From:

Rural-Based Food Processing Industry in Asia

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Report of the APO Multi-Country Study Mission on Rural-Based Food Processing Industry (SME-OS1-00)

Japan, 6–13 March 2001

Edited by Dr. Alastair Hicks, Bangkok, Thailand.

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RURAL-BASED

FOOD PROCESSING INDUSTRY

IN ASIA

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FOREWORD

The rural food processing industry can play a vital role in rural poverty alleviation and sustainable development in many Asia-Pacific countries. It can enhance farm incomes by offering a ready market for farm products, generate off-farm employment, and reduce rural–urban migration. Rural-based food processing industries are mostly small- and medium-sized enterprises (SMEs) and face such constraints as poor infrastructure, shortage of entrepreneurial talent and skilled manpower, limited access to appropriate technologies, volatile demand, and small profit margins.

In some member countries, successful attempts have been made to develop rural-based food processing SMEs. For example, some advanced member countries have developed well-integrated rural food processing industries employing state-of-the-art technologies and a participatory integrated rural development approach. Others have developed efficient production–processing–marketing chains through farmers' associations. In this regard, the experience of Japan could be extremely useful for other APO member countries in the development of efficient and viable food processing SMEs.

The APO organized the multi-country study mission on the "Rural-based Food Processing Industry" in Japan to learn about the latest developments in the small- and medium-scale rural-based food processing industry and to examine the possibilities of applying its experience in other member countries. This publication is a compilation of the papers and proceedings of the study mission. It is our hope that this publication will prove useful to our readers, especially policymakers, planners, and managers involved in the development of the food processing industry in the Asia-Pacific region.

The APO is grateful to the Government of Japan, especially the Ministry of Agriculture, Forestry and Fisheries, for hosting the study mission, and to the Association for International Cooperation of Agriculture and Forestry for implementing the program. Our appreciation also goes to the resource persons for their valuable contributions and to Dr. Alastair Hicks for editing this publication.

TAKASHI TAJIMA
Secretary-General

Tokyo
April 2004

SUMMARY OF FINDINGS

INTRODUCTION

The Multi-Country Study Mission on Rural-Based Food Processing Industry was held in Tokyo from 6 to 13 March 2001. The study mission was organized by the Asian Productivity Organization (APO) and hosted by the Government of Japan. The Association for International Cooperation of Agriculture and Forestry (AICAF) implemented the program with the financial and technical assistance of the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF). Eighteen participants from 14 member countries and three resource speakers from FAO and Japan attended the study mission.

The objectives of the study mission were: 1) to observe and review the rural-based small and medium food processing industry established in the host country; and 2) to examine its links with support services, supply of raw materials, marketing, etc. and discuss the possibilities of application of such systems in the member countries.

The study mission consisted of the presentation and discussion of resource papers, field visits to various food processing facilities in Gifu and Shizuoka prefectures, presentation of country papers and a workshop. The topics covered by the resource papers were: Characteristics and Problems of Agribusiness for Rural Development in Japan; Status of Rural-Based Small and Medium Food Processing Industry in Japan; and Issues and Strategies in Development of Rural-Based Small and Medium Food Industry in Asia and the Pacific. The country papers focused on the status review of rural-based small and medium food processing industry in the participating member countries. In the workshop, the participants identified the major issues and problems affecting the rural-based food processing industry in the member countries; and suggested specific strategic actions to address such issues.

The highlights of the Study Mission are presented as follows:

HIGHLIGHTS OF THE RESOURCE PAPERS

Characteristics and Problems of Agribusiness for Rural Development in Japan (Dr. Sueo Futatsugi)

Agriculture in Japan is undergoing transformation. Rural areas are scattered mainly in and around villages but also around towns and cities. Agribusiness for rural development is thus scattered around villages, towns and cities of Japan. There are three main food consumption systems in Japan, i.e., fresh foods directly purchased by the consumers, processed food products directly consumed by the people, and processed food products first going to restaurants and then consumed.

The paper describes characteristics and problems of agribusiness for rural development in Japan with emphasis on small and medium food processing industry based on a farm village as follows:

1. ***Meaning of Agribusiness for Rural Development***
   - What is agribusiness for rural development?
   - The background that is required for agribusiness for rural development
   - The motivation for starting agribusiness for rural development and the effects of such agribusiness.
2. ***Agriculture and Farm Village Marketing (Agri-marketing) and Agribusiness for Rural Development***
   - Agri-marketing and local management aspects
   - Putting value-added to local resources and agribusiness for rural development
   - Exchange activities between cities and farm villages and creation of local customers.
3. ***Local Small and Medium Food Processing Business Projects that Form the Center of Agribusiness for Rural Development***
   - Local food processing business projects with a clear customer target
   - Local food processing business projects that enable exchange activities between different business categories voluntarily within a region to function

- Local food processing business projects with a wide variety of business styles—agricultural cooperatives, agricultural associations, limited companies, corporations, women groups, etc.

4. ***Examples of Local Food Processing Business Projects with Some Features***

- JA Sawada agricultural cooperatives (Nakanojo-machi, Gunma prefecture) with a history of over 20 years of pickles production
- JA Sawayama and Sasayama Ikiikijuku Co. (Sasayama-cho, Hyogo prefecture) that support processing and sales of locally produced black soybeans
- Companies (Kamagari-cho, Hiroshima prefecture) that, together with an entrepreneur in Tokyo, started and succeeded in producing salt from seaweed
- Agricultural cooperatives and a government-led public corporation that skillfully and separately are in charge of processing, sales and development of garlic in the nation's biggest garlic producer to Takko-machi, Aomori prefecture
- Now many women groups are starting food processing business in Japan.

5. ***Problems of Local Food Processing Business***

- Create customers (market) and satisfy customers
- Develop new product and technology
- Secure materials in a stable manner
- Relate such business activities with exchange activities for rural development
- Business strategies (to grow and be competitive) and business management (improve efficiency) for securing profitability
- Secure food safety and work to preserve environment
- Governmental measures.

Status of Rural-Based Small and Medium Food Processing Industry in Japan (Isamu Sakurai)

In presenting his paper, Mr. Sakurai introduced in detail the JA-ZENCHU (Central Union of Agricultural Cooperatives), which is working towards a promising future. With the support of its nine million strong membership, it is striving for a stable supply of safe food, preservation of the rural environment and construction of vibrant rural communities.

The JA-ZENCHU is the apex body of the JA-Group, and was established for the development and coordination of joint policies, to further the development of the group. JA-ZENCHU is also helping to contribute to the development of the cooperative farmers' movements worldwide, through its affiliation with the International Cooperative Alliance (ICA) and International Federation of Agricultural Producers (IFAP).

Mr. Sakurai then discussed the origin and structure of agricultural cooperatives, types of agricultural cooperatives, JA's set-up, JA's activities and JA management styles. Also the status of rural-based small and medium food processing industry in Japan was explained. The details of expenditure on consumption of various food products such as agricultural and fishery products both domestic and imported products, food industry and restaurant products both the domestic and imported, and restaurants were given. Similarly sales of processed goods and by products in Japan were explained.

The paper focuses on the following sub-topics while explaining the basic concepts of food processing business in Japan:

1. *"From Available Local Products" is not good enough*: In order to produce high value-added products that will be well-received by consumers, it is necessary that product development be based on the concept of "meeting consumer needs" rather than "from available local products".
2. *Logical Process*: is the initial idea, expansion, development, and completion for product development. For planning and developing a business as well as a product, a logical process is necessary.
3. *Developing A Product to Sell Well*: A product that sells well can be planned and developed by going through the logical process in this order: expansion, development, initial idea and completion. However, since the concept "from available local products" is rigidly held in JA processing business, the order should be initial idea, expansion, development and completion.
4. *Taking the Initiative to Establish a Market*: If the product is a perishable food, it can be sold in wholesale markets although the selling price may be higher or lower than expected. However, for a processed food,

there is not more convenient market than the wholesale market. The JA has to find a market on its own for specialty products.

5. *Manageable Business Size*: To start up a special product processing business, capital investment is necessary, although the amount varies depending on type of the business. Subsidies are an important way of amassing capital. However, subsidies may also have the negative effect of making the business plan fanciful and unnecessarily increasing the size of the processing facilities.

6. *Defining Profit and Loss*: It is important to make a thorough business plan. The business is conducted according to the plan and the direction of the business is adjusted according to the results. If it is not expected in the planning stage that the business will be profitable, it may be necessary to give up starting the business. Accounting systems that do not define profit and loss until sizable amounts of money have been lost, should be avoided.

7. *Right-Brain Thinking, Not Overly Influenced by the Past Experience*: In order to start the processing business and to make it go, one needs to be able to think freely, and not be overly influenced by past experiences or standard solutions. This is called right-brain thinking. It is important for those engaged in specialty product processing businesses to find their own unique solutions rather than employing conventional solutions. Without right-brain thinking, the business will not evolve.

Issues and Strategies in Development of Rural-Based Small and Medium Food Industry in Asia and the Pacific (Dr. Alastair Hicks)

Food security means ensuring that all people at all times have access to the food they need for a healthy, active life. Increasing food production contributes to food security within communities and nations by making more food available and by generating employment and income. But increased production alone cannot guarantee food security. Increased income through value addition to agricultural raw materials is one way to achieve this.

Agro-processing industries generate value addition by the processing of agricultural raw materials, both food and non-food, into products which are marketable, usable or edible, have improved storability and/or nutritive value, and enhance income and profitability for producers.

The processing industries in the Region's countries are essentially agro-based enterprises. There is a huge range of ethnic and traditional food products in each of the countries. The local food industry has evolved around domestically available agricultural raw materials, such as maize or corn, paddy rice, fruits, vegetable, root crops, sugarcane, coconuts, oil palm, spices, beverages (tea, coffee, cocoa) and honey (apiculture).

1. ***Inter-sectoral Dependence Is the Hallmark of Agroindustry***

An industry depends on the primary sector for raw materials, the industrial sector in processing, and the consumer and market demand as a supplier of consumer goods.

2. ***Traditional Food Industry***

Constitutes as high as 70 percent of the companies in the rural areas of the developing countries of the Region. Normally family owned, they employ 50 or less workers and cater for domestic consumers. This industry is characterized by manual and batch type processes, labor-intensive, with minimal sophistication. Equipment is locally fabricated. The overall result is rather low productivity and efficiency. Quality control is often minimal and little if any research and development (R&D) is done. They offer little competition to the modern multinationals, but their products are sought after by local populations. Upgrading of these industries offers a window of opportunity to local markets where the economy is growing.

3. ***Modern Food Industry***

Modern food processing plants have been introduced in the developing countries, initially centered on processed foods derived from processed meats, wheat and flour products, dairy products. This has led to an increase in imported raw materials, ingredients and packaging, for the production of this type of food. In more recent years, however, indigenous companies have set up, often in joint venture with multinational corporations, to process local raw materials such as pineapples, cassava, fruits and vegetables to be packed, labeled and exported under the corporations' brand names. These operations include food canning, carbonated beverages, frozen food manufacture, flour and starch, and dairy products production. The

companies apply total quality assurance as well as comprehensive R&D procedures to ensure high quality, innovative products.

Backward linkages are essential, such as credit, agricultural inputs, support services and procurement; whilst forward linkages are needed for market information, produce marketing and new product development; infrastructure is required in the form of roads, water, power, irrigation; as well as social facilities (schools, hospitals) and other off-farm activities.

Policy instruments for agro-processing industrial development include, among others, regulation of technology transfer and industrial ownership; fiscal incentives for R&D, as well as training; financing of operations through risk capital contribution; unrecoverable financing for research and infrastructure; pre- and post-graduate studies scholarships; commercial protection and foreign investment regulation; private and public sector purchases and investment, and commercial liberalization.

In order to achieve the objectives and goals defined and established by governments; clear policies, strategies and their accompanying guidelines and rules are needed to promote and regulate the activities of agribusiness. Policies and strategies for food processing industries should be formulated in response to some key questions:

- What are the emerging needs and opportunities for agro-processing industrial development?
- Which organizational pattern is the most appropriate for agro-processing to benefit the rural population?
- What are the factors that affect the organization and management of successful agro-processing units?
- How many countries or companies ensure that agro-processing will return benefits also to the small farmers, not only to the multinational concerns?
- How can the agro-processing industries win and maintain markets, and which product systems should be promoted and where?
- What resources natural, human, financial, are available in the country, from government, institutions and private sector?

These vital questions should be considered by the interdisciplinary group referred to. Networks should be formed between these government groups, and international organizations such as FAO as well as private industries, to provide forums in which substantial policies and strategies can evolve, to enhance rural employment and incomes through the development of agro-processing industries in countries of the Region.

HIGHLIGHTS OF THE COUNTRY PAPERS

Bangladesh

Bangladesh is mainly an agricultural country and it was a food-deficit country up to 1997. Since then, the country has been producing a sufficient quantity of food, in excess of its demand. In the financial year 1999-2000, the country produced a total of about 24.9 million mt of food, while the food demand of the country in the same period was about 21.4 million mt.

The above mentioned figures include production of only food grains such as rice, wheat, and barley. Bangladesh also produces substantial quantities of various kinds of fruits and vegetables like mango, pineapple, goaba, jack fruits, banana, coconut, papaw, potato, tomato, and beans. The food processing industry has great prospects and potential in Bangladesh. But this industry has not yet grown sufficiently mainly due to lack of technology and investment funding.

The main rural-based food processing industries in Bangladesh are rice husking mills, flour mills, dairy farming, poultry, bakery and confectionery, sweet making, cheese making and hand-made pickle industry. These industries produce their products mainly for the local markets, while a few products are also exported. Most export-oriented food processing industries are located in the urban areas although they are not very significant in number.

Further development of rural-based small and medium food processing industry is constrained by a lack of finance and technology. The country encourages foreign investors for the provision of financial and technical assistance for its further development.

Republic of China

Taiwan's economic development went through three phases: agriculture, light industry, and heavy industry. Agriculture stands as the foundation of the Taiwan's economic development and is an essential sector within the overall economy. In the beginning, light industry relied on the food industry to earn foreign exchange and supported further industrial development. Canned foods, dehydrated foods, frozen foods, and salted foods were the major export items. Most food processing factories in Taiwan are located at rural villages for the convenience of collection and transportation of raw materials from farmers.

In recent years, under several disadvantageous conditions, Taiwan's food industry has entered a transitional period in which food product exports are experiencing sharp decreases, while imports are booming. Domestic sales orientation is becoming the major target for future growth in the Taiwan food industry.

The rural-based food processing factories and stations are also very popular in Taiwan's rural villages. Although this kind of processing enterprises is of a small scale, it is very profitable to the farmers. To ensure further development of these kinds of food factories and stations, our government has adopted several programs.

The execution and cooperating agencies of the rural-based food processing industry include government agencies, research institutes and farmers' associations. They jointly render assistance to the organizations of farmers for the production of raw materials, improvement of processing techniques and equipment, and packaging and marketing of products.

The promotion and modernization of the rural-based food processing industry not only solved the problem of oversupply of the plant crops, but also increased the income of farmers. Through the assistance of modern technology, the products greatly improved in quality and sanitation and have become well known in local market. Until now, 70 townships have been promoted under the project, with different products.

There is still a need to enhance the capabilities of farmers' management and market-oriented concepts; to impart training and education to improve the sanitation and packaging of products; to strengthen the relationship among township farmers' associations, processing stations/factories and farmers; and to ensure the optimal selection of available areas and products.

India

Two-thirds of India's population lives in rural areas and 70 percent of the population depends on agriculture. Poverty and unemployment in rural areas continue to be the two most important challenges. The potential of rural food processing industry (RFPI) to tackle these challenges is yet to be fully exploited in the country. Employment is much higher in the food sector than any other sector. Therefore, growth of RFPI becomes vital for a rapid transformation of the rural economy in a country like India. Food processing industry ranks Fifth in size in the country, employs 19 percent of the industrial labor force, and contributes 14 percent of the industrial output which is 5.5 percent of the national GDP.

Although India is one of the largest producers of raw material for the food processing industry in the world, the industry is still at a nascent stage. A plethora of laws covering processed food items and involving multiple agencies, the tax structure, poor infrastructure such as lack of integrated cold chains, good roads, quality power, and poor access to latest technology, are some of the constraints which have retarded the growth of this industry. Investment in the food processing sector is plagued with high risk and yields low returns, because of its dependence on the seasonality of production of raw materials. The RFPI at present is structured for subsistence, and is not market driven. Seventy-five percent of these industries are under the small and unorganized sector. The small and medium industries are engaged in primary processing and not in secondary or tertiary processing, reducing the scope for value addition, which further hinders the growth. The WTO regime further poses a challenge to the sector in terms of traditional versus modern technologies in the context of competitiveness.

Realizing the scope, potential and need, the Indian Government has been attaching importance to building a strong and effective food processing sector, so as to diversify agricultural activities, improve value addition to agricultural produce, ensure employment generation and to produce a surplus for the export of agro food products. Much emphasis is being laid on infrastructural development such as creation of cold storages, food parks and roads. The food processing industry is included in the priority sector.

Indonesia

Small- and medium-scale food processing industries (FPIs) in Indonesia have been growing steadily for the last few decades. During such development, the role of raw material availability and absorption of the products by the local market was significant. The FPIs are located in rural areas and the technologies used are mainly traditional ones. The process and equipment items used are very simple and the products usually have a short shelf-life, with simple packaging materials that lacks attractiveness. Usually the products of these processing industries are absorbed by the local markets, although some are marketed for export. However, some products such as shrimp crackers, gnemon cracker (*emping belinjo*), palm sugar and some other fishery products have successfully penetrated export market.

The FPIs, particularly the small ones, are scattered throughout the country. The main concentration is in Java (72.3 percent) followed by Sumatra (13.9 percent) and other areas (13.8 percent). On the contrary, the large and medium FPIs are usually distributed in areas where facilities and infrastructures are sufficiently available.

The government not only facilitates development of small FPIs for traditional products but also for products that have export market potential as well as those products with better value-added, while considering the availability of local raw material supplies.

Main constraints encountered in empowering and facilitating these industries are scattered location of the industries, inadequate investment, lack of availability of good quality raw materials, poor marketing of the products, lack of infrastructure and facilities, and lack of quality workers which give rise to low quality of the products, inefficiency of production and lack of hygienic practices. In future, increasing competition among processed products both in the domestic and international markets, due to trade liberalization under the WTO initiatives, would compel the government to have strategic planning for developing the rural-based food processing industries.

In order to empower the small and medium FPIs, the government of Indonesia has taken some measures along with formulation of policies to enhance the development of FPIs.

Islamic Republic of Iran

From the economic point of view the small rural industry can complete the chain of production based on agricultural products. In Iran one of the strategies for rural development must aim to increase the efficiency of existing forms of activity and introduce new opportunities and instruments of development. Additional investments in rural areas always helps to improve the agricultural productivity.

For promoting rural industry activity, 170 industrial zones were established in various parts of the country, but only 46 of them had been completed. Then 12,847 licenses were issued for new small rural industries and 36,210 for the existing small industries.

There are 250 small milk processing factories, mostly small white cheese workshops, that are managed by the private sector. The 242 private plants with total capacity of 1.08 million mt were under construction or non-operational. These factories produce yoghurt, butter and cheese. There are many traditional milk-processing factories that produce large quantities of yoghurt and cheese. Total meat production increased at 2.3 percent in 1995, 5.1 percent in 1998 and 3.75 percent in 1999. About 680 million chickens are consumed in Iran. However, if all slaughterhouses operate full time and at the maximum capacity they can only slaughter 528 million chickens per year. The shortage in capacity is about 22.5 percent of the total production of for slaughterhouses.

There are 466 slaughterhouses for small and large animals in Iran, of these only 24 units are well equipped and operate at the industrial and semi-industrial level, while others operate with minimum equipment for slaughtering.

The capacity of industrial slaughterhouses is for 885,300 head of small animals and 119,500 head of large animals. There are 112 factories for meat processing, with a capacity of about 339,842 mt per year. There are 24 factories for meat packaging in 11 provinces of Iran. Total cold storage capacity is about 1,104,665 mt per year. The cold storage facilities consist of 438 units of which 116 units belong to the public sector, the others to the private sector. There are 379 wool-processing factories. There are 39 units for packaging honeybee products in 10 province of Iran. The total capacity of these workshops is about 18,500 mt honey per year.

The Government of Iran has undertaken several projects to promote small- and medium-scale rural industry but rural-based small- and medium-scale food processing industry is still in the initial stages of development.

Republic of Korea

Food consumption patterns in Korea have undergone dramatic changes since 1980s. The changes are mainly characterized by an increased demand for processed food and food away from home (FAFH). The importance of food processing industry in the rural area has been recognized, according to changes in agricultural environment.

In order to strengthen the linkage between food industry and domestic agriculture, fostering these food processing projects, using domestic agricultural materials in rural areas, has become very important. In Korea, Ministry of Agriculture and Forestry (MAF) set up schemes to discover, to preserve, and to develop native Korean traditional foods, harmonized with the unique processing technology. Since 1989, MAF has been actively promoting the agricultural product processing industry. The development projects for food processing industry can be classified into traditional food development projects, general processing industry projects, and rural specialized products complex (RSPC). The government aims to build 2,000 food processing factories in rural areas by 2004. For this purpose, the financial support for promotion of food processing industry in rural areas consists of support for plant facility, packaging improvement support and raw material procurement support.

The support program by government was very effective to encourage food processing enterprises based in the rural areas to develop their traditional local processed foods. The government policy contributed to raising the prices of agricultural products and increasing farm incomes in those areas. However, many food processing enterprises are still confronted with problems such as low operating rate, poor sales, and small scale of operation.

Malaysia

Small-scale food processing industry is a dynamic and fast growing sub-sector in the Malaysian economy. In 1995, the gross production and value-added of this sub-sector reached a value of RM10.5 billion and RM4.2 billion, respectively. It also caters for about 33 percent of the employment in the non-agriculture sector. About 40-50 percent of the processed food requirement comes from this sub-sector.

The Third National Agriculture Policy (NAP3) emphasized the development of agro-based industries in terms of processing, storage, and handling of agricultural commodities to increase their value addition.

Rural-based food processing industries in Malaysia face several problems, such as inconsistent supply of raw materials, limited and inefficient production level, outdated processing methodology and equipments, poor quality of food products and product presentation, poor hygiene and sanitary practices, lack of product development, and lack of managerial and marketing know-how.

The government, through several agencies has adopted an integrated approach to develop the small-scale food processing industries into a commercially competitive and sustainable industry.

In view of the trade liberalization and open marketing, the small-scale food enterprises should prepare themselves to compete globally through commercialization, high quality product and low production cost.

Mongolia

Despite an unfavorable environment for the development of small- and medium-scale enterprises (SMEs), today they are found practically in all sectors of economy. According to a national survey in 1999, around 850 food processing small and medium businesses were registered, of which 70.7 percent were rural-based SMEs. However, due to state ownership of all enterprises in Mongolia in the recent past, development of rural-based food processing industry is still in infancy and is confronting various problems.

The most serious issues and problems for the development of rural-based food processing industries are lack of modern management know-how and marketing skills, severe shortage of loan capital, demand constraint, a low level of purchasing power, and a serious shortage of raw materials.

The Government of Mongolia is encouraging development of industry, including small and medium food processing industry. The key elements of present government agricultural policy are:

- development of national independence in food supply;
- encouragement of rural-based economic activity;
- actions to overcome some of the legal and commercial impediments faced by producers; and
- complete privatization of state shares in agriculturally-related businesses and farms.

Nepal

Nepal's economy is mainly based on agriculture, which employs more than 80 percent of the population. Rural-based food processing units account for 76 percent of the total industrial establishments in Nepal and 50 percent of the value-added during the Fifth Plan period. The contribution of the industrial sector to the GDP was 9.22 percent. The current plan envisages to increase the contribution of the industrial sector to GDP up to 14 percent by 2002.

In rural areas, traditional technologies are most common, particularly in grain milling and oil extraction. Processed food industries in rural areas include rice, beaten rice, flour, beans, pulses, tea, pickles, biscuits, snacks food, sugar, confectionery, canned fruits, fruit juice, beer, wine, soft drinks, yoghurt, jelly, jam, squash, sauces, and factories. Modern food processing plants mainly consist of those for milk processing, bakery products, instant noodles, soft drinks and alcoholic beverages. Modern industries have semi-automatic or automatic processing, filling, sealing, packing or canning machines. Alternative energy technology like solar drying systems are being used now for processing certain foods.

There are several constraints for development of small- and medium-scale RFIs. Some major problems confronted by RFPIs are limited production of raw materials, lack of easy access to modern technology, hard to maintain quality supply, less competitive market with limited marketing areas, lack of adequate trained labor force, and inadequate access to credit facility.

The role of the private sector in industrial development essentially consists of import of technology on a turn key basis, investment financing, attracting foreign collaboration and providing opportunities for employment. The role of NGOs, farmers' associations, farmers' cooperative societies and women's groups is predominantly seen as agents of resource mobilization from INGO, UNDP or Ministry of Local Development and the Department of Cottage and Small Scale Industry.

Government policy on RFPIs is so far not well defined, however, it is encouraging the private sector to invest in the RFPIs. The private sector participation in the development of RFPIs is still in infancy. Thus, specific government policies should be introduced to promote processed food industries in Nepal, particularly in rural areas.

Pakistan

In Pakistan, the food processing industry is the largest industry of the country, accounting for 27 percent of the total value-added production and 16 percent of the total employment in the manufacturing sector. Total production value of the output of food industry is estimated to be Rs.46 billion (US$767 million). Major groups of the industry are sugar, flour, dairy, fruit processing, fisheries, cooking oils, meat and poultry.

The use of processed food is not very common, as consumers prefer to use fresh foods. However, the size of the food processing industry and RFPIs is quite large and these industries produce substantial quantities of various processed and semi-processed foods.

The SMEs including RFPIs provide about 54 percent of the total employment and contribute a significant share (around 40 percent) to GDP. The main RFPIs of Pakistan are sugar/brown sugar, dairy products, dehydrated fruits and vegetables, traditional pickles, jams, marmalades, beverages, traditional confectionery, sweet-meat, vermicelli, spices, floor, and oil extraction industries.

The RFPIs producing various traditional products are using conventional methods and techniques of production, while the use of modern machinery and equipment is also nominal. The role being played by farmers' associations and NGOs is not very significant, while participation of women in the RFPIs is around 20 percent.

The RFPIs are facing difficulties due to the shrinking rural markets, disadvantages of small-scale operation, popularity of the products from modern plants and non-supportive government's policies. The poor infrastructure in the rural areas and difficulties in obtaining loans are also hampering the growth of SMEs and RFPIs.

Now the government is giving due importance to the promotion of SMEs including RFPIs. For this purpose, the Small and Medium Enterprises Development Authority has been established to formulate and implement suitable support programs for the SMEs. The requisite physical infrastructure is being developed in the rural areas, and provision of loans to the SMEs is also being ensured. Pakistan Industrial Development Corporation (PIDC) is setting up a few model rural-based food processing projects which include fish processing, postharvest apple treatment, dates processing, date syrup, fruits and vegetables grading and export projects.

Philippines

There are more than 200,000 rural-based food processors in the Philippines, only 1-2 percent are registered. The rural-based processors are supplying to the food exporters. This segment has enhanced the household income in the countryside. The entrepreneurs are mostly not academically trained in food science.

There is a wide range of raw materials available for processing. However, the quality and cost are the major challenges. Technologies applied are mostly processes handed down through generations, some were developed by government institutions. The major constraints are lack of availability of raw materials, lack of support services, lack of available packaging materials, cost of money and continuing reliance on single traditional markets.

Various departments and agencies of government have programs which directly assist the SMEs of the food industries. The vision for the food processing industry is "to be an internationally renowned Philippine food organization which adopt practices that will contribute to environmentally sustainable businesses, enhancing competitiveness in the global market, to benefit members' employees, consumers, stockholders and the community in which we operate".

Sri Lanka

Sri Lanka is a country with a predominantly agricultural economy, despite attempts during the last two decades to promote industrial development. It has been realized that development of RFPIs is an essential element in rural development.

Mostly RFPI is depending on traditional technologies, except a few products like dehydrated fruits and vegetables. Sri Lanka shows moderate economic growth and is currently promoting small and cottage industries through various programs. There are number of tariff and non-tariff barriers to protect the local agriculture sector.

Major constraints in the development of RFPI are lack of accessible technologies, lack of an autonomous national organization for promotion of RFPI, unfavorable trade policies, dearth of accurate market information, lack of access to many credit and incentive schemes, lack of quality processed food products – a controlling factor for small producers to enter the export markets, costly support services to develop the industrial hygiene, and less attractive and effective packaging. Manpower is now becoming an issue for this sector due to lack of skills and knowledge.

There are a number of business development organizations to help RFPI in general. While some institutions try to associate with the food processing sector, there are institutions providing support services in different areas such as technology, business development and rural credit. Women-headed food processing industries would be a priority area for many NGO-based business support services.

Thailand

Thailand is an agricultural country that has been moving towards food processing industry since 1960. The four main groups of exported foods are animal products, fishery products, vegetable and fruit products and cereal and tuber products. The total number of registered food industries is 9,713, of which about 88 percent are small, 9 percent are medium and 3 percent are large. In addition, there are an unknown number of unregistered small food processing industries in villages around the country. Most small and medium food processing industries are located in rural areas near raw material sources. They have low production efficiency and unstable product quality, and conditions are even worse in village industries.

The constraints on development of small and medium RFPIs are: seasonal supply and low quality of raw materials, unskilled workforce at operating level, inadequate modern technology, and quality management. Since the trend of processing is toward higher technology, training at all levels is required.

