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Final report

project

Economic and policy constraints affecting the development of small-scale dairy farmers in Pakistan

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2 Executive summary

The Pakistan Government has targeted the dairy industry as a way of increasing farm incomes through greater commercial sales of milk by small scale farmers. There is a long term plan to modernise the industry. The aim is to improve farm performance, increase production and extend the commercial processing of milk.

Policy interventions, regulatory issues and economic constraints in marketing perishable dairy products will play a major role in achieving this goal. These aspects of industry development were identified as an area where an ACIAR project could make a useful contribution to future policy development.

A considerable amount of time and effort was invested in scoping a policy project focused on the small holder dairy sector. The aim of the project was to review the economic and policy constraints holding back industry development. A key aspect of the project was to examine how policy interventions had shaped the development of dairy industries in other countries. Australia and India were nominated as the candidates for this purpose.

For various reasons the project was unable to proceed. In developing the project some preliminary research was undertaken on policy interventions and industry development in Australia. This report provides a summary of what was learned from that exercise. It has been prepared as a contribution to future project development should it occur.

In general dairy farming is not a specialised agricultural activity in Pakistan. Most of the milk is produced by small holders that run a few milking animals in conjunction with other agricultural activities. Some milk is retained for home consumption and the residual is sold to generate a regular income.

By western standards the industry is grossly under-developed. Industry development in the small holder sector has been constrained at the farm level by enterprise management issues with animal health and herd performance that contribute to low milk yields. Beyond the farm gate there are major infrastructure constraints, limited marketing options and weak information flows between farmers and the major selling centres:

- the biggest constraint is the deficiency in milk handling practises.

The supply chain for the small holder sector has a number of deficiencies that affects milk quality and contributes to food safety contamination risks. Poor hygiene in on-farm handling of milk and the adulteration of milk sold through gowalas are major impediments to growth in domestic sales of fresh milk. The variability in product composition and spoilage risks has a significant effect on product quality.

In many ways the current state of the small holder sector in the Pakistan dairy industry mirrors the initial development of the Australian dairy industry. In Australia the catalyst for higher returns and industry growth was the transition from localised farm based sales of milk products to a factory based system. This coincided with a shift from small scale farmers to specialist dairy producers.

The development of the Australian dairy industry has been shaped by a variety of factors. The two most significant factors were the adoption of new technology and government policy interventions. Preliminary research for the proposed project reviewed the major industry developments to identify areas for further investigation that could highlight some lessons for future policy development in Pakistan.

There were two broad phases to industry development in Australia. They could be described as the regulation period and the deregulation period. The aim of the preliminary research was to build a knowledge base on the events that shaped the transition of the Australian dairy industry. This report summarises the key findings.

The development of the Australian dairy industry since the late 1890s was driven by the adoption of new technology, the emergence of locally based farmer cooperatives, the introduction of food safety regulation and infrastructure improvements. The moderate rate of adoption of technical supply chain improvements during the 1890 to 1940 period was interesting feature of the industry development:

- widespread adoption of supply chain improvements in milk handling and processing practises did not occur until after the Second World War.

Improvements in food safety and milk handling procedures will be a key factor in the future development of the small holder sector in Pakistan. The milk collectors provide a rudimentary milk pick-up and delivery system. Experiences with the development of the Australian dairy industry suggests that government extension and education efforts were, by themselves, not sufficient to achieve the supply chain development that would improve milk quality and farm returns:

- regulatory requirements that were properly enforced were necessary to trigger the widespread changes required – the Second World War was a major 'shock' for the domestic dairy marketing system.

In Australia the adoption of improved on-farm milk handling practises was encouraged through government funded extension services. But it was food safety regulations that brought about the required change in attitudes and investment in farm plant and equipment. This was an important step in the transition to more a specialised industry.

Milking machines were rapidly introduced after the Second World War. Refrigerated farm holding tanks were introduced in the late 1950s. These were key developments in the industry transition. Bulk milk collections by refrigerated road tankers followed soon after. It encouraged a further move to large scale, specialised dairy farms:

- bulk milk collections was the catalyst for a dramatic rationalisation in the number of dairy factories
- this triggered a rationalisation in the number of dairy cooperatives – there were numerous mergers into larger regional based operations.

Policy interventions in the early period of industry development were largely confined to government funded extension activities. The drinking milk sector was only nominally regulated by State Governments from the early 1900s. There were no entry restrictions for milk vendors and many delivery routes were serviced by several vendors.

But in time there were requests for government intervention to regulate the fluid milk markets. It was driven by the complaints from milk producers and vendors about low and/or fluctuating incomes. Consumers also complained about the price fluctuations. In the early 1930s each State Government decided to regulate drinking milk supplies in order to stabilise prices.

An industry authority was set up to control the production and distribution of milk. Each State was broken up into discrete zones. The number of producers and vendors were fixed and prices were regulated by the relevant local authority. Milk production was restricted by quotas and minimum milk quality standards were established.

After the Second World War the arrangements were altered to allow the Authorities to fix the wholesale price of milk sold to the distributing vendors. This incorporated fixed prices for producers, vendors and retailers. Decisions on adjusting the fixed prices were made by the relevant State Authority. They were based on assessments of the cost of production for each component of the marketing chain.

The State Governments also became involved in regulating the markets for butter and cheese. A voluntary industry arrangement was established based on the concept of price equalisation. The system raised prices on the domestic market and the higher returns were shared among all market participants.

These domestic market support arrangements removed the incentive for individual companies to increase their sales on the higher priced domestic market. It involved the various State Governments establishing quotas for production sold in each state. The surplus product was exported. This allowed the ex-factory domestic price to be maintained at a higher level than the export price.

A company was established to negotiate agreements with each manufacturer for the equalisation of returns. Total returns received by all manufacturers from all markets – domestic and export – were pooled and divided by the total quantity sold be each company to yield an average price. There were separate equalisation arrangements for butter and cheese.

The success of the scheme required effective import controls. Import tariffs and import licensing controls were used to protect the industry from import competition and prevent the higher domestic price from being undermined. There was additional support from quotas imposed on margarine production. The Federal government also provided a subsidy (production bounty) which gave additional income support to farmers.

Eventually the arrangements were backed by legislation. The Government took control of the domestic price fixing arrangements for butter and cheese. They also introduced the concept of a guaranteed farmer return based on estimated costs of production.

The industry gained assistance from market support arrangements based on these same basic principles for more than 50 years. A phasing out the production subsidy in the mid 1970s was the first deregulatory act imposed on the industry since the late 19th century. In 1977-78 a new set of marketing arrangements for manufacturing milk were established that involved the pooling of market returns for five prescribed products.

In the mid 1980s the Federal Government decided the industry support arrangements for manufacturing milk had to be fundamentally reformed. A process of deregulation was initiated with the development of the Kerin Plan. It eventually led to changes in the fluid milk market support arrangements operated by States Governments.

The system of pooling export returns was abolished so that dairy manufacturers received the prevailing world price for their exports of each product. A new scheme was introduced that allowed the industry to earn higher returns on domestic sales. In 1992 Government underwriting of export returns was abolished. The level of support for manufacturing milk was gradually reduced.

Annual production quotas had long been used to restrict access to the respective fluid milk market. Three states subsequently abolished quotas in the 1990s and replaced them with pooling arrangements. Farmers received a fluid milk price premium for a fixed proportion of their total output. Other states maintained fluid milk quotas until July 2000.

