)
Implementer: Concerned country organizations and FAO/AGAP, AGAL and RAP

IIP-1.5: Unidentified Projects

Starting date: 2009 to 2013
Duration: 3 to 5 years
Objective: Support SDD at regional level
Budget: US$ .94 million (ASEAN, SAARC, RFIs, IFIs, Governments, international/bi-lateral development agencies, APO, private sector etc)

2.2 Sub-programme 2: Country Investment and Implementation Programme

5. The country level IIP-2 will depend to some extent on the finalisation of the IIP-1 sub-programme and on the interest of the IFIs/RFIs and regional trading blocks, e.g. ASEAN, SAARC, Governments, International/Bilateral Development Agencies and the private sector in actioning and financing the strategy at regional and national level. The indicative budget is US$ 240 million. The IIP-2 will include, *inter alia*, the following components:

IIP-2.1: Rapid Smallholder Milk Production Productivity and Quality Improvement Project

Countries: Afghanistan, Bangladesh, Iran, Mongolia, Myanmar, Nepal, Philippines
Starting date: Immediate (April 2008)
Duration: 3 years (2008-2010)
Objective: Improving the productivity of milk animals through enhanced: (i) dairy animal feeding; (ii) dairy breed improvement and (iii) milk quality through dairy training
Description: Includes on going and pipeline country level projects
Budget: US$ 5 million (10 projects up to US$ 500 000 per project), initially through the FAO Trust Fund and Technical Cooperation Programme (TCP) facility (see table below). FAO will also work to mobilise funding, programmes and projects from non-FAO sources, e.g. project in Afghanistan, Bangladesh, Iran, Mongolia, Myanmar, Nepal, DPR Korea, Philippines.
Implementer: Concerned country organizations and FAO

Country	Project Title	Budget (million)	Status
Afghanistan	Development of Integrated Dairy Schemes	$1.85	on-going
Bangladesh	Community Livestock and Dairy Development	$1.10	recently finished
Bangladesh	Dairy Cattle Improvement Programme	$0.38	being finalised
Iran	Smallholder Dairy Development	$0.45	being drafted
Mongolia	Fodder production, conservation/processing for milk/meat production	$0.40	on-going
Mongolia	Modernizing and upgrading the national animal breeding programme	$0.40	on-going
Mongolia	Increasing Dairy Supplies in Mongolia through Reducing Post-harvest losses and Restocking	$1.85	2nd phase
Myanmar	Dairy Cattle Improvement	$0.36	on-going
Nepal	Technical Assistance to the Community Livestock Development Project (CLDP)	$2.20	on-going
Nepal	Small-scale dairy training	$0.37	on-going
Nepal	Dairy Cattle Improvement	$0.37	being finalised
Pakistan	Up-scaling Dairy Development	$0.35	just finalised
Philippines	Capacity Building for Small-Scale Dairy Sector	$0.37	on-going
Total		**$10.50**	

IIP-2.2: Enhancing nutrition and livelihoods through school milk programmes linked to smallholder dairy operators

Countries: Bangladesh, Myanmar, Viet Nam
Starting date: January 2009
Duration: 3 years
Objective: Enhancing school-age child nutrition through increased dairy consumption while assuring and increasing livelihoods of local dairy producers and interested local entrepreneurs.
Description: Pilot sub-regional project to develop a regional Asian milk advocacy programme for improved health and nutrition under the Asia SDD Strategy slogan - ***A glass of Asian milk a day for every Asian child.*** Tentative outputs are:

- "best practices or lessons learned" intervention strategy developed that identify conditions fostering smallholder dairy development through linking producers to local markets by means of the establishment of school milk programmes in rural areas;
- locations identified where localized school milk programmes can be implemented, based on a review of national milk development strategies, which have worked;
- national school milk programmes designed or strengthened targeting schools in rural areas and the resource requirements for such programmes identified, assessing alternative and innovate funding options such as monetization of commodities or the utilization of duties on imported dairy products;
- the development of these local programmes linked with opportunities for smallholder dairy participation in supply of both fluid milk and value addition for other products;
- pilot interventions on the production side through the introduction of appropriate mechanisms to enhance productivity and milk availability;
- additional value generated through increased quality control and initiatives on village level milk processing and development or management of SMEs.

Budget: US$ 450 000 (FAO-TCP)
Implementer: Concerned country organizations and FAO

IIP-2.3: Piloting national SDD action plans

Countries: Bangladesh, Myanmar, Sri Lanka, Thailand (selected by CFC)
Starting date: June 2008
Duration: 1 year (2008-2009)
Objective: Formulating procedures for including SDD in national programmes in the context of context of supporting achievement of the hunger and poverty MDGs
Description: Providing tailored technical and policy assistance to countries at the local and strategic development level to: (i) promote SDD advocacy and policy engagement, (ii) prepare national actions plans to include SDD in national policies, plans and development programmes and (iii) identify entry points for donor intervention in supporting SDD. The tentative outcomes of the project are:

- SDD action plans for the four countries prepared;
- lessons on private-public SDD partnerships documented;
- local dairy producer boards organizations reviewed and strengthened;
- policy support sourced from regional groupings such as ASEAN, SAARC and IFIs/RFIs;
- SDD entry and intervention points identified and documented in project proposals to be submitted to donors;
- links with SDD Regional Centre at Chiang Mai identified and supported;
- SDD best practices identified and introduced at country level.

Budget: US$ 50 000
Implementer: Concerned country organizations, CFC, other donors and FAO

IIP-2.4: Smallholder Dairy Competiveness and Markets Access Country Level Projects

(could be combined with IIP-1.1, IIP-1.2 and IIP-1.3)

Countries: Those countries above with SDD action plans
Starting date: June 2009
Duration: 5 years
Objective: Developing and implementing country level SDD action plans
Description: Empowering smallholders by improving livelihoods through competitive production and marketing of high value added, diversified milk and dairy products. Tentative outputs are:

- the establishment of specified smallholder dairy zones which, through public-private partnership initiatives, link and upscale smallholder dairy producers into markets;
- increased infrastructure (cold chain, testing facilities, etc) in place to ensure provision marketing of high quality, affordable priced milk from targeted smallholders;
- enabling policy/institutional environment conducive for smallholder dairy participation in markets;
- the establishment of a well represented industry association which serves the role of advocate for smallholder dairy operators;
- increased productivity on-farm (through training in breeding, feeding, business operations);
- reduced post-harvest losses;
- increased incomes/nutrition of smallholder dairy farmers and high rural incomes through job creation along the dairy value chain;
- enhanced capacity of SDD regional dairy centre to provide technical and entrepreneurial training.