Educational institutions and industry should join hands in producing qualified personnel to meet industry needs.

Traditional technologies used in small and medium food industries are drying, fermenting and special processes for traditional food products. The modern technologies are chilling, freezing, pasteurization, sterilization and special process for unconventional food products.

The government has drafted legislation on SME promotion to set the framework for related government agencies. The implementation of SME promotion plan can be in many forms. One of the recent activities providing for 500 selected SMEs in 1999-2000, was a project on efficiency development of SMEs, run by the Department of Industrial Promotion in collaboration with universities around the country. An example of linkages among government agencies, private sector, NGOs and village groups is illustrated in the paper.

Vietnam

Vietnam rural areas account for 80 percent of the country's population and 73 percent of the labor resources. There is a lot of potential of promoting rural-based food processing industry (RFPI) in Vietnam.

Further development of RFPI can generate employment and increase of farmer's income.

For the past many years, contribution of food processing industry to GDP has been increasing at 12-14 percent annually. The processing industry has contributed an increase of 20 percent to the export structure and increased processed food products turnover. Products and packaging quality of many processed foods have gradually been improved, expanding to domestic markets, and have initially been accepted by world market.

The major reasons for the above achievements are government's decision to develop some major advantages in the production sectors such as rice, coffee, sugarcane and postharvest processing. Due to renovation of their management mechanism, some enterprises have actively invested to establish raw material areas, improve their production efficiency, and renovate their equipment and technologies for partial modernization to meet the market's demand.

The major constraints of RFPI are a low proportion of processing industry of certain agro-products, compared to its raw material potential (sugar, 70 percent; tea, 65-70 percent; fruit/vegetables, 8-12 percent; meat and milk, 12.5 percent), low product quality, export mostly of raw material, high harvest and postharvest losses, old devices and backward technologies, compared to other countries of the region and the world.

There are government policies to encourage farmers to develop RFPI, such as policies of land use, loans, labor, science and technologies, infrastructure and construction investment, marketing, and taxes.

The paper discusses the actual status of processing of rice, sugarcane, coffee, tea, fruits and vegetables in Vietnam.

FIELD VISITS

The participants of the study mission visited the following six facilities to observe the rural-based food processing industry in the host country (Japan):

JA Gujo Myogata Ham Plant

The participants visited JA Gujo "Myogata Ham Plant" (MHP) on 8 March 2001. Mr. Takeshi Taniguchi, Deputy Director, welcomed the participants, and briefed them on various aspects of the MHP.

The JA Gujo is situated in the Gifu prefecture. The JA has a membership of 8,000 with 240 employees. The JA installed the MHP in 1953. At present 35 people are working as employees in the MHP, whose products are ham and pickled plum, the participants visited the ham plant only.

Mr. Taniguchi pointed out that their operating principle is the production of safe products. For this purpose every precaution is used, including cleanliness of the uniform and hands of workers, sanitary equipment, and plant premises. Thereafter, he explained the entire process of making Myogata Ham. For instance, purchase of meat, taking off fat, cutting meat in small blocks and pieces, mixing with salt of sodium nitrite (2 percent w/w), curing for two weeks, packaging, boiling of packed meat for 70 minutes to reach 73ºC, cooling for 21 minutes, refrigeration for 30 days for maturation, and then labeling. All equipment is sterilized using alcohol, and after sterilization, all the equipment is inspected with an ATP (Adenosin Triphosphate) machine for detection of viruses, *E. coli* bacteria, etc. and resterilized, if needed.

Although MHP is trying to ensure the safety of their products, yet ISO standards have not been applied so far.

Annual production and turnover of the MHP are 600,000 packets (one packet = 400 gm of ham), and ¥400 million, respectively. Shelf-life of the ham product is 60 days from the date of delivery. The raw materials for the ham are purchased from the local pork breeders/farmers and national level JAs, as the local breeders cannot supply enough pork.

As regards marketing, Myogata Ham is sold mainly in the Gifu prefecture and other nearby prefectures such as Aichi. All the products are consumed by the local market. The retail price of the Myogata Ham is ¥950/400 gm packet.

Mr. Taniguchi pointed out that their pickled plum processing plant is producing 10 mt of pickled plum per year. Thereafter, the participants thanked Mr. Taniguchi for his time and hospitality, and left for visiting the Meiho Ladies Company.

Meiho Ladies Company

The participants visited "Meiho Ladies Company" (MLC) on 8 March 2001. The president of MLC, Ms. Eiko Motokawa welcomed the participants and briefed them on the historical background and activities of the MLC that is situated in Meiho village of Gifu prefecture.

In 1977, three women started processing of agricultural products to improve their livelihood. Each of the three women formed a new small group of women. These three groups started, on a trial basis, processing of ripened tomatoes to produce ketchup and other pickled products. Later they started processing sweet corn and producing pounded rice, a "*mochi*" product. The three groups merged to establish the Meiho Ladies Co. (Meiho-mura, Gifu prefecture) in 1992 with the cooperation of Meiho Municipal Government. At present the Company has 23 members. In 1995, the MLC received the Agriculture, Forestry and Fisheries Minister's Award, for female entrepreneurs in farm villages who process "Blessings from Mountains".

The MLC purchases tomatoes from the local and other JAs which are not suitable for the market due to their uneven size. The MLC built a new facility for processing of tomatoes to produce tomato ketchup in 1997. At present the Company is producing 50 mt of ketchup per year. However, demand for the ketchup is much higher than that produced by the company. The other processed food products include karabuki (cooked butterbur with soy sauce), salted/pickled plums, stalks and flowers of butterbur, marinated in vinegar, and red radish marinated in vinegar. In addition they manufacture tofu from soybeans. Their products are used at a coffee shop at Meiho Hot Spring, they also provide catering for lunch at Meiho-mura Leisure Center and others and are also sold at Meiho Ski Resort.

The MLC intends to listen to the voice of the young people and utilizes this feedback to move forward in their marketing. The participants observed the processing of tomatoes for production of ketchup, where all the operations were manual. At the end participants thanked the president, MLC for her time and hospitality.

JA Hida-Beef Processing Plant

The participants the "Beef Processing Plant" (BPP) of JA Hida in the afternoon of 8 March 2001. The director of BPP, Mr. Hideyuki Genda, welcomed the participants and briefed them on the BPP, which is situated in the Hida city of Gifu prefecture. It was established in 1993 under the Rural Area Activation Emergency Project. The total construction cost of BPP was ¥177 million (¥83 million from central government, ¥8 million from prefectural government, ¥86 million from JA Hida). Total membership of the JA Hida is 50-60,000 while BPP is being operated by 18 employees only.

Farmers of the JA Hida raise/breed pigs for pork and ham products and many cattle for beef. They also grow peaches, apple, tomato, cucumber, etc. JA Hida purchases beef cattle and pigs from the member farmers. Hida Meat Company slaughters the animals and sell pork and beef through the open auction. JA Hida-BPP purchases beef and pork from the Hida Meat Company.

At the BPP pork meat is cut into chunks, fat is removed, salt and spices are injected followed by curing, smoking, packaging (vacuum) and refrigeration. The shelf-life of the ham is one month. The preservatives and color stabilizers are used at a very low rate to ensure good quality and the good appearance of the product.

Other products include ham/smoked ham, bacon, beef and sausages. This year BPP produced ham/beef valued at ¥400 million, that is less than normal sale due to the slow national economy. Hida ham/beef is

produced for domestic consumption only and is well known among the Japanese. Since Hida beef contains marbling of fat, or marbled meat, it is very tasty and very acceptable to the consumers. The Hida beef is sold to many departmental stores, at an average price of ¥5,000/600 gm. The peak sale season is the summer from June to September, when a considerable amount of beef is sold in the form of wrapped gifts.

The participants observed the various facilities of the Hida BPP and asked many questions regarding the BPP and JA Hida. Thereafter, the participants thanked Mr. Genda for his time and hospitality and left for the Hidatakayama Washington Hotel Plaza, Takayama-shi.

Takayama Early Morning Market

The participants visited Takayama Early Morning Market (TEMM) on 9 March 2001. The TEMM was established about 40 years ago by the Takayama JA and Takayama Municipal Government. The market is situated just in front of the historic site of the "Takayama Jinya". This is the site where the food grains used to be reserved for the city people and the commander used to live about 200 years ago. The house of the commander is preserved as a national monument.

The objectives of the TEMM are: to provide jobs for the wives of the member farmers of the Takayama JA; and to increase household income of the farmers through selling various commodities.

Normally there are 30-40 shops in the TEMM. However, the participants were able to observe 15-20 shops only due to heavy snowfall. All shops are operated by the farmers' wives living in the nearby areas. These shops sell numerous products, such as fresh fruit and vegetables, processed food products such as pickled fruits and vegetables, bean curd, small wooden handicrafts and utensils.

The participants also visited the "Classic Merchant Homes on Kamisan-no-machi". Such homes are situated across the river close to the TEMM. There are numerous shops selling various traditional Japanese handicrafts, food items, "*dango*" or traditional rice snacks, sake, and wood carvings.

Piachure

In the afternoon of 9 March 2001, the participants visited "Piachure" (Piachure is Italian for 'nice to see you'). On arrival, the participants were welcomed by Ms. Kaori Yamashita, Deputy Managing Director, Piachure. She briefed them on the background of Piachure and the facilities available.

The Piachure unit was established in 1993 under the Third Sector Project with a total cost of ¥12 trillion and 12 million. This was the total cost of the two projects; namely, Agricultural Structure Improvement Project, and Activation of Rural Areas Project. The objective of the first project was to improve infrastructure such as roads, for improvement of agriculture, while the second project was aimed at activating rural people for their better participation in the development of the rural areas. The purpose of the Piachure is to facilitate production, processing, and sale of agricultural produce as well as for travelers/traffic in the area, through serving as an information base for the visitors.

The Piachure is run by the Shirakawa Town Agricultural Development Co., Ltd. The Company has 17 employees of which men and women are five and 12, respectively, to run the facility. The facilities at Piachure among others, include one green tea processing plant, and one ham processing plant, one open-air farmers' market, traffic monitoring system, and rest rooms for drivers/visitors.

At present, the green tea processing plant of the Piachure produces 10 mt of green tea for sale each year. The processed tea is of different types, viz., powder tea, stalk tea, etc. Wholesale market price of the processed green tea is ¥2,700-3,000 per kg. The Piachure is earning ¥340 million annually by selling green tea and ham. There are 500-600 farmers who grow green tea on an area of 40 km^2 in and around Shirakawa Town. Usually farmers sell green tea at ¥1,000-2,000 per kg.

Ms. Yamashita explained the entire process of green tea formation, i.e., picking and steaming of leaves followed by drying and selling. At the distribution center leaves are dried again, roasted, cut, graded and packaged for sale as different types of tea. The facility also processes tea for the farmers' own use.

In the open-air farmers' market, about 300 farmers bring their produce, particularly, vegetables, fix the prices themselves and sell them. Thus Piachure is facilitating farmers in selling their agricultural produce, as well as handicrafts.

After the above presentation, the participants visited various facilities of the Piachure; namely, the ham processing plant, tea processing plant, and open-air farmers' market guided by Ms. Yamashita. At the end, the participants thanked Ms. Yamashita for her time and hospitality, and left for Nagoya city.

Oratche

In the afternoon of 10 March 2001, the participants visited "Oratche", the Dairy Farming Kingdom. On arrival, the participants were welcomed by Mr. Toshikazu Katano, the President of Oratche. He briefed the participants on the background and facilities of the Oratche.

The Oratche has been constructed in Kannami-cho, the origin of dairy farming, in the Tanna district in Shizuoka prefecture. It has long played a leadership role as a place for dairy farming. For instance, it has 120 years of dairy farming history. Initially farmers used to sell milk to visitors who were attracted by the hot springs and high mountains of the area. Later on they expanded their dairy business and started selling milk to commercial companies, but were negatively affected. In 1955, the local JA installed the milk processing plant. Since then local farmers could be more successful in dairy farming. However, in recent years, the milk production environment has become very harsh due to globalization and other factors. Thus, the project named Oratche was undertaken to improve agricultural infrastructure, to establish a base for local agriculture. In order to activate local agriculture, also a facility for producing local beer was constructed and a forum for the exchange of producers and consumers was created.

The Oratche facility was constructed with a total cost of ¥1.49 billion. The central government provided a subsidy of ¥600 million while the balance was provided as a loan by the Agriculture, Forestry and Fisheries Public Financing Corporation. The Oratche also received subsidy under the Rural Area Activation Project. Since it is a Third Sector Project, the Oratche is managed by the joint company comprising public and private sectors. The management style of the Oratche is unique as the Joint Company Ltd. consists of the local JA and three consumer organizations. There are eight regular employees and 40 part-time workers. The facilities at Oratche include an agricultural product processing facility with a local beer brewery, jam, juice making, etc., a livestock processing facility for cheese and butter, a restaurant, and a greenhouse for flowers in the farmers' market that is currently used as a snack shop. The Oratche is proud of producing and selling many organic products, e.g., local beer, milk, juice, jam, ice cream, cheese, cake, etc. Net profit of the Oratche is ¥180 million per year. In conclusion, Oratche is providing several facilities to the local farmers for improvement of agriculture and activation of the rural area as well as to the outside visitors.

The participants visited different facilities of the Oratche; namely, barley malting room, brew house, juice studio, jam studio, cake studio, cheese studio, butter studio, ice cream studio, restaurant and greenhouse. The participants were also able to observe various recreational activities and an ongoing dairy cow competition at the premises of the Oratche. At the end, the participants thanked Mr. Katano for his time and hospitality, and left for Tokyo.

Regadless of the winter season and snowfall at some visiting places, the field visits were completed successfully. The participants demonstrated keen interest in the field visits and were very inquisitive throughout the field studies.

WORKSHOP OUTPUT

Objectives

A workshop was conducted to identify the major issues and problems affecting the rural-based food processing industry in the member countries, and suggest specific strategic action(s) to address such issues. To enhance the discussion and achieve a better sharing of views and experiences, the participants were divided into two small groups as follows:

Group I:

Bangladesh, India, Islamic Republic of Iran, Nepal, Pakistan and Sri Lanka

Chairperson: Mr. Mushfiqur Rahman Bhuiyan

Rapporteur: Mr. Shailesh Chandra Singh

Group II: Republic of China, Indonesia, Republic of Korea, Malaysia, Mongolia, Philippines, Thailand and Vietnam
Chairperson: Dr. Ming Chang Wu
Rapporteur: Ms. Filipina Divina G. Sonido

The outputs of the two groups presented in a plenary session are as follows:

Group I

Issues	Strategies
1) Lack of suitable policy framework for RFPI	– Adopt proactive conducive policy towards industry – Implement good governance and provide adequate fiscal and monetary support
2) Low productivity	– Efforts are needed for improving productivity including improved extension network
3) Shortage of trained manpower	– Strengthen training infrastructure
4) Ineffective linkages between R&D institutions and productive sector	– Strengthen R&D institutions and encourage R&D under the private sector
5) Inadequate infrastructure	– Invest more on infrastructure development, particularly road connectivity in rural areas
6) Poor access to information and communication technology and information networks	– Strengthen market intelligence and establish mechanisms for effective information exchange among the APO member countries
7) Lack of quality consciousness	– Implement quality standards and promote consumer awareness
8) Poor access to credit	– Provide liberal credit at reduced interest rate and adequate working capital
9) Degradation of natural resources	– Adopt sustainable natural resource management strategy

Group II

Issues	Short-term Strategies	Long-term Strategies
1. Raw Material		
A) Availability		
– Seasonal	– Chilling to preserve raw materials	– Off-seasonal crops
– Postharvest losses	– Partially process product	– Provide farmers, some stake in processing
– Farmer-processor relationship	– Contract farming, outsourcing	– Construction of postharvest facilities
	– Raw material exchange	– Crop zoning
B) Quality		
– Postharvest management	– Training farmer and processor	– Postharvest facilities
– Variety	– Basic research of applied research on horticultural practices and processing behavior	
– Management	– Coordination of farmers/ processors	
– Season	– Processing control	

... To be continued

Continuation

Issues	Short-term Strategies	Long-term Strategies
C) Cost of raw material – Cost of production – Cost of distribution D) Safety	 – Mechanization – Cooperative farming – Elimination of middleman – Pesticides/herbicide/veterinary drugs control – Proper harvest and handling	 – Economic size of production – Joint ventures and reverse investment – Selection of high-yielding varieties – Accreditation for organic product
2. Process Technologies A) Process – Know-how – Obsolete technologies B) Equipment – Lack of facilities	 – Effective communication between processors and academic/research institution – Awareness of market trend and product development – Knowledge of safety requirement of the process – Effective planning of factory layout and equipment design	 – Curriculum development in food science, technologies, engineering
3. Market A) Inadequate knowledge B) Packaging design/labeling C) Promotion and advertisement	 – Market orientation/knowing consumer needs – Consumer education – Suitability – Knowledge of labeling and requirement in each receiving country – Exhibition and trade fair – Direct selling – Promotion of cuisine – Strengthening linkages among processor, producer, food service and consumer	

1. CHARACTERISTICS AND PROBLEMS OF AGRIBUSINESS FOR RURAL DEVELOPMENT IN JAPAN

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MEANING OF AGRIBUSINESS FOR RURAL DEVELOPMENT

What is Agribusiness for Rural Development?

A rural small- and medium-sized food processing business aims to give added value to locally produced agricultural products. It can sustain its business of food processing by utilizing various local area resources such as nature, culture, history, human resources and appealing to "real taste", "traditional taste", and "homemade taste", thus attracting visitors to the local area as their main customers. Such food processing industry is mostly small- to medium-sized agribusiness for rural development, and is mostly located in mountainous areas of Japan.

Agribusiness for rural development aims to create an affluent local community in a real sense, to nurture human resources through promotion of agriculture, and is an agriculture-related project, voluntarily carried out within the community. Food processing industry forms the center of such agribusiness. Although in some cases, it is necessary to bring human resources and introduce know-how from outside to start such business, it is basically a project carried out by local residents in a creative manner, by utilizing resources and specialties within a local community, as well as locally available capital, ideas, technology and human resources.

Background of Agribusiness for Rural Development

According to Japan's national statistics, the GDP of agriculture, forestry and fisheries is at a level of ¥10 trillion in nominal terms. However, consumption of food and beverages, which is the final form of agricultural products, exceeds ¥70 trillion and it is growing year by year. While "food" industry, which includes processing and distribution of agricultural products in Japan continues to grow to a large scale, "agriculture" which is the industry that provides materials for food industry, is stagnant.

It is necessary for farmers not only to sell the agricultural products they produce, but to make efforts to enlarge the size of traditional "agriculture" by creating new business opportunities in such fields as processing, distribution and sales; further to health, comfort and education or tourism services for creating markets with even higher added value.

Such a situation has also evolved because as the people's lifestyle changes in relation to agribusiness for rural development, city dwellers have not only deepened interest in exchanges with farm villages but have actually begun exchanges with such villages. They do so because they hope to experience 'nature' in the farm villages and they prefer fresh, safe and specialty foods that can be obtained in specific places. This trend is proven by such expressions as "preference for hometown" and "preference for the real". Such changes in consumers' needs are a strong factor in new establishment of small food processing business, with the aim of producing specialty processed food, in agribusiness for rural development.

Motivation to Start Agribusiness for Rural Development

Traditional local industries such as *sake*, soybean paste and soy sauce production that can be found in many places, are established by individuals with property, and they maintain their business by dealing with

changes in their business environment. Meanwhile, food processing businesses that produce specialty products, such as pickle producers in Nagano prefecture, which originally started in local areas, are working to develop their business to expand the market to urban areas, through general food distribution. Production of livestock processed food was originally started by stock-breeders, and their associations do not have only the market of their local community as their main target.

On the other hand, the motivation to start a food processing business as agribusiness for rural development is linked strongly to the promotion of rural development, and thus they do not easily conclude business ties with companies from outside, even when there is such an offer. Based on consensus of various people within a local community, food processing, as agribusiness for rural development, is carried out internally and solidly.

This business is expected to have such effects as adding value to local resources as a whole, being deeply related to the effects of rural development. This is different from business who expect to maximize profits, or associations who expect to improve income of association members. This means that the foundation for local small- and medium-sized food processing business in Japan, to exist in future, has to be based on agribusiness.

AGRICULTURE, FARM VILLAGE MARKETING (AGRI-MARKETING) AND LOCAL FOOD PROCESSING INDUSTRY

Agri-marketing and Local Management

In trying to draw a course for Japan's future agriculture and promote the development of farm villages, "local management" is an indispensable concept. Local management is an idea to put added-valued (improved profits) to local resources and promote agriculture by utilizing local resources multi-dimensionally, creating local customers and making them satisfied.

Because local resources are different from management resources of regular companies and cannot be transferred, customers have to be those who come from outside, i.e., people who have exchange with local communities. The local resources are natural resources (land, forest, scenery, marine resources and weather conditions), cultural and human resources (ruins, historical cultural assets, historical buildings, institutions and systems, various traditional technology and human resources), man-made facility resources (town streets, dams and big bridges) and farmland (tourism farms, citizens' farms, farms for providing farming experiences). Agricultural, forestry and fisheries products, primary-processed products and processed specialty products, are added to these resources.

In the promotion of rural development, it is necessary to bring people who exchange with the local community and make them into customers; then scenery, hot springs, farming experiences, tourism farms, citizens' farms and various facilities for exchange can be utilized. By combining various local resources, local customers can be produced, and the market for food processing industry can be secured. Sales in a local market created in such a way have the advantage of securing advantageous sales conditions, as prices are decided under a multi-level distribution system in Japan.

Agri-marketing aims to maximize profits by creating some core business of all of these resources and developing a "5P Mix" strategy, with the core as a center. "Food processing" can be placed as a strong core business. Ideally, the combination of the core business and other businesses, such as direct sales stands farmers' market and farm village restaurants, create a synergy effect.

Here the 5P strategy of agribusiness can function effectively. Locally unique ***products*** with added-value and development of services (P1), putting appropriate ***prices*** to them or advantageous price setting (P2), creating ***places*** for sales, such as farmers' market and direct sales stand (P3), effective advertising such as word-of-mouth and ***public*** information (P4) and securing local consensus, which includes ***promotion*** of exchange activities, led by the government (P5). By skillfully mixing the five Ps, outcomes should be improved and as a result, profits should increase. In other words, maximum return to the local community should be secured.

If we consider the creation of local customers and its characteristics, we find that in a local community, the creation of customers has a pre-condition that local resources cannot be transferred. Thus, creation of exchange customers has an extremely important meaning. In the background of this creation of exchange customers, there are exchange activities between local communities, or exchange within a region. Especially,

with regard to exchange between cities and farm villages, the effects of green tourism and others has gradually emerged.

In order to clarify the characteristics of those who have exchange customers, it has to be recognized that there are two types of exchange. The first type is exchange between cities and farm villages or with other areas. City dwellers who come to local areas seeking nature and culture are of this type and their behavior and needs are different from regular tourists. Tourists visit tourist spots, tourist facilities and hot springs and return without having a wide variety of relations with the local community they visited. What they purchase as souvenirs can be found anywhere and they are not specialty products of where they visited. On the other hand, those who come for exchange actually have some form of exchange with local residents, while having contact with various local resources and culture and, in some cases, experience even farming itself. For example, they can taste buckwheat noodles unique to the area they visited. They can also have contact with handicraft work unique to the area and learn how to make it.

They purchase fresh and processed agricultural products and mountain vegetables unique to the area, and stories about their experiences are shared in their own community, at their workplace and among friends. The uniqueness of the local area is communicated by word-of-mouth and the number of visitors to the area increases. This means such visitors have two-way relations, through people and things in the area and information about the area. Recently, there has been some attention on exchange, as a forum to educate school children about "food and agriculture", also exchange for the elderly from different areas, from the standpoint of "well-being" (for example, elderly people from Yamagata prefecture stay in Miyakojima island for about two weeks in winter).

They are people who come to local communities to exchange with them. Thus, the most important issue is to find out a way to have such visitors as stable and local customers.

The second type is exchange between farmers and non-farmers within a local community. This type of exchange is frequently found in areas of agriculture around cities. An example is when non-farmer residents become users of citizens' farms, experience these farms and start to have relationship with farmers, then the exchange between farmers and non-farmers begins. Even if it is only a short experience, non-farmers produce agricultural products by themselves and eat them, experiencing the hardship and the joy of agricultural production.

They deepen their interest in food, environmental conservation and agricultural production, which affects their own lifestyle, creating a new lifestyle. On the other hand, farmers absorb a sense of life and values they have never had through contact with non-farmers. In other words, there emerges a united lifestyle. This influences surrounding people, and based on this, they become stable customers as they have more interest in the products and services the business projects provide.

In order to enable the creation of business projects with a target of local exchange customers, the creation of a local market based on such exchange customers, is needed, involving local residents. In creating such a market, not only sales of agricultural products and processed products but also a "regional brand" emerges, that includes unique meals and various services, by utilizing resources which serve as the foundation. If this can be realized, conditions for forming oligopoly or monopoly markets, with relatively little competition, are provided.

Based on the creation of a market, if more conditions to deal with a large demand of processed products are provided, then direct sales from producers (direct to consumers and direct to stores) become possible. If agricultural cooperatives are involved in the creation of such a market, multiple channels in addition to traditional "*kyosen*" and joint sales routes, led by agricultural cooperatives will emerge, making it possible to build a more advantageous sales system.

In promoting agriculture while conserving environment, to which more importance should be attached, the production of organic agricultural products can be one way to do this, though this is extremely difficult unless the market is secured. By creating a local market and establishing a direct sales system, its viability is greatly improved.

CREATION OF LOCAL FOOD PROCESSING BUSINESS AND BUSINESS STYLES

Exchange between Different Business Categories and Combining Industries

The creation of local food processing business is different from the traditional food industry which can be widely observed.

Local food processing centers, as agribusiness for rural development, are frequently formed by ties between local farmers and processing business establishments, also with processing centres of agricultural cooperatives, as well as local sellers. The coordination function of local governments and agricultural cooperatives becomes important in this procedure.

Introduced in the following list are some examples:

- Pickles processing business project of JA Sawada in Nakanojo-machi, Gunma prefecture, is carried out under the leadership of the agricultural cooperatives.
- Production, processing and sales of black soybeans in Sasayama-cho, Hyogo prefecture, involves agricultural cooperatives and local government and is carried out by a third sector company (established by the public and private sectors).
- Salt production from seaweed in Kamagari-cho, Hiroshima prefecture, is carried out by a private company jointly with a start-up company under the leadership of local government.
- The cooperative system between agricultural cooperatives and local government, each having their own responsibilities, supports a project of processing, sales and development of garlic in the nation's biggest garlic producing area of Takko-machi, Aomori prefecture.

Creation of Local Food Processing Business Projects

Table 1 shows Japan's agriculture and types of agriculture-related business projects.

Table 1. Japan's Agriculture and Types of Agriculture-related Business Projects

Legal Types / Narrow Definition of Company Types	Natural Person		Corporation							
			Private Corporation						Public Corporation	
			Moderate Corporation		Profit-making Corporation					
	Individual Management	Joint Management (voluntary)	Agricultural Association Corporation	Agricultural	Unlimited Partnership	Limited Partnership	Limited Company	Joint-stock Company	Municipal Agricultural Corporation	Government Finance Corporation, etc.
Private company:										
Family business or private company	"				"	"	"	"		
Association company		"	!	!						
Joint company					"	"	!	!		
Company established by public and private entities							!	!	!	
Public company										"

Note: ! is a main type of agribusiness projects for rural development.

An important point to be recognized is the difference between profit-making entities, such as joint-stock companies and limited companies, and non-profit-making entities including agricultural cooperatives, agricultural association corporations and public corporations. The former aims to maximize profits but the latter aims to secure profits of association members. Although both have merits and demerits, in the case of local food processing business projects, company management style that attaches importance to management sense and marketing, with the sustainability of projects taken into consideration, is desirable.

Recently, consideration has been given to the introduction of know-how in company activities, through private finance initiatives, public works projects and NPO activities.

EXAMPLES OF LOCAL FOOD PROCESSING BUSINESS PROJECTS

JA Sawada Agricultural Cooperatives (Nakanojo-machi, Gunma Prefecture) with a history of over 20 years of pickles production

- Eighty percent of locally produced vegetables are processed into pickles.
- In addition to local direct sales stand, the products are currently sold at department stores and kiosks.
- In 1996, the Hakusa Nogyo Park opened so as to increase customers for exchange purpose.
- At present, it has annual sales of ¥800 million and income of the project reaches ¥1.6 billion, when combined with the park project.

JA Sasayama and Sasayama Ikiikijuku Co. (Sasayamacho, Hyogo Prefecture) that Support Processing and Sales of Locally-produced Black Soybeans

- A developed sales route of speciality product, black soybeans for department stores.
- Development and sales of black soybean processed products, with a local exchange facility as a base.
- Together with sales of other specialty products including yams, income of the project exceeds ¥1.2 billion. Sales of processed products (including restaurants) accounts for nearly 50 percent of the income.
- Sasayama Ikiikijuku Co. (a company jointly established by the public and private sectors) promotes various projects such as holding cooking classes and sales of boxed lunch, and an agricultural cooperatives is in charge of selling black soybeans overseas, mainly through department stores.