During the 1990s a number of other reforms were made to the fluid milk price support arrangements by State Governments. In general the changes involved deregulating the post farm gate marketing controls on wholesalers, vendors and retailers. Restrictions on trading zones for individual processors and vendors were eliminated.

In the late 1990s there were a number of factors that created economic and political pressures for further policy reform. The industry took a proactive approach to managing the change and asked the government to deregulate the dairy market.

All state based support schemes for fluid milk and the manufacturing milk support scheme were simultaneously abolished on 1 July 2000. The Federal Government provided a $1.78 billion restructuring package to provide transitional assistance. The industry has adjusted to these developments and returned to the free market conditions that prevailed in the late 19th century:

- this preliminary research provides some useful insights on the early development of the Australian industry that could help to frame future policy in Pakistan.

3 Introduction

The dairy industry is a major component of Pakistan's rural sector. About 80% of the industry's output is supplied by small scale producers in a mixed farming system. Cash sales of milk are important for generating a regular farm income. Improvements in the economic performance of the small holder dairy sector could potentially have significant poverty alleviation benefits in many rural areas.

Industry development in the small holder sector has been stagnant for some time. Physical farm performance is constrained by poor herd management – milk yields are low because of inadequate water and feed for livestock. Financial performance is weak because of low milk prices and constraints on milk marketing.

The Pakistan Government has targeted the dairy industry as a way of increasing farm incomes through greater commercial sales of milk by small scale farmers. There is a long term plan to modernise the industry. The aim is to improve farm performance, increase production and extend the commercial processing of milk.

An industry body – *Dairy Pakistan* – has been established as an agent for change. The industry plan is a production driven strategy based on expectations of increased domestic sales absorbing larger amounts of commercially processed milk. Policy interventions, regulatory issues and economic constraints in marketing perishable dairy products will play a major role in achieving this goal.

ACIAR identified this aspect of the industry plan as an area where a review of the economic and policy constraints affecting industry performance could make a useful contribution to future policy development. A scoping exercise was undertaken to develop a project. It identified a need for a project to review the current situation from a policy and economic perspective. It also highlighted the value of assessing overseas policy experiences and identifying the factors that were the catalyst for a transition to small scale, commercially focused specialised dairy farms.

The proposed project was designed to link with ACIAR project LPS/2005/132, Improving dairy production in Pakistan through improved extension services. This project is part of the *Agriculture Sector Linkages Program* (ASLP) which was established to build linkages between the agriculture sectors of Australia and Pakistan. It commenced in June 2007 and is using case study communities to show the benefits of improving farm management practises.

A considerable amount of time and effort was invested in scoping a policy project. The aim of the project was to review the economic and policy constraints that were holding back industry development. A key aspect of the project was to examine how policy interventions had shaped the development of dairy industries in other countries. Australia and India were nominated as the candidates for this purpose:

- India was a neighbouring developing country with similar climatic conditions and a dairy industry that had made considerable progress in the transition to a commercially focused industry
- Australia was an advanced country where the dairy industry has experienced a great deal of policy intervention and developed into a major export supplier to the world market.

Two scoping study missions were undertaken to establish an understanding of the institutional and policy environment in the Pakistan dairy industry. They were also undertaken to find a suitable project partner and to gain support for the project from government and industry officials. Meetings were held with a wide range of officials from government agencies, academic institutions, industry bodies and aid agencies. Discussions were also held with a range of senior executives from major dairy companies

and farmers from the small holder sector. In general there was a high degree of support for the project. But the project was unable to proceed, amongst other reasons because of insufficient funding. In developing the project some preliminary research was undertaken on policy interventions and industry development in Australia.

This report provides a summary of what was learned from that exercise. It has been prepared as a contribution to future project development should it occur. The report will briefly review the factors that shaped the development of the Australian dairy industry.

Before summarising the findings of the preliminary research some background on the Pakistan dairy industry is necessary. The project objective was focused on industry development issues from the perspective of the small holder dairy sector. Therefore the following discussion of the Pakistan dairy industry will focus on this sector – developments in the commercial sector are not discussed.

3.1 The Pakistan dairy industry

Milk is a staple product in Pakistan. Fresh and boiled milk accounts for around 75% of household spending on dairy products. Consumption of packaged, powdered and condensed milk is limited. Yoghurt and curd/cheese products are the main processed dairy products. They account for about 13% of consumer spending on dairy products. Butter and ghee account for around 10% of household spending.

Most of the milk sold in Pakistan is unprocessed raw milk purchased in a ‘loose’ form. This contrasts with the situation in developed economies like Australia where milk is sold in a packaged from after a process of pasteurisation, standardisation and homogenisation. In Pakistan the ‘loose’ milk is sold in milk shops or by an informal network of independent distributors known as gowalas:

- a small amount of packaged milk is sold in the major urban centres.

The loose milk is primarily supplied by small holders but there are some peri-urban feed-lot operations located near the major populations centres. About 80% of the unpackaged fresh milk sales are consumed at home as a drink. The remainder is used for other products such as desserts, yoghurt etc. Gowalas make home deliveries and there is no cold chain in moving of this milk from the farm to delivery point.

There are a range of non-fluid milk uses. Some milk powders and condensed milk is sold through retail outlets. Cheese is not a traditional part of the Pakistani diet and production is limited. Butter sales are also limited because most people use ghee for cooking and dairy spreads are not a traditional part of the diet (Stanton, Emms & Sia 2007).

Desi ghee refers to a butter ghee product that is made in villages. It has been a major end-use use of milk but consumption is declining in favour of vegetable oils. Most of the ghee is consumed at the village level or retained for on-farm consumption.

The other major end-use of milk is fresh yoghurt (dahi) which is a traditional part of the national diet. It has a short shelf life and is mostly made at home from delivered milk or fresh milk purchased at the local shop. Small holders also use some of the daily milk supply to make dahi for on-farm consumption.

There is also drinking yoghurt known as lassi. This product is a traditional part of the national diet. It is made and consumed at home and also purchased fresh from the local milk shops. Lassi is made from aged yoghurt, fresh milk and ice.

Fresh milk, traditional yoghurt products (dahi and lassi) and desi ghee are common consumption items for all members of society – upper, middle and lower income groups. Processed products such as butter, cheese, packaged milk, milk powders etc are predominantly consumed by the upper income groups.

The small holder sector is tied to supplying fresh milk for home deliveries the local milk shops. They are excluded from the commercial distribution of processed milk and dairy products because of supply chain constraints and food safety requirements. In general the products sold by the local milk shops come from milk stored in open vats kept warm by different forms of heating.

Milk production in Pakistan is dominated by these small scale farms. There are about 14 million farms producing milk from dairy cattle and buffaloes. In 2005 the milking herd was composed of around 7.5 million milking cows and 10.1 milking buffaloes:

- small holders account for about 90% of total milk supplies
- about 70% of farms have less than 5 milking animals.

In general dairy farming is not a specialised agricultural activity in Pakistan. Apart from the peri-urban feedlots most of the milk is produced by small holders that run a few milking animals in conjunction with other agricultural activities. Some milk is retained for home consumption and the residual is sold to generate a regular income.