Budget: US$ 4.5 million
Implementer: Concerned country public and private organizations, CFC, and FAO

IIP-2.5: Expansion of activities related to Dairy Policy Development and Smallholder Dairy Competiveness/ Markets Access Country Level Projects

Countries: Those countries with SDD action plans
Starting date: June 2009
Duration: 5 years
Objective: Developing and implementing country level SDD action plans
Description: Empowering smallholders by improving livelihoods through competitive production and marketing of high value added, diversified milk and dairy products.
Budget: US$ 200 million
Implementer: Concerned country public and private organizations, NGOs, IFI/RFIs and FAO

IIP-2.6: Unidentified Projects

Starting date: 2009 to 2013
Duration: 3 to 8 years
Objective: Actioning SDD and school milk schemes in 20 countries
Budget: US$ 30 million (private sector, Governments, IFIs, RFIs, ASEAN, SAARC, RFIs, IFIs international/bi-lateral development agencies etc)

2.3 IIP Summary and Timeframe

6. The IIP is summarised below and outlined in more detail in annex 2.

Projects		Indicative Budget (US$ million)	Implementation Plan (2008-2018)										
			08	09	10	11	12	13	14	15	16	17	18
Sub-programme 1: Regional Investment and Implementation Programme (IIP-1)													
1.1	*DairyAsia information network	0.06											
1.2	SDD regional centre, Thailand	5.00											
1.3	Dairy Asia Association	2.00											
1.4	SDD greenhouse gas emission	2.00											
1.5	Unidentified	5.94											
	Sub-total	**10.00**											
Sub-programme 2: Country Investment and Implementation Programme (IIP-2)													
2.1	*Rapid SDD milk productivity projects	10.50											
2.2	*Pilot school milk	0.45											
2.3	*Piloting National SDD Action Plans	0.05											
2.4	*National SDD action plans	4.50											
2.5	SDD country project – 20 countries	200.00											
2.6	Unidentified	24.50											
	Sub-total	**240.00**											
	Total	**250.00**											

* Funding agreed in principle

2.4 Monitoring and Evaluation

7. Implementation of the Asia SDD Strategy will initially be guided and monitored by an APHCA Asia Dairy Task Force, facilitated by FAO and other involved organizations operating in the region. Later, as movement builds for SDD in Asia, the task will be taken over by the proposed DAA. The Task Force would initially be funded by APHCA (first three years), then by the proposed CFC/FAO pilot regional project (years four and five) and thereafter by the DAA. Task Force members are drawn from a broad constituency of public, private and NGO SDD stakeholders who attended the Chiang Mai workshop as indicated below, who have signified their willingness to participate. The Chair will be elected by members for two-year periods.

(1) China — Board Chairman, Inner Mongolia Mengniu Dairy Industry (Group) Co Ltd., Hohhot
(2) India — Senior General Manager, Corporate Services, National Dairy Development Board, Anand
(3) Pakistan — Head of Milk Collection and Agri Services, Haleeb Foods, Lahore
(4) Philippines — Former Administrator, National Dairy Authority, Manila
(5) Thailand — Head Livestock products, Department of Livestock Development, Ministry of Agriculture and Cooperative, Bangkok
(6) FAO — Regional Livestock Policy Officer, Regional Office for Asia and the Pacific

8. Membership is intentionally limited to streamline meeting business and, to the extent possible, is gender-balanced. However, the option is kept to co-opt additional members with specialised expertise on an ad-hoc basis as and when needed. Outline terms of reference for the Task Force are:

- Guide and harmonise all regional IIPs and projects implemented under the SDD strategy at the regional level, including the preparation of annual workplans for the proposed Chiang Mai based Regional SDD Centre.
- Source and channel funding for SDD and the DAA.
- Ensure the widest possible gender-balanced participation of all SDD stakeholders at country level by setting up, where appropriate, SDD working groups under the lead national dairy institution.
- Review all substantives reports and documents prepared under the SDD IIP.

- Meet at least once a year at the proposed Chiang Mai Regional SDD Centre to review progress and approve annual workplans for the SDD IIP and the Centre.

9. In addition to the standard performance monitoring and evaluation built into each IIP programme/project, FAO and APHCA will develop an M&E system, based on the strategy logframe (annex 3), to assess the overall performance and impact of the strategy and the IIP. A mid-term review of the IIP will be carried out during year four to review progress to determine the scope in interventions for the remaining IIP period.

ANNEX 3

ASIA SMALLHOLDER DAIRY DEVELOPMENT STRATEGY AND INVESTMENT PLAN LOGICAL FRAMEWORK

Narrative Summary	Verifiable Indicators a/	Means of Verification a/	Assumptions and Risks
Overall Strategic Objectives: • A glass of Asian milk per day for every Asian child	• Per capita milk consumption data	• Household consumption and nutrition surveys	• Sufficient productive capacity exists
• Regional self-reliance and dairy food security	• Regional dairy products balance sheet	• Imports, exports and domestic production data converted to LMEs	• Governments will maintain policies which favour self-reliance and food security
• Smallholders better linked to formal markets and enable to become commercial dairy entrepreneurs	• Number of smallholders who graduate to become commercial farmers	• Amount of smallholder milk in formal sector • Quantities of milk delivered per farmer	• Formal markets will be more attractive and remunerative than informal markets
• Each link in the dairy food chain becomes more efficient, productive and profitable in a socially and environmentally responsible manner	• Productivity and profitability at each stage in the value chain • Social and environmental impact of dairy sector	• Special-purpose value chain studies to estimate productivity and profitability • Studies on social and environmental impacts	• Enabling environment enhanced (see Pillar 3)
• Higher earnings for safer quality milk	• Relationship between milk prices and quality measures	• Milk price and quality data collected by dairy enterprises and supporting institutions	• Dairy processors and farmers will recognize that quality-based payment is a win-win
• Regional and national recognition of the multiple benefits of smallholder dairy production	• Specific inclusion of smallholders in national dairy development policies • Budget allocations to dairy development	• Government policy documents • Official budgets & investments	• Regional and national authorities will adopt pro-poor agricultural and rural development policies
Pillar 1: Human Resource Development and Knowledge Management			
Pillar 1 Objectives: • Provide smallholders with appropriate skills training	• Skill levels of dairy smallholders	• Evaluation reports of training programmes	• Smallholders are willing to be trained
• Provide training to other value chain actors	• Skill levels of other value chain actors	• Evaluation reports of training programmes	• Value chain actors are willing to be trained
• Effective monitoring and evaluation of sectoral development	• National and regional M&E systems, including baseline surveys	• M&E reports prepared by dairy development agencies	• Dairy agencies recognize the importance of M&E
• Support regional collaboration in knowledge management through smallholder dairy network	• Formal network created and operational	• Reports and website of smallholder dairy network	• Regional dairy organizations are willing to invest in collaborative activities such as sharing information & experiences
Pillar 2: Improving Productivity and Competitiveness			
Pillar 2 Objectives: • Prepare "menu of options" for dairy development models	• Comprehensive inventory of models identified and described	• Reports on available dairy development models and their characteristics	• Successful models can be identified to cover most circumstances
• Select dairy development models appropriate for local conditions	• "Menu of options" used to select appropriate models	• Studies of success/failure rates for various dairy development models	
• Assist smallholder dairy sector to compete for resources	• Smallholder dairy sector able to procure the necessary resources	• Statistics on level of production from smallholder versus commercial sub-sectors	• Necessary resources are available and accessible to smallholders
• Assist smallholder dairy sector to compete in product markets	• Smallholder dairy products competitive with commercial products and imports	• Statistics on sales of products derived from smallholder versus commercial production	• Barriers preventing smallholder access to markets can be overcome or circumvented
• Increase milk yields, quality and profitability	• Amount and quality of milk produced by smallholders • Cost of production and profitability	• Production statistics and milk quality data collected by processing enterprises • Cost of production and profitability data from FAOSTAT, IFCN, national statistics	• Genetic resources, feed supplies and animal health services are adequate