Companies (Kamagari-cho, Hiroshima Prefecture) that, together with An Entrepreneur in Tokyo, Started and Succeeded in Producing Salt from Seaweed

- An old salt production method from seaweed was discovered, mainly by the research group, so that what has been preserved as a local cultural resource, was made into a business project.
- A food start-up company based in Tokyo built a factory, and one of its staff manages the salt business as their president. Sales are growing as an expensive specialty gift.
- The municipal government built a route to promote salt production from seaweed around the salt factory, and students from 18 schools visit the facility during their school excursion annually.
- Exchange visitors to the local community are significantly satisfied with the salt project and the synergy effect of the project and local beaches designated by the prefectural government; also hot springs, an orange orchard where visitors can pick the fruits, a walking trail, bungalows (an accommodation facility of the prefectural government and managed by the local municipal government). Last year, a bridge was built to the island, and an increase in the number of exchange visitors has had a further impact on the overall effect.

A Public Corporation led by Agricultural Cooperatives and Government that is Skillfully and Separately in charge of Processing, Sales and Development of Garlic, in the Nation's Biggest Garlic Producer of Takko-machi, Aomori Prefecture

- By taking advantage of its status as Japan's biggest producer of garlic, the municipal government built a garlic center (public corporation), and the center develops garlic-processed products and promotes publicity to extend the market. It also conducts international exchange activities and now has exchange activities with Gilroy in the United States. For example, the center developed garlic ramen noodles, garlic wine, garlic jam and garlic sauce. It also tried to extend the market with a target of Italian restaurants mainly in Tokyo. Development of products through the co-op headquarters is promoted and the annual sales have doubled year after year.
- Meanwhile, agricultural cooperatives are, as before, introducing garlic to the market through '*Kyosen*' and joint sales system. By creating "Takko" brand, this enabled advantageous prices setting. Agricultural cooperatives are working to process garlic products at their processing centers wherever possible.

- Based on the separate responsibilities of agricultural cooperatives and a public corporation, they realized strategic advantageous sales, also sales with added-value to garlic, and this has had the effect of expanding returns to farmers.

SUMMARY OF CHALLENGES FACED BY LOCAL FOOD PROCESSING BUSINESS AS AGRIBUSINESS FOR RURAL DEVELOPMENT

The challenges are to:

- develop new products and technology
- completely satisfy customers
- provide management to secure materials
- strengthen relations between local exchange activities and such business projects
- have business and marketing strategies for securing profitability
- secure food safety and work to preserve the environment
- obtain governmental measures for support of the venture.

2. STATUS OF RURAL-BASED SMALL AND MEDIUM FOOD PROCESSING INDUSTRY IN JAPAN

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BASIC CONCEPTS FOR FOOD PROCESSING BUSINESS DEVELOPMENT

The concept "made from available local products" is commonly shared by those who are engaged in the JA specialty product processing business. This is natural enough, considering that many of them started their businesses to utilize surplus agricultural products. Their idea of making good use of the products of their region and adding extra value to the products by processing them, should not be rejected out of hand, but it is not sufficient.

In order to make specialty food product processing into a business, it is necessary not only to create processed food products using local ingredients, but it is also important to have consumers buy them. In other words, a business cannot be a business if its products are not wanted by consumers, nor can it make any profit, unless its products are purchased.

The product must have value that consumers recognize or they will not buy it. A high value-added product is one for which consumers, not the producer, recognize the extra added value. In order to produce high value-added products that will be well-received by consumers, it is necessary that product development be based on the concept of "meeting consumer needs" rather than just made "from available local products".

It is recognized that people engaged in JA processing businesses will always operate on the idea of "from available local products" to some extent. Even so, they should also bear in mind the idea of "meeting consumer needs" when they develop a product. It is important that they not be limited by their current skills and facilities, but consider developing products to meet consumer needs, even if it requires obtaining necessary skills and facilities.

What are Consumer Needs?

These three questions can be considered as criteria:

- Where will you sell the product?
- Whom will you sell the product to?
- What price will you sell the product for?

Considering these questions will bring consumer needs more clearly into focus and make it possible to identify any similarities between the product being planned, and consumer needs.

Let us consider the logical process of an initial idea, its development, its expansion and completion for product development. For planning and developing a business, a logical process is necessary. For the same reasons, planning and developing a product also need a logical process. A logical process for developing a product can be as follows:

- Initial idea and internal factors:
  - Raw material: convincing consumers why the particular raw material is selected for the region.
  - Narrative features: a "story", or a "rumour" is necessary.
  - Being "talked about" is absolutely fundamental.

- Development and internal aggregate strengths:
  - Existing internal strengths in terms of skills, developmental abilities, facilities, organization, finance and marketing.
- Adaptability for logic (marketing concept) and freshness (originality)
- Expansion and external factors:
  - Total marketing factors such as marketability, price competitiveness and distribution.
  - Potential demand for the product in the market leads to consumer needs.
- Completion and final results:
  - Establishment as a business, growth and ripple effects, and return of profits.

Developing a Product to Sell Well

It is difficult to make a product that sells well. This is even if a product is developed considering its purpose, the necessary steps and the market; then taken through the logical process of initial idea, development, expansion and completion.

Why do products developed in order of initial idea, development, expansion and completion not sell well? Let us consider each logical step:

Table 1. Product Development for Business

Logical Step	Reasons Used	Harmful Effects
Initial idea	From available local products	Are these the only raw materials available?
Developmen	Self-satisfied development	Are these the only skills and facilities available? **The focus is on the producer.**
Expansion	Self-centered solutions	Setting production/distribution speeds to suit the producers **Marketability ignored.**
Completion	Failure	The product does not sell **The product/business is not self-sustaining.**

A product that ignores the market (consumer), likewise the sales potential of a product that was created without thought for demand, is practically zero.

Taking the Initiative to Establish a Market

It is not easy for a JA to start any specialty product processing business because it first has to convince its members. Even if a JA succeeds in convincing them, starts the specialty processing business and produces products, it often has difficulty opening up a market. Processing facilities can readily be constructed with subsidies. Manufacturing skills can also be obtained with effort, although it is not easy. However, selling the products is different and is a most difficult thing to do.

As described above, if consumer needs are not considered when developing the product, no specific market for the product is targeted, and the business is not planned and operated as a whole, it is difficult to create a product that will sell well. There are many JAs that have failed to find a market and consequently they hardly use fine processing facilities, that subsidies were used to construct.

If the product is a perishable food, it can be sold in wholesale markets although the selling price may be higher or lower than one might expect. However, for a processed food, there is no more convenient market than the wholesale market. The JA has to find a market of its own, for the specialty products developed.

Manageable Business Size

To start up a specialty product processing business, capital investment is necessary, although the amount varies depending on type of the business. Subsidies are an alternative, though important way of amassing capital. However, subsidies may also have the negative effect of making the business plan fanciful, and unnecessarily increasing the size of the processing facilities.

Subsidies are granted for constructing processing facilities, however, the costs of operating and maintaining them are beyond the scope of the subsidies. The administrative and maintenance expenses must be covered by the income and profits made by the business every year. In accounting terms, the business may

go into the red, even if actual income and expenditure breakeven, due to depreciation of the facilities. The balance must be in the black, when all accounting processes are concluded. Facilities beyond the accounting capability become a burden for the business.

When using subsidies, conditions will be applied to, for example, the construction of the facilities, thus depriving the producer of freedom. This must be fully considered when applying for subsidies. Subsidies should never be taken for granted when planning a business. Depending on subsidies relaxes the criteria for investment in facilities, as well as significantly dulling the sense of return on investment (recouping capital). Excessively increased investment in facilities will ensure high administrative and maintenance expenditure and costs for depreciation of the facilities.

Defining Profit and Loss

It may be difficult for a JA which is starting a specialty product processing business, to define the long-term prospects of the business. However, for this very reason it is important to make a thorough business plan. The business is conducted according to the plan and the direction of the business is adjusted according to the results. If it is not clear from the planning stage that the business will be profitable, it may be necessary to give up starting the business. Once a business is started, it is important to keep it going. Accounting systems that do not define profit and loss, until sizable amounts of money have been lost, should be avoided.

It is also important to build an organization which ensures profit and loss are easily defined. This can be described as a business model that shows the results of the specialty product processing business, separately from other businesses operated. The flow of accounting forms may vary, depending on the system. It should be remembered that many JAs that had fine processing facilities failed to keep their processing business, because they did not have sound business models.

Right-brain Thinking

Due to the dramatic changes in the environment surrounding agriculture and the JAs, many JA businesses can no longer be assured of success simply by sticking to proven successful procedures. They should not be overly influenced by past experience. For problems a business may encounter, conventional solutions that had been standardized no longer suffice. Especially for specialty product processing businesses, which are relatively new compared to other JA businesses, there are no standard solutions. Those who expect standard solutions are not qualified to start up a specialty product processing business.

In order to start the processing business and make it operate, one needs to be able to think freely, and not be overly influenced by past experience or standard solutions. This is called “right-brain thinking”. The left part of the brain is for intelligence and memory while the right part is for sensibility. The right-brain serves for enjoying music and the arts and for creating and planning new things. Protective abilities depend on the left-brain while planning ability depends on the right-brain.

For specialty products, especially for products of processing business, narrative features are crucial. A story that can convince consumers is created from an amalgamation of culture and time. How does your product express such abstract aspects such as a story, culture and time? Thinking with the right-brain is necessary to answer to this difficult question.

It may be necessary to demolish everything to build a completely new thing; however, it may also be necessary to build a new thing based on existing traditions. Simply going with traditional practices is not a genuine way to carry on a culture. Developing products may require a certain level of studied repetition. The important thing, however, is not simply to repeat yesterday or yesteryear, but to repeat the basics as well as reflecting the current time, and putting original ideas into the products.

To do this, it is necessary to understand the current time, then reflect it in the product. It is necessary to resonate with the consumer’s sense of values and develop a product to which consumers can be related. It is important for those engaged in specialty product processing businesses to find their own unique solutions, rather than employing conventional solutions. Without “right-brain thinking”, the business will not evolve.

3. ISSUES AND STRATEGIES IN DEVELOPMENT OF RURAL-BASED SMALL AND MEDIUM FOOD INDUSTRY IN ASIA AND THE PACIFIC

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INTRODUCTION

Today, in a world that is capable of producing enough food to supply an adequate diet for all, hundreds of millions of people go hungry. Chronic undernutrition persists, mainly among rural people in poor developing countries, most of which depend heavily on agriculture for their livelihood. So long as that is the case, eliminating hunger will require concerted efforts to speed up agricultural and rural development, including agro-industry.

Most of the 800 million people who are chronically undernourished live in the Low Income Food Deficit Countries (LIFDCs), over 80 countries that do not produce enough food to feed their population and cannot afford to bridge the gap with imports. Over half of these countries are located in Africa but nearly a quarter in Asia, where the food situation justifies urgent action and requires additional funds to finance rural development projects.

What Is Food Security?

Food security means ensuring that all people at all times have access to the food they need for a healthy, active life. Increasing food production contributes to food security within communities and nations by making more food available and by generating employment and income. But increased production alone cannot guarantee food security. Increased income through value addition to agricultural raw materials is one way to achieve this.

THE SITUATION IN THE ASIA AND PACIFIC REGION

The Asia and the Pacific Region consists of 31 countries, three of which are developed (Australia, Japan and New Zealand) while the remaining 28 are considered developing. These include Bangladesh, Bhutan, Cambodia, People's Republic of China, Cook Islands, Democratic People's Republic of Korea, Fiji, India, Indonesia, Islamic Republic of Iran, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Rep. of Korea, Western Samoa, Solomon Islands, Sri Lanka, Thailand, Tonga, Vanuatu, Vietnam and recently Kazakhstan.

The Region covers about 23 percent of the world's land area and accounts for around 32 percent of the world's arable and permanently cropped land. The Region contains 53 percent of the world's total population and 73 percent of the world's agricultural population; thus nearly three quarters of the world's agricultural population exist on one-third of the world's arable and permanently cropped land. Although in the Region itself the *percentage* of agricultural population to total population in the last three decades has declined from 65 percent to 61 percent, the *actual* agricultural population in the Region has increased in absolute numbers. In the same period, the ratio of arable and permanently cropped land to agricultural population has declined from 0.34 ha/caput to 0.25 ha/caput.

These are indicators of *severe land scarcity*, in contrast to the rest of the world. For farmers and rural people to increase their fast dwindling available land area and hence production is difficult, hence apart from productivity gains, the application of *value addition through processing* has strong potential for income improvement, from the same or less land area (Hicks, 1998).

Although in the Region, there has been declining trend in the share of agriculture in GDP, at the same time the *value addition* in agriculture has increased dramatically in many countries (Tables 1-2). Agriculture and/or fisheries remain the major contributors to GNP in many countries of the sub-region. In addition, it is a main source of employment and provides a major supply of exports.

Table 1. Growth of GDP and Agricultural GDP of Some Countries of the Asia-Pacific Region

Countries	Total GDP				Agricultural GDP			
	At Current Price (US$ million)		Average Annual Growth Rate (%)		At Current Price (US$ million)		Average Annual Growth Rate (%)	
	1970	1993	1970-80	1980-93	1980	1989	1970-80	1980-89
Australia	159,728	331,990	3.5	3.4	7,986	9,960	3.3	-0.1
Bangladesh	12,950	26,164	4.3	4.2	6,475	7,849	2.7	1.9
China	201,696	522,172	10.2	12.9	60,508	10,965	-	4.1
Fiji	-	1,456	-	-	3,055	-	-	-
India	172,521	293,606	5.8	3.8	-	-	3.1	2.9
Indonesia	78,013	174,640	6.1	7.6	65,481	88,001	3.4	3.0
Iran	92,664	63,716	1.5	5.2	18,723	29,688	4.5	5.8
Japan	1,059,257	4,590,971	4.1	1.2	16,679	13,380	1.1	-2.8
Lao PDR	-	1,534	-	6.2	42,370	91,819	3.8	2.8
Rep. of Korea	63,661	376,505	9.4	6.6	8,125	14,116	2.8	1.8
Malaysia	24,488	70,626	5.2	8.4	-	782	-	-
Mongolia	2,329	741	5.5	-4.4	-	-	2.9	-4.0
Myanmar	-	-	0.6	5.7	326	155	0.5	5.1
Nepal	1,946	4,048	4.6	4.9	-	-	4.0	1.3
New Zealand	22,469	50,777	1.9	3.0	1,206	1,781	4.1	-
Pakistan	23,690	52,011	6.3	4.6	2,471	-	4.3	2.7
Papua New Guinea	2,548	5,403	1.9	11.5	7,007	13,002	1.8	5.3
Philippines	32,500	64,162	1.0	1.6	840	1,512	1.0	1.6
Sri Lanka	4,024	11,712	4.2	5.4	1,127	2,810	2.2	2.0
Thailand	32,354	143,209	7.6	8.2	7,741	14,320	4.0	3.1
Vietnam	-	15,570	-	8.0	-	4,360	-	4.5

Sources: IBRD, *Trends in Developing Economics*, 1995 and *World Development Report*, 1996; Asian Development Bank, *Outlook 1995-96*; and FAO Country Tables and Selected Indicators of Food and Agricultural Development in Asia-Pacific Region, 1986-96.

Table 2. Agriculture's Share in GDP of Some Countries of the Asia-Pacific Region

(Unit: Percent)

Country	Share of Agriculture in GDP		Country	Share of Agriculture in GDP	
	1991	1994		1991	1994
Australia	3	3	Mongolia	20	21
Bangladesh	35	30	Myanmar	57	63
China	27	19	Nepal	59	43
Fiji	20	18	New Zealand	9	7
India	32	30	Pakistan	26	25
Indonesia	19	17	Papua New Guinea	26	28
Iran	21	21	Philippines	21	22
Japan	3	2	Sri Lanka	27	24
Rep. of	10	7	Thailand	12	10
Lao PDR	-	57	Vietnam	-	28
Malaysia	-	14			

Sources: IBRD, *World Bank Atlas*, 1996; Asian Development Bank, *Outlook*, 1996 and 1997; and FAO, Country Tables, and Selected Indicators of Food and Agricultural Development in Asia-Pacific Region, 1986-96.

AGRO-INDUSTRIAL SYSTEMS

Agro-industrial Systems Development

Biomass in its widest sense encompasses plants, animals, fish, insects and micro-organisms, ranging across every primary agricultural commodity and organic residue. The biological raw materials processed, range from ground crops to tree crops and forest products, from livestock and dairy products to marine and fisheries products; providing food, fiber and energy as well as a range of commercial products. Hence plant, animal and fish by-products and waste, can also provide a huge variety of goods.

Agro-processing industries generate value addition by the processing of agricultural raw materials, both food and non-food, into products which are marketable, useable or edible; have improved storability and/or nutritive value, and enhance income and profitability for producers.

An agro-industrial system includes the consumption, marketing, processing and production of agricultural materials; within the boundaries of the particular socio-economic, administrative, political and financial framework prevailing in Region's countries. The particular population or society is then considered independently from the model system. These societies may range from highly centralized and urbanized, to rural subsistence.

Long-term sustainable growth from agro-industrialization is created by sound economic opportunities located close to *abundant available raw material supplies*. This factor is even more critical than the availability of vast supplies of low-cost labor, and is the primary basis for agro-industry development in the Region, being also linked to land use. For example, a number of the Newly Industrialized Economies (NIEs) of the East Asian Region are relocating labor-intensive industries to Southeast Asian countries, not only because of their own rising costs of labor, but also their limited supply of natural raw materials.

This, coupled with sound internal and export markets, appropriate policies and continued economic deregulation, can lead to a deepening of agro-industrial growth in Asia and Pacific countries. These industries will have multiplier effects on the economy, forward and backward linkages to consumers and farmers, with the industries themselves being market-driven.

Product-System Selection and Integration

Agro-industries are grouped around activities which involve substantial volumes of the same primary sector raw material, forming the basis for product-system selection and integration. A product-system is a grouping of those agro-industries based on the same raw material(s), as well as being a set of unit operations. The extent to which integration occurs in the industry indicates the dependency on the product-system and hence the raw material involved.

For example, a sugar system consists of six agro-industrial classes: sugar and cane products, sugar products and brown sugar, soft drink and beverages, chewing gum, food products, and alcoholic spirits. Agro-industries using sugarcane as a raw material are fairly highly integrated; vertically within the sugar industry as well as horizontally to other product-systems.

AGRO-INDUSTRIES IN THE ASIA-PACIFIC COUNTRIES

Food Industries

The processing industries in the Region's countries are essentially agro-based enterprises. There is a huge range of ethnic and traditional food products in each of the countries. The local food industry has evolved around domestically available agricultural raw materials, such as maize or corn, paddy rice, fruits, vegetable, root crops, sugarcane, coconuts, oil palm, spices, beverages (tea, coffee, cocoa) and honey (apiculture).

1. ***Traditional Food Industry***

Traditional food industry constitutes as high as 70 percent of the companies in the rural areas of the developing countries of the Region. Normally family owned, they employ 50 or less workers and cater for domestic consumers. This industry is characterized by manual and batch type processes, labor-intensive, with minimal sophistication. Equipment is locally fabricated and the overall result is rather low productivity and efficiency. Quality control is often minimal and little if any research and development is done. They offer

little competition to the modern multinationals, though their products are sought after by local populations. Upgrading of these industries offers a window of opportunity in local markets where the economy is growing.

2. ***Modern Food Industry***

Modern food processing plants have been introduced in developing Region's countries, initially centered on processed foods derived from processed meats, wheat and flour products, dairy products. This has led to an increase in imported raw materials ingredients and packaging, for the production of this type of food. In more recent years, however, indigenous companies have set up, often in joint venture with multinational corporations, to process local raw materials such as pineapples, cassava, fruits and vegetables to be packed, labeled and exported under the corporations' brand names. These operations include food canning, carbonated beverages, frozen food manufacture, flour and starch production. The companies apply total quality assurance as well as comprehensive research and development procedures to ensure high quality innovative products.

3. ***Infrastructure and Equipment***

There is a lack of modern infrastructure and equipment for food processing in many developing countries of the Region. Inadequate transportation, poor distribution, inadequate cold storage and freezer capacity, lack of potable water and unreliable power supply are the main shortcomings.

4. ***Human Resources***

There is a shortage of trained, skilled labor and technical competence in agriculture especially in the traditional food industry sector. This coupled with poor management, leads to inefficiency and poor competitiveness. Labor costs have risen markedly in newly industrialized countries, in the last decade. This results in higher production costs, for labor-intensive operation. Moving the operation to lower labor cost countries, or automation, is the response of modern food companies.

AGRO-INDUSTRIES POLICIES AND STRATEGIES

Inter-sectoral Dependence – the Hallmark of Agro-industry

A industry which requires raw materials, it depends on the primary sector, then in processing it depends on the industrial sector, as a supplier of consumer goods it depends on the consumer and market demand.

Backward linkages are essential, such as credit, agricultural inputs, support services and procurement, etc.; whilst forward linkages are needed for market information, produce marketing and new product development; infrastructure is required in the form of roads, water, power, irrigation; as well as social facilities (schools, hospitals) and other off-farm activities (Hicks, *et al*., 1992).

Development Policies for Agro-industries

The interface between agroindustry and the productive sector of equipment and other input manufacturers, and the interfaces between each of these and the science and technology capabilities in-country, need careful analysis. Then only can clear targets be identified for agro-industries development which will have impact on the countries' economic development and lead to increased rural incomes, without unplanned negative effects.

Policy instruments for agroindustrial development include, among others, regulation of technology transfer and industrial ownership; fiscal incentives for research and development, as well as training; financing of operations through risk capital contribution; unrecoverable financing for research and infrastructure; pre- and post-graduate studies scholarships; commercial protection and foreign investment regulation; private and public sector purchases and investment, and commercial liberalization.

Advances in and Constraints to Agro-industries Development

Agro-industries development relies on the existence of and activity within the scientific community in the country, not just on importing overseas technology. Some of the important scientific fields which require fostering are agro-processing technology, food science and technology, industrial chemistry, biotechnology, textile technology, industrial design, metallurgy, polymer and non-metal technology, mechanical, chemical electrical and industrial engineering, environmental engineering, business administration and finance.

Methodology used to establish priority policies and instruments can be developed by an interdisciplinary group of high level experts, drawn from technical, industrial and political backgrounds. This group will take into account the feasibility of linking the current levels of technology with industry, and relate these to the economic and socio-political environment. The group will consider priorities for employment, local consumption, export economics and investment. The relative importance of policies, once prioritized, will define the required policy applications in technological fields, their prospects and constraints.

Government Approaches to Agro-industries

Governments have three major instruments to support agroindustrial promotion: these are in the legal, fiscal and institutional arenas.

The legal framework encompasses laws on land ownership, regulation of associated ministries, review of laws to remove inconsistencies and limitations to development. The association of primary and agro-industrial products will come under various forms of legislation, whether they be defined under land owners, agricultural associations, agroindustry enterprises or consumer associations.

At the fiscal and institutional level, the Ministry of Agriculture, though its Center for Agro-industrial Development undertakes programs and policies which impact on the technology support areas. Regionally, the ministry impacts on the rural development districts, through rural support centers. Internationally, involvement in programs such as Codex Alimentarius should be supported.

Four principles require equal consideration in the restructuring of the institutional framework, itself a long and difficult process. These are the elimination of bureaucracy, the minimization of regulation, the promotion of decentralization and privatization.

Private Sector Involvement in Agroindustries

The privatization process involves the transfer of decisions, functions, instruments and parastatal enterprises, presently operating under government jurisdiction, from the public to the private sector. This process is based on the establishment of clear guidelines and rules, by government, to assign responsibilities to the operators involved. Emphasis needs to be on strengthening of the auto-regulation capacity of private enterprises, with a shared responsibility between them and government.

These are three guiding principles which should be applied during the move to privatization:

- **First** is that non-viable parastatal enterprises should not be transferred to private sector.
- **Second** is that operators with the capacity to manage key functions should be identified before the transfer process.
- **Third**, that comprehensive technical assistance and training should be provided simultaneously with the transfer of viable enterprises. In this way, governments can promote and foster the development of agro-industries without becoming too directly involved in their operation.

SOME ISSUES FOR CONSIDERATIONS

Prevailing Status and Potential of Agro-industries

1. ***Agricultural Production***

The Region is a consistent supplier of agricultural commodities such as palm oil, coconut oil, sugar, spices, rice, fish and marine products, fruits and vegetables, which present good opportunities for more sophisticated value-added processing. At the same time skewed shortages exist in several other countries, who, for example, import wheat-based products and animal feeds, for which suitable local substitutes can be identified and produced. Producer countries could also intensify the production of these commodities for other countries in the Region, where they have comparative advantage (Hicks, 1995).

2. ***Land Availability***

This ranges from a situation of extreme land shortage in some Asian countries, where the ratio of agricultural land to agricultural population is as low as 0.25 ha/head, compared to a global figure of 0.59 ha/head.

3. ***Water Availability***

The provision of irrigation facilities ranges from between 20-40 percent in Indonesia, to 5-10 percent in Australia. Otherwise dependency on rainfed agriculture and the number of droughts per decade, influences the crop growing situation.

4. ***Capital/Income***

The per capita GNP of the countries indicates the level of development and this ranges from less than US$500 per annum in countries like Mongolia and Bangladesh, to countries like Australia, which are at US$18,000 per caput or higher. The availability of capital for investment is reflected by these figures.

5. ***Raw Materials Quality and Quantity***

A consistent supply of quality raw materials for agro-processing industries is lacking in many countries of the Region, with inefficient handling and transportation systems. This situation can improve when a mutually beneficial and stable relationship between the producer and processor develops and matures, whether in contractual or other forms.

There is also a continuous effort to increase production and productivity of food and fiber crops and improve quality of their products; as well as to increase production of other food and commercial crops, fruits and vegetables, meat, poultry and dairy, oilseeds and plantation crops.

6. ***Marketing/Export and Import***

Agro-based products already play a significant role in generating export revenues for some member countries. The ability to meet international quality standards is of common concern and most countries are handicapped by a lack of information about international markets. These concerns apply in particular to small and medium industries.

High tariff and non-tariff restrictions in the period leading up to the 1994 Uruguay Round have been a major constraint to expansion of export products of importance to the Region's countries but now the has potential for an increase in trade in agricultural exports.

7. ***Technology***

The pace of adaptation of available technologies to local conditions in the Region's countries falls short of current requirements in the areas of process equipment, process and product development and control. There exist modern and advanced, as well as old and backward laboratories in the Region's countries, where utilization can be optimized. Some are stagnating need rejuvenation. Other current technical issues of concern are environmental protection, waste treatment, hygienic practices, and high technology applications.

8. ***Manpower***

A time lag exists between current technologies in the agro-industries and educational practices in the institutions. Manipulative skills are available to the agro-industries in the Region. However, inadequacy of in-depth technical understanding and lack of management skills in the workforce restricts innovation and consistent performance. The physical working environment for many agro-industries is generally uncomfortable and the compensation incentives and labor practices are not always at par with other labor-intensive industries. The seasonal nature of production and processing compounds difficulties and insecurities for workers.

9. ***Infrastructure Development***

Both institutional and physical, is a component of most national development plans. Establishment of basic infrastructure such as roads, water supply and power, is recognized as essential for the growth of agro-processing industries. Selected postharvest facilities like cool stores and drying facilities as well as farm-to-factory roads are often deficient, though important, for the proper delivery of raw materials.

10. ***Science and Technology***

Applications for conversion of biomass and industrial products, requires scientific information about agricultural raw materials and their commercial and industrial potential. This leads to processing technologies, equipment designs and factory establishment. Varietal selection of plants and animals is needed to suit the requirements of postharvest handling and processing as well as to meet consumer demands.

Several countries have also been able to develop a sound technological and industrial base, human resources in science, technology administration and management, also physical and institutional infrastructure. Institutes for research and development working on the needs of agri-based industries exist at different levels of development in the Region's countries. The relationships between laboratory and land, laboratory and factory, need to be strengthened.

CONCLUSIONS

In conclusion, planned investment and socio-economic development will open up many opportunities, and provide the foundation and confidence for rapid advancement. At this stage the production and processing of agricultural biomass including its by-products, for commercial and industrial purposes, becomes increasingly viable for countries of the Region's countries. Farm, forest and industry can be integrated for the optimum utilization of each country's biomass resources, leading to wealth generation, through agribusiness development.

On the other hand, the near absence of agro-industry, resulting in low value-added in agricultural transformation has been one of the main causes for stagnation in rural GDP and rural incomes, in some countries. Conversely, a substantial agro-food industry transformation sub-sector, generating high value addition to the outflow of goods, correlates with higher levels of agricultural GDP and rural incomes in other countries.

The main constraints to the development of fully integrated agriculture with agro-industries can be identified and understood by observation of the imbalance between:

- rising agricultural population and the declining role of agriculture.
- accelerating growth of the industrial sector and the lack of trained personnel.
- rising urban drift of rural workers coupled with associated urban unemployment, low incomes and social problems.
- disparate urban incomes compared to rural incomes, ranging as high as 10:1 and more, indicating severe rural poverty.
- rising material expectations of the people with profound implications for the social and traditional values of rural villages.
- damaging environmental impact of intensive and commercial agricultural and agro-systems, in contrast to those of traditional agriculture, food and forestry industries.
- shrinking subsistence farming versus increased cash cropping, coinciding with the depletion of forests, soil and a rise in plant and animal diseases.

In order to achieve the objectives and goals defined and established by governments, clear policies, strategies and their accompanying guidelines and rules are needed to promote and regulate the activities of agribusiness. Policies and strategies for agro-industries should be formulated in response to some key questions:

- What are the emerging needs and opportunities for small and medium food and agro-industrial development?
- Which organizational pattern is the most appropriate for small and medium food and agro-processing to benefit the rural population?
- What are the factors that affect the organization and management of successful small and medium food-processing units?
- How many countries or companies ensure that food-processing will return benefits also to the small farmers, not only to the multinational concerns?
- How can the small and medium food industries win and maintain markets, and which product systems should be promoted and where?
- What resources natural, human, financial, are available in the country, from government, institutions and private sector?