By western standards the industry is grossly under-developed. Industry development in the small holder sector has been constrained by numerous issues. At the farm level there are enterprise management issues with animal health and herd performance that contribute to low milk yields. Beyond the farm gate there are major infrastructure constraints, limited marketing options and weak information flows between farmers and the major selling centres:

- the biggest constraint is the deficiency in milk handling practises.

The supply chain for the small holder sector has a number of deficiencies that affects milk quality and contributes to food safety contamination risks. Poor hygiene in on-farm handling of milk and the adulteration of milk sold through Gowalas are major impediments to growth in domestic sales of fresh milk. The variability in product composition and spoilage risks has a significant effect on product quality.

The lack of an effective cold chain for the storage, transport and distribution of milk reduces the shelf life of a highly perishable product. Milk has to be rapidly sold and consumed to reduce the risk of spoilage. In general the marketing options are limited and the combined effect of these factors is to reduce the farm gate value of milk. Sales growth and farmer returns in the small holder sector are tied to:

- the integrity of the distribution system for milk in the local market
- the competitiveness of alternative marketing options.

3.2 Food safety and milk handling

Improvements in food safety and milk handling procedures will be a key factor in the future development of the small holder sector. Milk is susceptible to rapid product deterioration caused by microbiological growth if it is not handled and stored under appropriate conditions. To extend the shelf life:

- milking needs to occur under hygienic conditions
- the milk needs to be chilled as soon as possible after milking
- milk transport to the final point of sale needs to occur under chilled conditions.

These actions minimise the risk of product spoilage and contamination. They also slow the rate of product degradation. Shelf life is further extended when the milk is processed into products such as yoghurt, cheese, butter, milk powders etc. The crucial factor in maximising raw milk returns to the farmer is the integrity of the supply chain from the farm through to the final point of sale.

The final selling point is either the consumer for fresh milk and dairy products or a business that uses the milk for processing into dairy products. Buyers need to be convinced the milk has been handled appropriately with minimal contamination risks. It becomes a higher quality product with a higher value in comparison to situations where there are doubts about the safety and quality of the product:

- changes in livestock management practises and yield gains are more likely to be achieved among small scale producers if returns are higher
- farmers are more likely to make the transition from a mixed farming operation to a specialised commercially focused dairy enterprise.

If milk is handled in this way it increases the end-use options for milk. For small scale producers in the Pakistan it opens up the possibility of milk being used for processed dairy products. Greater competition for purchasing milk can strengthen farm returns. The fresh milk can be sold as a higher quality product in local markets or used by processors to make products with a longer shelf life.

The use of fresh milk for manufactured dairy products essentially relies on a piece of equipment called the separator. It is used to separate the milk fat into a concentrated cream product and leaves a lower fat skimmed milk in a liquid form. The fat content of the cream concentrate and the skim milk can be varied by adjusting the speed of the separation process. This allows the manufacturing of dairy products with different product compositions.

Once the milk has been through the separation process it can be used to make a range of products with a longer shelf life. For example, milk powders are made by a process that removes some of the water and converts the remaining liquid into a fine mist which is dried. Cheese and yoghurt are fermented products that require the addition of a bacterial culture which slows the rate of product deterioration. Butter is solidified milk fat that has to be refrigerated to maintain a solid form.

The critical factor in increasing the value of milk is shelf life. Pasteurisation is an essential process for reducing the rate of deterioration of milk (Katz 2006). The process involves heat treatment of the milk at a specified temperature for 15 seconds. It destroys unwanted micro-organisms that cause milk spoilage. In most countries pasteurisation of milk is required for food safety reasons. The process is applied to fresh drinking milk and to milk used processed dairy products.

UHT (Ultra High Temperature) milk is alternative process that involves heat treating the milk under pressure at higher temperatures for 2-3 seconds. This process sterilises the milk and it is used to make packaged milk that can be stored at room temperature for up to 6 months – refrigeration is not required until the product is opened.

The other process that is commonly used to extend the shelf life and value of the fresh milk is homogenization. This process breaks up the milk fat into very small globules to stabilise the product and slow the natural rate of separation of milk fat into cream. If it occurs the product quality deteriorates the residual becomes a skimmed milk liquid with little flavour.

Adoption of the processes of pasteurisation and homogenization were key factors in the growth and development of dairy industries in the major developed economies. There were human health benefits from reduced food safety risks that strengthened the demand for fresh milk. But they also increased the economic value of milk by extending the shelf life of dairy products.

3.3 Policy interventions in the Pakistan dairy industry

At a federal level there is very little government intervention in the dairy market. There are no domestic support polices to raise producer returns for milk. There are no milk

marketing agencies backed by government regulations. Milk sales by the small holder sector are largely restricted to purchases by the milk collectors – gowalas.

The milk collectors provide a rudimentary milk pick-up and delivery system. Most use a motor-bike to carry milk cans from the farm to the delivery point. In hot weather ice is used to prevent spoilage and this can lead to adulteration of the milk. The quality varies and consumers boil the milk after delivery because of food safety concerns.

The use and enforcement of food safety regulations on the gowalas and retail milk shops is an issue that was to be investigated by the project. This independent milk marketing system appears to be the most efficient way of collecting and selling milk from rural areas that are not located close to a major transport route:

- poor transport infrastructure is a major constraint for developing alternative market outlets for milk producers in many areas
- the lack of an alternative market outlet through milk purchases by dairy companies limits the price received by most small scale producers
- as a highly perishable commodity, milk requires a good road system and a cold chain system that allows timely delivery to processing plants.

There are very few milk marketing cooperatives in Pakistan. This contrasts with the situation in India. Corporate governance issues and the failure of previous attempts to establish cooperatives may have contributed to this situation. Marketing cooperatives can strengthen the bargaining position of small scale milk producers by introducing more competition:

- successful cooperatives require technical expertise in milk marketing and processing as well as a willingness for members to invest in the required infrastructure
- a review of the development of dairy cooperatives in Australia and India was identified as an important component of the proposed project.

At a federal level the other area of government intervention is trade policy. Industry protection is based on import tariffs – there are no tariff rate quotas – and the current tariff rates are:

- 25% for bulk imports of all milk powders (packs > 20 kg)
- 35% for non-bulk imports of all milk powders (eg retail packs)
- the same tariff rates apply to bulk and non-bulk imports of other dairy products (eg cheese, UHT milk, butter, whey, etc).

Dairy products imports mostly consist of milk powders enriched with vegetable fat. There is a limited trade in cheese and other dairy products for specialised end-uses. Milk powder imports are used by manufacturers of ice cream, confectionary, infant formulas and retail packs of powdered milk. In some cases imports are blended with fresh milk to standardise the fat and protein content for specific end uses.

There are policy interventions that affect the dairy industry at the Provincial and District levels of government. At a district level the ruling authorities have the power to fix retail milk prices based on the recommendations of a price committee. It is not clear how extensively these powers are exercised. It is also not clear if the pricing powers extend to other fresh dairy products:

- in some cases these price controls are reportedly affecting the price determination process for milk sold by small holders through the gowalas
- this issue was to be investigated by the proposed project.

If retail price controls are applied it effectively sets the maximum price received by farmers for raw milk. Price rises due to increased demand or seasonal changes in supply are

constrained. This distorts the price signals that flow back to producers and removes the incentive for increased production:

- the retail price control is equivalent to imposing a tax on farmers in order to subsidise the cost of milk consumption in urban areas
- it limits the opportunity for farmers to increase their income.