Narrative Summary	Verifiable Indicators a/	Means of Verification a/	Assumptions and Risks
Pillar 3: Strengthening Linkages Between Farmers and Consumers			
Pillar 3 Objectives: • Improve farmer access to marketing channels	• Number of farmers with good, poor and marginal access to markets	• Studies on farmers' access to various marketing channels	• Farmers will take advantage of improving market access
• Increase opportunities for smallholders to access the formal sector	• Percentage of smallholder milk marketed formally	• Milk production and marketing statistics	• Farmers will recognize opportunities, and are able to access the formal sector
• Strengthen price incentives to deliver quality milk	• Pricing systems linked to objective quality measurement	• Statistics on milk prices and their correlation with quality criteria	• Pricing systems incorporate adequate incentives to drive quality improvements
• Create competitive supply chain conditions	• Number of value chain actors and evidence of competitive conditions	• Presence/absence of anecdotal evidence of anti-competitive behaviour • Correlation between CIF/FOB and local prices	• Anti-competitive behaviour can be identified and curtailed
• Create fair and transparent pricing systems	• Pricing systems being used	• Farm-retail price differences • Correlation between milk prices and quality	• Farmers and value chain actors will respond positively to fair and transparent pricing
• Diversify the range of dairy products on offer	• Number and range of local products in the market	• Product range on offer in retail outlets • Amount of smallholder milk used to manufacture these products	• Market is ready to accept new products • Smallholder milk is suitable for manufacturing new products
• Educate consumers on the nutritional benefits of dairy products	• Consumer awareness and consumption levels	• Consumer awareness surveys • Consumption levels versus other foods	• Consumers will recognize the benefits and adjust consumption patterns
• Stimulate consumer demand (e.g. school milk)	• Consumer awareness and consumption levels	• Consumption levels in target groups (e.g. school children)	• Consumer demand will respond
• Reduce losses (qualitative/quantitative) in the dairy chain	• Qualitative and quantitative loss data	• Quantity of milk produced compared with quantity processed and marketed • Value of final products vs. farmgate value	
Pillar 4 Enhancing the Enabling Environment			
Pillar 4 Objectives: • Develop a smallholder inclusive policy framework	• Published national policy documents	• National policy documents approved by Governments	• Political interest & motivation for smallholder participation in dairy markets
• Create a conducive legal and regulatory framework	• Laws and regulations relating to commercial transactions and dairy sector specifically	• Laws and regulations in place • Number of successful legal or regulatory enforcement actions	• Governments will have the political will to create and enforce laws and regulations
• Ensure a favourable macro-economic framework	• Macro-economic statistics: inflation, interest rates, exchange rates c	• Official economic statistics	• Competent macro-economic management and absence of major external shocks
• Create supportive institutions and farmer organizations	• Assessment of institutional capacity and number/capacity of farmer organizations	• Studies on institutional capacity and farmer organizations	• Governments are prepared to support dairy development institutions • Effective farmer organizations are formed and sustained
• Ensure that necessary inputs are available	• Availability of dairy production inputs	• Utilisation of inputs in the smallholder sector	
• Provide the necessary financial services	• Accessibility of loans, insurance and other essential financial services	• Records of financial institutions • Official economic statistics	• Financial sector development will keep pace with evolving needs of the sector
• Develop and maintain the necessary infrastructure	• Inventory of transport and communications infrastructure	• Observations and anecdotal reports on the adequacy of transport and communications infrastructure	• Adequate funding is made available for infrastructure development and maintenance

a/ Most indicators will be monitored and evaluated at national level

ANNEX 4

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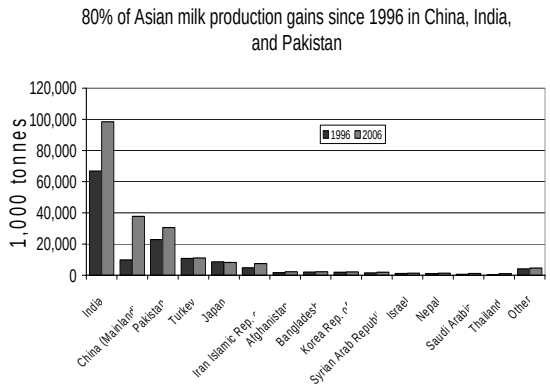
ANNEX 5

AN APHCA BRIEF ON SMALLHOLDER DAIRY EVELOPMENT

Supporting opportunities for the smallholder dairy sector in Asia
The challenges for regional stakeholders

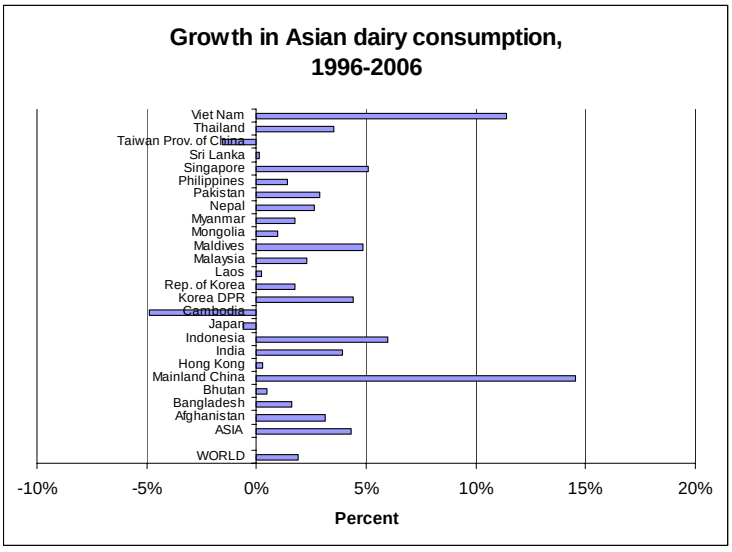
1. Dairy consumption in Asia and the Pacific has more than doubled in twenty-five years, rising 4 percent annually to reach nearly 240 million tonnes in 2007, more than one-third of global totals. Nearly four-fifths of these gains have been housed in South Asia which accounts for 60 percent of the region's bovine and ovine populations and for 20 percent of global milk consumption.

2. In 2006, a possible long-term structural adjustment in international dairy markets, characterized, in particular, by tight global supplies and high prices as a result of elimination of EU export subsidies for dairy products shocked market participants. Combined with long term drought in Australia and a potential long term investment slow down in that industry, which accounts for 10 percent of global exports, these developments hold unprecedented opportunities for smallholder dairy operations in many developing countries. This is particularly true in Asia where over 80 percent of dairy animals are raised by backyard or small scale farmers who have provided a critical and unique ingredient in the region's ability to maintain robust gains in milk production. Certainly one of the catalysts for supporting local dairy development from the perspective of policy-makers is highlighted by FAO's recent estimates that dairy product imports by developing countries will reach US$ 21.3 billion in 2007, up from $13 billion in 2006. This is fuelled by a two-thirds increase in import prices and, in combination with escalating prices for basic food stuffs such as maize, rice, and vegetable oils, raises regional concerns about food security.



Local responses to growing consumption needs

3. Translating into opportunities for local producers, strong consumption gains in Asia over the past 10 years have supported the dairy sector with production rising from 138 million tonnes to 222 in 2007. In fact, production gains in Asia have accounted for nearly 60 percent of global totals over the past decade. Growing demand by both urban and rural consumers in South Asia, a region of strong dairy traditions, was supplied by smallholders holding 2-5 cows; these are the producers who reputedly account for nearly 80 percent of milk production.