These vital questions should be considered by the interdisciplinary group referred to. Networks should be formed between these government groups, international organizations such as FAO as well as private industries, to provide forums in which substantial policies and strategies can evolve, to enhance rural employment and incomes through the development of (small and medium) agro-processing industries in countries of the Region.

FAO's Special Programme for Food Security has a specific objective: to increase national food security as quickly as possible by helping to boost food production in areas where quick returns, at little risk, are

feasible. It is an innovative approach to strengthening food security in LIFDCs. A concerted effort is being made to bring together the basic elements and key players necessary to increase staple food production in a sustainable manner.

The present decade up to the year 2000 is a critical period for the Region's countries, not just in terms of growth, but whether the countries and their economies can clearly identify their sustainable pathways and systems: agricultural, ecological and industrial.

BIBLIOGRAPHY

FAO, 1995. *FAO Production Yearbook*, Vol. 49, Rome, Italy.

----------, 1998. *Food Outlook: Global Information and Early Warning System on Food and Agriculture*, No. 3, Rome, June 1998.

Hicks, P. A., 1995. "An Overview of Issues and Strategies in the Development of Food Processing Industries in Asia and the Pacific", in *Growth of the Food Processing Industry in Asia and the Pacific*, APO, Tokyo, Japan.

----------, 1998. "Food and Agro Industries for Income Generation by Rural People", paper presented to the Meeting of Ministers of Industry and Technology, United Nations Conference Centre, Bangkok, Thailand, 19-24 February 1998.

Hicks, P. A., *et al*., 1992. "Enhancing Rural Employment and Incomes through the Development of Agro-Processing Industries", Ministerial-level paper presented at the FAO 21st Regional Conference, Delhi, India.

1. BANGLADESH

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INTRODUCTION

The total area of the country is 147,570 km^2. It is one of the most densely populated country in the world, with about 128 million people, or 868 persons per square kilometer population density. About 81 percent live in the rural areas while the urban population is only 19 percent. At present the rural people are persistently migrating from rural to urban areas.

THE ECONOMY OF BANGLADESH

The economy of Bangladesh is mainly agrarian and rural based, the largest sector being agriculture. The contribution of the agriculture sector to the GDP is about 31.7 percent and the per capita income of the country is about US$375. The next major sector is industry, which is flourishing although its contribution to the GDP is not so significant, currently at only 15.4 percent according to the statistics of 1999-2000. The other main sectors of the economy are construction, tourism, gas and power. The sector-wise distribution of the GDP and their growth rate (1999-2000) are as follows:

Table 1. Distribution of GDP and Growth Rate 1999-2000

(Unit: Percent)

Sector	Contribution to GDP	GDP Growth Rate
Agriculture	31.7	5.49
Industry	15.4	4.25
Construction	7.8	8.0
Gas, oil and power	1.4	6.0
Others	43.7	8.0

Agriculture is fully run by the private sector, while the industry sector is owned both by government and private individuals. The large industries are mostly under government ownership and are in the process of privatization, whereas small and medium industries are under the ownership of private entrepreneurs.

The main natural resources of the country are forestry, natural gas, agricultural products, and small quantities of coal, oil and limestone. The major exportable goods are jute and its products, fertilizer, tea, leather, ready-made garments, frozen fish, processed foods and vegetables. A large amount of foreign exchange is earned through the export of skilled and semi-skilled manpower to different countries of the world. The long list of imports includes a wide range of items from food, consumer goods, machinery and equipment to industrial raw materials and fertilizer.

The annual export and import of the country are US$8,018 million and US$5,324 million, respectively (fiscal year 1998-99). The trade deficit is approximately US$2,694 million, which at the moment is a critical problem for the country.

SMALL AND COTTAGE INDUSTRIES

Under the industries sector, the majority share lies with the Small and Cottage Industries (SCI). At present there are about 53 thousand small industries and 490,000 cottage industries in the country.* This sub-sector employs about 2.4 million people, who represent about 82 percent of the total industrial labor force of the country. The contribution of all industries to the GDP is 15.4 percent while the contribution of the SCI to the GDP is around 4 percent. It has been observed that in small industries an investment of between Tk.25-50 thousand (Taka) can create one job, and in cottage industries a single job creation needs an investment of only Tk.5 thousands, or less than US$100. The government has also prioritized this SCIs sub-sector to be one of the main engines for industrial growth. It has been stated in the current Industrial Policy 1999 of the Government of Bangladesh that one of its objectives is "to ensure rapid growth of industrial employment by generating investment in labor intensive SCIs".

Quite a few government, semi-government agencies and a number of NGOs are working in the field of SCIs in Bangladesh, while Bangladesh Small and Cottage Industries Corporation (BSCIC) is the prime mover organization mandated for the development of SCIs in the country, as well as being the sponsoring authority for SCI sector. The two other sponsoring agencies are the Board of Investment (BOI) for large and medium industries and Bangladesh Export Processing Zones Authorities (BEPZA) for industries located in the Export Processing Zones (EPZs) in the country.

ROLE OF BANGLADESH SMALL AND COTTAGE INDUSTRIES CORPORATION

It has been mentioned earlier that BSCIC is the prime mover organization for the promotion and development of SCIs in the country. BSCIC has been promoting this sub-sector of the private sector by providing a package of services though its public sector programs/projects.

INCENTIVES/PROVISIONS FOR SMALL AND COTTAGE INDUSTRIES

The encouraging provisions and incentives kept in the present Industrial Policy for SCIs are mentioned below:

1) Tax holiday facilities are available for five or seven years depending on the location of the industrial enterprise (five years for developed areas and seven years for underdeveloped areas).
2) Industrial undertakings not enjoying tax holiday facilities may enjoy accelerated depreciation allowances. Such allowances are available at the rate of one hundred percent of the cost of the machinery or plant, if it is set up in the developed areas.
3) Special incentives are available to encourage non-resident Bangladeshi to invest in the country.
4) Industrial plots at different industrial estates of BSCIC are available at a subsidized price which is payable under easy terms and conditions, on an installment basis. Foreign investors are given priority to set up industries in these estates.
5) Credit financing is available under comparatively easy terms and conditions for SCIs, some of which are operated by a few NGOs also.
6) The entire export earnings from handicrafts and cottage industries are tax-free.

EXPORT-ORIENTED AND EXPORT-LINKAGE INDUSTRIES

One of the main strategies of industrial development in Bangladesh is to promote export-oriented and export-linkage industries, with the aim to reduce its huge trade imbalance, as well as to make opportunities

* 'Small Industry' is an enterprise employing fewer than 50 workers, excluding the cottage units and/or with a fixed capital investment of less than Tk.100 million (US$1.00 = Tk.53.50); 'Cottage Industry' covers household-based units operated mainly with family labor; and 'Medium Industry' covers enterprises employing between 50 and 99 workers and/or with a fixed capital investment between Tk.100 million and 300 million.

for surplus production to meet local demand. However, to make investment in 100 percent export-oriented industries attractive, the following incentives and facilities are available in Bangladesh:

a) Importation of capital machinery and up to 10 percent of their spares are duty free.
b) Bonded warehouse and back-to-back L.C. (Letter of Credit) facilities are available.
c) Duty drawback facilities are available on a flat rate basis and are cashable from the relevant commercial banks.
d) An Export Credit Guarantee Scheme is operating to support the export business of the country where interest rate is only 9 percent, quite low in comparison to other interest rates in the market.

FOREIGN INVESTMENT

Foreign investment, particularly Foreign Direct Investment (FDI) is highly encouraged in Bangladesh and is therefore strongly protected by a legal policy framework under the Foreign Investment (Promotion and Protection) Act 1980 which provides for:

- non-discriminatory treatment between foreign and local investment.
- protection of foreign investment from expropriation by the State.
- ensured repatriation of proceeds from sale of shares and profit.

The other main encouraging and motivating features for foreign investment in Bangladesh are as follows:

a) For foreign investments in Bangladesh there is no limitation pertaining to equity participation, i.e., 100 percent foreign equity is allowed.
b) Foreign investors or companies with foreign investment are eligible to buy shares through the stock exchange and their participation will be guided by framing appropriate rules.
c) Foreign investors or companies may obtain full working capital loans from local banks.
d) Foreign entrepreneurs enjoy the same facilities as domestic entrepreneurs in respect of tax holiday, payment of royalty, technical know-how fees, etc.
e) Full repatriation of capital from foreign sources is allowed.

EXPORT PROCESSING ZONES

To encourage FDI Government of Bangladesh has established many EPZs where only export-oriented industries are allowed. To avoid any unrest in the industries located in the EPZs, trade union activities are prohibited there. However, the following facilities are provided to units located in the EPZs:

a) Income tax exemption for 10 years and 50 percent income tax rebate on export earning after that period.
b) Duty-free import of raw materials, machinery, construction materials and other materials used in manufacturing process.
c) Income tax exemption, subject to existing conditions on salaries of foreign technicians, for three years.
d) Tax exemption on interest on foreign loans.
e) Tax exemption on royalties, technical know-how and technical assistance fees.
f) Tax exemption on profits on account of transfer of shares by foreign companies listed with the stock exchange. Relocation of running manufacturing units from EPZs abroad.
g) Units in the EPZs will be permitted to supply linkage materials for manufacture of exportable items to industries operating in domestic tariff area, through bonded warehouse and/or back to back L/C.
h) Off-shore banking facilities.
i) Establishment of backward linkage industries will be encouraged for supplying inputs in EPZs.

ADVANTAGES OF SMALL AND COTTAGE INDUSTRIES IN BANGLADESH

Compared to large and medium industries, SCIs in Bangladesh have many inherent advantages. These are:

- they need lower capital investment.
- they are more labor-intensive and they generate more direct and indirect jobs per unit of invested capital on the average.
- they have a lower capital output ratio.
- they do not need a highly developed infrastructure or highly trained and skilled labor.
- their start-up time is shorter.
- they are more suitable for serving limited and specialized markets.
- they provide a seedbed for entrepreneurial talent and a testing place for new industries. They are also more responsive to incentives.
- they supply dynamism and contribute to competition within the economy.
- they are more conducive to equitable distribution of wealth, dispersion of economic activities and balanced economic growth.
- they consume less energy and do less harm to the physical environment.
- they stimulate personal savings, promote agro-industrial linkages, improve rural welfare and generally raise the level of popular participation in the economy.
- above all, they preserve the human substance in industrial production and do not deprive people of the kind of work that they enjoy most, creative useful work with hands and brains.

GROWTH CENTER

The districts and sub-districts of the country are potential growth centers of SCIs. The industrial estates of BSCIC and EPZ are established as growth centers for small, medium and big industries of the country. Besides the sub-districts are growth centers for SCIs, the large metropolitan cities Dhaka, Chittagong also service as growth centers for specific industries like light engineering, leather and leather products and other semi-modern SCIs.

FOOD PROCESSING INDUSTRIES IN BANGLADESH

Although Bangladesh is mainly an agricultural country, for a long time it was a food-deficit country till before the year 1997. Since 1997, the country has produced sufficient quantity of food, in excess of demand. In the financial year 1999-2000, the country produced a total of 24,907,000 mt of food, while food demand of the country in the same period was 21,358,000 mt.

The above mentioned figures are concerned with production of food grain only which includes rice, wheat, barley, etc. In addition to that Bangladesh also produces various kinds of fruits in abundance, like mango, pineapple, guava, jack-fruits, banana, coconut, papaya, and vegetables like potato, tomato and beans. This situation reveals that the food processing industry has great prospects and potential in Bangladesh. But the fact is that this industry has not yet grown sufficiently, mainly due to lack of technology and investment fund.

However, the main food processing industries in Bangladesh, especially the rural-based food processing industries, are rice husking mills, flour mills, dairy farms, poultry, bakery and confectionery, sweet making, cheese making and handmade pickles industry. These industries produce their products mainly for the local markets, while a very few products are also exported. On the other hand, the most export-oriented food processing industries are located in the urban areas, though they are not very significant in number.

The Government of Japan and Japanese investors could assist Bangladesh for the promotion and extension of food processing industries there. It should be mentioned here that the investment climate now in Bangladesh is very attractive. The policy support from the government for foreign investors in Bangladesh is quite healthy. Moreover, necessary infrastructural and institutional support is also available there to a

significant extent. One of the main goals of the present industrial policy of the Government of Bangladesh is to attract foreign investors. It is hoped that Investors will be interested to avail of these opportunities provided by the Government of Bangladesh which will also help to promote the food processing industries, along with various other industries.

2. REPUBLIC OF CHINA

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INTRODUCTION

Taiwan is a small and crowded island with an area of about 36,188 km^2, almost two-thirds of the island are occupied by mountains and hills, leaving only about 858,800 ha suitable for farming and livestock production.

Agriculture in Taiwan stands as the foundation of the ROC's economic development and is an essential sector within the overall economy. Agricultural development in the ROC has been marked by a number of distinctive features. The government has developed a series of agricultural programs in order to reach its policy objectives of developing agriculture, building up farming villages, and protecting the interests of farmers.

Throughout the history of these development, one can see how agricultural development has evolved from the earliest stage, in which efforts were concentrated on increasing crop production, by raising productivity to the present stage of modern agriculture, that seeks to strike a balance between productivity, livelihood, and ecology.

Agriculture was a key element in the early stage of Taiwan's economic development. Over the last five decades, Taiwan has developed from an agriculture-based economy to a newly industrialized one. Along with changes in the structure of the economy, agriculture's share in the GDP fell from 32.2 percent in 1952 to 2.61 percent in 1999 (Table 1) and the role of agriculture has shifted from economic contribution to food security and environmental conservation.

Table 1. Industrial Origin of GDP

(Unit: Percent)

Year	Agriculture	Industries	Services	Year	Agriculture	Industries	Services
1952	32.22	19.69	48.09	1975	12.70	39.92	47.38
1955	29.09	23.23	47.68	1980	7.68	45.75	46.57
1960	28.54	26.87	44.50	1985	5.78	46.28	47.94
1965	23.63	30.21	46.16	1990	4.18	41.23	54.59
1970	15.47	36.80	47.40	1995	3.48	36.38	60.14
				1999	2.61	33.09	64.31

Sources: Directorate-General of Budget, Accounting and Statistics (DGBAS), *Statistical Abstract of National Income in Taiwan Area, R.O.C.*, Executive Yuan.

THE STATUS OF RURAL-BASED FOOD PROCESSING INDUSTRIES

Processed food products have a significant impact on Taiwan's economy in earning foreign exchange. The rural-based food processing industry played the most important role in the country's development. Almost 92 percent of export products were processed food products in 1952 (Table 2). However, it sharply decreased to 1.8 percent in 1997 as Taiwan's light industries and heavy industries developed.

Fast economic growth and increased national income (Table 3) have brought about not only a demand for high food nutrient standards, but also structural changes in the food processing industry. People pay more

attention to the nutritive value and the safety of foods. Increasing job opportunities for women, modern home appliances such as refrigerators, reluctance to learn cooking among the younger generations, increasing interest in outdoor activities and other changes in modern life have all contributed to the changes in the food processing industry. As a result, all kinds of bakery products, frozen foods, milk products, fruit and vegetable juices, soft drinks and snack foods appear in the market, one after another.

Table 2. Food Industry Contribution to Foreign Exchange and Its Role Change

Development Stage	1952	1962	1972	1982	1992	1997
Ratio of food industries export value to overall export value (percent)	91.9	49.5	10.7	5.0	3.6	1.8
Market orientation	Export-oriented		÷	Domestic orientation		
Acting role	Export to earn foreign exchange to support	÷	To add farm product values and thus increase	÷	To satisfy domestic food requirement and promote living	

Source: *Almanac of Food Industry in the R.O.C. on Taiwan*, 2000.

Table 3. Economic Growth and National Income in Taiwan

Year	Economic Growth Rate (percent)	National Income (US$ per capita)	Year	Economic Growth Rate (percent)	National Income (US$ per capita)
1990	5.39	7,413	1995	6.42	11,276
1991	7.55	8,189	1996	6.10	11,635
1992	7.49	9,536	1997	6.68	11,950
1993	7.01	9,872	1998	4.57	12,237
1994	7.11	10,566	1999	5.67	13,125

Source: DGBAS, *Statistical Abstract of National Income in Taiwan Area, R.O.C.*, Executive Yuan.

The consumption habits have changed in last five decades (Table 4). Rice consumption decreased from 131 kg to 58.4 kg per person per year from 1951 to 1997 (Table 4). However, fruit intake increased sharply form 19.1 kg (1951) to 150.1 kg (1997) while milk and sugar consumption increased from 0.5 kg (1951) to 23.4 kg and from 9.4 kg (1951)to 24.5 kg, respectively (1997).

Table 4. Food Consumption Quantity per Person per Year in Taiwan

(Unit: kg)

Year	Rice	Sweet Potatoes	Sugar	Vegetable	Fruits	Fishery	Milk
1951	131.00	62.3	9.4	63.3	19.1	13.1	0.5
1961	136.80	58.1	9.4	57.2	19.9	25.3	1.7
1971	134.30	21.4	12.4	91.3	45.0	34.3	2.3
1981	99.44	23.0	22.8	115.6	80.5	35.8	5.7
1991	67.56	22.4	24.4	14.4	107.2	40.4	15.7
1992	62.20	22.7	26.1	97.9	129.8	45.3	18.3
1993	60.70	20.8	25.3	98.8	144.6	48.7	20.2
1994	59.90	22.2	25.1	93.3	136.5	38.4	21.3
1995	59.10	18.1	24.5	101.9	137.4	38.4	23.0
1996	58.80	19.3	24.9	108.9	138.8	38.5	22.8
1997	58.40	23.4	24.5	108.3	150.1	42.4	23.4

Sources: Council of Agriculture, Executive Yuan.

Most of the food industries in Taiwan are located in rural villages, for convenience of collection and transportation of raw materials from farmers. Food industry is closely related to development of the rural economy and increase of farmers' income. The income from the processed foods is considered to be a great boost to rural economy.

In the 1970s canned products such as pineapple, mushroom, asparagus and tomato played an important role in the development of Taiwan's economy. More than 97 percent of the canned foods were exported, mainly to Europe, America and Japan. These canned products were major export items, that earned a lot of foreign exchange for Taiwan.

In succession, frozen food appeared in the market and developed into a sizeable industry in the early 1980s. About 98 percent of the frozen foods were exported to Japan, West Germany, U.S.A., Hong Kong and Canada. The top three were vegetables, marine products and pork. The most important frozen vegetables were mushrooms, asparagus, soybean in the pods and beans. Among marine products, shrimp, eel, crab and fish paste were the main items. Pork is the only meat item and Chinese-style snack foods were the chief items of frozen prepared foods.

The salted foods industry is an important source of income for the farmers, who grow fruits and vegetables on sloping land. The main items include preserved ginger, prunes, eggplant, mustard, cucumbers, mushrooms and bulbous onions. Japan imports 80 percent of Taiwan's salted foods. Because most products are in a semi-finished form, profits for these products are limited.

Later on, under rather disadvantageous conditions, such as growing international protectionism, shortage of labor, appreciation of New Taiwan dollar and the threat of cheap imported products from developing countries, also greatly lowered competitiveness of the export of traditional products. Taiwan's food industry entered a transitional period in which food product exports are experiencing sharp decreases, while imports are booming.

From 1987 to 1999, the value of food product exports gradually increased while imports sharply increased (Table 5). As a result, the food industry had to reverse its role to meet domestic demands, and satisfy the island's domestic eating needs due to upgraded living standards. The domestic market's orientation became the major target for future growth in the Taiwan food industry.

Table 5. Composition of Export in 1981-99

(Unit: US$ million)

Year	Agricultural Products	Processed Agricultural Products	Industrial Products	Total
1981	580 (2.6)	1,042 (4.6)	20,989 (92.8)	22,611
1985	491 (1.6)	1,386 (4.5)	28,847 (93.9)	30,724
1990	431 (0.7)	2,578 (3.8)	64,204 (95.5)	67,213
1995	481 (0.4)	3,802 (3.4)	107,375 (96.2)	111,658
1996	466 (0.4)	3,618 (3.1)	111,896 (96.5)	115,980
1997	465 (0.3)	2,169 (1.8)	119,529 (97.9)	122,163
1998		3,154 (2.8)	107,428 (97.2)	110,582
1999		3,101 (2.6)	118,490 (97.4)	121,591

Source: Food Industry Research & Development Institute, *Food Industry Statistics Book*; no additional data available in 1998 and 1999 on Agriculture Products.

Note: Figures in parentheses are percentage to total.

The total value of food processing industry production in Taiwan area is around US$143.2 billion (Table 6). The total number of food processing plants in Taiwan is around 6,000, but most of them are small scale and are family businesses, total employees are about 130 thousand. The butchering industry is the largest one, with production value of US$18.4 billion. Animal feed industry and non-alcoholic beverage industries come in as the second and third, with US$14.6 billion of value production, respectively.

Apart from the main food industries as described, rural-based food processing industry is very popular in the rural villages in Taiwan. Although this kind of processing enterprises is small scale, it is very important to the farmers due to higher profits from processed foods, compared to the price of the raw materials from the fields. The oversupply of vegetable and fruits can be processed as preserved or semi-finished products

by the rural-based food processing factory or station. Also, the rural-based food processing industry provides job opportunities for the farmers. To ensure further development of these kinds of food enterprises, the government has adopted several programs.

Table 6. Value of Food Processing Industry Production in Taiwan Area

(Unit: US$ billion)

Industrial Category	1997	1998	1999
Butchering industry	16.9	14.9	18.4
Animal feed industry	20.6	14.8	14.6
Frozen food industry	16.9	11.0	10.7
Rice grinding industry	15.5	12.7	13.4
Non-alcoholic beverage industry	17.2	15.0	14.6
Miscellaneous food industry	18.1	14.3	13.4
Flour making industry	10.2	7.8	7.7
Winery industry	8.8	7.0	7.5
Beer manufacturing industry	7.1	7.1	7.1
Dairy industry	7.1	6.6	6.6
Edible oil industry	5.1	5.5	5.0
Bakery food industry	6.7	5.6	6.2
Noodle manufacturing industry	4.8	4.0	4.1
Canned food industry	3.1	2.6	2.5
Sugar industry	2.9	2.1	2.1
Confection industry	2.0	2.1	2.1
Other seasoning industry	2.0	2.6	2.4
Monosodium glutamate making industry	2.0	1.4	1.5
Tea industry	2.9	0.7	0.8
Salted food industry	2.9	1.0	1.3
Dehydrated food industry	1.1	1.3	0.9
Total	173.9	140.1	142.9

Sources: Food Industry Research and Development Institute, *Food Industry Statistics Book*.
Note: US$1 = NT$32.2 in 1999.

GOVERNMENT PROGRAMS FOR PROMOTION AND MODERNIZATION OF RURAL-BASED FOOD PROCESSING INDUSTRY

The objectives of these programs are to encourage farmers to process vegetables and fruits to increase their product value, prolong their storage period, prevent oversupply during the season, and develop local traditional processed products, one township per one product. The executing and cooperating agencies of rural-based food processing industry include government agencies, research institutes, and farmers' associations. They jointly render assistance to the farmers' organizations for production of raw materials, improvement of processing techniques and equipment, assisting in the packaging and marketing. The members and their responsibilities involved in the project are as follows:

- ***Council of Agriculture (COA)***: To create the policies and evaluate the results of the project.
- ***District Agricultural Improvement Station***: To transfer the techniques of breeding, planting, harvesting and transportation of crops.
- ***Food Industry Research and Development Institute (FIRDI)***: To study the techniques of processing, design of factories, layout of equipment and facilities and to develop new products.
- ***China External Trade Development Council (CETDC)***: To assist local enterprises in promoting their products and conduct packaging design for the products.
- ***Local Farmers' Association***: To organize training programs for farmers and conduct sub-projects.

There are several methods enabling the local farmers' association to develop rural-based food processing and to promote their products:

- To establish a processing station/factory in the area of farmers' associations – The farmers' association carries out business management and sales of products.
- To establish a processing station/factory for farmers' research groups – The members of the group make it a priority to supply raw material for processing, one or several of the farmers manage the factory and the product is sold directly by this group.
- To establish a packaging and transportation center in farmers' associations – The product or semi-finished products produced by farmers are packed and sold by farmers' associations.
- To convince the farms to be a reliable supplier to food factories – Government encourages food factories to directly purchase raw materials from farmers, who produce the crops required for processing, under long-term purchase contracts. Government also assists the farmers' association to set up pretreatment stations, where the raw material can be processed into semi-prepared products, which are then transported to food factories for further process. Under the protection of contracts and assistance of government agencies, the price of crops can be stabilized and the quantity and quality of raw materials can be guaranteed. Both farmers and food factories will obtain reasonable benefits from their cooperation, under good partnership arrangements.

The ways in which each project is conducted and the procedures may be different, due to some discrimination and the regional nature of crops. However, a prerequisite of this work and the first step is to organize farmers through the farmers' associations. The mode of organization may be a research group, a postharvest research group or a packaging and transportation research groups, etc. By inviting experts to give training courses or lectures for the farmers, this shows the importance in improving techniques of breeding, planting, fertilizing, farm management and harvesting of the crops.

The second step is to establish a processing station/factory in the right place, with an optimal production scale, which should be conducted by the farmers' associations or research groups. Under the guidance of FIRDI, the factory design, facility layout, trial running, technique transfer and production are all carried out. Then, CETDC conducts the packaging design according to the characteristics of various products. In this way, the project can run consistently and efficiently.

Since 1976, COA has demonstrated a project, at a selected area named Kungkuan Township, for mustard stem and mustard leaf processing. There are seven processing groups organized, each group having 10 farmers and covering 10 ha of mustard leaf and 5 ha of mustard stem. The products are collected by the Packing Center, managed by five of the farmers under the supervision of the Kungkuan Farmers' Association. After grading and packing at the Center, the products are sold by the management team, under the Farmers' Association brand. After a three-year promotion, the Kungkuan preserved mustard stem and mustard leaf has become well known in Taiwan.

Another successful example is the Putai Township. Many types of vegetables such as radish, cabbage and cucumber are planted in this area. Before processing stations were set up, farmers sometimes did not want to harvest their crops, whenever oversupply occurred in the season, because there was no profit at all. Now, vegetables in oversupply can be collected and processed as salted products; besides the processing stations also provide job opportunities, especially for aging farmers (over 50 years old).

Since the project has proven successful in Kungkuan and Putai Townships, COA continuously supports the promotion of rural-based food processing factories or stations in other areas, every year.

The roles of rural-based food processing industry in the rural economy are as follows: Due to the climate and other factors, oversupply situations usually occur in the production of fruits and vegetables in Taiwan. Wuku is one of the major production areas of bamboo shoot. The price of bamboo shoot is NT$60/kg in the early season, but it falls dramatically to NT$15/kg in season. Therefore, the government convinced the farmers' association to set up a processing factory to collect the oversupplied bamboo shoot, to be processed into canned bamboo shoot. As a result, the price of bamboo shoot remains through the oversupplied production period. It not only remains a reasonable price but also increases in its value-added. (Table 7).

Table 7. Economic Effectiveness Shown in Wuku in 1998

Product	Quantity of Bamboo Shoot (kg)	Guarantee Price (NT$/kg)	Cost (NT$)	Quantity of Canned Bamboo Shoot	Value of Sale (NT$)	Profit (NT$)
Dried bamboo shoot	56,558	20.84	1,729,284	36,933[a]	2,363,520	634,236
Canned bamboo	12,976	23.37	1,872,000	12,480[b]	2,121,600	249,600
Total	69,534		3,601,284		4,485,120	883,836

Sources: Wuku Farmers' Association.
Notes: [a] kg; and [b] can.

Another example is the Peipu Farmers' Association (Table 8). There are some valuable local agricultural specialties belonging to the local community. They are usually not processed by food industry, because of special manufacturing methods being required. The processing technology of these products has to be improved or they disappear from the market. Persimmon is one of the local specialties at Peipu. The government agencies and food processing experts assisted Peipu Farmers' Association to establish four plants and improve the processing technology and packaging. Persimmon are purchased by Peipu Farmers' Association, at the price of NT$2 per kg higher than the farm price, and are processed by the association's members, then sold by the Association. The Association further returns 30 percent of its profit to the farmers. This is a highly recommended pattern.

Table 8. Economic Effectiveness Shown in Peipu in 1998

Quantity of Persimmon (kg)	Guarantee Price (NT$/kg)	Cost[a] (NT$)	Quantity of Dried Persimmon (kg)	Value of Sale (NT$)	Profit[b] (NT$)
40,407	26	1,752,634	13,537	2,522,900	770,266

Source: Peipu Farmers' Association.
Notes: [a] Cost include salary of employee (NT$720,052); and [b] 30 percent of profit (NT$231,080) is returned to the farmers, 70 percent (NT$539,186) belongs to Peipu Farmers' Association.

Until now, 70 townships have gone through this promotion under the projects, with different products. The promotion and modernization of rural-based food processing industry not only solved the problem of oversupply of the plant crops, but also increased the income of farmers. Through the assistance of modern technology, the products have been greatly improved in quality and sanitation and have become well known in local markets.

CONCLUSIONS

Food processing industry is a very important industry for rural people. It can satisfy their food requirements and promote their quality of life. It also provides additional value to agricultural products, provides job opportunities for rural people and boosts the rural economy. Besides the canned food, frozen food and salted food industries, rural-based food processing industry has also been planned and developed in this country since 1976. Although it has created great benefits for the local farmers, there still remains much to do in the future.