A further area of policy intervention is Provincial Government spending through their agriculture and livestock departments in support of industry development. There have been sizeable expenditures directed into primary research activities for some time. But it appears the application and adoption of research results by farmers has been limited.

The overall impression from the scoping study visits is that farm extension activities have not been effective. In the small holder sector most producers have limited education. Public provision of training on livestock management and dairy enterprise performance improvements appears to be inadequate. There are also deficiencies in the provision of animal health services in many areas:

- inadequate extension advice on physical and financial farm performance has constrained industry development
- this may have stifled the transition from a small scale mixed farm approach to more specialised dairy farming operations
- this issue was to be investigated by the proposed project.

Some processors are establishing milk collection systems that suit their individual requirements. In some cases this includes the provision of extension and animal health services. Small holders selling milk to processors reportedly gain higher returns but processed milk is a small component of the industry – less than 5% of total output.

The limited adoption of commercially focused farm management practises that would potentially lead to higher returns has been a constraint on industry development. For example, Nestle is a major milk processor and has developed a milk collection system for 135,000 farmers. Only 3,000 of these suppliers are considered to be progressive adopters of advice on farm performance improvements:

- there are 13.8 million farms in Pakistan producing milk
- small holders that are not located near a major transport route are essentially excluded from the commercial milk processing system
- they rely entirely on the provision of public extension services.

4 Regulation and development of the Australian dairy industry

The development of the Australian dairy industry has been shaped by a variety of factors. The two most significant factors have been the adoption of new technology and government policy interventions. Preliminary research for the proposed project reviewed the major industry developments which are briefly summarised in the following two chapters.

There were two broad phases to industry development in Australia. They could be described as the regulation period and the deregulation period. The aim of the preliminary research was to build a knowledge base on the events that shaped the transition of the Australian dairy industry. Further research was planned to draw out the lessons that could be learned for future policy development in Pakistan.

In many ways the current state of the small holder sector in the Pakistan dairy industry mirrors the initial stages of the development of the Australian dairy industry. In Australia the catalyst for higher returns and industry growth was the transition from localised farm based sales of milk products to a factory based system. This coincided with a shift from small scale farmers to specialist dairy producers.

4.1 Technical factors affecting industry development

In Australia the transition to a commercially focused dairy industry began in the late 19th century. Up until 1880 it was a local industry where milk had to be consumed within a few days before it spoiled. Food safety regulations, government assistance measures, the adoption of new technologies and the establishment of collective milk marketing opportunities were the key factors in the transition.

For much of the 19th century the industry was composed of small scale dairy herds on mixed output farms. Some milk was retained for home use. The residual milk was sold to local villages as fresh milk or as butter and cheese made on farm. Transport constraints, variations in farm hygiene conditions and the absence of cold storage facilities restricted the opportunities for sales in the major population centres (Farrer, 2005).

Butter and cheese was made by traditional hand-made production techniques. Product quality was highly variable. Food safety contamination risks were high especially for butter as the production process was to allow the milk to ‘stand’ until the cream rose to the top. The cream would often become contaminated by dust and insects. Salt was added to reduce the food safety risks and boric acid was used as a preservative.

The development of a factory based production system was rudimentary at first. It simply involved a central collection point for milk that would be used for cheese and butter production. This centralised processing was successfully established for cheese production by the 1870s. But it was less successful for butter production because of the requirements for extracting the cream.

Farmers were paid for the milk they delivered to the factories and the products were sold locally. Fresh milk was not part of this initial effort to centralised processing of dairy products. Milk collectors would visit farms and collect milk for distributing to households and retail outlets. The milk was transferred by hand from milk cans to a bucket (milk pail) at each house. There was no refrigerated transport and the milk was consumed within a short period of time because of a lack of cold storage.

The transition to factory based dairy production was accelerated by the invention and rapid adoption of the separator in the 1880s. This machine was a major breakthrough for butter production. In conjunction with equipment that mechanised the churning process

and a test for butterfat content the separator created greater opportunities for commercial sales of butter.

The separator eliminated the most of the contamination issues associated with the hand-made production system. Milk from surrounding farms could be combined to produce uniform, higher quality butter. Butter factories were rapidly established in all the major dairying regions. Large numbers of farmer cooperatives were formed to finance the development of butter and cheese factories.

The separator was the catalyst for a substantial industry expansion. Hand operated separators allowed on-farm milk separation. Cream was sold to the butter factories and the skim milk was retained on-farm for livestock feed. Some cheese factories were converted to creameries producing butter and there was a sustained period of growth in milk sold for manufacturing purposes.

By the end of the 19th century there were 304 butter factories in Victoria and a substantial number of cheese factories. Many factories had no refrigeration and relied on cellars for product storage. Refrigeration for overseas shipments of butter was introduced around this time and a sustainable export trade to the UK developed:

- to encourage the export trade the Victoria Government introduced a system of bounties for export butter that was government graded and branded.

Another important development in the late 1890s was the introduction of milk fat testing. Farmers were paid according to the fat content of their milk instead of milk volume. This move was resisted at first but eventually became a commonly accepted practise. It had two major advantages in terms of industry development:

- it eliminated watering of milk
- it encouraged improvements in stock selection – livestock producing milk with a low fat content were culled from the dairy herd.

The benefits of introducing payments based on a fat test are relevant to the situation in Pakistan. Water dilution of milk is a widespread complaint about fresh milk sales by the Gowalas. In some cases it is deliberate and in other cases it comes from adding ice to prevent spoilage during deliveries. Lower quality milk leads to lower farm returns:

- there are also food safety concerns – the ice or water added to the milk is often taken from streams or other contaminated water sources.

Water dilution of milk is not restricted to dishonest Gowalas. Farmers also have an incentive to adopt the same practise, especially during the seasonal trough in milk production.

Stock selection and livestock management are other major constraints on industry development in Pakistan. A farm payment system based on milk fat content creates an incentive for farm management improvements. This issue and the use of regulations to verify milk quality were to be investigated in the proposed project.

Fresh milk sales in Australia in the late 1880s were similarly handicapped by a lack of cold storage for on-farm storage, transport and home storage. It was overcome when milk distributors introduced a cold chain distribution system. The process involved an immediate cooling of farm milk purchases with transport to major population centres in ice cooled rail wagons or trucks.

These distributors were the early forms of milk processing companies. The milk was transported in milk cans filled to the top to minimising milk churning during the trip. In conjunction with testing for milk fat this approach significantly improvement the quality of the fresh milk. It also reduced the food safety and spoilage risks.

The fresh milk sold under these distribution conditions reportedly earned a higher price. This created an incentive for farmers supplying milk to these distributors to take more care

with handling their milk. In time herd testing and regular microbiological testing of milk would be introduced. But hygienic milking conditions and on-farm storage that minimised product deterioration would not become a common feature of Australian dairy farms for some time.

The other major technological development that shaped industry development in Australia was pasteurisation. Equipment for batch pasteurisation had been available since the late 1800s and it was gradually being adopted in other parts of the world – Denmark made it compulsory for bottled milk in 1898. But widespread commercial use of this process was not rapidly adopted in Australia.