4. Characterized by a long historical tradition of both urban and rural milk consumption accompanied by strong informal rural milk market systems, consumers in South Asia consume nearly 93 kg/caput/annually (compared to the 113 kg/global average). However, the explosion in consumer acceptance of dairy products over the past decade has been in East and South East Asia where per capita consumption levels are generally one-third the levels of South Asia.

5. Coming from a low base characterized by low traditional preferences for fluid milk, double digit consumption gains in have been witnessed in countries like China and Viet Nam where annual gains since 2000 in this region have exceeded 11 percent/year. These gains have been fuelled by growing incomes, changing diets and demographic trends which favour more western diets and strong generic promotion of milk products, including the promotion of school milk programmes.

The role of imports in supplying local consumption

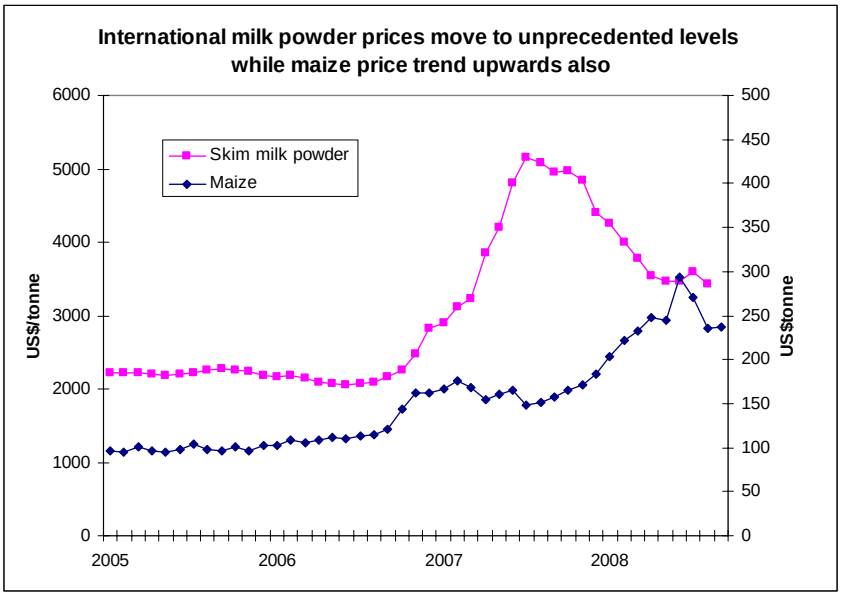
6. Asia, a region where GDP growth is estimated at 5-6 percent annually, constitutes an important market for the major dairy exporters, dominated by New Zealand, the European Union, Australia, the United States of America, and increasingly Argentina. While the region's dairy product imports, particularly those of milk powder, have nearly doubled over the period, from 10 to an estimated of 24 million tonnes in 2006, the import dependency of the region has remained stable at nearly 9 percent.

Asian Dairy Imports*			**% consumption**	
1,000 tonnes milk eq.	**1996**	**2006**	**1996**	**2006**
China (Mainland)	537	2 500	5	6
Indonesia	577	1 600	45	69
Philippines	1 251	1 900	99	108
Malaysia	1 232	1 300	107	115
Japan	1 631	1 500	16	16
Thailand	1 131	1 400	80	70
Singapore	720	1 400	175	182
Viet Nam	247	700	78	74
Taiwan Prov. of China	749	700	69	68
Korea Rep. of	310	800	13	27
Hong Kong SAR	986	500	231	122
Total Asia	14 018	24 000	9	10

***Share of consumption exceeding 100% implies re-exports

7. Regional averages, however, tend to mask local realities and, in fact, while dairy product imports by South Asia, limited by strong consumer preferences for fresh milk, availabilities of local product and barriers to imports, constitute only 1 percent of domestic consumption, imported milk products into the South East Asian region supply nearly one-quarter of domestic requirements. When calculating dairy imports as a share of processed milk, this share jumps to over 90 percent in some countries.

8. In fact, Asian imports constitute more than half of global totals in milk products, and in countries like Sri Lanka, the Philippines, and Viet Nam, where tariff levels are very low and consumers are familiar with and favour reconstituted milk products, import dependency has reached over 80 percent. In China, a country which has witnessed double-digit consumption gains over the past decade, imports constitute only 6 percent of total consumption. However, with imports estimated at 2.5 million tonnes, China constitutes the largest dairy product importer in the world, followed by Mexico, the Russian Federation, Egypt, Indonesia, Malaysia and the Philippines.



The opportunity …….

9. International market prices of dairy products, rising well over twice their levels of one year ago, hold considerable opportunities for future dairy development in Asia. While prices of internationally traded milk powder are expected to subside gradually from their historical peak of near US$ 5 000/tonne in late 2007, the perceived competitiveness of large holder dairies heavily reliant on increasingly higher-priced imported inputs is expected to erode. Increasingly large processors in the region are gravitating towards local

suppliers of fresh milk, and in many regions, this implies stronger institutional linkages with smallholder producers, the characteristics of which differ by country and by local conditions within countries.

10. In some countries, depending on their linkages with international markets and the substitutability of fluid milk with reconstituted or UHT milk, domestic prices have been rising. This affords interesting opportunities for local dairy development. In some countries, however, smallholder participation has been constrained by government administered pricing schemes for milk or strong monopsony power by processors or collusion in price setting.

Changes in dairy prices since late 2006

	Units	Oct-06	Dec-07	% increase
SMP (NZ)	tonne	2 263	4 400	94%
SMP (Phil)	25kg bag	2 300	6 200	170%
Fluid Milk (Sri Lanka)	litre	22.00	27.50	25%
Fluid Milk (Viet Nam)	litre	36 00	61 00	69%

The Challenges……

11. To ensure broader stakeholder engagement in current market opportunities for dairy, it is clear that the opportunities for smallholder dairy producers can only be understood within the wide range of influencing factors: economic, institutional, commercial, legal, technological and social. However, effective strategies for enhancing the contribution by smallholders to growing livestock product demand is complicated by the fact that the specific constraints/opportunities facing the sector differ not only by country but by specific localities.

12. Consequently, useful models of small and large-holder milk producers, which are characterized by the specific linkages within the value chain, need to be reviewed and analyzed. It is particularly important that the enabling factors which are critical in successfully forging linkages between smallholder suppliers, processing facilities and traditional markets for fluid milk and other locally acceptable dairy products be identified, weighted and ranked. The selection and promotion of acceptable models need to be based on local conditions, market access, cultural factors and consumption patterns. These models could range from enterprise-driven smallholder dairy operations in the Philippines and Viet Nam, to cooperative development in South Asia, to strengthening opportunities for subsistence farmers in Bangladesh.