Some of these actions needed are shown as follows:

- To enhance the capabilities of farmer's management and market-oriented concepts: How to manage a factory and promote their products in the market, is of considerable importance to the farmers' association. The farmers should be trained in the direction of business-orientation to increase the competitiveness of their products in the market.
- Training and education to improvement sanitation standards and packaging of products: Since the scale of a cottage food processing station is small, farmers usually do not have much idea on requirements of food sanitation and packaging. The contamination of products sometimes happens during processing

and marketing. Education should be strengthened to upgrade the quality of the product, and make it more competitive in the market.

- To strengthen the relationship among township farmers' associations, processing stations/factory and farmers.
- There should be a contract between farmers' associations and farmers or between processing station and farmers, to stabilize the management system. Farmers should have a common understanding that they all will profit from the system when they cooperate. Through this arrangement, the farmers' associations can provide bulk-purchased seeds, fertilizers and pesticides for the farmers at lower cost and at standardized quality. The farmers' supply raw materials according to the contract for the processing. The processing station will then share the profit with farmers from the product sale. In this way a strong management system can be established.
- The selection of available areas and agricultural products should be optimal. The area selected should be the main production area of the crop, therefore, the supply of the raw material for processing will be convenient and stable. The farmers of the area should be willing to follow the guidance of the program and technical expertise; the processed products should also have market potential.

3. INDIA

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INTRODUCTION

Poverty and unemployment in the rural areas are the two most important challenges India faces. In spite of all the industrial development in the country, agriculture still maintains about 70 percent of the population of the country. It is in the rural areas again where 75 percent of the population of the country lives and they will continue to constitute at least two-thirds of labor force. It is imperative therefore that the rural economy is improved, so the burden of poverty can be lessened and the working population overflowing from the villages can be absorbed in off-farm activities. The rural economy cannot be developed fully by improving only the productivity of agriculture, although this will go a long way in improving the rural economy; however, rural industries, subsidiary activity and food processing industry in particular, are of great importance for a rapid transformation of the rural economy, in India. According to National Sample Survey (NSS) and census data, nearly 25 percent of the rural labor force is employed in non-agricultural activity. The economic status of this population can also be improved by increasing non-farm activities, particularly rural food processing industries.

Rural food processing industries are beneficial to relieve pressure on land, establish linkages between agriculture and industry, increase employment opportunities, improve the economic well-being of rural people by increasing their income, and to prevent migration of rural population to cities, which increases slums. Some of these arguments have also been found acceptable to the policymakers of the country during various planning periods, however, in spite of this intention by the Indian Government, the growth of food processing industries has not been encouraging. Food processing is where business meets agriculture. This is an area that offers excellent opportunities for entrepreneurs, corporate- and modern-minded farmers to set up agribusiness and agro-industry. Food processing industry is of enormous significance for India's development because of the vital linkages and synergies that it promotes between the two pillars of the economy; namely, industry and agriculture. India is the second largest producer of food in the world and has the potential to become a leading producer of food in due course of time with sustained efforts.

Employment generation potential is much higher in the food sector than any other sector, i.e., 54,000 persons get direct employment per Rs.100 million of investment in the food sector in comparison to 48,000 in textiles and 25,000 in paper industry. There is also scope for four-fold generation of indirect employment in the ancillary and down stream activity on account of investment in the food sector. Furthermore, 60 percent of the employment generation is in small towns and rural areas.

STATUS OF RURAL-BASED FOOD PROCESSING INDUSTRY

The food processing industry ranks fifth in size in the country and employs 19 percent of the industrial labor force. Fourteen percent of the industrial output is contributed by the food processing industries, which is 5.5 percent of the GDP of India. The estimated turnover of the food processing industry is Rs.1,440 billion of which about 75 percent is estimated to be in the unorganized sector and that is in the rural areas. The increase in per capita income, particularly in the middle class segment, and changing food habits of the India's population as a whole, have opened up avenues for food processing industries. Ready-to-eat food, beverages, processed and frozen fruit and vegetable products, marine, dairy and meat products among others

have gained significance in the recent past. Quality and health consciousness of the consumers have forced the industry to adopt state of the art technology in the production line.

A study conducted by Mckinsey & Company has visualized the year 2000 and beyond as a period of immense growth and development for the food processing industry in India. Not only the food processing industry is estimated to reach a gross value of Rs.5 trillion but value-added foods are expected to grow at a much faster rate, i.e., to expand from Rs.800 billion to Rs.2,250 billion by 2005 AD. The study predicts that by 2005 around 200 million people will move from subsistence foods, like cereals and pulses, to basic processed foods.

STATUS OF VARIOUS SECTORS OF FOOD PROCESSING INDUSTRIES

Fruits and Vegetables

India is the third largest producer of fruits and second largest producer of vegetables. Twelve million ha, or 7 percent of the total cropped area in India is under horticultural crop production, producing about 100 million mt which is about 18 percent of the gross agricultural produce in the country. In the period between 1993-98 there has been a quantum jump of about 40 percent increase in the production of fruits and vegetables, or about 66 percent of the total quantity of production of food grains. It is estimated that, by the year 2010 this would be 80 percent of the quantity of food grains produced in India. Though India is a major world producer it accounts for only 1 percent of the world trade in fruits and vegetables. Exports of fruit pulps, pickles, chutneys, canned fruits, vegetables and dehydrated vegetables in 1997-98 were valued at Rs.5,240 million.

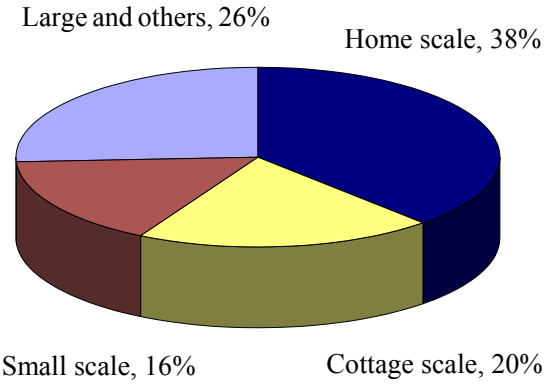

Figure 1. Distribution of Fruit and Vegetable Processing Industries

Fruit and vegetable processing has attracted an investment of about Rs.750 billion out of which about 12 percent of the investment is accounted for by Foreign Direct Investment (FDI). Out of the number of 5,198 fruit and vegetable processing units 38 percent are on the home scale, 20 percent on the cottage scale, 16 percent are on the small scale and 26 percent is accounted for in the large and other category (Figure 1).

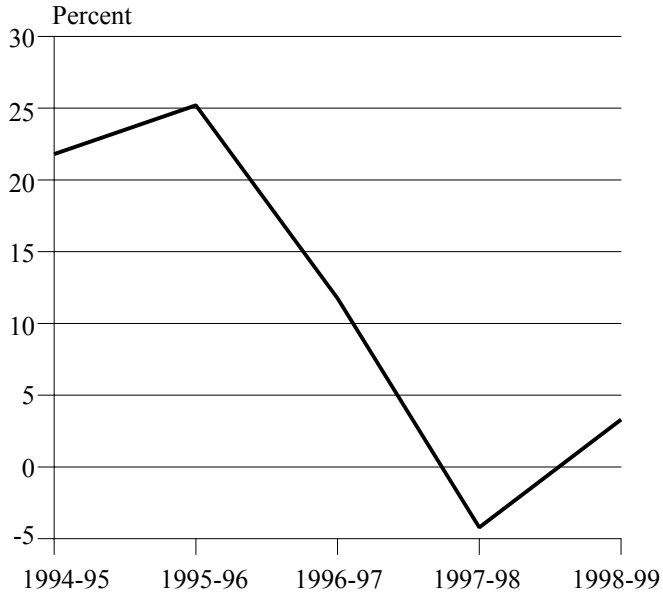

Figure 2. Growth Trend of Fruit and Vegetable Processing Industry

The growth trend of the fruit and vegetable processing sector from 1994 onwards till 1997 remained positive, then during 1997-98 it actually showed a negative trend of 4.2 percent owing to a levy of excise duty of 8 percent on fruit and vegetable processed products, as against zero duty in the preceding years. However, the period 1998-99 has shown a marginal positive growth of 3.3 percent (Figure 2).

In the situation that prevails in India, 90 percent of the fruits and vegetables are marketed by the farmer as compared to less than 20 percent of cereals. This shows that the main challenge that the food sector will face in the coming decade, will be one of marketing, which has been a major constraint in its growth. In this kind of scenario, food processing becomes critical. This can absorb surpluses at farm level while ensuring fair prices to the producers. It should also ensure availability of produce at reasonable prices for the consumer.

MEAT AND POULTRY INDUSTRY

Meat

India has the largest livestock population in the world with 50 percent of the total buffalo and one-sixth of the goat population in the world. FAO estimates present production of various types of meat and poultry products to be about 4.42 million mt. Only 11 percent of the buffalo, 6.4 percent of cattle, 33 percent of sheep and 38 percent of goat population in India is culled for meat. Maximum value addition is carried out for pork products, whereas, for other meat and poultry items these are traded for domestic consumption without much value addition. However, with the growing urbanization and increasing quality consciousness the market for scientifically produced meat products is expected to grow rapidly. The current level of exports of meat products from India is worth Rs.80 billion, the major importers being countries in the Middle East and the Southeast Asia. Meat processing in India has recently become a thrust sector for Indian industry, and a number of processing centers equipped with the latest technology are being set up. This sector has attracted a total investment of Rs.9 billion including FDI worth Rs.5 billion over the last six years.

Poultry

The Indian poultry sector has seen spectacular progress over last few years and stands today as a Rs.75 trillion industry. Growing in size, quality and productivity, the industry has transformed itself from a backyard farming activity into one of the India's largest food sectors. India produces 1.61 million mt of eggs and recently, there has been an annual increase of 10 percent in demand for eggs. The average rate of growth for poultry is 16 percent while that for broilers is even higher at 27 percent per annum. There are five modern, integrated, poultry processing plants functioning in the country. There are however, large number of small plants, which do not have modern equipment. Though the poultry industry is growing very rapidly, chicken dressing and processing is still in its infancy in India. There are 115 layer and 280 broiler hatcheries both in the private and government sectors, producing 1.3 million layer parents, and 2.6 million broiler parents, to support this industry. To produce whole egg, yolk and albumen powders, five modern egg powder plants have also been established.

Milk and Milk Products

India produces 72 million mt of milk every year being the world's number one producer. The whole world acknowledges India's dairy development program as of the one most successful development interventions in present day India. Milk production in India has increased by 4 percent during the last three years while the world milk production has gone down by 2 percent (FAO estimate). Out of the total milk produced, 46 percent is consumed as liquid milk without any value addition. The remaining 54 percent is utilized for conversion to milk products. The share of the organized sector in conversion of milk to other milk products, is less than 10 percent. Ghee (clarified butter) alone accounts for 85 percent of the total milk products produced in the country. The value of Indian dairy produce is expected to rise from Rs.288 billion in 1991 to Rs.1,000 billion by 2005. The industry has attracted a total investment worth Rs3,600 million over the last six years. The growth in processed milk products is depicted in Figure3.

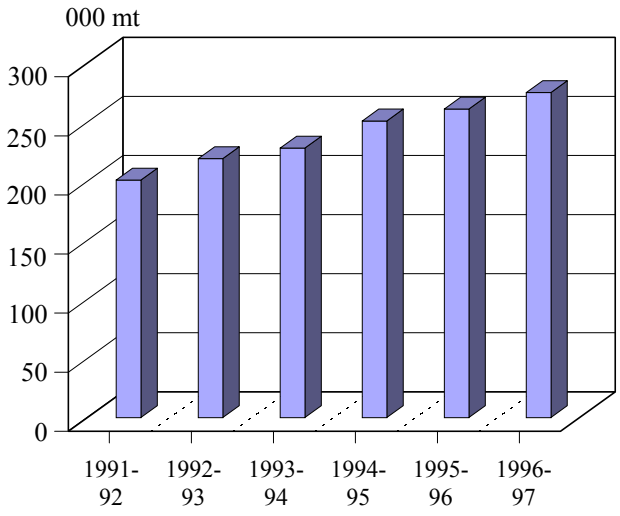

Figure 3. Growth in Production of Processed Milk Products

Source: National Dairy Development Board, 1999.

The National Dairy Development Board, Anand, has played a key role in development of this sector through successful dairy cooperatives in the rural areas, thereby benefiting the rural people to a great extent.

Meanwhile, National Dairy Research Institute, Karnal, has been playing a major role in technology development for this sector.

Consumer Products

Consumer products include confectionery, chocolates, cocoa products, soy-based products and ready-to-eat foods, aerated drinks and mineral water and high protein foods. This sector has successfully attracted substantial investment of about Rs.128 billion including FDI of Rs.50 billion in the last six years. The value of the Indian soft drink market is about Rs.22 billion a year. Confectionery items, other than chocolate, are mostly found in the small-scale sector, cocoa- and non-cocoa-based products are mostly found in the organized sector, with prominent brand names. The output of confectionery grew at a compound rate of 6-7 percent while the rate of growth of chocolate production increased at a rate of 10-15 percent per annum.

In the ready-to-eat segment, pasta products like noodles, macaroni, vermicelli, produced in the organized sector, has an installed capacity of 33,400 mt per annum. Demand for corn, oats and rice flakes is increasing, and is catered for by 10 units with a capacity of 9,340 mt in the organized sector, the rest being from the unorganized sector.

Fish and Fish Products

India has over 8,000 km of coastline with an exclusive economic zone of 2 million square kilometers. Other water bodies include 29,000 km of rivers and canals, 1.45 million ha of reservoirs and 0.75 million ha of tanks and ponds. The Indian fishing fleet consists of 200,000 traditional craft, 47,000 mechanized boats, and 180 deep-sea trawlers. While traditional crafts and some mechanized craft operate throughout the Indian coast; the majority of the mechanized fishing vessels operate from five major fishing harbors, 28 minor fishing harbors and 114 landing centers in the country.

The export sector is backed by modern processing infrastructure, which includes freezing plants and individually quick frozen (IQF) facilities. The sector employs 10,000 workers, most of whom are women from rural areas. The per capita consumption of fish in the country is low, only 5 kg per annum as against the world average of 12 kg per annum and Japan's average of 86 kg/capita. Fish harvesting from the Exclusive Economic Zone (EEZ) is 2.87 million mt and 2.7 million mt from inland waters.

During the past 10 years the organized corporate sector has been involved in the preservation and export of coastal fish. Processing of fish into canned and frozen products is entirely carried out for export market. There are 258 registered freezing units with a capacity of 2,170 mt, 23 canning units with a capacity of 84.5 mt, 24 fish meal units with a capacity of 419 mt, and 297 cold storage units with a capacity of 203,448 mt per annum. This sector has attracted a very high quantum of investment, to the tune of about Rs.30 billion during the past six years, of which 23 percent is foreign investment.

Alcoholic Beverages

In India, alcoholic beverages are generally categorized under beer, country liquor, and Indian Made Foreign Liquor (IMFL). Country liquor is made from a variety of raw materials, is known by different local names in different parts of the country, and is exclusively produced in the rural areas for local consumption. IMFL consists of rum, whisky, vodka, etc. which is produced in 36 breweries with a total licensed capacity of 160 million liters per annum. Premixed drinks like gin and lime, rum and coke are gaining popularity. The beer market in India is estimated at Rs.7 billion and is growing at a rate of 15 percent per annum. There are 212 distilleries with an installed capacity of 1,933 million liters per annum. The abundant availability of raw materials as brewing adjuncts, such as molasses, barley, yeast, grapes, maize and potato make brewing easy.

Grain Processing (Cereals)

India produces about 225 million mt of food grains including rice, *jawar, bajra*, maize, ragi, wheat, gram and pulses. The processing of these items contributes very meaningfully to the reduction of postharvest losses for the rural farmers. The most important point in these items is that substantial portions of this sector are grown and processed in the rural areas with very high employment potential. Grain processing is the biggest component in the food sector, contributing over 40 percent of the total value. Almost 96 percent of the total value addition derives from the primary processing sector, whereas secondary and tertiary processing contribute only 4 percent of the total value addition. Globally, there is a substantial market for

Indian *Basmati* rice. The export of *basmati* and non-*basmati* rice has been increasing continuously, against an export of Rs.538.3 million in 1988-89, the export has increased to Rs.62 billion in 1998-99. Still traditional milling of paddy, which is predominantly carried out in the rural areas with around 40 percent of the total paddy produced, using approximately 100,000 traditional rice mills (hullers), with the remaining 60 percent being done by modern milling systems.

Plantation Crops

Tea, coffee, cashew, cocoa are the major plantation crops presently grown in different parts of India, as per the agro-climatic requirement of the crops. It accounted for 5-6 percent of India's aggregate export earnings. India continues to be largest producer, consumer and exporter of black tea. Cashew is an important cash crop producing 36,000 mt annually and India is the world's leading producer and exporter of cashew kernels. Cashew earns foreign exchange worth Rs.16 billion through exports. There were fewer sophisticated modern processing industries in the country, until recently the cashew processing industries have been mainly labor-intensive. Coffee is one of the oldest plantation crops grown in India, which has also a good international market.

MAJOR CONSTRAINTS FACED IN THE DEVELOPMENT OF SMALL- AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRIES

The value addition of food fortification in India is only 7 percent in comparison to other countries like China, 23 percent; Philippines, 45 percent; and U.K., 188 percent. In various national and international forums, the need of processed and preserved food for the growing population of India is emphasized. The greater the distance between the rural producer and the urban consumer, the greater is the risk of postharvest deterioration. Although India is one of the largest producers of raw material for the food processing industry in the world, the food industry is still at a nascent stage. Less than 2 percent of fruit and vegetable production is processed compared with 30 percent in Thailand, 70 percent in Brazil, 78 percent in Philippines and 80 percent in Malaysia. In spite of the tremendous growth potential with respect to rural-based food processing industries in the country there are many constraints, which have impeded development, which are:

- agriculture has largely been for subsistence and has not been market-driven. This has not yielded adequate surpluses for processing, and coupled with the low yields of crops, has been a bottleneck. The lack of awareness and the non-availability of suitable, processable varieties of raw materials, in terms of type, size, color, texture, etc. has contributed to the absence of large volumes of processable varieties and therefore to economies of scale.
- the small and unorganized sector accounts for 75 percent of the total food processing industry. There are only a few organized large industrial houses who make their presence felt in the food-processing arena in India. The food processing industries were neglected during previous planning periods. The liberalized economy, poses a threat to the small and unorganized sector from a marketing point of view. When products from other countries are available in the Indian market at lower prices the local small industries are facing lot of problems in marketing their products, so that some of them had to close down in a competitive business environment.
- the tax levels on processed foods in India are among the highest in the world. Few, if any, other countries in the world impose excise duty on locally processed food. There is also a distinction between branded and un-branded products for taxation in India. Excise duty of 16 percent, sales tax, octroi tax, mandi and samiti tax, taxes of the local bodies for entry and exit increase the tax burden on the product from 27 to 35 percent. India is also one of the few countries to levy tax on the machinery and equipment for food processing industry. Because of these various taxes and duties, the product becomes very highly priced and cannot compete in the national and international market, consequently having to close down. It can be said that multiple and complicated tax regimes have made the food processing industry uncompetitive. The investments in food processing are in any case high risk and yield low returns. Investments are further depressed, despite the advantage of hygiene and quality, as the price-sensitive Indian consumer has stayed away from the high priced packaged foodstuffs.

- the existence of multifarious laws and multiple authorities is another hurdle. Many of the laws were framed some 50 years ago like Prevention of Food Adulteration Act, which was meant to serve the purpose of food safety and to prevent adulteration. The plethora of laws covering food and processed items, involving multiple agencies, at present, hinders growth and makes administration of the processed food industry difficult.
- in India the production of food grains and other items is still dependent on the vagaries of nature, which are rather unpredictable. This also affects the small- and medium-scale rural-based food processing industries to a great extent, because of their dependence on seasonality of production.
- many of the small- and medium-sized food processing industries are engaged in primary processing, not secondary or tertiary processing which reduces the scope for value addition.
- almost all the food processing industries, particularly the small and medium ones, are in the hands of the private sector, who do not have access to latest technology because of the prohibitive cost of technology. In the Information Technology age, many Indian food processing industries do not have a database, one of the major hindrances in setting up new industries.
- poor infrastructure such as lack of integrated cold chains, roads, power, etc. has also retarded the growth of food processing industry.
- due to seasonality, non-availability of quality raw materials in time, high inventory carrying cost due to purchases at the time of abundance, and very high cost of packaging, i.e, around 40 percent of the product price, the working capital requirement in this sector is high.
- the Ministry of Food Processing Industries was demoted to the status of a department under the Ministry of Agriculture in October 1999. This diluted the focus attached to the sector by the government.

Measures to Alleviate the Constraints

The Government of India has realized the importance of the infrastructural requirement and programs have been initiated for the creation of a number of cold storages and go-downs for storage of potatoes, onions and other horticultural produce. Steps are being taken by the government to harmonize the existing multifarious food laws framed 50 years ago, to bring about a development orientation and to facilitate faster growth for the industry. In order to provide adequate protection to small and medium industries in this sector, the large industries or corporations must become anchors to assist and nurture them. Besides these anchor industrial corporations, a number of food parks are also being prepared to provide assistance in adhering to international standards, by establishing common facilities. The chosen anchor industries will assist them to market primary and secondary items and convert them into value-added products for sale, through their distribution network including export. Attempts are being made to develop a strong database and market intelligence. Priority has been attached for the development of inter-connected sealed roads to the rural areas, which will facilitate movement of raw materials and finished products. The parliamentary standing committee has already reiterated that the Department of Food Processing Industries under Ministry of Agriculture, should be given its previous status of a fully fledged ministry which would help in attaching greater emphasis and priority, in terms of policy, program formulation and implementation.

TRADITIONAL AND MODERN TECHNOLOGIES IN RURAL-BASED FOOD PROCESSING INDUSTRIES

Successful rural technologies for of traditional foods fall into three categories: (i) agro-base technologies, comprising processing of cereals, legumes, and oil seeds; (ii) technology of products from locally available raw materials, which include dehydrated products and fermented foods; and (iii) appropriate technologies having a rural base, which are secondary and tertiary processing techniques adapted to upgrade home scale preparations, e.g., foods based on legumes, grain flours and oilseed mill. The second category includes preservation by salt, sugar and sun-drying. The basic principle of these methods of preservation is to reduce the water available for microbial growth. Fruit products such as jam, jelly, etc. are produced by adding sugar to fruit pulp up to a concentration of 65-70 percent. Pickles made with various fruit and vegetables are mostly produced in these unorganized rural units. Sun-drying with its inherent disadvantages like exposure to dust, insects, requirement of a large area, still finds a major place in preservation of food, as the sun is the cheapest and most abundantly available source of energy in India.

Transformation of simple home-scale technology into commercial production, has resulted in significant impact on the social and economic structure of the rural areas. The Central Food Technological Research Institute (CFTRI), Mysore, a premier institute in the field of technology development in food sector, is making constant endeavors to popularize and propagate traditional food technologies. Technologies such as those developed at CFTRI, which have wide acceptance by rural areas are: (a) pulse mill for the production for dhal splits from red gram; (b) utilization of oilseed meal as a dhal substitute in traditional foods, e.g., sambar mix; (c) *papad* and *vadian* from legumes and cereals; and (d) beaten rice products. These inexpensive technologies are gradually getting accepted in rural areas.

Modern processing technologies are normally used for processing agricultural products in sophisticated industries such as thermal processing, canning and evaporation (or) concentration.

GOVERNMENT POLICIES FOR PROMOTION OF SMALL- AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRIES

Realizing the importance of food processing sector, the Government of India formulated policies and plans for the improvement of food processing infrastructure, including upgrading technology and the enforcement of quality standards, activating the domestic market, with a focus on exports, during the Ninth Five-Year Plan.

Food processing industry has been identified as a thrust area for development in recent planning periods. A few of the policy guidelines are as follows:

- Food processing industry is included in the priority-lending sector. Most have been exempted from the provisions of industrial licensing under Industries (Development and Regulation) Act, 1951.
- Where foreign investment is concerned, automatic approval for even 100 percent equity is available for the majority of processed foods.
- The expenditure outlay of Ministry/Department of Food Processing has been increased from Rs1,770 million during Eighth Plan to an outlay of Rs.2,500 million during Ninth Plan period.

ROLE OF PRIVATE SECTOR, NGO, FARMERS ASSOCIATIONS, RURAL WOMEN IN RURAL-BASED FOOD PROCESSING INDUSTRIES

There is a need to increase food processing in India from an existing low level of 2 percent up to 10 percent by 2010. This would require an investment of Rs.14 trillion in the food processing sector. This investment would generate direct employment for about 7.7 million persons and indirect employment for about 30 million. This could also reduce food wastage worth Rs.800 billion. Apart from these advantages, the value addition to the food products will go from 7 to 35 percent, which will increase contribution of this sector to the GNP. The thrust will have to attract foreign and domestic investment, and generate internal accruals of such magnitude. Domestic investment needs to come from the private sector, NGOs and community-based organization, including farmers associations.

The private sector/corporate business houses and entrepreneurs will need to increase their investment, in setting up of industries for processing and value addition, since public sector investment has been declining in the post-liberalization era. The NGOs need to continue to be active with their catalytic role, in such as activities relating to capacity building, awareness building, empowerment and people. Apart from this the NGOs have to expand their role in terms of establishment of critical infrastructure such as cold storage, grading and cleaning facilities. The farmers associations and community-based organizations will focus on production (including planning for production), and marketing. This will also be helpful for reducing cost of production because of economies of scale of operation. This will widen the market supplies and empower the producers to be able to bargain with the corporate anchor industries. Rural women continue to contribute to the extent possible in postharvest handling and processing of produce. An effective interactive coupling, linking all these organizations (private enterprise, NGO, community organization, individual farmers) can contribute greatly towards the development of small- and medium-scale food processing industries in rural India, thereby improving the rural economy of the country.

4. INDONESIA

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INTRODUCTION

The Indonesian economy has been deteriorating quickly since the monetary crisis began in mid-1997. The strong dependency on imported components, and collapse of the major industries, led to mass unemployment and reducing real income, which later pushed hyper-inflation and other related social problems. During those years, the economy of Indonesia had not really relied upon the mass of small and medium industries. A few big industries, which were significantly facilitated by the government at that time, could not afford to continue their business and were not strong enough to face the regional economic downturn.

The last few years, starting from 1998 were very difficult for many Indonesian businesses and consumers. Business investment was minimized because of higher costs and the unpredictable conditions in the country. Despite the crisis, the agriculture sector still showed a positive growth rate of 0.22 percent in 1998 and continued to perform well even when the national economic growth rate fell to -13.7 percent. These experiences under crisis conditions proved that businesses and industries based on natural resources bases, are relatively stable in a monetary crisis, since they use local, not imported components.

The undervalued Rupiah has now made Indonesia a more attractive place to establish food processing and packaging plants not only supplying to the domestic market, but also exporting to meet the increasing world demand for processed foods. Processed foods cannot be separated from the main resources, agricultural products and rural areas. These have always characterized small- and medium-scale food processing industries (FPIs) in Indonesia.

Small- and medium-scale FPIs in Indonesia have been growing quite satisfactorily for several decades. The products usually supply especially local and domestic markets. Some products, such as shrimp crackers, gnemon cracker (emping belinjo), palm sugar and some fishery products, have successfully penetrated export market. As new processing techniques as well as technologies are being developed, there are a growing number of processed products being introduced to the consumers. Medium- and large-scale FPIs also play an important role in accelerating exports as well as in supplying foods to fulfill domestic market demand.

According to data from the Indonesian Food and Beverages Association, total food and beverage processing industries in 1997 was 1,060,848 companies which covered large, medium, small and cottage industries. Those figures showed 3,359,597 employed people resulting in the total output of Rp.65,364 billion (approximately US$27 billion). Meanwhile, data from the Ministry of Industry and Trade (MIT) showed that the number of total FPI in 1998 was 554,966 units, with investment value of Rp.30,109 billion employing 4.05 million workers and producing a total output of Rp.50,608 billion (around US$6.1 billion) the export value of which is US$2.09 million.

FPIs, particularly the small-scale ones are scattered throughout the country. Generally, the businesses are located in rural areas and the technologies used are mainly traditional ones adopted from the predecessors. Meanwhile, the process and equipment used are very simple and the products usually have short shelf-life with simple packing materials and lack of attractiveness. Usually the products of these

processing industries are absorbed by the local markets although some are marketed for export. These products, for example, are *tempeh* (fermented soybean cake), *tauco* (fermented soybean paste), *oncom* (fermented soybean or peanut press cake), tofu, salted fish, *ikan peda* (salted-fermented fish), palm sugar, *kerupuk* (fish/shrimp crackers), *rempeyek* (peanut crackers), *petis* (shrimp paste), *terasi* (fermented shrimp or fish paste) and many more traditional cakes or pastries made from various flours.

Development and facilitation from the government on small FPIs are not only for traditional products but also for products that have export market potency as well as those with better value-added, while considering the availability of local raw material supplies. All of these are taken into consideration to secure production by maximizing the use of local component for the industries.

Through the years of development, some constraints are encountered in empowering and facilitating these industries, the main ones of which are: scattered location of the industries, access to investment, availability of good quality raw materials, marketing of the products, lack of infrastructures and facilities, the existing quality of workers (which can give rise to low quality products, inefficiency of production and lack of hygienic practices). It is important to keep in mind that in the future, consumer preference will shift to better quality products as the income of people increases. Besides, competition among local or domestic and foreign processors will be tighter in an open market situation, enforcing the government to use strategic planning for developing rural-based FPIs.