In the early 1900s very few cheese and butter factories had installed pasteurisers. Milk distributors also showed little interest in pasteurising their fresh milk sales. Bottled fresh milk was introduced in the 1920s and this accelerated the transition of milk distributors into milk processing companies.

Previously milk distributors had simply collected and delivered the milk to customers. Their factory was essentially depot for receiving and distributing milk. With the introduction of bottling a more substantive factory operation was required. Bottling reduced contamination risks during delivery but there was no regulatory requirement for pasteurisation and most milk processors bottled and sold unpasteurised milk.

It took some time for bottled milk to be used for home deliveries. Loose milk was still being hand delivered into household milk cans in the early hours of the morning until well after the Second World War. Pasteurisers and refrigeration was not a standard feature of milk processing until after the war. Demands by the armed services for milk with a longer shelf life encouraged the adoption of these technical innovations.

Improvements in on-farm milk handling were another factor in industry development. Convincing farmers of the need for cleanliness and hygiene in their milking parlous was a slow process. The importance of sterilising equipment used in the diaries was not well understood. In the early 1900s there were widespread concerns about the lack of hygienic storage conditions for milk before it was transported to butter factories or distributed to households.

Milking machines had been available since the early 1900s. But they were not widely adopted until after the Second World War. A lack of electricity on dairy farms, the small scale of many mixed farm dairy enterprises and financial constraints from the depression limited the rate of adoption of milking machines. These factors also delayed the introduction of on-farm chillers for cooling freshly harvested milk:

- many farmers were using water coolers to chill freshly harvested milk in the early 20th century
- but there were no regulations specifying this requirement and milk quality was highly variable
- milk cooling was not an enforced requirement for fresh milk supplied to the Melbourne market until 1922.

The adoption of improved on farm milk handling practises was encouraged through government funded extension services. But it was food safety regulations that brought about the required change in attitudes and investment in farm plant and equipment. This was an important step in the transition to more a specialised industry. Farmers were forced to make the choice between a small scale mixed farm approach and a larger scale specialised dairy farm:

- the initial regulatory requirements that required a more sophisticated approach to milking and on-farm storage was to be investigated for the project

- apart from the infrastructure constraints, the introduction and enforcement of on-farm food safety regulations was seen to be a key issue for future development of the small holder sector in Pakistan.

Milking machines were rapidly introduced after the Second World War. It was a labour saving device and improved on-farm milk handling practises. Refrigerated farm holding tanks were introduced in the late 1950s. This was a key development in the industry transition. Bulk milk collections by refrigerated road tankers followed soon after. It encouraged a further move to large scale, specialised dairy farms:

- bulk milk collections was the catalyst for a dramatic rationalisation in the number of dairy factories
- the need for a factory in every village based region disappeared
- this triggered a rationalisation in the number of dairy cooperatives – there were numerous mergers into larger regional based operations.

The development of the Australian dairy industry since the late 1890s was driven by the adoption of new technology, the emergence of locally based farmer cooperatives, the introduction of food safety regulation and infrastructure improvements. These developments were to be a key focus of the project.

The moderate rate of adoption of technical innovations during the 1890 to 1940 period was interesting feature of the industry development. Some progressive farmers and milk processors were early adopters of technical innovations that strengthened the integrity of the milk handling supply chain. But it appears there were no widespread changes in milk handling and processing practises until after the Second World War.

The impetus for widespread change was the Second World War and the progressive implementation of regulations associated with food safety concerns in milk handling. This is a relevant consideration for the development of the Pakistan small holder dairy sector. The Australian experience suggests that government extension and education efforts were, by themselves, not sufficient to achieve the supply chain development that would improve milk quality and farm returns:

- regulatory requirements that were properly enforced were necessary to trigger the widespread changes required – the Second World War was a major 'shock' for the domestic dairy marketing system
- it seems that many dairy farmers, milk vendors and milk processing companies had to be pushed into adopting the changes by food safety regulations
- further investigation of this preliminary assessment was to be a key element of the project because of the implications it may have for future dairy policy development in Pakistan.

4.2 Policy interventions affecting industry development

Policy interventions in the early period of industry development were largely confined to government funded extension activities. In general the aim of the extension efforts was focused on adopting new technology and teaching farmers about the need to improve milk handling practises:

- in the early 1900s some State Governments created travelling demonstration dairies and toured dairying regions to explain the benefits of using the new separator technology and milk handling practises
- demonstration farms were established and used to educate farmers on better livestock handling practises.

There were some attempts to regulate prices in the early 1900s because of concerns about the fluctuations in returns and farm incomes. Details of these early initiatives were to be investigated in the project. In general it appears the move to government intervention was driven by the instability in farm returns and the strong competition among milk vendors supplying the fresh milk to the major population centres.

The drinking milk sector was only nominally regulated by State Governments from the early 1900s. The regulations were essentially a requirement for dairy producers and milk vendors to register with a local authority. There were no entry restrictions for milk vendors and many delivery routes were serviced by several vendors.

Moves to regulate the fluid milk markets were driven by the complaints from milk producers and vendors about low and/or fluctuating incomes. Consumers also complained about the price fluctuations. State Governments had the political powers to regulate the market and in the early 1930s decisions were made to regulate drinking milk supplies in order to stabilise prices.

Developments in NSW were typical of what eventually occurred in all States (Drane and Edwards 1961). An industry authority was established with the powers to control the production and distribution of milk. The State was broken up into discrete districts or zones and the following arrangements applied:

- the number of producers and vendors were fixed – new entrants were only allowed if supplies were considered to be inadequate;\
- prices were regulated by the relevant local authority
- milk production was restricted by quotas
- minimum milk quality standards were established and there were regulations on the methods of milk production, processing and transport.

Price regulations initially involved the setting of a maximum price. After the Second World War the arrangements were altered to allow the State Authorities to fix the wholesale price of milk sold to the distributing vendors. This incorporated fixed prices for producers, vendors and retailers. Decisions on adjusting the fixed prices were made by the relevant State Authority. They were based on assessments of the cost of production for each component of the marketing chain.

Individual State Governments also became involved in regulating the markets for butter and cheese. In the early 1900s fluctuating farm returns and unstable consumer prices led to calls for government intervention. State Governments had the political powers to regulate these markets.

Early attempts to regulate cheese and butter marketing failed. The Paterson Plan was the first set of effective marketing arrangements for these products. The scheme operated over the 1926-34 period and was based on the concept of price equalisation. It involved imposing a levy on all butter production:

- the revenue was used to pay a bounty (subsidy) on all butter exports
- the net effect of the arrangements was to raise the price of butter on the domestic market – it was known as a home price support scheme
- per unit returns on all butter production were ‘equalised’ as producers of butter exports received a subsidy to compensate for the lower export returns.

The Paterson Plan was a voluntary arrangement – it was not backed by government legislation. It reportedly operated with some success until 1934 despite the lack of support from all butter manufacturers. But there were complications because there were different prices charged for butter in different States and the volume of exports was expanding.

Calls for Federal legislation to enforce the scheme resulted in the development of regulations to control the movement of product between the States. This would allow a national own price support scheme to operate without the risk of interstate product movements undermining the market returns. The regulations were not implemented but a voluntary equalisation arrangement was established:

- a company (CDPEC Ltd) was established to negotiate agreements with each manufacturer for the equalisation of returns
- total returns received by all manufacturers from all markets – domestic and export – were pooled and divided by the total quantity sold be each company to yield an average price
- there were separate equalisation arrangements for butter and cheese.