APHCA's response

13. In anticipation of generating guidance on best practices involved in context specific sustainable smallholder dairy development, lessons learned in the region need to be reviewed and analyzed as to the critical factors supporting their success or leading to failure. It is critical that the context specific/organization issues be analyzed to determine possibilities for increasing productivity, scaling up and/or replication of specific models. It is only then that specific entry points for the various stakeholders, whether they be producers, processors, or policy-makers, can be identified

14. The Animal Production and Health Commission of Asia and the Pacific (APHCA), FAO, and the Common Fund for Commodities (CFC), organized a workshop on smallholder dairy development in Chiang Mai, Thailand from February 26-29th, 2008. The objective of this workshop was to regroup regional dairy experts/private sector stakeholders/donors and policy-makers to discuss the development of a regional strategy or an "actionable roadmap" for smallholder dairy development. Approximately 50 participants from 18 countries in the region participated. More information on the project can be found at the following website: http://www.aphca.org/reference/dairy/dairy.html.

World and Asian dairy markets at a glance

	1986	1990	2000	fcst 2007	Share of global: 1981	1990	2000	2007	Change 2007/1981 % 1/	2007/1990 % 1/	Annual change 1986-2007 % 1/	2000-2007 % 1/
World Balance												
Live Inventories (1000 number)												
World	-	324,436	528,273	544,404					73	68		0.4%
Developed	-	44,043	73,441	63,980	0%	11%	13%	9%	34	37		-1.7%
Dvpg	-	280,368	455,167	480,882	0%	69%	79%	71%	158	124		0.7%
Asia	-	224,359	258,212	262,207	0%	56%	45%	39%	160	123		0.2%
SE Asia	-	10,312	12,794	14,266	0%	3%	2%	2%	530	384		1.4%
South Asia	-	114,079	137,317	154,457	0%	28%	24%	23%	129	94		1.5%
US	-	9,993	9,210	9,204	0%	2%	2%	1%	30	26		0.0%
EU	-	-	-	-	-	-	-	-				
Oceania	-	4,376	5,508	6,234	0%	1%	1%	1%	74	81		1.6%
Production (000 tonnes)												
World	391,550	404,115	579,209	678,215					76	69	2.5%	2.0%
Developed	268,462	262,551	346,649	360,503	69%	65%	60%	53%	35	36	1.3%	0.5%
Dvpg	123,087	141,562	232,560	317,711	31%	35%	40%	47%	148	121	4.4%	4.0%
Asia (from 1992 incl. CIS	93,069	108,462	170,693	241,527	24%	27%	29%	36%	154	120	4.4%	4.4%
SE Asia	8,127	10,577	17,240	51,223	2%	3%	3%	8%	425	317	8.7%	14.6%
South Asia	60,282	71,200	109,902	137,860	15%	18%	19%	20%	126	93	3.8%	2.9%
US	64,920	67,005	76,023	84,097	17%	17%	13%	12%	29	21	1.2%	1.3%
EU 1/	138,974	130,416	127,062	151,391	35%	32%	22%	22%		17		2.2%
Oceania	14,522	13,965	23,418	25,213	4%	3%	4%	4%	10	15	2.5%	0.9%
Consumption (000 tonnes milk equiv.)												
World	386,062	401,372	576,030	677,951					26	38	2.6%	2.1%
Developed	247,423	245,622	321,075	333,779	64%	61%	56%	49%	-1	29	1.4%	0.5%
Dvpg	138,632	155,738	255,326	344,147	36%	39%	44%	51%	77	71	4.2%	3.8%
Asia (from 1992 incl. CIS	102,658	118,262	186,027	260,733	27%	29%	32%	38%	73	62	4.3%	4.3%
SE Asia	11,867	14,951	26,212	62,313	3%	4%	5%	9%	312	248	7.8%	11.4%
South Asia	61,231	71,840	110,675	138,412	16%	18%	19%	20%	52	41	3.8%	2.8%
US	63,069	67,220	75,089	81,167	16%	17%	13%	12%	3	1	1.2%	1.0%
EU 1/	126,119	120,035	116,644	140,851	33%	30%	20%	21%		23		2.4%
Oceania	8,203	7,830	9,796	9,040	2%	2%	2%	1%	-18	-9	0.4%	-1.0%
Per capita consumption (kg/cap/year milk equiv.)												
World	76	69	88	96					114	126	1.1%	1.1%
Developed	178	136	171	176					114	136	-0.1%	0.3%
Dvpg	38	39	55	66					114	123	2.6%	2.5%
Asia (from 1992 incl. CIS	36	38	51	62					134	124	2.5%	2.6%
SE Asia	8	9	14	31					217	161	6.6%	10.6%
South Asia	61	65	83	92					8	60	1.9%	1.4%
US	257	263	263	265					41	58	0.2%	0.1%
EU 1/	351	237	246	290						20		2.1%
Oceania	327	293	316	268					185	146	-0.9%	-2.0%
Imports (000 tonnes milk equiv.)												
World	21,685	20,504	38,850	46,412					72	101	3.5%	2.2%
Developed	5,453	4,945	11,463	11,676	25%	24%	30%	25%	45	76	3.5%	0.2%
Dvpg	16,226	15,554	27,118	34,736	75%	76%	70%	75%	1241	502	3.5%	3.1%
Asia (from 1992 incl. CIS	10,124	10,570	17,411	23,645	47%	52%	45%	51%	730	476	3.9%	3.9%
SE Asia	4,096	4,976	10,289	13,000	19%	24%	26%	28%	437	217	5.4%	3.0%
South Asia	967	650	916	1,040	4%	3%	2%	2%	2468	4780	0.3%	1.6%
US	1,399	1,245	1,952	1,970	6%	6%	5%	4%	51	375	1.6%	0.1%
EU 1/	1,598	1,329	3,063	1,600	7%	6%	8%	3%		4		-7.8%
Oceania	239	276	548	679	1%	1%	1%	1%	157	160	4.9%	2.7%
Exports (000 tonnes milk equiv.)												
World	27,111	23,246	41,551	46,676					-95	-90	2.5%	1.5%
Developed	26,492	21,868	37,218	38,400	98%	94%	90%	82%	27	58	1.7%	0.4%
Dvpg	619	1,378	4,351	8,300	2%	6%	10%	18%	69	86	12.5%	8.4%
Asia (from 1992 incl. CIS	535	770	2,077	4,439	2%	3%	5%	10%	100	96	10.1%	10.0%
SE Asia	356	602	1,317	1,910	1%	3%	3%	4%	197	154	7.9%	4.8%
South Asia	19	10	143	488	0%	0%	0%	1%	-43	-14	15.9%	16.6%
US	3,250	1,031	2,886	4,900	12%	4%	7%	10%	-10	-1469	1.9%	6.8%
EU 1/	14,453	11,710	13,481	12,140	53%	50%	32%	26%		2		-1.3%
Oceania	6,557	6,480	14,237	16,852	24%	28%	34%	36%	156	161	4.4%	2.1%

Milk and milk products statistics ***(million tonnes, milk equivalent)***
SOURCE: FAO's FOOD OUTLOOK, NOVEMBER 2007