PRESENT STATUS OF SMALL- AND MEDIUM-SCALE FOOD PROCESSING INDUSTRY

FPI is one of the prime movers of Indonesia's economy. The root of this sector is those small-scale and home industries which are developed to provide food for local and domestic market. Since the concentration of Indonesia's population is in Java, this island have become the main center of FPI especially the small ones. Tables 1 and 2 show that the main concentration is in Java (72.3 percent) and the rests are in Sumatra (13.9 percent), Bali and Nusa Tenggara (6.9 percent), Sulawesi (5.1 percent) and other areas (1.8 percent). It means that FPI is distributed more heavily in Java and Sumatra and becoming less as one moves eastward. Meanwhile, the large and medium FPIs are usually distributed in areas where facilities and infrastructure are sufficiently available. Otherwise, they have to invest more for improving inadequate infrastructure such as road, electricity or even harborage.

Table 1. The Potency of Small Food Processing Industry, 1998

Region	Business Unit	Labor (people)	Investment Value (Rp. million)	Production Value (Rp. million)	Raw Material Value (Rp. million)
Sumatra	75,147	281,461	790,377	1,677,954	787,272
Java	392,270	2,570,217	875,020	9,272,548	5,335,319
Kalimantan	6,858	18,151	25,380	117,300	38,580
Bali/Nusa Tenggara	37,669	1,145,089	1,039,740	505,918	240,313
Sulawesi	27,501	87,522	89,104	449,003	156,584
Maluku and Irian	2,996	9,689	11,146	31,227	16,569
Total	542,441	4,112,129	2,830,767	12,053,950	6,574,637

Table 2. Distribution Percentage of Small Food Processing Industry, 1998

Region	Business Unit	Labor	Investment Value	Production Value	Raw Material Value
Sumatra	13.85	9.13	27.92	13.92	11.97
Java	72.32	83.39	30.91	76.93	81.15
Kalimantan	1.26	0.59	0.90	0.97	0.59
Bali/Nusa Tenggara	6.94	3.73	36.73	4.20	3.66
Sulawesi	5.07	2.85	3.15	3.72	2.38
Maluku and Irian	0.56	0.31	0.39	0.26	0.25
Total	100.00	100.00	100.00	100.00	100.00

In the developing process, FPIs in Indonesia are classified based on their investment as follows:

- Investment up to Rp.1 billion (excluded land and construction) is categorized into small industry, authority for development of which is at the Directorate of Small Industry and Trade of the Ministry of Industry and Trade.
- Investment of more than Rp.1 billion (excluded land and construction) is categorized into medium and big industries, in which the Directorate Agro-Industry of the Ministry of Industry and Trade is responsible for promoting the development.

In doing their duties and function, the two directorates run their program in accordance with their authorities synergistically. The status of FPIs during 1995-98 is as shown in Table 3.

Table 3. Data on the Indonesian Food Industry

Category/Classification	1995[a]	1996[a]	1997[a]	1998[b]
Medium/large industry (unit)	5,336	5,608	5,713	2,416
– Employee (people)	895,762	810,221	784,667	953,020
– Total output (Rp. billion)	40,181	48,198	53,284	38,554
– Value-added (Rp. billion)	16,502	17,594	19,715	11,276
Small Industry (units)	922,795	960,828	1,055,135	542,550
– Employee (people)	2,123,793	2,259,767	2,574,930	3,082,129
– Total output (Rp. billion)	10,624	10,699	12,080	12,054
– Value-added (Rp. billion)	2,970	2,869	3,228	9,223
Total Food Industry (units)	928,131	966,436	1,060,848	544,966
– Employee (people)	3,109,555	3,069,988	3,359,597	4,035,149
– Total output (Rp. billion)	50,805	58,897	65,364	50,608
– Value-added (Rp. billion)	19,472	20,463	22,943	20,499

Source: [a] Indonesian Food and Beverage Association; and [b] Ministry of Industry and Trade of the Republic of Indonesia.

It can be concluded from Table 1 that during 1995-98, small FPI represents not less than 99 percent of the total unit business employing approximately 73 percent of the total labor force in food industry sector. Although small industries absorbed decreasing percentage of the total investment of 1995-98, experience proved that they were more resistant to the impact of economic crisis of 1997. They gained value-added of Rp.9,223 million in 1998 meaning an increase of almost triple of that of 1997. Meanwhile, the medium and large industries conversely lost almost 43 percent of the value-added in the same period. Based on the ratio of labor per business unit, small industries in average employed only six people each.

Promotion and development of the small FPIs are based on supply and demand considerations. Government places more emphasis on promotion and development of those small processing industries which reserve a steady local raw material supply as well as market-oriented industries which are able to gain a high value-added. The macro policies for promoting and developing small FPI include:

- improvement of food quality and safety;
- improvement of managerial and technical skills of workers;
- focus on product development and diversification to support import substitution and food security (encouraging the use of domestic production);
- promotion of professional or well-qualified service and providing processors with market information, technology and business opportunities;
- strengthening institutional development and the networks among processors;
- strengthening the institution whose responsibility it is to promote small business enterprises; and
- creating a favorable condition for development of small and medium business.

Meanwhile, the strategies that will be used to promote and develop small FPI are:

- improving alignment for synchronized program action among the related institutions.
- performing stratification for development.
- determining commodity priority for further promotion and development.

Considering the priorities above, the Ministry of Industry and Trade has determined that:

1. industries which produce basic food materials/supporting industries, for example, are cooking oil, fish processing, meat processing, flour processing from various raw materials, etc.
2. industries which produce import substitution products, for example, are cassava flour processing, arrow root flour processing, cheese processing, feed processing, fish meal processing, etc.
3. export-oriented industries, for example, are horticulture processing, sweet potatoes processing, gnetum nut (*emping blinjo*) processing, various crackers processing, *nata de coco*, cashew nut processing, etc.

Meanwhile, the main priority in promoting and developing agriculture-based industry (classified as medium- and large-scale industry) is focused on utilizing the optimum production capacity of cultivated areas and the processing plants by considering the market requirements. The industries are classified according to their sources of raw materials:

- Fishery processing industry, e.g., are frozen fish/shrimp, fish canning, smoked fish processing, sea weed processing, etc.
- Estate crops processing industry, e.g., are palm oil processing, desiccated coconut, cacao processing, coffee, tea, etc.
- Food crops processing industry, e.g., are fruits and vegetables canning industries, tapioca and the derivative products, snack food, etc.
- Livestock processing industry, e.g., are milk and milk products processing industries, meat canning, etc.

CONSTRAINTS IN THE DEVELOPMENT OF RURAL-BASED FOOD PROCESSING INDUSTRY

FPI in Indonesia has been promoted to supply the basic needs of food for people throughout the country. The availability of raw material, labor and market to absorb the products appears to be the most critical aspect of economic development in certain areas. However, along the development, some significant constraints are: supply of good quality raw material; wide distribution of the location; access to capital; existing quality of workers (low quality of the products, inefficiency of production, and lack of hygienic practice); and access to the market.

Supply of good quality-low price raw materials is essential to FPI. In term of quantity, there is competition between the need of raw materials for processing and for direct consumption. Since most agricultural products are perishable, primary handling/processing is important in supplying good quality raw materials. Besides, some raw materials (such as wheat flour and soybean) which are actually important for processing of many products, as well as food additives and supporting materials are imported. Supply of raw materials for processing is seasonal and intended for export market. This condition may be worsened considering the scattered location of small FPI. Meanwhile there is another problem that should be considered, namely the ongoing process of regional autonomy which may have an impact on FPI development.

The needs of capital/credit availability especially for imported items are getting crucial. The undervalued Rupiah makes the import items expensive because of high commercial interest. The Government of Indonesia has provided different kinds of credit schemes. However, this facility could not be used properly by the private sector because they cannot fulfill some administrative requirements.

Rural-based food industry is usually characterized by its labor intensity. At the same time, the educational level as well as the skill of people is low, giving rise to limitations in many aspects of proper business development. Laborers are usually recruited from their own family regardless the skills or educational background they have. Besides, more skilled and educated workers tend to look for job

opportunities in the cities. It is not unusual for families in a small town to send their children to the city for better education, but only a few of them are willing to go back to their home town after getting education.

Another constraint is simple technologies, resulting in limitations and inefficiency in many aspects of business, among others are production process, production capacity, shelf-life, market access, hygienic practice and performance of the product. Likewise the technologies and methods they use enable the product to possess poor quality, insufficient to compete in domestic market. Inconsistency in quality as a whole, lack of hygienic practice in the process as well as unattractive packing material and design are among aspects which should be developed, in order to penetrate a broaden market in the future. This should be anticipated considering the changing consumer preferences as their incomes increase.

Limitation of access to local market is probably due to the lower buying power of the consumers in rural areas in general. For domestic and export markets, this may also be due to the short shelf-life of the product which actually limits their distribution, as well as to the quality of the product, despite the real good taste of the products. All the above mentioned problems are worsened by the inadequate infrastructure in rural areas.

Considering those constraints mentioned above, some specific measures have been taken in order to alleviate the constraints. The measures are:

- the Government of Indonesia is committed to take strong corrective action through economic and financial re-structurization and reform programs. This is to bring the economy back to the path of rapid growth by transforming the "high cost economy" into a more open, competitive and efficient one. To achieve this transformation, foreign trade and investment were further liberalized and domestic activities were also further deregulated. The deregulation offers more opportunities for the private sector to take an active role in various economic sectors both locally and internationally.
- coordination/alignment for synchronized program action among the related ministries such as Ministry of Agriculture, Ministry of Industry and Trade, Ministry of Cooperative and Small and Medium Enterprises, etc. in term of securing raw material supply to rural-based FPI. This integrated and synchronized action will enhance the development of FPI and other agro-processing sector.
- establishment of an Integrated Agroindustry Belt for effective management of resources.
- development action plan for FPI in order to improve technical and managerial skills for those involved in the business, through establishment of agribusiness incubators, vocational training institutions, development project programs such as training on process production technology, product design and marketing promotion, quality assurance, quality planning, etc.
- opening the access to financial institutions by introducing different kinds of credit schemes for FPI.
- mapping of raw material resources and the existing facilities for promoting FPI in rural areas.
- improvement and establishment of facilities and infrastructure needed for further development of FPI, especially those of rural based ones.

TECHNOLOGY USED IN FOOD PROCESSING INDUSTRY

Technology used in FPI in Indonesia varies widely. There are various kinds of methods of processing practiced, from the very simple ways of processing (drying, fermentation, frying and cooking) to modern ones such as those used in large processing industries (freeze drying, canning, extruding, etc.) The difference between traditional and modern technology is a matter of equipment they use. They can use the same method of processing but the equipment may be different, the traditional one and modern one. Among the various processes, fermentation, sun-drying, curing/pickling, are commonly considered as traditional methods of processing. The process usually uses simple steps and equipment, and the method handed down by their predecessors. Meanwhile, canning, HTST (high-temperature short-time), hi-tech drying (freeze drying, spray drying, mechanically controlled drying), extruding, etc. are generally considered as modern ones, characterized by the more hi-tech/complicated or sophisticated equipment and procedures they used, to assure the quality and efficiency.

Fermentation is used in the production of some products using different kinds of raw materials. Soybean is usually processed into tofu, while the fermented process produces *tempeh, tauco, kecap, oncom* (from the press cake after extracting the milk for producing tofu). Fermentation is also applied to cassava

to produce *tapeh*, rice to produce rice wine, peanut press cake to produce *oncom Bandung*, fish (Indian mackerel) to produce *ikan peda*, shrimp to produce *terasi*, etc. The technology is inherited from their parents and usually is not rationally explained. The product is usually very simple in design and packing and is appreciated very much by local consumers. The same fermentation processes, but using modern equipment are, for example, bread making, fermented milk products (yoghurt, yakult, butter, cheese, etc.), and *nata de coco* usually done by the large-scale FPI.

Cooking, frying, or steaming are usually used for the production of ready-to-eat products such as cakes, fried crackers, meat balls and some other high moisture products. Baking is used for breads, pastries and cookies which is becoming popular recently. Drying is intended for reducing moisture of some raw materials such as fruit, peanut, or grains while pickling (sweet, sour or salty) is now so popular in some areas, that the processor uses the town's name as trade mark of the product. Some processors also practice the use of combination methods of processing, such as pickling and drying, baking and drying, steaming and grilling, etc.

The small FPI usually uses simple packing materials made of paper, plastic sheet or cardboard or even banana *jati* leaves. Sometimes the packing material can not even protect the product from damages. However, there are many FPI that use plastic (polyethylene [PE]) to pack the products. This kind of packing material usually is cheap compared to packing materials used by large FPI which are more expensive.

GOVERNMENT POLICY FOR THE PROMOTION OF SMALL- AND MEDIUM-SCALE FOOD INDUSTRY

In taking advantage of the WTO Agreement, Indonesia has taken action on both policy arrangement and operational matters especially for small- and medium-scale trading promotion, e.g.:

1. Acceptance of acceleration of trade commodity tariff and abolition of non-tariff barrier, according to WTO regulation, with free and fair trading principles for all member countries.
2. Deregulation policy on Negative Investment List to give more opportunity on small- and medium-scale business to develop through partnership business. This condition will provide convenience for investment in Indonesia.
3. Extend the competitiveness of export commodity of small- and medium-scale food industry through enhancement of export structure, and broaden access to export target market, in accordance with applied standard requirements in the target export country.
4. Investment profile arrangement for commodity of small- and medium-scale industry and its distribution to inform new business opportunities.
5. Increasing trade promotion of small- and medium-scale food industry through outlet, exhibition, printed and electronic media, CD-ROM, trade mission.

THE ROLE OF TRADE BUSINESS, PRIVATE SECTOR, FARMER ASSOCIATION, AND VILLAGE WOMEN IN DEVELOPMENT OF SMALL- AND MEDIUM-SCALE FOOD INDUSTRY

- Businesses should be able to provide information/inputs to government about requirements in business development. These information/inputs are useful resources for government in making policy for future development. A conducive environment could be created through continuous meetings between economic performer and government.
- Private sector facilitated by government is actively involved in assisting and developing the small FPI, especially in terms of special scheme credit, process technology development, machinery technology, product design, education and training for human resources development, development of management system and promotion and marketing through partnership pattern.
- Farmers play a significant role in developing institutions among villagers such as farmer groups, village unit cooperatives, etc. as unit organizations, to empower the members by introducing new technology, knowledge, or information about how to supply good raw materials for further processing, or providing high quality fresh products ready for market.

- Village women may function both as farmers and business women. Together with their husband they are farmers who produce raw material for processing. Some of them also develop a household business to further process some of what they harvest, to create value-added products instead of selling them in a raw state. Some of the village women now realize that they can help the family in generating additional income. Therefore, the program of PKK (*Pendidikan Kesejahteraan Keluarga* or home economics training), intended for village women, is getting popular with the village women to gain more business knowledge.

5. ISLAMIC REPUBLIC OF IRAN

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INTRODUCTION

Rural development is a process of changes which taken together leads to material progress (growth of incomes and wealth, poverty alleviation) and progress in cultural, spiritual and ethical values. In very general terms, rural development is the outcome of the history of struggle between the forces of expanding capitalism and rural populist or nationalist movements.

The aim of rural development is not only the development of rural situations in a narrow economic sense, but also a balanced social and economic development of particular areas or regions, with a special awareness of the optimum utilization of local resources, and the wider distribution of benefit arising from that development.

From the economy's point of view, small rural industry completes the chain of production, based on agricultural products. In Iran one of the strategies for rural development must aim to increase the efficiency of existing activities and introduce new opportunities and instruments for development. Additional investment in rural areas has established that assistance, improving the productivity of agricultural production.

GENERAL INFORMATION

Population

The total population of Iran is about 64 million of which 48 percent live in the rural area. Iran has a young population, as 39.3 percent are less than 14 years old and 56.1 percent between 15-64 years old. The population growth rate is 1.8 percent.

AGRICULTURE

Different climatic conditions provide opportunities for growing a range of different crops, mainly wheat, barley, rice, paddy, cotton, oilseeds, potato, onion, pulses, sugar beet, sugarcane and fodder crops including alfalfa and clover. Various types of fruit are produced in the north, central and western parts of Iran.

ANIMAL PRODUCTION

The animal population of Iran is shown in Table 1. The main livestock in Iran consists of sheep and goats. The trend of poultry production has been increasing over the last two decades, it has increased to more than double that of meat and egg production. At present, annual poultry meat production is 720 thousand mt, and egg production is 480 thousand mt annually and yet there is still further capacity for production. The amount of red meat, white meat, eggs and milk production, from goat, lamb, cow, camel, and chicken in 1999 is shown in Table 2. The country has become self-sufficient in meat, milk and eggs production and now has the ability to export these products.

Table 1. Animal and Poultry Population in 1999

Large Ruminant (000 head)			Small Ruminant (000 head)		Poultry (million head)	
Native	Hybrid	Pure	Goat	Sheep	Broiler	Layer
5,500	1,806	741	25,757	53,900	180	56

Table 2. Trend of Meat, Egg, Milk and Honey Production

(Unit: 000 mt)

Animal Product	1994	1995	1996	1997	1998	1999
Red meat	643	658	674	685	720	747
White meat	560	613	620	650	712	720
Milk	4,281	4,450	4,540	4,705	4,895	5,105
Egg	450	480	516	520	470	498
Honey	18.5	20.5	22.7	23.5	24.2	24.6

RURAL INDUSTRIES

Rural industries refer to those which are located in the rural areas, using a local workforce, utilizing raw materials available locally, and manufacturing goods for both domestic and, potentially for, international markets. More specifically, the criteria for defining rural industries are a function of:

- the number of employees which should be 49 and below.
- the capitalization of the particular rural industries.
- the type of technology employed.
- the estimated volume of production.
- the volume of exportable products.

According to the latest data in the Islamic Republic of Iran, 92 percent of all industries were in the category of small industries; having 56 percent of total employment; 35 percent of value-added industries; and 30 percent of all industry products were manufactured by small industries.

GOVERNMENT POLICY ON SMALL INDUSTRIES

It is the task of the government to ensure that the following policies related to small industries are observed.

- Increase productivity and optimize the use of the factors of production such as materials for handicrafts.
- Establish the necessary grounds for capital investment in rural industries, for instance attraction of capital investment in both rural and urban small industries.
- Produce and create productive employment for surplus workers from rural areas, by establishing agro-industry projects.
- Accelerate the export of handicrafts and other products of small industries, by organizing commercial entities for this purpose.
- Promote improved technology levels among artisans and workers in small industries, through expansion of local training in all aspects of production.
- Protect and prevent environmental pollution in rural areas by enforcing regulations for the preservation of the environment in both rural and urban areas.

ACCOMPLISHMENTS IN SMALL RURAL-BASED INDUSTRIES

The Ministry of Jihad for Construction reported that between 1997 and 1998, the following accomplishments have been achieved in an effort to promote small rural-based industries in Iran.

So far, 12,847 licenses for small rural industries were issued with fixed capital investments of US$2,880 million, for the creation of 178,000 jobs in different industrial fields of food industries, mining and non-metal industries, chemical and cellulose industries, textile and leather industries.

Already 36,210 identification cards for existing rural industries workshops have been issued, with fixed capital investments of US$285.7 million, for the protection of 76,352 jobs. The Jihad Ministry has granted 14,350 units of land, for establishing small processing factories with fixed capital investments of US$3,897 million, to provide 195,000 jobs in rural area. From these land grants 4,318 units became complete and provided more than 53,000 jobs.

The Ministry is establishing 170 industrial zones, out of which 46 have been completed. The remaining 124 zones still require US$34.2 million from governmental budget. In the completed industrial zones, 1,750 small industries are expected to be installed, that would create a total of 21,900 new jobs. Another 60,000 new jobs will be created, on completion of the remaining 124 industry zones.

MILK PRODUCTION

The Islamic Republic of Iran produced a total 5.6 million mt of raw milk, from various types of livestock in 1999. Out of this total, 1.6 million mt entered the industrial cycle, and was processed by small and large processing plants. In addition to very small traditional units and cottage industries, 1,332 industries and professional workshops operated, with daily capacities of more than 500 mt. Thousands of other smaller seasonal units also contributed to employment, through the non-formal sector of the industry.

Milk production increased by 19.2 percent within six years. This increase in milk production caused the development of a milk products industry. There are 45 large milk processing factories with 2.5 mt/hour capacity. Fourteen of them belong to government (Iranian Dairy Industry Company) and others belong to the private and semi-private sector. Most of these factories have the capacity to receive 75-150 mt milk per day. The most subsidized milk is produced by governmental sector. There are 250 small milk processing factories (mostly small white cheese workshops) that are managed by private sector (Table 3). The same survey indicated that 242 private plants, with total capacity of 1.08 million mt were under construction or non-operational. These factories produce yoghurt, butter and cheese. There are many traditional milk-processing factories that produce large quantities of yoghurt and cheese. The policy of government for increasing milk products is to encourage the private sector to invest in the establishment of milk-processing factories. Now there exist plants with capacity for processing 2 million mt milk per year, of which government takes responsibility for 1 million mt. Of the total milk production, 65 percent is processed by milk processing factories (Table 4). The milk and milk products import has decreased as a result of increasing milk production. Cheese production has increased in recent years and Iran has become self-sufficient and even an exporter of cheese (Table 5).

Table 3. Milk Processing Factory Ownership

(Unit: 000 mt)

Title	Real Capacity	Used Capacity
Government	78.78 (28.13)	78.8 (51.64)
Private	201.28 (71.87)	73.8 (48.36)
Total	280.06 (100.00)	152.6 (100.00)

Note: Figures in parentheses are percent.

Table 4. Number and Processing Capacity of Milk Industry in 1999

Large Plants			Small Industrial Plants			Traditional Plants	
Number	Nominal Capacity (000 mt/day)	Actual Capacity (000 mt/day)	Number	Nominal Capacity (000 mt/day)	Actual Capacity (000 mt/day)	Number	Capacity (000 mt/day)
44	4,999	3,937	254	2,513	1,170	1,332	1,000

Table 5. Different Type of Cheese Production

(Unit: 000 mt)

Type of Cheese		Capacity of Yearly Production	Available Milk for Processing
White cheese:	Industrial	99	693
	Semi-industrial	84	585.19
U.F. cheese		28	154
Total		211	1,432.19

By increasing total milk production and expanding cheese factories, different kinds of cheese have been produced in recent years. White cheese is a major type of production (Table 5). The amount of cheese manufactured in 195 workshops over 10 years (1987-97) was 135,000 mt valued at US$234 million.

Dry powdered milk is another type of milk product that has been produced in recent years in Iran. There are plants with 280,000 mt capacity for producing dry milk, but they only utilize 31,200 mt of this capacity.

Future Program for Milk Products

- Expanding milk production in rural area.
- Improving and expanding milk collection centers.
- Assigning acceptable prices based on percentage of fat and protein in milk.
- Establishing and expanding milk-processing factories for sheep and goat milk.
- Improving the quality of milk-processing factories, for improving the conversion ratio in to cheese production.

MEAT PRODUCTION AND SLAUGHTERING INDUSTRY

Total meat production has increased by 2.3 percent in 1995, by 5.1 percent in 1998 and by 3.75 percent in 1999. These increases in meat production are as a result of improving the sheep and bovine population in all type of rearing, consisting of industrial, nomadic and rural management. There are good markets for Iranian sheep in Arabic countries and Turkey. More than one million sheep and goats were exported to these countries in the year 2000.

Animal Slaughterhouses

There are 466 slaughterhouses for small and large animals in Iran, of these there are 24 industrial and semi-industrial units active with minimum equipment for slaughtering. The capacity of industrial slaughterhouses is 8,853,000 head for small animals and 119,500 head for large animals. This is 15 percent and 42 percent, respectively of total small and large animals. The other animals are slaughtered in traditional slaughterhouses. As shown in Table 6, 56 percent of small animals are slaughtered in traditional slaughterhouses and 38 percent of them are slaughtered outside the slaughterhouses. The actual capacity of slaughterhouses is inadequate for the total number of animals slaughtered.

Table 6. The Different Types of Slaughterhouses and Capacity

(Unit: 000 head)

Traditional Slaughterhouses		Outside Slaughterhouses		Industrial Slaughterhouses	
Small	Large	Small	Large	Small	Large
13,414.24	1,410.86	15,701	1,842.1	8,853	1,195

Meat Processing Factories

Meat processing factories are among of the most important centers for utilization of red and white meat in Iran. There are 112 factories for meat processing. The capacity of these factories is estimated at 339,842 mt per year. The most important problem of these factories is obtaining meat as raw material, because the

capacity of these factories is higher than available meat production, so some part of their raw material needs are provided by importing meat from other countries.

Meat Packaging Factories

There are 24 factories for meat packaging, in 11 provinces of Iran. The capacity of these factories is 104,698 mt per year.

Chicken Slaughterhouses

There are about 680 million chickens produced in Iran annually. If all industrial slaughterhouses work full time and with maximum capacity, they can slaughter 528 million chickens per year. Therefore the shortage in capacity is about 22.5 percent for chicken slaughterhouses. As there are some limitations in the storage system carrying chickens overnight, and with the competition from traditional slaughterhouses, only 62 percent of total capacity is used of the industrial slaughterhouses. The capacity of different type of slaughterhouses is shown in Table 7.

Table 7. Slaughterhouse Industry and Capacity

Type	Number	Capacity		
		Chickens/hour	000 Unit/Year	Percent
Full industrial	26	84,000	201,600	52.3
Industrial	20	46,500	111,600	21.1
Semi-industrial	28	58,700	140,880	26.6
Total	74	189,200	454,080	100.0

Cold Storage

Total capacity of cold storage in Iran is about 1,104,665 mt per year. It consists of 438 units, of which 116 units belong to the governmental sector and the others belong to the private sector. The present need is for 400,000 mt of extra capacity for cool storage.

Honeybee Production Packaging Factories

There are 39 units for packaging honeybee products in 10 provinces of Iran. The capacities of these workshops are about 18,500 mt honey per year. Of these factories only 20 units are active, with 7,655 mt capacity.

6. REPUBLIC OF KOREA

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INTRODUCTION

Food consumption patterns in Korea have undergone dramatic changes since the 1980s. The changes are mainly characterized by an increased demand for processed food and food away from home (FAFH). The proportion of expenditure on processed food and FAFH expenditure by urban households, has been increasing over time. In 1999, processed food and FAFH accounted for 24 percent and 36 percent of total food expenditure, respectively. The importance of the food processing industry in the rural area has been recognized in relation to changes in the agricultural economy and environment.

Food processing industry enhances the demand for agricultural raw materials through increased added value, and by extending the marketing period of agricultural raw materials, after processing and storage. Large-scale purchase of agricultural raw materials, made during the harvesting season, raises the price of agricultural raw materials during that season. Such generation of derived demand and price support, contribute to increases in farm income. The processing factories in rural areas can provide more job opportunities for farm workers, which adds to an increase in non-farm income, and having an influence on development of agriculture sector.

Since the current agricultural liberalization has resulted in some import dependency for agricultural and semi-processed food, the effect on domestic agriculture, by the development of food industry, becomes smaller. In order to strengthen the linkage between food industry and domestic agriculture, it is important to foster food processing projects using domestic agricultural materials in rural areas. In Korea, several governmental policies have been implemented to encourage the food processing industry in the rural area. They aim to revitalize the local economy and increase farm income. Since that local agricultural raw materials are used for production of processed food, in rural-based processing industry, and many farmers are running these processing facilities; the food processing industry contributes to development of rural areas, as it expands production infrastructure and maintains the agricultural community.

The primary focus of the paper is to describe the situation and issues on rural-based food processing industry in Korea. Some policy implications and recommendations are discussed.

BACKGROUND RELATED TO FOOD PROCESSING INDUSTRY

Changes in the Pattern of Food Consumption

Since the 1980s, the pattern of food consumption in Korea has been changed significantly in terms of volume and quality of food. Numerous factors are responsible for these, including demographic and lifestyle changes, also diet, health, and food safety concerns. New product development, new varieties, and advertising campaigns have also contributed to the shift in consumption patterns. The changes are mainly characterized by an increased demand for meat, processed food products, and FAFH, while demand for cereal products such as rice and barley have decreased. The proportion of expenditure on processed products, and FAFH expenditure by urban households, has been increasing over time. In 1999, processed food products and FAFH, account for 24 percent and 36 percent of total food expenditure, respectively. Recently the proportion of expenditure on processed products is stagnant at 24 percent, due to the increase in the FAFH expenditure. The proportion of FAFH expenditure is increasing remarkably.

Position of Food Processing Industry

In Korea, the industrialization strategy was led by export and urbanization, which contributed to solving the underemployment problems, incurred from absolute poverty and a surplus labor force in the rural

area. The importance of the agriculture sector has been shrinking with the progress of industrialization. The share of agriculture, forestry and fisheries in the GDP decreased rather consistently from 25.0 percent in 1975 to only 5.0 percent in 1999. However, the share of all manufacturing in GDP ranged between 26.1-32.5 percent, without showing a clearly diminishing or increasing trend. Over1975-90 the share of food and beverage industries in GDP decreased from 6.2 percent to 3.1 percent, but in the 1990s still accounted for about 3 percent (Table 2).

Table 1. Monthly Food Expenditure Per Household

(Unit: won, percent)

Year	Food Expenditure (A)	Food at Home			FAFH (D)	Food-related Service	B/A	C/A	D/A
		Raw Food (B)	Processed Food (C)	Total					
1970	12,120	9,698	2,186	11,884	230	6	80.0	18.0	1.9
1975	28,470	22,192	5,727	27,919	559	168	77.9	20.1	2.0
1980	77,498	56,268	18,388	74,656	2,871	273	72.6	23.7	3.7
1985	118,898	77,334	32,436	109,770	8,871	257	65.0	27.3	7.5
1990	220,834	118,796	56,777	175,573	44,844	417	53.8	25.7	20.3
1995	367,080	162,463	88,394	250,857	115,745	478	44.3	24.1	31.5
1999	412,056	165,180	99,976	265,156	146,363	537	40.1	24.3	35.5
1970-99	12.9	11.3	10.3	14.1	24.9	16.8	-2.4	1.0	10.6

Source: National Statistical Office.