These domestic market support arrangements removed the incentive for individual companies to increase their sales on the higher priced domestic market. It involved the various State Governments establishing quotas for production sold in each state. The surplus product was exported. This allowed the domestic price to be maintained at a higher level than the export price:

- the ex-factory domestic price for butter and cheese were fixed by the company that established to administer the support arrangements.

The success of the scheme required effective import controls. Import tariffs and import licensing controls were used to protect the industry from import competition and prevent the higher domestic price from being undermined. There was additional support from quotas imposed on margarine production. The Federal government also provided a subsidy which gave additional income support to farmers:

- the subsidy was provided as a production 'bounty'.

This voluntary system of price equalisation lasted for some time. But there were times when arrangements were threatened by market developments. When export prices were depressed the high priced domestic market was attractive to cheese and butter manufacturers. Companies that focused their attention on the domestic market would be required to make large payments to the pool of returns from their domestic sales.

Eventually the arrangements were be backed by legislation at the Federal level. In the early 1950s the Federal Government took control of domestic price fixing arrangements for butter and cheese. The company that administered the scheme was relieved of this responsibility in the interests of achieving some balance between the interests of producers and domestic consumers:

- while the Federal Government was responsible for setting the ex-factory prices the power to fix prices was in the hands of the State Governments
- each year the Federal Government would issue a price fixing request to each State Governments for implementation.

As for fluid milk the decisions on changes in the ex-factory domestic price was based on official estimates of changes in the cost of production. The overall effect of these arrangements was to increase producer returns and farm incomes. But this stimulated higher production most of which had to be sold on lower priced export markets:

- expanding export sales diluted the value of the domestic price support arrangements
- the total revenue raised was shared across total output that was composed of increasing volumes of lower priced export sales
- this would lead to increase political pressures to raise the fixed ex-factory domestic price.

The Federal Government subsidy that was added to the pool of revenue for equalised returns originated as a temporary measure during the Second World War to strengthen returns and stimulate higher production (Sieper 1982). The subsidy was introduced in 1942 and distributed by the company that administered the scheme:

- there were concerns of output shortfalls in a trading environment of price controls on domestic sales and low export returns.

It became a permanent feature of the support scheme when industry representatives formally applied to the National Prices Commissioner for recognition of the need for farmers received an average return that was reasonable in the context of the wider economy. In the late 1940s there was a further change with the Federal Government announcing an intention to guarantee farmer returns:

- the size of the annual subsidy to butter and cheese producers was dependant on market conditions and the level of guaranteed returns
- guaranteed returns were based on estimates of the cost of production.

The dairy production subsidy (bounty) on manufactured dairy products remained in place until the early 1970s – approximately 30 years. Originally it was a relatively modest amount – A$2 million – but the size of subsidy increased over time to a peak of $36 million in 1951-52 (Sieper 1982). The subsidy grew because of the government commitment to a guaranteed return:

- in the mid 1950s the government decided to fix the size of the dairy bounty to $27m per year and it remained at this level until the mid 1960s.

Initially the guaranteed returns applied to all production but this was subsequently adjusted to focus on domestic sales. By the early 1950's the Federal Government had gained control of the price fixing powers from State Governments. This allowed for greater control of the size of the direct subsidy under the guaranteed returns.

The policy principles of price equalisation, a production bounty for manufactured dairy products and underwriting of guaranteed returns remained a feature of the industry support arrangements until the early 1970s. Political power at the federal level was in the hands of the same political parties during their period:

- the prevailing approach to rural industry policy was protectionist
- in the mid 1970s the production bounty was phased out in the mid 1970s following a change in government
- the principle of guaranteed returns remained in place but was adjusted to reflect a floor price rather than a nominated acceptable return.

After the initial policy interventions of the early 1920s the industry had remained supported by regulatory arrangements that followed the same basic principles for 50 years. Phasing out the production bounty in the mid 1970s was the first deregulatory act imposed on the industry since the adoption of the Paterson Plan.

In 1977-78 the Federal Government established a new set of marketing arrangements for manufacturing milk. They remained in place until 1985-86. It involved the pooling of market returns for five prescribed products:

- butter
- cheddar and related types of cheese
- casein
- whole milk powder
- skim milk powder.

A separate pooled return operated for each product category. In each case a levy was imposed on domestic sales which raised the price paid by consumers. Levy funds were combined with export returns and manufacturers received an average ‘pooled’ return based on the amount they produced. It effectively meant exports returns remained subsidised by an implicit tax on domestic consumers.

A government authority, the Australian Dairy Corporation, managed the pooling arrangements. The authority also exercised considerable control over dairy product exports. It had the power to issued export certificates which specified export values for particular markets and/or products. The exporter was required to remit the full value of the certificate for inclusion in the relevant pool of returns.

These pooling arrangements were a continuation of the ‘equalisation’ concept that was established by the Paterson Plan in the early 1920s. The size of the levy varied for each product category. As the amount sold domestically also varied the impact of the levies on the prices received by manufacturers was different for each product.

It was a highly distorted set of pricing arrangements. Market signals on the relative profitability of different products were difficult to assess. There was also no incentive for individual companies to increase plant efficiency, increase returns by altering their product mix, invest in export marketing efforts and adopt innovations. All participants in the product pool received the same average return.

5 Deregulation and development of the Australian dairy industry

In the mid 1980s the Federal Government decided the industry support arrangements for manufacturing milk had to be fundamentally reformed. A process of deregulation was initiated with the development of the Kerin Plan. The initial reforms sought to remedy the problems of the previous support arrangements. It led to changes in the fluid milk market support arrangements operated by States Governments.

At the start of this process of reform a national market for dairy products did not exist. Government regulations had created an artificial separation of the market between fluid milk sales and milk used for manufactured dairy products (Harris 2005). The State Government regulations had established six separate markets for fluid milk which effectively precluded interstate trade in fresh milk.

State Governments had continued to justify their fluid milk market interventions on the basis of a perceived market failure. Milk production was highly seasonal and there was a perceived need to ensure adequate supplies of drinking milk throughout the year. This required the use of pricing controls to ensure dairy farmers had the incentive to meet the demand for off-season milk:

- Statutory Marketing Authorities (SMA's) were established with monopoly rights on the marketing of raw milk and pricing was regulated at each stage of the marketing chain.

There were restrictions on interstate trade in drinking milk based on a requirement for interstate purchases of raw milk to be priced at the prevailing regulated price in the selling state. These restrictions existed despite the apparent contravention of Section 92 of the Constitution which guarantees free trade between the States.

There was no commonality in market milk pricing between the States and over time significant differences emerged. Pricing decisions were based on costs of production and what was considered to be a 'fair' price for dairy farmers. Prices were set at levels well above the export parity price for manufacturing milk.

Price support for manufacturing milk was based on the compulsory pooling arrangements that had been introduced by the Federal Government in 1977 (IC 1991). Pool returns were under-written by the Government and there was a significant income transfer from domestic consumers of dairy products to dairy farmers.

Pooling arrangements had two effects on the prices received by dairy manufacturers. It averaged export returns for each product across all manufacturers. It also distributed the revenue from the regulated price premium on domestic sales across all production. The net effect was to raise the price of manufacturing milk above export parity.