	Production			Imports			Exports		
	2005	2006 estim.	2007 f 'cast	2005	2006 estim.	2007 f 'cast	2005	2006 estim.	2007 f 'cast
ASIA	**216.7**	**229.0**	**241.5**	**22.8**	**24.0**	**23.6**	**4.4**	**4.6**	**4.4**
China	32.0	38.1	45.0	3.5	3.7	3.8	0.4	0.3	0.3
India 1/	95.1	98.4	101.4	-	-	-	0.6	0.7	0.5
Indonesia	0.9	0.9	0.9	1.5	1.6	1.5	0.2	0.2	0.2
Iran, Islamic Rep. of	7.4	7.6	8.0	0.3	0.3	0.3	-	-	-
Japan	8.3	8.1	8.0	1.6	1.5	1.4	-	-	-
Korea, Rep. of	2.2	2.2	2.1	0.8	0.8	0.8	-	-	-
Malaysia	-	-	-	1.3	1.3	1.3	0.2	0.2	0.2
Pakistan	29.7	31.2	32.5	-	-	-	-	-	-
Philippines	-	-	-	1.7	1.9	1.8	0.1	0.1	0.1
Saudi Arabia	1.2	1.2	1.3	2.2	2.4	2.3	0.8	0.8	0.9
Singapore	-	-	-	1.2	1.4	1.4	0.6	0.6	0.7
Thailand	0.9	1.0	1.0	1.4	1.4	1.4	0.4	0.4	0.4
Turkey	11.1	11.6	12.1	0.1	0.1	0.1	0.1	0.1	0.1
AFRICA	**32.6**	**32.7**	**33.0**	**6.8**	**7.0**	**6.8**	**0.4**	**0.4**	**0.4**
Algeria	1.7	1.7	1.8	1.9	1.8	1.7	-	-	-
Egypt	4.1	3.7	3.7	0.8	0.8	0.8	0.1	0.1	0.1
Kenya	2.8	2.8	2.7	-	-	-	-	-	-
South Africa	2.9	2.9	2.8	0.2	0.2	0.2	0.1	0.1	0.1
Sudan	7.6	7.6	7.7	0.2	0.2	0.2	-	-	-
Tunisia	1.0	1.0	1.0	0.1	0.1	0.1	-	-	-
CENTRAL AMERICA	**15.7**	**16.0**	**16.3**	**5.4**	**4.8**	**4.8**	**0.3**	**0.3**	**0.3**
Costa Rica	0.8	0.8	0.8	-	-	-	0.1	0.1	0.1
Mexico	10.0	10.2	10.4	2.9	2.4	2.5	0.1	0.1	0.1
SOUTH AMERICA	**52.4**	**54.1**	**54.7**	**2.1**	**2.2**	**2.2**	**3.0**	**3.6**	**3.1**
Argentina	10.1	10.8	10.1	-	-	-	1.7	2.2	1.8
Brazil	25.5	26.2	27.0	0.5	0.5	0.5	0.4	0.3	0.3
Colombia	6.8	6.8	6.9	-	-	-	0.1	0.2	0.2
Uruguay	1.8	1.8	1.8	-	-	-	0.5	0.5	0.4
Venezuela	1.3	1.4	1.6	0.8	0.7	0.7	-	-	-
NORTH AMERICA	**88.3**	**90.5**	**92.0**	**3.0**	**2.6**	**2.6**	**5.0**	**5.2**	**5.3**
Canada	8.1	8.0	7.9	0.8	0.6	0.7	0.4	0.4	0.4
United States	80.3	82.5	84.1	2.3	1.9	2.0	4.6	4.8	4.9
EUROPE	**216.1**	**215.0**	**215.5**	**5.1**	**5.6**	**5.7**	**17.6**	**15.7**	**16.3**
European Union	146.9	145.5	151.4	1.8	1.7	1.6	13.4	11.6	12.1
Romania	6.3	6.4	-	0.1	0.1	0.1	-	-	-
Russian Fed.	31.1	31.3	32.2	2.4	2.9	3.1	0.3	0.2	0.2
Ukraine	13.7	13.3	13.0	-	-	-	1.3	1.1	1.0
OCEANIA	**24.7**	**25.4**	**25.2**	**0.7**	**0.7**	**0.7**	**15.3**	**17.5**	**16.9**
Australia 2/	10.1	10.1	9.6	0.4	0.4	0.4	4.7	5.1	4.3
New Zealand 3/	14.5	15.2	15.6	-	-	-	10.6	12.4	12.6
WORLD	**646.5**	**662.7**	**678.2**	**45.9**	**46.8**	**46.4**	**46.0**	**47.3**	**46.7**
Developing Countries	290.2	304.4	317.7	34.6	35.2	34.7	7.9	8.7	8.3
Developed Countries	356.2	358.3	360.5	11.3	11.7	11.7	38.1	38.6	38.4
LIFDC	214.7	226.5	238.7	14.3	15.0	14.8	3.3	3.6	3.4
LDC	22.9	23.2	23.5	2.5	2.6	2.5	0.1	0.1	0.1
NFIDC	46.3	47.3	48.5	3.7	3.7	3.7	0.3	0.3	0.3

[1] Dairy years starting April of the year stated.

[2] Dairy years ending June of the year stated.

[3] Dairy years ending May of the year stated.

Note: The solids content method is used to calculate milk equivalents. ME multiplication factors used: butter, 6.60; cheese (from whole cow milk), 4.40; cheese (from skim cow milk), 2.00; milk powder, 7.60. Regarding assumptions and approaches and in calculation of milk equivalents please refer to Bulletin of IDF 390 (March 2004).

ANNEX 6

UNDERSTANDING DAIRY VALUE CHAINS: A COMPETITIVENESS FRAMEWORK FOR SMALLHOLDER DAIRY DEVELOPMENT

1. The recent boom in world dairy prices combined with long-term growth prospects for dairy products in Asia presents a promising opportunity for strategies to include and upgrade smallholder participation in these markets. Smallholders and the national and sub-national (local) dairy value chains may be able to respond to growing market opportunities, but there is no guarantee of this outcome. FAO is working to develop a framework for understanding the ability of smallholder dairying in participating countries to respond to these opportunities. The framework, tested in the three value chain case studies, reviews and analyzes the related abilities of value chain participants to respond to market opportunities, upgrade to meet new market requirements, address challenges posed by international competition, and to provide sustainable livelihoods to value chain participants as the *competitiveness of the smallholder dairy enterprise.*

2. The competitiveness framework is a set of analytical steps that constitute a structured process for analyzing the current situation of smallholder dairy as an enterprise in any given national or sub-national marketplace in a way that can provide useful comparisons across the participating countries. Within the context of the regional strategy on smallholder dairy development, the goal of which is to enable participants to succeed in many different environments, this framework attempts to develop a common language that can help with the discussion of common challenges and differences between markets[25]. It is based on the approach that all participants can experience improvements in smallholder dairy performance, though some countries may have more favourable overall conditions and greater success in the long-term. And finally, the framework is a method for identifying which models are most suitable to address and correct or overcome specific challenges, or to respond to specific opportunities.

3. Using the framework entails a number of analytical steps. Mapping and diagnosis of the dairy value chain yields an understanding of the issues facing smallholder dairy. In the framework, these issues are categorized into a standard set of performance/competitiveness drivers that fall into five areas. Each issue is then evaluated for whether it is subject to the influence (or control) of: (i) governments, (ii) firms, (iii) whether it is can only be partially controlled, or (iv) whether it is entirely out of the span of control of local actors. The relative favourability or unfavourability of each issue is then determined, normally through discussions among a variety of stakeholders. Existing models are then evaluated and scored for their effectiveness in addressing the constraints of the environment. In this way, the framework is helpful in understanding what elements of specific models provide solutions to specific challenges, and what challenges require new policy and organizational innovation.