Table 2. Relative Importance of Food Manufacturing Industry in GDP

(Unit: Percent)

Year	GDP (₩ billion)	Share of Agriculture, Forestry and Fisheries	Share of Manufacturing	Share of Food Manufacturing
1975	10,228	25.0	26.1	6.2 (23.8)
1980	37,789	14.9	29.7	5.2 (17.5)
1985	81,312	12.8	30.3	4.2 (13.9)
1990	178,797	9.0	28.9	3.1 (10.7)
1995	377,350	6.2	29.4	2.9 (9.8)
1999	483,778	5.0	31.8	3.2 (10.1)

Source: Ministry of Agriculture and Forestry (MAF).
Note: Figures in parentheses indicate the share in manufacturing to GDP.

The number of food and beverage industries was 6,364 enterprises in 1999 (Table 3). It accounted for 7.0 percent of all manufacturing industries. Most enterprises in the food processing industry are small to medium in size, though some of these have increased the scale of their business. However, the number of average monthly workers per enterprise decreased to 27.4 persons in 1999 from 31.7 persons in 1996.

Total production value of food industries was ₩30,136 billion and total added value of food industries was ₩12,944 billion in 1999.

Exports of Processed Products

Korea's export volume increased from US$3.3 million in 1960 to US$143.7 billion in 1999 (Table 4). During the same period, export of agricultural products jumped from US$10 million to US$1,680 million. Though export of agricultural products rose sizably in terms of absolute value, its share of total exports began to drop sharply since 1970s. The share was at its peak in 1962, at 43 percent, then fell to 2.2 percent in 1990. It reached 1.2 percent in 1999. The major export items of processed products were *kimchi* and ginseng products (Korean traditional foods), processed fruits, mayonnaise, cookies, cane sugar, noodles, processed chestnuts and vegetable oils. The total value of exported *kimchi* was US$78.8 million, which was over double

the value of exports in 1997; most were exported to Japan. The total value of exported ginseng products was US$84.3 million and half were exported to Hong Kong.

Table 3. Major Indicators of All Manufacturing and Food and Beverage Industries

Indicators	1996	1997	1998	1999
Number of establishments:				
All manufacturing industries	97,144	92,138	79,544	91,156
Food and beverage industries	6,239	6,166	5,824	6,364
Number of monthly average workers (000):				
All manufacturing industries	2,898	2,698	2,324	2,508
Food and beverage industries	198	187	170	174
Total value of production (₩ billion)*				
All manufacturing industries	389,489	405,686	353,289	399,112
Food and beverage industries	28,933	29,315	28,140	30,136
Total added value (₩ billion)*				
All manufacturing industries	168,813	168,923	146,908	167,167
Food and beverage industries	12,025	11,741	10,852	12,944

Source: National Statistical Office.
Note: * 1995 price.

Table 4. Exports of Major Processed Products

(Unit: US$ million)

	1997	1998	1999
Total exports	136,164	132,313	143,685
Agricultural, forestry and livestock products	1,847	1,635	1,680
Exports of major processed products:			
Kimchi	39.7	43.7	78.8
Ginseng products	89.2	82.0	84.3
Processed fruits	30.2	14.5	6.3
Soybean paste with red pepper	6.6	5.2	6.7
Mayonnaise	38.6	27.4	10.0
Breads	30.4	24.7	25.8
Cockies	235.2	131.8	131.3
Cane sugar	97.1	108.6	73.2
Ramen (noodles)	115.3	91.3	79.5
Processed chestnuts	88.4	65.3	85.3
Vegetable oils	26.5	20.3	6.7
Soy sauce	4.0	3.3	3.4

Sources: MAF, and Korea Customs Service.

SITUATION AND ISSUES FOOD PROCESSING INDUSTRY IN RURAL AREAS

Policies for Promotion of Food Processing Enterprises in Rural Areas

MAF tries to control the adjustment between demand and supply of agricultural products, to stabilize agricultural prices, and to increase farm household incomes, by promoting food processing projects in rural areas. In accordance with the current trade liberalization policy, MAF set up schemes to discover, to preserve, and to develop native Korean traditional food, harmonized with unique processing technology. This action program contributes to the increase in farm incomes, by the creation of new employment opportunities, generation of new added value, and by pioneering new industry, that emerges from conventional agriculture centered on farm produce.

Since 1989, MAF has actively promoted the agricultural product processing industry. Especially, the Law on Promotion and Quality Management of Agricultural Product Processing Industry enacted in 1993, which established a foundation for active support by the government. The basic principle of the Law is to encourage the farmers and agricultural cooperatives to act as the main groups of food processing industry. That is, the government intends to foster the farmers for simple processing or small-scale production of traditional foods, producer cooperatives as the managing body of medium- and large-scale processing enterprises, and general processors as the leader for raising the quality, respectively.

The development projects for food processing industry can be classified into traditional food development projects, general processing industry projects, and Rural Specialized Products Complex (RSPC). RSPC is designed to boost rural income and vitalize rural economy, by using idle labor force and rural natural resources. The primary beneficiaries of traditional food development projects (including RSPC) are joint farmers and agricultural cooperatives. The beneficiaries of food processing development projects in rural areas are cooperatives and general enterprises (non-farmers).

For harmonious fulfillment of the above projects, MAF in general takes care of the establishment of policy, nomination of business proprietor, and fund support, while Agricultural and Fishery Marketing Corporation (AFMC) takes charge of special sectors such as project feasibility research and management appraisal. And the Korea Food Research Institute (KFRI) concerns itself with the technical fields.

The government aims to build 2,000 food processing factories in rural areas by 2004. For this purpose, financial support for promotion of food processing industry in rural areas consists of financial support for plant facilities, improved packaging support and raw material procurement support. Financial support for a plant facility fund will be provided to the traditional food development projects. For general food processing development projects in rural areas, that need domestic agricultural raw materials as the main ingredients to produce processed products. A sum of ₩250 million (approximately US$200,000) will be provided for plant facility fund, for each enterprise of joint farm households or producer cooperatives, based on traditional food development projects. The producer cooperatives or general enterprises that are presently processing or will process domestic agricultural material in rural areas, are to be supported with ₩1 billion (approximately US$800,000) as the maximum for each enterprise according to the food processing development projects.

Packaging improvement support will be helped with the highest amount, ₩20 million, which consists of 40 percent of government subsidy, 40 percent of loan, and 20 percent of individual shares. Thirdly, a raw material procurement loan will be supported within the range of 70 percent of the total fund in demand.

Production and Sales of Processed Products

According to the regular support by government since 1989, the total number of food processing enterprises in rural area has reached 1,073 at the end of 1999 (Table 5). Among 1,073 of enterprises, 791 enterprises (including 241 of RSPC) were supported as traditional food development projects and the remaining 282 enterprises were supported as general food processing industry in rural areas. In respect of their management bodies, food processing enterprises are divided into 674 joint farm households, 258 producer cooperatives, and 141 general enterprises.

Table 5. Support Amounts for Food Processing Enterprises in Rural Areas, 1989-99

Type of Enterprise	Number of Enterprises	Support Amounts (₩ million)		
		Subsidy	Loan	Total
Traditional food development project:	550	42,792	39,610	82,402
Joint farm households	437	33,693	31,410	65,103
Producer cooperatives	113	9,099	8,200	17,299
Rural specialized products complex:	241	0	16,318	16,318
Joint farm households	237	0	15,839	15,839
Producer cooperatives	7	0	479	479
Food processing project in rural areas:	282	66,026	106,168	172,194
Producer cooperatives	141	66,026	53,881	119,907
General enterprises	141	0	52,287	52,287
Total	1,073	108,818	162,096	270,914

Source: AFMC, 2000.

The amounts of total financial support are ₩270.9 billion, which consists of ₩108.8 billion for governmental subsidy and ₩162.1 billion for the loan. Support amounts for traditional food processing project and RSPC were ₩82.4 billion and ₩16.3 billion, respectively. In the case of RSPC, there is no governmental subsidy. Support amounts for general food processing industry in rural areas was ₩172.2 billion, which represented about 60 percent of total support amounts.

There were various items that government supported to encourage the food processing industry from 1989 to 1999 (Table 6). Majority of the granted items were taken by enterprises such as pickled foods (116), tea processing (106), *kimchi* making (69). Presently, the food processing industry in rural areas is mainly done in the form of joint farm households; namely, farmers who take part in this industry, and the traditional food enterprises are leading. There is a tendency that *kimchi*, pickling foods and starchy noodles are most favored because those items do not require any special technology for processing or heavy cost for building the factory, and the market entry of such items is relatively easy.

Table 6. Number of Food Processing Enterprises by Items in Rural Areas, 1989-99

Items	Number of Enterprises	Items	Number of Enterprises
Persimmon processing	24	Vegetable drying	18
Powdered red pepper	20	Bee-keeping processing	14
Soybean paste mixed with red pepper	20	Livestock processing	44
Starchy noodles	39	Teas	106
Rice processing	26	Jam	8
Kimchi	69	Mushroom	22
Acorn processing	30	Edible mountain herbs	33
Pulse processing	25	Korean cockies	36
Garlic, onion processing	31	Herb processing for remedy	40
Fermented soybeans	29	Vinegar	36
Other cereal processing	20	Wheat-gluten, malt processing	28
Chestnut processing	11	Beverage	54
Alcoholic liquors	41	Ginseng processing	27
Sesame oil	30	Pickling foods	116
Vegetable processing	22	Other soy sauce	54

Source: AFMC, 2000.

Total production capacity in 1999 was 646,000 mt and per capita capacity was 755 mt (Table 7). The food processing enterprise with the largest per capita capacity, is the general food processing enterprise, which has 1,134 mt per enterprise. Total actual production is 354,000 mt and actual production per enterprise is 413 mt. The average operating capacity of food processing enterprises in rural areas was 54.8 percent. The operating capacities for traditional food enterprises, RSPC and general food processing enterprises are 45.1, 55.6 and 59.6 percent, respectively.

Table 7. Operating Results per Enterprise by Projects, 1999

	Traditional Food Enterprise	RSPC Enterprise	General Food Processing Enterprise	Total
Production capacity (mt)	390	335	1,903	755
Actual production quantity (mt)	176	186	1,134	413
Value of sales (₩ million)	408	318	1,319	619
Value of exports (US$)	29,015	19,333	99,185	44,921

Source: AFMC, 2000.

From the viewpoint of sales, total quantity of sales was 70,000 mt and their value was to ₩530 billion. The average amounts of exports per traditional food enterprise, RSPC and general food processing enterprise are US$29,015, US$19,333 and US$99,185, respectively.

Problems Faced by Food Processing Enterprises in Rural Areas

The problems faced by food processing enterprises in rural areas can be summarized as follows.

First, the operating capacity of food processing enterprises is very low. It is mainly because the facility investment is made without taking the future market condition into consideration, leading to poor marketing and sales. In 1999, among 1,073 of enterprises supported by the government, 217 enterprises left the food processing industry because of chronic deficit operations. At present, 856 enterprises are still operating in rural areas.

Second, most enterprises are run on a small scale and they have limited ability to do product development by themselves, or technology for improving quality. Many enterprises experience difficulties in coping rapidly with market changes, owing to lack of new technology, and of development of new products and improvement of processing technology.

Third, due to the characteristics of food processing industry, the share of raw material cost in production cost is relatively higher, compared to other costs. In this regard, the food processing businesses are faced with problems, such as shortage of raw materials, purchasing fund and stabilized raw material procurement. That is, due to the seasonal variation of agricultural product, the food processing enterprises are pressed by purchase of raw materials at the harvest period and it is not easy to obtain the required quantity of necessary material steadily throughout the year.

Fourth, most of the food processing enterprises have difficulties in securing professional workers and procuring labor during the busy season. Due to the seasonal variation of agricultural products, the labor demand increases suddenly at certain periods, and its high dependency on aged female laborers also hampers productivity. Low operating capacity and the heavy burden of high costs for raw material and personnel, are the primary elements that increase the production cost, which subsequently causes inactivity in sales.

Fifth, food processing enterprises are confronted with poor product sales and difficulties in finding their ways into the market. Furthermore, preference for the relatively easy-to-process items, engenders severe competition among enterprises and as a result, many of the food processing enterprises experience bottlenecks in sales. The food processing enterprises usually take low-cost measures to promote sales. Due to their financial burden, they cannot pay for advertisements. Only public information materials or samples are offered by their sales agent and then they passively wait for orders. Most of the food processing enterprises in rural areas are weak and vulnerable in management and know-how, and undergo difficulties in order to get accustomed to the new changes in their circumstances.

CONCLUSIONS AND RECOMMENDATIONS

The support program by government was effective in encouraging food processing enterprise based in the rural area, to develop the traditional local processed foods. The government policy contributed to raise the prices of agricultural products and increase the farm income in those areas. However, many food processing enterprises are still confronted with problems as mentioned above.

In order to solve problems faced by the food processing enterprises, the following strategies can be suggested:

- Government should selectively support food processing enterprises according to the market performance of the enterprises. Keeping optimal production capacity and modern facilities is very important for the enterprise to make progress in the market. Since 1997, government has evaluated the performance of those enterprises, which received financial support from government. An appraisal study conducted by AFMC in 1999 showed that most deficit management usually resulted from inordinate investment and low level of operating capacity.
- Policy and strategy must be market-oriented which previously was production-oriented. Many enterprises experienced difficulties with sales expansion. Most production items have a life cycle and the taste of consumers changes rapidly. In order to meet consumer demand, enterprises should continuously monitor consumer's preferences and the market situation.
- Government should support food processing enterprises in terms of technical aspects and management skill, because most of enterprises do not have specialists to develop new products and improve the quality of the product. Also the owners of enterprises have limited business experiences and management ability. Since 1999 government established a management and technology consulting

program for rural-based food processing industry. Government subsidizes 70 percent of the total consulting fee. The KFRI runs the consulting center. The technical and managerial specialists, who consist of professors and researchers, are responsible for these consulting activities.

C For the proficient enterprises, continuous support for operating funds is necessary. The financial assistance at the startup of the business is not enough to continue the business, because it is only for facilities. Therefore, additional assistance is needed for successful operation. If the enterprise is proficient and has potential, then government may provide loans for operating costs such as raw material procurement costs and wages.

REFERENCES

Agricultural and Fishery Marketing Corporation, 2000. *Situation of Agricultural Processing Factories* (in Korean).

Asian Productivity Organization, 1994. *Promoting Agribusiness for High Productivity in Asia and the Pacific*.

----------, 1995. *Growth of the Food Processing Industry in Asia and the Pacific*.

Korea Rural Economic Institute, 1999. *Agriculture in Korea*.

----------, 1999. *Food Balance Sheet*.

Ministry of Agriculture and Forestry, 1999. *Agricultural and Forestry Statistical Yearbook*.

----------, 2000. *Major Statistics of Agriculture and Forestry*.

National Statistical Office, 2000. *Annual Report on the Family Income and Expenditure Survey*.

7. MALAYSIA

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INTRODUCTION

According to the Registrar of Trade of Malaysia, firms that registered with the department were classified into four segments according to the number of employees. First are the tiny or micro-scale enterprises employing less than five workers, these are usually backyard industries; small-scale enterprises employing 5-49 workers; medium-scale enterprises employing 50-199 workers; and the fourth, the large-scale enterprises with 200 or more workers. Another definition of small-scale industry is a company with capital less than RM250,000 and having less than 25 full-time workers.

Small-scale industry is a dynamic and fast growing sector with respect to the Malaysian economy. These 'owner-operator' enterprises can easily change or adjust their production system or management style, since they do not have to go through a complex decision-making process by a Board of Directors and shareholders, as in the corporate companies. Due to their low investment capital, these small entrepreneurs can efficiently adjust their production according to market demand, and still maintain their low production costs.

In 1982, there were about 127,000 venture firms in the non-agriculture sector and other economic activities, of which 95 percent were small-scale industries. This figure increased to more than 300,000 in 1995. The percentage breakdown according to sector is:

engineering	– 28.9 percent
food industry	– 18.3 percent
timber industry	– 16.3 percent
hardware and building materials	– 3.9 percent
others	– 32.6 percent

Now there are about 14,000 small and medium industries (SMIs) involved in food processing and other activities related to food.

The food processing sub-sector experienced tremendous growth after the 1980s. The gross production value of this sub-sector stood at RM4.4 billion in 1981 and reached a value of RM10.5 billion in 1995. In terms of value-added, this sub-sector experienced a 4.2-fold increase from RM1.001 billion in 1981 to RM4.2 billion in 1995. This sub-sector also is responsible for more than one-third of the employment in the non-agriculture sector.

A large part of the total output value of this sub-sector comes from the dairy products industry (14.6 percent), the animal feed industry (14.5 percent), the beverage (13.4 percent), sugar refining (13.3 percent) and the flour industry (9.1 percent). These five industries form the most modern section of the sub-sector in terms of equipment used and degree of technology involved. However, most of the above mentioned industries are confined to the urban areas and a large portion of the raw materials used is imported.

CHALLENGES AND ISSUES FACING THE FOOD INDUSTRY

Currently, Malaysia is still not self-sufficient in many food products particularly milk, mutton and beef, consequently the country has to depend on imports to meet her food needs, which amounted to RM7.7 billion in 1995 and increased to RM10.0 billion in 1997. Major food imports include wheat, maize, sugar, rice, dairy products, fish, fruits, vegetables and meat products.

Higher income and changes in lifestyle are expected to change food consumption habits to more nutritious and higher quality products. There is also a growing trend towards the consumption of convenient food products that are 'easy-to-cook', ready-to-eat and '*halal* foods'. This scenario will further increase the food demand and the importance of food industries.

Realizing the situation, the government identified food processing as a source for future economic growth for the country. This commitment as stated in the Second Industrial Master Plan (IMP2) will provide the synergistic link between upstream food production and manufacturing, which will further enhance the development of food sub-sector.

The core issues and challenges currently facing the food industry are:

- food availability and affordability
- inter-sectoral competition for resources
- competition from imported products due to market liberalization
- low raw material supply to support food processing industry
- infrastructural constraints.

CURRENT ISSUES AND PROBLEMS OF RURAL FOOD PROCESSING INDUSTRIES

Forty to fifty percent of Malaysian requirements for processed foods are being met by small-scale food industries. In spite of this high proportion, small-scale processors face a number of problems:

- The rural food processing industries in Malaysia generally are small in size and practice traditional technologies. The production levels are usually limited and their marketing growth is usually slow. This slows down the returns which are needed for reinvestment and expanding the industry. More often, these factors do not favor banks and finance institutions in providing loans needed.
- In their production aspects, the poor quality of food products is the major problem faced by food processors. This results in short self-life and unacceptability of the products. The poor product quality is attributed to factors such as lack of understanding of proper quality control and good manufacturing practices. Quite a number of food industries do not have a proper quality control set-up or trained personnel to manage it. Their understanding of processes involved is minimal.
- The raw materials are of substandard grades because of inconsistency in supply and availability. These also usually affect the production flow and the marketing set-up.
- Proper hygiene and sanitary practices are often neglected.
- The processing methodology and equipment is often crude and has been used over many years. Efforts to mechanize, improve the efficiency and modernize the operations have been insufficient. Production efficiency in many of the industries is therefore low due to the various laborious operations.
- Product development was not given appropriate attention, now expanded to meet growing demands and changing habits.
- Lack of awareness of the importance of product presentation. Many good quality products do not sell well because of poor packaging and presentation.
- Lack of managerial and marketing know-how leads to poor promotion, marketing and distribution which results in slow production and low returns.
- Small food industries have been known to indiscriminately use chemicals such as preservatives, stabilizers, coloring materials and non-nutritive sweeteners in food preparations.
- Lack of awareness among consumers on health and quality products encourages the production of 'junk' foods at low prices but higher margins.
- No strong linkage exists between production and processing sector. In some areas, the raw materials required for processing are imported due to lack of comparative advantage in production.

THE INTEGRATED APPROACH TO THE DEVELOPMENT OF SMALL-SCALE FOOD INDUSTRIES

To overcome these problems, the government through the various agencies, has formulated an integrated approach to develop the small-scale food industries. The Third National Agriculture Policy

(NAP3) status that places 'emphasis on the development of agro-based industries will be in terms of processing, storage and handling of agricultural commodities to increase their value-added'.

There are 10 ministries including 19 government agencies which are involved in providing assistance to small industries at various levels. The type of assistance given can be classified generally as technical services, training and extension services, financial assistance, and advisory and consultancy services. Two main ministries are the Ministry of International Trade and Industry (MITI) and the Ministry of Entrepreneur Development. The objectives of the integrated program are to expand and rationalize the technical assistance program for small-scale enterprises and to strengthen the institutions, increase their supply of credit, especially long-term credit with soft-term conditions, also improve conditions of financial and technical services.

The coordinating agency for this program is the Small and Medium Industry Division of MITI (Figure 1). The managerial assistance or managerial training program is provided by the National Productivity Center, the Small and Medium Industries Development Corporation (SMIDEC) and the Malaysian Entrepreneur Development Center (MEDEC); technical and engineering assistance is provided by the Food Technology Division of the Malaysian Agriculture Research and Development Institute (MARDI). Financial assistance is given by the Development Bank of Malaysia, the Malaysian Industrial Development Finance (MIDF) and Agriculture Bank of Malaysia (MAB). All requests for assistance whether financial, technical or managerial, are channeled through a technical committee in which MARDI plays a very active role. The technical committee meet once a month and screens all new and expansion projects for new or existing entrepreneurs. This committee looks into the feasibility of the projects and provides technical inputs of managerial training and financial assistance.

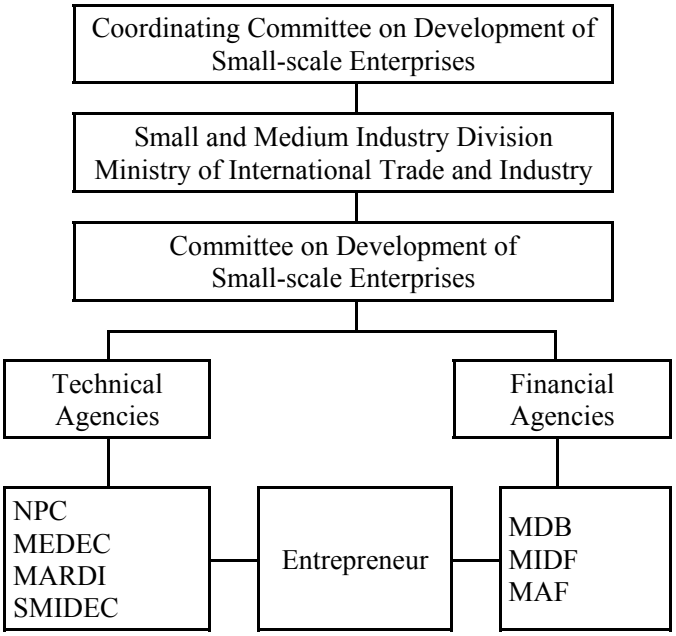

Figure 1. The Committee Set-up for Development of Small-scale Industries

The Linkage between various aspects of the integrated programme are shown in Figure 2.

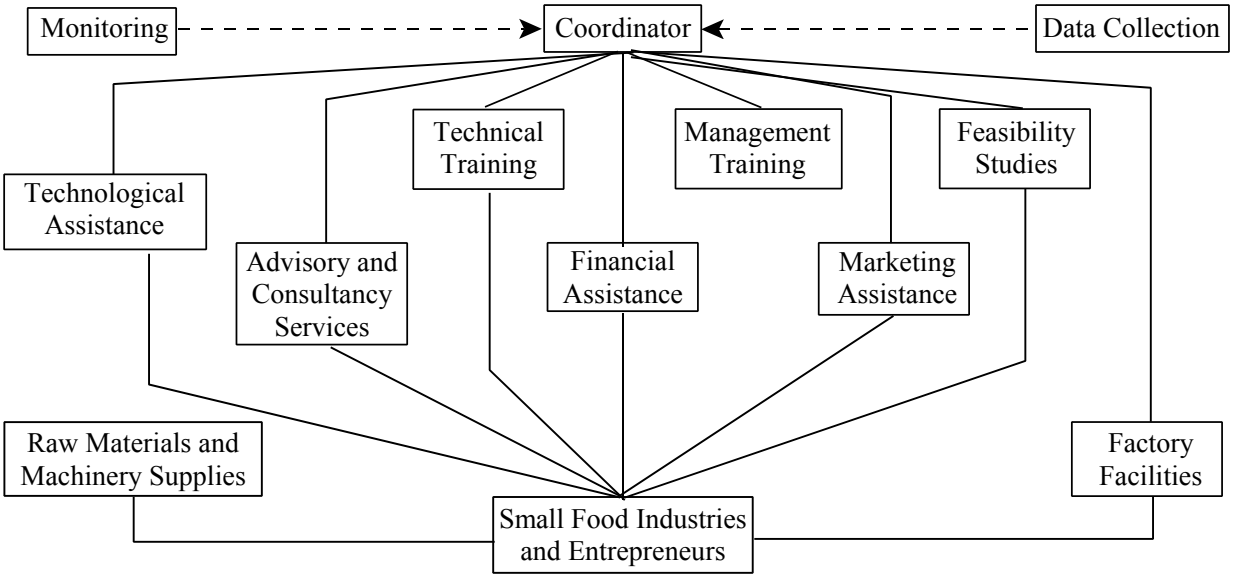

Figure 2. Integrated Development of Small-scale Food Industries

The government also has set up an integrated marketing program to assist the small-scale food production enterprise through an integrated marketing approach by various agencies.

The objectives of this program are:

- to improve the marketing of food produced by small-scale enterprises in the open market.
- to assist small-scale entrepreneurs in production, management, promotion and quality control.
- to encourage and assist small-scale entrepreneurs in improving production efficiency.

The coordination is again carried out by the Small and Medium Industry Division, of MITI while marketing is handled by several government subsidiaries such as Pernas Edar Sdn. Bhd. and Besta Distributors Sdn. Bhd.

These companies have connections in the export market as well as in the domestic chain, retail and wholesale outlets. Financial development is provided by the Development Bank of Malaysia; management consultancies services by Majlis Amanah Rakyat (MARA) through MEDEC and technical assistance by the Food Technology Division, MARDI and Standards and Industrial Research Institute of Malaysia (SIRIM). Figure 3 shows the integrated marketing approach that has been adopted.

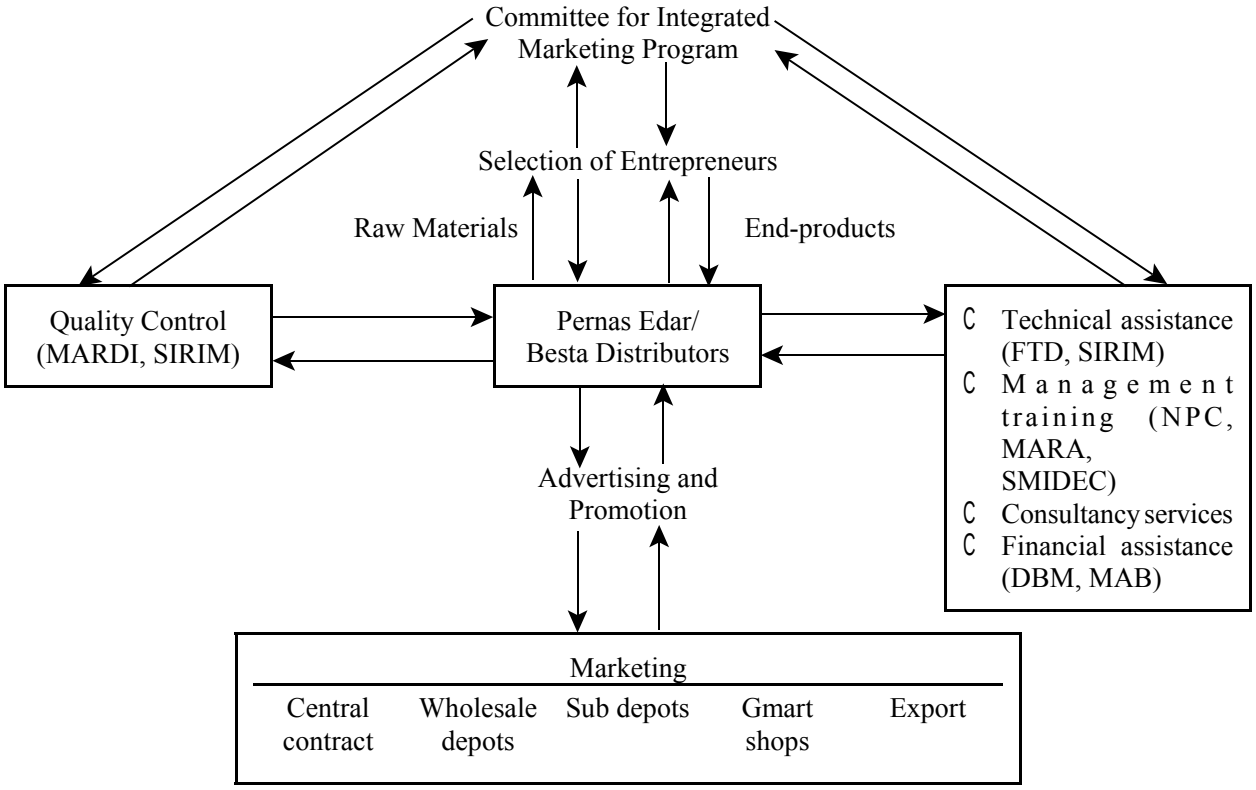

Figure 3. Integrated Marketing Approach

At the implementation stage, the government has established specific schemes or programs for different categories of entrepreneurs.