The averaging of export returns distorted production decisions by removing the link to world prices for individual products. Manufacturers had no incentive to adjust their product mix in line with changes in world prices. It diluted the competitive pressures for processing efficiency improvements. There was little incentive to invest in marketing improvements and the scheme encouraged a commodity approach to export market development.

5.1 Dairy policy reforms in 1986

Deregulation of the Australian dairy industry effectively commenced with a set of policy reforms introduced in July 1986. The Kerin Plan introduced major changes to marketing arrangements in the manufacturing milk sector.

The system of pooling export returns was abolished. From that point manufacturers received the prevailing world price for their exports of each product. They also received a *Market Support Payment* (MSP) on their exports.

The MSP was paid at a uniform rate on all exports. It was funded by a farm gate levy on all milk production – the *All Milk Levy*. Regulation of domestic prices continued although the level of price support was reduced to the 'fair trading' prices of imports from New Zealand. Government underwriting commitment on export returns was adjusted to reflect 85% of the long term average price of each product.

Under the new arrangements manufacturers had to respond to changes in world prices. The reforms initiated a process of post-farm gate industry rationalization. Smaller co-operatives merged to gain economies of scale in processing and marketing. The MSP encouraged manufacturers to raise the price of their domestic sales above export parity. The net effect was to raise manufacturing milk prices above export parity.

The objective of the Kerin Plan was to improve the global competitiveness of milk manufacturers and gradually reduce the level of industry assistance. The phased reduction in support gave dairy farmers time to adjust to the impact on farm incomes. The Federal Government continue the gradual reduction in industry assistance when the Kerin Plan was replaced with the Crean Plan in 1992.

Under the 1992 policy arrangements Government underwriting of export returns was abolished. A maximum allowable level of support was established based on export parity prices. The plan specified annual reductions in support to a level of 10% of the average export price by the year 2000.

The Crean Plan was scheduled to run until the year 2000. But in 1995 the support mechanisms had to be re-designed in response to a WTO interpretation of the scheme. The central element of the assistance measures – *Market Support Payments* – involved a payment on exports. The policy arrangements were therefore classed as a domestic support measure and an export subsidy scheme.

The Crean Plan was adjusted to establish a transparent price support scheme under WTO rules. In 1995 the *Domestic Market Support Scheme* (DMS) was introduced. The new scheme provided the same level of support but the link to export sales was removed with the termination of *Market Support Payments*.

The *All Milk Levy* was abolished and replaced by two new levies. A *Market Milk Levy* was imposed on milk used for domestic sales of drinking milk. A second levy applied to milk used for domestic sales of manufactured dairy products. The *Domestic Manufacturing Milk Levy* was initially set at a level that approximated the expected benefit that would have been achieved under the Crean Plan in 1995.

Manufacturers were expected to pass on the cost of the levy to domestic consumers. This would generate the same price premium that was created by the Crean Plan. The combined levy revenue was used to fund a DMS payment to manufacturing milk producers. Producers received a per litre payment based on their production of manufacturing milk.

The three schemes created an income transfer from the States focused on fluid milk sales (mainly Queensland and NSW) to the States dominated by manufacturing milk production. The Victorian dairy industry was a net beneficiary of the intra-industry transfers. This helped to reduce the incentive for Victorian processors to sell milk into the fluid milk sectors of other States.

The Kerin Plan had a 'comfort clause' that allowed any State to request a termination of the levy arrangements that funded the price support payments for manufacturing milk. The Government would implement the request if the fluid milk price premium was threatened by interstate milk sales.

This comfort clause was removed from the support arrangements under the Crean Plan. In its place the Victorian Government introduced legislation requiring Victorian processors to pay the regulated fluid milk price for milk sold interstate. This removed the threat of Victorian milk undermining the price premiums in other States.

5.2 Reform of the fluid milk support arrangements

Annual production quotas had long been used to restrict access to the respective fluid milk market. Three states – Victoria, Tasmania and South Australia – subsequently abolished quotas in the 1990s and replaced them with pooling arrangements. Farmers received a fluid milk price premium for a fixed proportion of their total output. NSW, Queensland and Western Australia maintained fluid milk quotas until July 2000.

During the 1990s a number of other reforms were made to the fluid milk price support arrangements by State Governments. In general the regulatory changes involved deregulating the post farm gate marketing controls. Pricing controls on wholesalers, vendors and retailers were removed. Restrictions on trading zones for individual processors and vendors were eliminated.

The objective of the changes was to increase competition and improve the efficiency of the milk distribution system. Marketing margins on milk sales were effectively deregulated. Processors and retailers set prices according to changes in cost structures and product marketing initiatives.

There was no coordinated approach by the State Governments to the content and timing of these reforms. Some states implemented adjustment schemes to manage the impact of the reforms on milk vendors.

Post farm gate deregulation created an incentive for processors to introduce product innovations and invest in brand based promotion. Marketing margins increased and retail prices rose as the cost of marketing initiatives were greater than cost reductions from supply chain efficiencies. The reaction of processors to deregulation was not surprising as consumer demand for milk is not highly responsive to price changes.

5.3 Industry adjustment to policy reforms

There was considerable industry adjustment in the period between 1985 and the year 2000. In the ten years to 1984-85 there had been a 11,288 reduction in the number of farms and milk production had declined. This adjustment reflected a period of relatively low returns in the late 1970s caused by reduced export opportunities.

After 1984-85, the industry became more focused on exports and milk production increased. Structural adjustment continued as producers responded to the effects of fluctuating global market developments and the domestic policy reforms. By June 2000 the industry was composed of 10,847 dairy farms – another 6,454 farms had left the industry since 1984-85.

The pressure for adjustment was especially evident in the manufacturing milk sector. In Victoria and Tasmania around 3,500 farms left the industry during the 1985-2000 period. Support for manufacturing milk returns was gradually declining and by 1999-00 had been reduced to around 10%.

During this period producers also faced adjustment pressures from world markets. Export returns were weakened by restricted access on world markets and large volumes of subsidised exports. There was also stronger competition on the domestic market from New Zealand imports following the signing of a free trade agreement (ANZCERTA).

The adjustment process involved resource movements and on-farm developments that improved the competitiveness of the remaining producers. Some of the livestock and land resources of those exiting the industry were purchased by those who remained in the

industry. In other cases land was directed into other agricultural industries or purchased for non-agricultural uses.

Farmers who remained in the industry made adjustments to increase their scale of operations and improve farm productivity. Farm output and average herd sizes increased considerably. The rate of change accelerated in the period after 1984-85. Some farmers expanded their land base to accommodate a larger herd. In other cases the pasture base was developed to improve the productive capacity of the farm.

At the same time there were on-going improvements in livestock productivity. In 1984-85 average milk yields were around 3,340 litres per cow. By 1999-00 average milk yields had increased to almost 5,000 litres per cow. The change reflected an improvement in pasture quality and a greater used of supplementary feeds to improve the nutritional content of livestock feed, as well as genetic improvements in the herds.

5.4 The final stage of industry deregulation

In the late 1990s there were a number of pressures for further policy reform. Federal legislation for the *DMS Scheme* was scheduled to terminate in June 2000. This event would have implications for maintaining the fluid milk support arrangements.