4. The five Performance-Competitiveness Drivers categories are: (i) demand conditions, (ii) factors of production and utilization, (iii) market and competitive structure, (iv) related and supporting industries, including producer services; and (v) government and business enabling environment. The model captures economic, technological, institutional, governmental, and market structure issues across the value chain, consequently serving as a useful framework for analysis.

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[25] For consistency and understanding the following SDD generic characterisations are adopted. These are based on the findings of the country studies commissioned by the project and will of course vary according to the local context.

Smallholder milk producer: family producing milk mainly for home consumption and selling any surplus, i.e. subsistence production.
Small dairy farmer: someone specialising in commercial milk production with up to 20 dairy cows in milk. Many subsistence smallholders aspire to up-scale and become more intensive small dairy famers.
Informal dairy market: usually small-scale, short chain / local market, with / without processing, lower-cost end product, price more important than quality to consumers.
Formal dairy market: usually medium to large-scale, long chain / more distant market, with processing, higher-cost end product, quality and safety important to consumers. Informal and formal markets often overlap.
Dairy value chain: the stages through which milk and dairy products pass from farm to final consumer.

Steps in prioritizing performance-competitiveness drivers

5. The competitiveness framework includes three steps in prioritization of identified performance and competitiveness drivers. Keeping in mind what national-level policy and program interventions can realistically achieve is very important in regional strategy formulation. The *first step* in prioritizing which performance and competitiveness drivers to address entails understanding whether opportunities and constraints can be controlled or influenced by government, by firms, those factors that are "quazi-controllable," and those that cannot be controlled.

6. The *second and third steps* in prioritization entail analyzing the drivers (identified above) to determine their relative influence on the competitive position of the value chain. This is accomplished by assessing their favourability or unfavorability to the smallholder dairy enterprise on a scale of -2 (Very unfavourable) to +2 (Very favourable), and assigning each issue a relative weight (importance) compared with other factors in a given category. Each category of issues represents a weight of 100%, and sub-factors are assigned a value reflecting their significance to the enterprise as a whole. By multiplying the favourability score by the weight, each sub-factor is assigned a positive or negative value, and the performance of the category as a whole can also be analysed.[26]

Evaluating model effectiveness

7. Evaluating and choosing models to scale up and/or replicate requires understanding what a particular model addresses well, and also a recognition that there may not yet be an appropriate model developed to overcome specific challenges or take advantage of current opportunities. The most fundamental question considered in the model evaluation step is, "whether a particular model *responds effectively to the specific, high-priority challenges and opportunities that smallholder milk producer faces in my country's environment?"* The framework uses a simple scoring system to address this question and provides an opportunity to review the effectiveness of various smallholder dairy models in addressing a few of the key opportunities and challenges.[27]

8. The existing framework analysis of smallholder dairy competitiveness focuses at the system almost exclusively from the "inside" – that is, from the perspective of upgrading what currently exists. However, research has demonstrated that the attractiveness of smallholder dairy as a remunerative option declines quickly with rising rural wage rates. The attractiveness of dairying as a remunerative activity appears to depend on low labour opportunity costs (as represented by low rural wage rates) and lack of access to other savings and investment vehicles.

9. The implication of this analysis suggests that "next steps" for smallholders should be considered very carefully with respect to the rural wage context. Where rural wages are moving towards convergence with urban wages (though these cases may be somewhat rare), it is likely that the value of 'other returns' to milk production will decline (particularly manure), reducing both the competitiveness and the desirability of smallholder dairy production.

10. In these cases, encouraging smallholder strategies may be less favourable than considering other forms of local dairy enterprise development in which smallholders can participate, focusing on those that can reap the economies of scale required to make dairy a favourable option in a higher rural wage context.

[26] This category structure is derived from Harvard Business School Professor Michael Porter's diamond model of competitive advantage.

[27] The framework findings from the country case studies reveal that the challenges faced by each of the three countries differ significantly both within and across driver categories (for specific information, go to workshop paper and presentation located at the following web site: http://www.aphca.org/reference/dairy/chiangmai_workshop_feb08.html

ANNEX 7

KEY ELEMENTS OF THE ENABLING ENVIRONMENT FOR SMALLHOLDER DAIRY DEVELOPMENT

(1) Legal and regulatory framework

- A system of property rights, particularly a land tenure system which gives acceptable security for smallholders.
- A predictable and transparent system of taxation and government charges and taxes/charges.
- A law enforcement system which provides an acceptable degree of protection for personnel and property.
- Food safety regulations and practices which give consumers confidence in the product.
- Environmental regulations which are enforced to avert threats to the sustainability of production systems and/or adverse consumer response.
- Fully documented export and import protocols for food and agricultural commodities and established procedures which allow for free flow of goods.
- A system of licensing or permitting which does not present a barrier to investment or unduly inhibit interest of small-scale dairy entrepreneurs.
- A legal framework for producer organizations/cooperatives which provides a level playing field for them to operate with other corporate entities.
- Efficient regulatory mechanisms to ensure that all aspects of breeding services (including production/procurement, storage of semen and delivery of AI services), health services (preventative and curative) and feeding services (cattle feed, mineral mixtures, fodder seeds supply) are conforming to prescribed standards and protocols.

(2) Macroeconomic framework

- Level of protection provided to the agricultural sector and its major sub-sectors comparable with other developing countries.
- Responsible fiscal and monetary policy which provides a stable and predictable financial environment.
- An acceptable degree of stability in prices and exchange rates, or the means to deal with uncertainties in these areas.

(3) Markets and marketing systems

- Quality assurance and product trading systems which transmit price/quality signals along the value chain from end-user to smallholder.
- An independent product certification service-provider which is trusted by the market.
- Well developed marketing systems including market infrastructure, roads, transport, storage and processing facilities, market information services, product grading systems etc.
- Open competition within the marketing systems with fair and transparent trading practices and a level playing field with regard to market information and bargaining power.

(4) Input supplies

- Ready access to input supplies such as labour, water, seeds, feeds, animals, fertilisers and pesticides, together with the information needed to use them effectively and safely.
- Ready access to input services such as breeding, animal health and management advice.

(5) Financial services

- Banking, credit and insurance services which are accessible to smallholders and SMEs.
- Other financial services needed by larger enterprises such as leasing, warehouse receipting, commodity price hedging, forex transactions etc.

(6) Institutional support

- Research institutions which are responsive to stakeholder needs and have the resources needed to conduct high priority research.
- Extension or advisory services providing relevant information and training to smallholders.

- A quarantine and inspection service which can protect the agricultural sector from exotic pests and diseases and control internal spread of these.
- Effective farmer organizations and/or cooperatives, including village level groups which can be engaged to disseminate improved technologies.
- Statistical information necessary to monitor key trends and provide a sound basis for sectoral planning and policy analysis.
- Arrangements for public-private partnerships where necessary and privatization of input delivery services (including breeding) to provide effective door step services to dairy producers.
- **Training and education services to generate the skilled personnel required in the sector.**

(7) Infrastructure

- Satisfactory telecommunication services and electricity supply in rural areas.
- Transport infrastructure, especially roads and bridges, and systems in place to ensure that these are maintained or improved in line with demand.
- Supply of potable water in villages to ensure clean milk production practices.