Assistance for the manufacturing sector encouraged increased output and higher exports. Under the Kerin/Crean Plans support payments were explicitly linked to export sales and could be legitimately defined as an export subsidy. Measures under the *DMS Scheme*, even after the adjustments made in 1995, could be defined as trade distorting domestic support under WTO interpretations.

The *DMS Scheme* had not been subjected to a WTO challenge. But continuing the scheme beyond June 2000 may have increased the risk of a WTO challenge at some time in the future. Strong growth in manufacturing milk supplies had diluted the farm gate value of the market support payments. Revenue raised by the support measures was increasingly spread over a larger volume of manufacturing milk production.

From the start of the Kerin Plan import protection was gradually reduced. The support policies created an incentive for other countries to export dairy products to Australia. Domestic prices were above export parity and imports from New Zealand were growing. By the late 1990s New Zealand exporters supplied more than 10% of the cheese market.

The *DMS Scheme* assumed the *Domestic Manufacturing Milk Levy* would be fully passed on to domestic consumers. However, competition from imports limited the ability of manufacturers to gain higher prices on the domestic market. By the late 1990s the major dairy companies claimed the ‘value’ of the dairy product component of the support arrangements was minimal.

A legal challenge to the market milk regulations under Section 92 of the Constitution was an ever present possibility. Section 92 guaranteed free trade between the States and various legal opinions had questioned the constitutional validity of the State legislation. A successful challenge would mean the end of support arrangements for manufacturing milk and the end of regulated price premiums for fluid milk sales.

The Victorian dairy industry was the major milk producer in Australia and dominated by farmer co-operatives. Competitive pressures on performance were an ever present incentive to consider the commercial gains from selling milk interstate. As the value of the support arrangements declined producer support for an end to the interstate trading restrictions strengthened in Victoria.

Commercial pressure for unrestricted interstate milk sales was linked to developments in food retailing. Milk processors faced increasing pressure from national supermarket chains to meet their requirements for national distribution and product pricing. There was also strong competition among the milk processors to supply the home brand milk

contracts. Commercial arrangements were moving towards a national sourcing and distribution system for home brand milk contracts.

In the late 1990s all dairy support policies were subjected to a regulatory review process under the National Competition Policy (NCP). Regulations that restricted competition had to be assessed against a 'public benefit' test by the year 2000. The regulations could only continue if the community benefits exceeded the costs, and if those benefits could only be achieved by limiting competition (PC 1999).

Several state reviews concluded there was a net public benefit in the regulation of fluid milk prices. In 1998 the NSW and Queensland Governments announced an extension of farm gate price controls until 2003. In both States the extension of the regulations was subject to any changes to the fluid milk regulations in Victoria.

The Victorian regulatory review was completed in mid 1999 and found there was no net benefit from the regulations. The Government accepted the recommendation to terminate farm gate price controls on 1 July 2000. This decision was supported by the Victorian dairy industry:

- the main farmer organisation and the dairy co-operatives were in favour of ending the regulations.

In response to this decision the industry took a proactive approach to managing the change. It was generally accepted that if deregulation was going to occur it was essential to have an orderly transition. After considerable discussion the industry decided to support full deregulation of the dairy market in conjunction with adjustment assistance to manage the impact on the farm sector.

The industry proposed to simultaneously end all state based support schemes for fluid milk and the DMS Scheme at the same time. The final stage of industry deregulation occurred on 1 July 2000. There was no transition period – the change happen over-night. A phasing out period was not a realistic proposition because of the difficulty in coordinating the separate political processes in each of the six States.

The Federal Government implemented a $1.78 billion dairy industry restructuring package as part of the planned deregulation of the market (Phillips 2002). The package was designed to provide transitional adjustment assistance. There were concerns about the expected impact of a large reduction in the incomes of many farmers immediately following deregulation.

The package had two main components:

- a *Dairy Structural Adjustment Program* (DSAP) of transitional assistance for all dairy producers
- a voluntary *Dairy Exit Program* (DEP) to assist farmers exiting the industry.

The adjustment assistance was funded by a levy imposed on domestic sales of liquid milk. A consumer tax of 11cents/litre remained in place for several years until the cost of the assistance was fully recovered. The levy was set at a rate to achieve an initial reduction in the retail price of milk and to limit the package repayment period. It was equivalent to a two-step phasing out of the farm gate pricing regulations:

- the initial step involved a sizeable price reduction that would not be 'lost' in any commercial adjustments to price margins
- removing the levy at the end of the repayment period would mean another substantial reduction in retail prices.

The DSAP scheme accounted for the majority of the adjustment assistance – around A$1.63 billion. The assistance approximated the loss of income that would have been received in the first three years of deregulation. Individual transitional assistance was

based on milk produced in the 1998-99 season. Producers were unable to affect the amount of adjustment assistance by subsequently increasing production.

Dairy Farmers who were eligible for a DSAP grant but had decided to leave the industry could apply for exit assistance under the *Dairy Exit Program* (DEP). The maximum value of the exit assistance was a tax-free lump sum grant of A$45,000. Successful applicants gave up their right to a DSAP grant:

- producers who planned to retire from the industry could do so with either a DSAP grant or a DEP payment.

The objective of the exit program was to assist farmers in financial difficulty to exit the industry. It was a voluntary program and open to applications for two years from the date of deregulation. Eligibility was subject to an assets test and acceptance of a DEP payment required dairy farmers to sell their farm and withdraw from agricultural production for 5 years.

Deregulation caused a large number of farmers to exit the industry. Over a thousand farmers left the industry in the first year of deregulation and there were further exits in subsequent years. The remaining producers made substantial changes to their farming operations to off-set a decline in net farm income. The on-farm adjustments resulted in milk output per farm increasing by 6% in the first year of deregulation and almost 14% in the second year. The structural adjustments substantially improved the scale and productivity of Australian dairy farms.

6 Concluding comments

The preliminary research highlighted some technical changes that accelerated the development of the Australian dairy industry in the early 1900s. The adoption of these innovations was encouraged by government funded extension activities. At the same time a focus on extension efforts in livestock management and on-farm milk handling practises facilitated the transition to a more commercially focused industry.

There are some useful insights from the early development of the Australian industry that could help to frame industry policy in Pakistan. A detailed assessment of current policy interventions in Pakistan and proposals for future policy measures would be an essential first step in an ACIAR project. The economic constraints on growth in the small holder sector will ultimately require a transition away from small scale mixed farm operations to larger scale more specialised dairy farms.

Policy interventions to support dairy farmer incomes in Australia caused many years of distorted market outcomes. Resources that should have moved to more wealth creating productive activities were encouraged to remain in the dairy industry. The cost of these interventions on consumers and other end-users was substantial as they were the source of funding for the implicit income transfers.

Future policy development in Pakistan will inevitably face requests for government interventions to stabilise prices or to raise farm incomes. There are some useful insights from Australia's experiences that could be applicable in Pakistan. The project proposed to review the Australian experiences and evaluate what principles could be applied to the current situation in Pakistan. This preliminary research has highlighted the key issues for the small holder sector to be:

- the effectiveness and focus of government extension activities
- the development and enforcement of food safety regulations affecting milk handling on-farm, market distribution and dairy product utilisation
- how to handle future requests for government interventions to support prices and farm incomes
- targeted infrastructure improvements to facilitate the transition of small scale producers into the milk processing industry.

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