ANNEX 8

Documents produced by the project and references

1. Documents prepared by the project[28]

1.1 Field Document 1 (June 2007): Inception Report (Brian Dugdill and Nancy Morgan)
1.2 Field Document 2 (July 2007): Assignment Report 01-14 July 2007 (Brian Dugdill).
1.3 Field Document 3 (October 2007): Project Progress Report (Brian Dugdill and Nancy Morgan)
1.4 Field Document 4 (October 2007): Smallholder Dairy Lessons Learned - from FAO case studies and other literature (Nancy Morgan and Brian Dugdill)
1.5 Field Document 5: (November 2007) Assignment Report 05 October-15 November 2007 (Brian Dugdill).
1.6 Field Document 6 (January 2008): Dairy Value Chain Competitive Framework (Phil Psilos and Nancy Morgan)
1.7 Field Document 7 (March 2008): Smallholder Dairy Strategy Workshop Report (Terry Clayton)
1.8 Field Document 8 (March 2008): Smallholder Dairy Strategy Workshop Proceedings (Nancy Morgan)
1.9 Draft Field Document 9 (March 2008): Asia Smallholder dairy Development Strategy and Investment Plan (Brian Dugdill, Nancy Morgan, David Young, Anthony Bennett, Hans Wagner, Phil Psilos)

2. Lessons learned studies

2.1 Bangladesh**:** Lessons Learned Study (November 2007). S.A.M. Anwarul Haque, former General Manager, Bangladesh Milk Producers' Cooperative Union Limited, Dhaka
2.2 China**:** Lesson Learned Study (November 2007). Linking Markets to Smallholder Dairy Farmers in China - Quality as a New Driver. Kevin Chen, Hu Song (Beijing Project Office, China Canada Small Farmer Adapting to Global Markets Project), Dinghuan Hu (Researcher, Agricultural Economics Research Institute, Chinese Academy of Agriculture Science, Beijing)
2.3 India**:** Lessons Learned Study (November 2007). Aminesh Banerjee, formerly with OFP-NDDB and Chairman Indian Dairy Association, New Delhi,
2.4 Mongolia**:** Lessons Learned Study (November 2007). Small Milk Producers – the key to Dairy Industry Revival. Tsetsgee Ser-Od, Coordinator, National Dairy Programme, Food Division, Ministry of Food and Agriculture, Ulaanbaatar.
2.5 Pakistan**:** Lessons Learned Study (November 2007). Analysis of Milk Marketing Chain. Umm E. Zia, Consultant, Islamabad.
2.6 The Philippines**:** Lessons Learned Study (November 2007). Enterprise-driven Dairy development, Sally Bulatao, former Administrator, National Dairy Authority, Manila.
2.7 Sri Lanka**:** Lessons Learned Study, (November 2007). N.F.C. Ranaweera, Policy Adviser, Colombo.
2.8. Thailand**:** Lessons Learned Study (November 2007). Smallholder Dairying, Pensri Jungsiriwat, Chief, Milk and Meat, Department of Livestock Development, Ministry of Agriculture and Cooperatives, Bangkok.
2.9 Viet Nam**:** Lessons Learned Study (November 2007). Case of Viet Nam, Nguyen Anh Phong, Head, Marketing and Commodity Analysis Division, Institute of Policy and Strategy for Agriculture and Rural Development, Hanoi.

3. Dairy value chain competitiveness analyses

3.1 India: Smallholder Dairy Value Chain Competitiveness Analysis (February 2007), Meeta Punjabi, Consultant, New Delhi
3.2 Philippines: Smallholder Dairy Value Chain Competitiveness Analysis (February 2007), Sally Bulatao, former Administrator, National Dairy Authority, Manila.
3.3 Viet Nam: Smallholder Dairy Value Chain Competitiveness Analysis (February 2007), Patrice Gautier, Asia Veterinary and Livestock Services, Hanoi.

[28] Downloadable from: http://www.aphca.org/reference/dairy/dairy.html.

4. Others

4.1 Nepal: Concept Note on Cheese Production from Goat Milk in Chitlang (November 2007), D.D. Joshi, former Executive Director, National Dairy Development Board, Kathmandu.

4.2 Philippines: Carabao as an entry point for smallholder dairy producers (December 2007), L. Battard, Philippines Carabao Research Centre

5. Papers and presentations from the Chiang Mai workshop

5.1 The project, the context and the workshop – where are we going (Nancy Morgan, Livestock Policy Officer, FAO, Bangkok and David Young, FAO Private Sector Management Consultant).

5.2 Dairy development in the Asia region: based on synthesis of nine lessons learned studies from Bangladesh, China, India, Mongolia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam (Brian Dugdill, FAO Dairy Development Consultant and Nancy Morgan, Livestock Policy Officer, FAO, Bangkok)

5.3 Dairy Value Chain Case Studies:India (Meeta Punjabi, FAO VCA Consultant)
Viet Nam: Smallholder dairy in Viet Nam (Patrice Gautier, FAO VCA Consultant)
Smallholder-based Enterprise Models in the Philippines dairy Sector – a Vale Chain Approach (Sally Bulatao, FAO VCA Consultant)

5.4 Competitiveness Framework for Asian Smallholder Dairy Development (Phil Psilos, FAO Value Chain Competitiveness Consultant).

5.5 Selected Smallholder Dairy Experiences from Bangladesh and Mongolia (Tsetsgee Ser-Od, Mongolia, Director, National Dairy Programme, Ulaanbaatar, Md. Mustafa Hussain, General Manager, Grameen Bank Fisheries and Livestock Foundation, Dhaka, Brian Dugdill, FAO Lead Consultant/Dairy Development Specialist).

5.6 China: dairy industry (Nui Genseng, Board Chairman, Inner Mongolia Mengniu Dairy Industry (Group) Co. Ltd, China).

5.7 Dairy Development for the Resource Poor: Lessons for Planning and Policy Strategies (Nick Hooten, ILRI).

5.8 Developing Dairy Institutions (Anthony Bennett, Dairy and Meat Officer, FAO, Rome).

5.9 Changing the structure of dairy farming: developed versus developing countries (Torsten Hemme, IFCN).

5.10 Innovative Approaches to Improve Dairy Development in Viet Nam (Raf Somers, Chief Technical Advisor, Viet Nam Belgium Dairy Project)

5.11 Developing a Regional Smallholder Dairy Strategy for Asia - the Challenge to Workshop Participants (David Young, FAO Private Sector Management Consultant)

6. References

6.1 3A Business Consulting / Shainwright Consulting & Research Group (2006). China: Dairy Opportunities Unlimited.

6.2 Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S., Courbois, C., (1999). Livestock to 2020: The Next Food Revolution (FAO, IFPRI, ILRI)

6.3 Dugdill, B.T., Ser-Od, Tsetsgee (2006). Mongolia: milk production, processing, consumption and outlook to 2010 (paper presented to IDF/FAO World Dairy Summit, Shanghai October 2006)

6.4 ESCAP (2008). Economic and Social Survey of Asia and the Pacific 2008.

6.5 FAO (2004) Project Completion Report. PDR Korea: Strengthening Small-scale Goat Milk

6.6 Processing Capacity Project (TCP/DRK/0168)

6.7 FAO (2004). Nepal: Project Document. Training for the Small-scale Dairy Sector in Support of the Community Livestock Development project (TCP/NEP/3103).

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