- Rural Industry Programs: This program offered by Ministry of Rural Development focuses on the requisite capability of the rural entrepreneurs. The government will provide the machines, assist in training, promotion and marketing while the entrepreneurs have first to secure the operational cost, factory site and building, also additional machines.
- 'Mentor-Mentee' Program: Under this program, big companies (*mentor*) will provide training assistance, advisory and consultancy to the small and medium entrepreneurs (*mentee*) so that they can

develop experience, competitiveness and develop business contact in the open market. Thirteen companies are offering this program for a period of 3-5 years.

- Franchise Development Program
- Small Enterprise Financial Fund (SEFF): This special fund, offered through various banks, provides soft-loans ranging from RM10,000 to RM50,000, for small-scale entrepreneurs without collateral and guarantor.
- Umbrella Concept – Integrated Marketing: Under this program the government will provide grants to the main company to carry out the marketing activities for the small enterprises, such as promotion, credit for raw materials, quality development, training and consultancy.

8. MONGOLIA

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PRESENT STATUS OF SMALL- AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRY

Today small- and medium-scale enterprises (SMEs) have been developed in practically all sectors of the economy. In 1999, a National Statistical Office took a survey of 20,000 business entities, which showed that around 850 food processing small and medium businesses have been registered, of which 70.7 percent are rural-based SMEs, the balance being in and around the capital (Table1). The survey also showed that 75 percent of the rural-based food processing industries are engaged in spirit and beverage (28.1 percent), bread and bakery (27.6 percent) and meat production (18.6 percent) activities.

Table 1. Food Processing Small and Medium Industries

Food Processing Industries	Whole Country (number)		Provincial Areas (number)	
	SME	Workers	SME	Workers
Meat production	146	3,631	112	2,811
Fruit and vegetable production and conservation	3	21	3	21
Milk and milk production	99	877	58	568
Flour mill	189	2,334	93	1,106
Feed production	2	46	-	-
Break and bakery production	300	3,773	166	2,792
Spirit and beverages	111	2,591	169	1,943
Total	850	13,273	601	9,241

Source: National Statistical Office, *A Survey on Economic Entities*, January 2001.

The following positive effects of SMEs are already being noticed in the Mongolian economy, despite the fact that there is no favorable environment created yet:

- SMEs constitute the backbone of the private sector, the new and dominant sector of the Mongolian economy.
- SMEs contribute to easing and decline of industrial concentration and monopolistic power dominating as in the past; and by developing these local, rural processing industries, there is a better allocation of labor and material resources and an improving consumer goods and services supply situation.
- rural SMEs through their material and technological growth, and their vertical and horizontal integration with each other, together with large companies are starting to influence and contribute to the recovery of the national economy.
- SMEs are shifting Mongolians from the old mentality of state dependence, teaching them new independent ways of living in a new environment, and convincing and committing them to private property rights.
- SMEs expand employment opportunities and helping the government by reducing the number of vulnerable population needing support.

CONSUMPTION OF FOOD AND AGRICULTURAL PRODUCTS

The economic reforms in agriculture have affected the food consumption and food security of the population. Two main factors influencing the supply of domestic food items have been a gradual and permanent increase in livestock population and a sharp decline in crop production. Compared to 1990, in 1996 the consumption of meat and meat products increased by 3.4per cent and milk by 15.8 percent, while butter and eggs decreased by around 90 percent. During this period there was a considerable decline in crop production, with total cereals down by 69.4 percent; wheat by 63.9 percent, potatoes by 64.9 percent and vegetables by 42.9 percent. By this time low-cost imported food products played an important role in the food supply. Changes in inflation and declining purchasing capacity of the population have also altered the demand for food products.

Compared to the accepted physiological standard for Mongolia, the daily needs in meat and meat products are covered almost at normal levels: flour at 83.4 percent; butter, 55.7 percent; milk and milk products, 46.6 percent; and in fish and fish products, 46.2 percent. In terms of food security, the substantial deterioration of the diet of Mongolians is potentially dangerous. It is estimated that per capita energy supply dropped from some 2,621.0 kcal/day in 1989 to 1,962.9 kcal in 1993, then it gradually climbed up to near the previous level (2,241.2 kcal in 1999).

According to the state statistics (1999), per household monthly average expenses for food stuff are 21,854 tugrik or 36.8 percent of expenditure for a rural household and 37,115 tugrik or 44.0 percent for an urban household. Flour and bakery products are the biggest item, 47.7 percent in food purchases of a rural household, compared to 26.7 percent for an urban household. The purchase of livestock food products is the biggest expense, 36.0 percent in food consumption of an urban household while it is just 6.0 percent for a rural household.

MAJOR CONSTRAINTS ON DEVELOPMENT OF SMALL AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRY

Lack of financial resources is one serious common problem faced by most entrepreneurial businesses. Long-term investment lending has almost disappeared since 1990. The commercial banks lending interest rates have declined and are now around 8-12 percent on average. This decline in interest rates cannot ensure financial support for new and expanding production and services for modernization and technological renovation. There are three major reasons for need of further banking resources:

- First, most small businesses lack their own plant and premises and if they do have them, require huge investments for repair and improvements.
- Second, SMEs often run their business using state owned enterprises' leftover equipment and technology, inferior, cheap raw materials and production waste. There are many cases where small businesses routinely use locally made machinery and equipment. They lack the financial resources to have access to high-tech plant and equipment and/or better quality inputs.
- Third, in the old system of state property dominance, there was no opportunity for the individuals and households to have access to private property rights, or to accumulate wealth and savings.
- Another difficulty for small businesses is the lack of knowledge and experience in business management, entrepreneurial skills and modern financial and accounting procedures.

Some of the most serious problems for development of rural-based food processing industries are:

- lack of modern management know-how and marketing skills. Over 70 years of centrally-controlled economy had deprived people of their initiative in running their own businesses. There is a shortage of management know-how or weak management is the main cause for the high abortion rate of SMEs. The Mongolian Business Development Center (MBDC) was established against this background in 1994, with cooperation between the government, business associations, and the donor community, to provide the opportunity to train Mongolian trainers and consultants. Government must urgently train

qualified trainers and certified extension workers, to diffuse improved management skills to as many as possible small- and medium-sized operators with the assistance of the donor community.

- severe shortage of loan capital. Credit is perceived as the most critical element in promoting SME development. The lack of working capital is a dire necessity among SMEs. The first loans would be better to be small in size, easier for inexperienced SME clients to manage and repay.
- demand constraint (low level of purchasing power). In rural areas a survey of the average herdsmen's household expenditure shows that 66 percent of their consumption is met by self-production, and the remainder depends on their purchases from markets, meaning that markets have imperfectly developed in rural Mongolia. This data clarifies that the actual size of the national market is much smaller, relative to its population size; indicating that tiny markets or very limited demand would become a serious constraint on the sustainable development of industries and enterprises. The most effective marketing method is to promote the export-oriented, animal related industries, which directly benefit the herdsmen's household.
- serious shortage of raw materials. Upon sudden breakdown of state procurement systems, the small- and medium-sized manufacturers suffered from a severe and permanent shortage of raw materials. The lack of raw materials is the main cause for overall decline of production.

TRADITIONAL AND MODERN TECHNOLOGIES USED IN THE RURAL-BASED FOOD PROCESSING INDUSTRY

Initially our company was established as a food processing factory in Zuun Kharaa town in 1973 with Russian technical assistance. The factory is located in Selenge province, 170 km far from capital city. In 1984, it was expanded and renamed as the "Spirit Bal Buram" (SBB) enterprise and started to produce spirit. SBB spirits make up the core element of many famous vodka brands, the winners of international and national prizes. Besides spirits, SBB products include vodka, sugarcane, protein flour, carbon dioxide and various foods.

The enterprise utilizes the equipment from Russia, Poland, Czech Republic and Germany all of which were produced in the 1980s. All equipment and engineering lines were fully exploited for over 15-25 years. Therefore, in the year 2000 about 50 percent of the equipment was renovated and renewed.

THE GOVERNMENT AGRICULTURAL POLICY

The government has initiated a large number of measures to further the reform process in the agriculture sector. Privatization is the centerpiece of economic reform, while 31.9 percent of total livestock were state property in 1990, by 1996 about 93.4 percent of the herds had been privatized.

With privatization, the large central farms and cooperatives located in rural areas were often split into three or more individual private company units, or smaller cooperatives. These units were given land areas from about 100 ha up to several thousand ha. At the same time, individual farmers were given smaller plots of 1-5 ha to farm on their own account.

Apart from restricting the privatization process, between 1991 and 1995, the government also retained control of crop prices to protect consumers in a period of rapid inflation. The effect was to transfer the working capital of the farms to the consumers. To remedy this, the government directed banks and flour mills to lend money to the farms. This was at very high interest rates which the farms could not pay with their capped prices. The combined effect of these policies was a liquidity crisis and debt spiral in the crop sector. While wheat prices have been liberalized since 1996, the lack of liquidity has meant that many growers are unable to produce enough wheat to rebuild their capital base.

Key elements of present government agricultural policy are:

- the development of national independence in food supply;
- the encouragement of rural-based economic activity;
- actions to overcome some of the legal and commercial impediments faced by producers; and
- the complete privatization of state shares in agriculturally-related businesses and farms. Major actions proposed under the policy are:

- improving the operation of markets by developing structural and information linkages;
- raising agricultural and livestock productivity through investment in upgraded technology;
- privatizing the delivery of technical services; and
- introduction of certification and quality standards for agricultural products.

The framework of the current national rural and agricultural policy is set out in three parliamentary resolutions:

1) Basic Guidelines for Rural Policy, Resolution No 32, 20 May 1996
2) Program of Government Activities, Resolution No 61, 1 November 1996
3) National Program for the Green Revolution, Resolution No199, 24 September 1997.

The general provisions of the basic guidelines for rural policy recognize that the agriculture sector is a significant contributor to exports, supplies the population with food and consumer goods, and produces raw materials for industry. The purpose of the rural policy is stated as: (i) to provide comfortable living conditions for the rural population and to maintain traditional Mongolian lifestyle; (ii) to reduce the gap between urban and rural living conditions; (iii) to expand agricultural output, increasing the efficiency, quality and security of food production; and (iv) to maintain environmental balance and provide sustainable social development.

GOVERNMENT POLICIES FOR THE PROMOTION OF SMALL AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRIES

The Government of Mongolia focused on the privatization process, recognizing the vital importance of private property rights for introducing new market-based economic relations. Simultaneously, the government was pursuing the development of a completely new, entrepreneurial private sector through promoting SMEs which had to be viable in the competitive market, adaptive to regional and domestic demand and needs, also job creation.

As for a transitional economy like Mongolia, promotion of SMEs will bring in multiple advantages as follows:

First, an SME promotion policy can be considered as complementary to the privatization policy and an important method to increase efficiency and productivity. Newly born SMEs are generally superior to the larger privatized enterprises, in terms of profit-making orientation and customer relations.

Second, being the same as in most developed countries, the nurturing of SMEs can create a competitive environment. In the market economy, competition can promote companies' efforts to improve the quality of their products and services, also their technological capability, leading to long-term corporate development.

Third, SMEs will become the greatest absorber of labor and unemployed people, especially for a transitional economy, where the rapid privatization process would produce a lot of unemployed workers.

Fourth, small-sized operations can be much easier to manage for inexperienced businessmen/women, than a larger one.

9. NEPAL (1)

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INTRODUCTION

Nepal is predominantly an agricultural economy, as the agriculture sector supports 80 percent of the total population (22.9 million), and the contribution of the agriculture sector to the total GDP constitutes 40.1 percent. Nepalese agriculture is still very primitive and traditional. In general, farm holdings are small and the methods of cultivation are manual and labor-intensive. Paddy, maize and wheat are the main crops and the mixed crops are millet, legumes and potatoes. Cash crops like sugarcane, tea, jute, tobacco and cotton are also grown in the country. In short a small kitchen garden of a few fruit trees, a handful of livestock and poultry are the main features of the Nepalese farm households.

From an industrial viewpoint also, Nepal is a least developed country where the industrial sector contributes just 10 percent to the GDP and employs only a small portion of the available labor force. An overview of the manufacturing establishments is shown in recent statistics published by the Central Bureau of Statistics.

Table 1. Overview of Manufacturing Establishments

Description	Rural Areas	Urban Areas	Total
Number of manufacturing establishments	1,594	1,963	3,557
Investment on fixed assets (NRs. million)	-	-	26,491
Employment generated (person)	92,344	104,364	196,708

Source: Central Bureau of Statistics.

The Federation of Nepal Cottage & Small Industries (FNCSI) was established in 1990. It is a non-governmental, non-political and non-profit-making organization. Its overall objective is to protect and promote the cottage and small industries in Nepal. There are about 100,000 cottage and small industries (CSI) and about 600 medium and large industries registered. Only 40 percent of CSI units are in operation. The CSI sector provides 95 percent of the total employment generated by the industrial sector.

At present FNCSI has 25,000 general members in 68 district associations out of 75 districts of the country, and has 15 associate members. To protect and promote the interest of its members FNCSI has been conducting different promotional activities throughout the Kingdom. The major programs organized by FNCSI are managerial and skill upgrading training and workshops on productivity improvement, industrial visits, business consultancies, dissemination of business information, industrial exhibitions and lobbying.

RATIONALE

The concept of processed food industry is emerging in Nepal, but is still at a developing stage adapting indigenous technology in most of the business units. In Nepal, the processed foods available consists of ***cereal foods*** (processed rice, milled rice, flour, beans, pulses), ***dry foods*** (nuts, spices, tea, pickles, biscuits, snack foods, sugar, confectionery), and ***wet acidic foods*** (canned fruits, fruit juices, beer, wine, soft drinks, yoghurt, jam, jelly, squash and sauces).

The processed food industry in Nepal is highly dependent on the agriculture sector. The major food crops cultivated in Nepal are paddy, maize, wheat, barley, and millet. Farmers are also producing cash crops such as sugarcane, oilseeds, tobacco, potato and tea. Besides these, Nepalese farmers are producing pulses, fruits, and vegetables. Furthermore, the livestock business is getting popular and generating an alternative source of income to the farmers in the rural areas. Farmers are thus engaged in producing milk, buffalo, mutton, pork, poultry, eggs and fish. The major processed food industries are established in urban areas, gaining more advantages over the establishments in rural areas, e.g., easy access to the wider markets, modern means of transportation and communication, and other infrastructure facilities. Though Nepal does not have specific data of processed food units, Tables 2 and 3 highlight the present scenario of processed food industries (information source – Central Bureau of Statistics, Nepal).

Table 2. Food Processing Industry in Nepal: Selected Indicators and Food Processing Establishments by Type and by NSIC (1996/97)

(Total number)

NSIC	NSIC Name	No. of Establishments	No. of Persons Engaged	No. of Employee
1511	Manufacture of meat and meat products	2		
1513	Processing and preserving of fruit and vegetables	2		
1514	Vegetable and animal oils and fats	47	1,659	1,767
1520	Dairy products	26	1,841	1,760
1531	Grain mill product	286	5,082	4,329
1532	Starches and starch products	2		
1533	Animal feeds	40	770	663
1541	Bakery products	113	2,991	2,619
1542	Manufacture of sugar	30	6,419	6,343
1543	Cocoa and confectionery products	26	415	363
1544	Manufacture of noodles and similar products	17	656	613
1549	Manufacture of food products n.e.s.*	43	1,989	1,784
1551	Distill, rectify and blending of sprits	16	738	691
1553	Manufacture of malt liquors and malt	4	698	694
1554	Soft drinks and mineral waters	7	544	535
1600	Manufacture of tobacco products	38	3,213	3,142

Note: * Not elsewhere specified.

Table 3. Food Processing Industry in Nepal: Production of Principal Food Processing Industries by Type of Goods Produced

Industrial Product	Unit	1988/89	1993/94	1995/96	1997/98
Sugar	mt	24,197	34,044	67,051	67,206
Liquor	000 liter	2,092	2,100	2,608	3,100
Tea	mt	1,184	1,993	2,457	2,275
Beer	000 liter	6,281	14,900	18,315	20,500
Biscuits	mt	4,458	6,278	6,057	6,744

Source: Ministry of Finance, Economic Survey, 1997/98.
Note: * Provisional estimates based on nine months date.

MAJOR PROBLEMS

1. ***Production***

Available agricultural products are decreasing gradually. Three decades ago, Nepal was exporting its agricultural products to other countries. At present it has to import agricultural products from other countries. The reasons behind this could be the decreasing area of arable farming land, due to high population growth rate and excessive use of chemical fertilizer.

2. ***Modern Technology***

The postharvest operations adopted by the Nepalese farmers are traditional. The high cost of modern technology is difficult to afford by the entrepreneurs in rural areas. Even the transportation technology in rural areas is at a primitive stage. Raw materials and finished goods, in most of the rural areas, are still transported in bullock-drawn carts. Packaging technology, which is needed for processed food products, is slowly emerging, but modern technology in product packaging is still not accessible to the rural entrepreneurs.

3. ***Quality Supply***

Processed food products have their special quality features, needing to complete a production process.

The process and the quality to be maintained for processed food products seems very complicated, for the entrepreneurs of rural areas in Nepal.

4. ***Competitive Market with Limited Marketing Areas***

Nepal as a land locked and least developed poor country, having a large population with low purchasing capacity, could not support the market for quality manufactured processed foods. The Nepalese consumer market is also dominated by Indian and Chinese products. The open border with India is a big constraint to the Nepalese entrepreneurs, facing unfair competition in the marketplace.

5. ***Trained Labor Force***

The lack of a local skilled and trained work force is another shortcoming for the Nepalese producer, who is still dependent on skilled and trained Indian labors.

6. ***Inadequate Access to a Credit Facility***

The manufacturing units could not attract financial institutions for investment. Financial institutions are more focused on the trading business for their investment. The complicated and lengthy process of sanctioning loans discourages small and medium entrepreneurs.

GOVERNMENT POLICY

Actual industrial development is picking up only after the restoration of democracy in 1990. The previous state-guided economic system has been replaced by a liberal economic policy, which is much more flexible and open, but the system has taken time to become established and familiar to the entrepreneurs. As the history of processed food products is not very old, the government also has not been in a position to formulate any specific rules and regulations for the development of the processed food industry. At present there are two governmental agencies directly or indirectly concerned with food processing sector. They are: 1) the Food Research Laboratory under Ministry of Agriculture; and 2) the Department of Standards under the Ministry of Industry.

These two organizations are focussing their attention only on the content of the packaged food products. They do not pay much attention to the quality and type of products. This is because the normal consumer, whose purchasing capacity is relatively low, does not think as much about the quality than about the content. It is felt that there should be specific governmental policy for the processed food producer. The government should also consider strengthening processed food products, by formulating appropriate and specific rules and regulations.

ROLE OF PRIVATE SECTOR

It is obvious that only the private sector can play the vital role for the promotion of processed food business. This means distribution, wholesaling and retailing of processed foods and development of the infrastructure facilities, such as a technically trained labor force, computer-based information systems and appropriate/specific specifications and systems to monitor quality products. Every country today is in the pursuit of upgrading their technologies to improve quality and productivity. Raw materials from different sources; namely, natural, mineral and synthetics are explored with emphasis on renewable materials and energy, with nature-based materials enjoying the leading edge.

Least developed countries like Nepal and the private sector in this country have been moving forwards new technology. As new machines and packaging materials are not available in the country, so they have been imported from other countries. The new technologies adopted by the private sector for processed foods are instant noodles, biscuits, milk foods, processed fruit products and beverages. The new technologies for processed foods, at the global level is highly improved, and neighboring China and India are also following

these global trends in processed food technology. The private sector is moving towards introducing and adapting these new techniques in processed food products.

CONCLUSIONS AND RECOMMENDATIONS

The countries of the world are coming closer, with the help of satellite audiovisual communications and innovations in computer science. Technology transfer has become a common phenomenon, but Nepal is very far from the adaptation of new technology for processed food products, considering the rural areas as well as the transformation from manual labor to automation. There could be considerable demand from consumers for quality-processed foods. Not only information about new technology, but also marketing aspects should be given due consideration. Easy access to the appropriate technology, market and finance for the entrepreneurs, could be a significant move towards the sustainable development of processed food products. The Government of Nepal should initiate the formulation of specific policies for processed food products. Private sector organizations, as well as enterprises can boost it, towards the global trend in processed food technology. In this context the role of the Asian Productivity Organization could be highly appreciated by the entrepreneurs involved in this sector. The programs organized by the APO such as study tours, training, seminars, conferences and business information are very helpful to small entrepreneurs and for lobbying the government in policy formulation. The APO is encouraged to continue its activities in a wide range of services, for the better productivity and promotion of small businesses.

10. NEPAL (2)

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INTRODUCTION

Nepal's economy has been mainly based on agriculture, which along with forestry, has significantly contributed to the GDP and provided employment to more than 80 percent of the population. It has been estimated that around 14 percent of the labor force is unemployed and more than 40 percent is underemployed (National Planning Commission, 1998). Therefore, the current National Development Plan has accorded top priority to poverty alleviation through substantially increasing self-employment and other employment opportunities.

During the Fifth Plan period the industrial sector consisted mostly of rural-based food processing units, which accounted for 76 percent of the total number of industrial establishments and 50 percent of the value-added. In an economy of agricultural predominance, it is natural that industries are agriculture- and forest-based in the initial stage. Some medium and large industries were also established during the Fifth Plan, such as cement, sugar, cigarette, and jute industries. However, the per capita contribution of the industrial sector in GDP was still as low as 4.3 percent. Industrial development in later years increased the percentage contribution of this sector in GDP. The contribution of this sector in GDP reached at 9.22 percent by the end of the Eighth Plan period. The current development plan (Ninth Plan) has set a target of raising the contribution of the industrial sector in GDP to 14 percent by the end of the plan period (2002).

CLASSIFICATION OF INDUSTRIES

Industries in Nepal are classified into the following seven categories:

- Manufacturing Industries – which produce goods for utilizing or processing raw materials by products or waste products or any other goods;
- Energy Industries – generating energy from water resources and wind, solar, coal, natural oil and gas, bio-gas or any other sources;
- Agro- and Forest-based Industries – mainly based on agriculture or forest products such as integrated sericulture and silk production, horticulture and fruit processing, animal husbandry, dairy industries, poultry farming, fishery, tea gardening and processing, coffee farming and processing, herb culture and herb processing, vegetable seed farming, mushroom cultivation, vegetable processing, tissue culture, bee-keeping and honey production, rubber plantation, floriculture and agro-forestry;
- Mineral Industries;
- Tourism Industries;
- Service Industries; and
- Construction Industries.

All these industries are further grouped into the following four classes depending upon the investment in fixed assets and the relationship with traditional art and culture: (i) Small Industries – with fixed assets of up to an amount of NRs.30 million; (ii) Medium Industries – with fixed assets between NRs.30 million and NRs.100 million; (iii) Large Industries – with fixed assets of more than NRs.100 million; and

(iv) Cottage Industries – the traditional industries utilizing specific skills, or local raw materials and resources; labor-intensive and linked with national tradition, art and culture, and with fixed assets reaching up to NRs.200 thousand. Examples are handloom, semi-automatic loom, hand-knitted woolen carpet, hand-made paper, cardamom processing, pottery, leather tanning, stone carving, wood carving, etc.

PRESENT STATUS OF FOOD PROCESSING INDUSTRIES

Food processing industries in Nepal are in the agro-based and forest-based industries and manufacturing industries, according to the classification of industries. They also come under the cottage industry, small-, medium- and large-scale industry categories. In this paper, food processing industries include food and beverage industries.

Distribution

Prior to the initiation of planned national development efforts in the country, almost all industries in Nepal were centered in Kathmandu, Biratnagar and Birgunj. Between 1956 to 1970, industries began to be dispersed to other towns and cities of the country, but not yet in rural areas. The recent pattern of industrialization in Nepal is based on the regional distribution.

Industrial districts (IDs) have been established in 11 districts, covering different development regions of Nepal. These IDs occupy 284.1 ha of land, and provide infrastructure facilities for industries. There are more than 418 industrial establishments within these IDs.

Number of Industries

The total number of cottage and small industries registered in the Eighth Plan period reached 45,474, out of which 37,635 units were small-scale industries. These included 1,771 agro- and forest-based industries and 26,686 manufacturing establishments; both of these categories included the rural-based food processing industries. These industries provided employment to 13,847 persons. It was estimated that 1,345 medium-and large-scale industries registered at the Department of Industry were supposed to generate employment for 115,000 persons by the end of the Eighth Plan. According to a survey of manufacturing establishments (Central Bureau of Statistics [CBS], 1994/95), there are 363 grain milling establishments, 131 bakery units, 44 cocoa and confectionery production units, 70 vegetable and animal oil fat production units, 34 sugar factories and refineries, 40 dairy products establishments, nine fruits and vegetable processing and canning units, one meat product manufacturing unit, 75 other food products manufacturing units and 42 beverages industries.

Joint Venture Industries

In recent years the number of joint venture industries established in the country has increased. By January 1999, the list of joint venture industries included 214 operating industries, 51 under construction, 128 licensed and 37 newly approved industries. Among these, the food processing industries included 20 operating, four under construction, seven licensed and two newly approved industries.

THE RAW MATERIAL SITUATION

The production of major food crops such as paddy, maize, wheat, millet and barley amounted to 6,395 thousand mt in 1996/97, the final year of the Eighth Plan. It is targeted that the quantity of these food crops will reach 8,242 thousand mt in the final year of the Ninth Plan. Similarly oilseeds, sugarcane, potato and vegetable production will be increased in the final year of the Ninth Plan (Table 1).

The targeted production for citrus fruits in the final year of the Ninth Plan is 126,000 mt; apple, 31,397 mt; other fruits, 342,603 mt; spices, 89,800 mt; and cardamom 4,700 mt. (Table 2).

The production targets for animal-based raw materials for food processing industries in the final year of the Ninth Plan have not drastically increased, as compared to the first year of the same Plan (Table 3). Milk production is targeted to reach 1,326 mt; meat production to 235 mt; egg production to 590 million eggs; and fish production to 35,000 mt, in the final year of the current plan period.

Table 1. Projection of Area, Production and Yield of Major Crops in the Ninth Plan

(Unit: Area = 000 ha; production = 000 mt; and yield = kg/ha)

Crops	Status of FY 1996/97			Projected Target for FY 2001/02		
	Area	Production	Yield	Area	Production	Yield
Paddy	1,505	3,699	2,458	1,632	5,000	3,064
Maize	793	1,312	1,654	829	1,600	1,930
Wheat	665	1,056	1,588	708	1,300	1,836
Millet	260	289	1,112	260	300	1,154
Barley	39	39	1,000	39	42	1,077
Oilseeds	185	119	643	185	155	838
Sugarcane	46	1,622	35,261	48	2,100	43,750
Potato	110	961	8,736	140	1,300	9,286
Vegetables	146	1,350	9,247	160	1,716	10,725

Source: National Planning Commission, the Ninth Plan (1997/98-2001/02).

Table 2. Projected Production of Fruits and Spices in the Ninth Plan

(Unit: Area = 000 ha; production = 000 mt; and yield = kg/ha)

Crops	Status of FY 1996/97			Projected Target for FY 2001/02		
	Area	Production	Yield	Area	Production	Yield
Citrus fruits	9,330	92,994	9,967	12,000	126,000	10,500
Apple	3,006	28,595	9,513	3,264	31,397	9,619
Other fruits	42,344	306,636	7,242	45,469	342,603	7,535
Cardamon	9,554	4,456	466	10,000	4,700	470
Other spices	11,636	87,208	7,495	12,000	89,800	7,483

Source: National Planning Commission, the Ninth Plan.

Table 3. Projection of Milk, Meat, Egg and Fish in the Ninth Plan

Particulars	Unit	Initial Year (FY 1997/98)	Final Year (FY 2001/02)
Milk production	mt	1,068	1,326
Meat production	mt	185	235
Egg production	Million	450	590
Fish production	mt	23,458	35,000

Source: National Planning Commission, the Ninth Plan.

CAPACITY UTILIZATION

Most small- and medium-scale food processing industries in Nepal have not operated at their specified capacity. Capacity utilization of major food industries in Nepal at the end of the Eighth Plan period is presented in Table 4. The maximum percentage of capacity utilization of major food industries was 75 percent and the minimum was 39 percent in the fiscal year 1996/97. Such levels of operation may be either due to weaknesses in management, or in some cases, due to unavailability of raw materials in time. It is logical to assume that raw materials may not be available in large quantities, adequate for one year's operation at full capacity of the industry, nor it is often possible to have storage facilities so large. Inadequate promotional efforts such as occasional advertisement of the products in audiovisual media, etc. could also be a reason for slow marketing of products and poor managerial control of production at the full capacity. Frequently, a sharp rise in the price of raw materials and competition with imported products has negative impact on the operation of industries at full capacity.

Table 4. Capacity Utilization of Major Food Industries, 1996/97

Industry	No. of Units	Approved Annual Production Capacity	Production	Capacity Utilization (percent)
Noodles	6	6,932 mt	5,215 mt	75
Soft drinks	4	31,900 liter	21,885 liter	63
Sugar	8	130,226 mt	78,894 mt	61
Flour	12	19,100 mt	93,942 mt	49
Biscuits	10	15,590 mt	7,177 mt	46
Vegetable ghee and oil	17	144,777 mt	44,959 mt	39

Source: FNCCI, 1999, *Nepal and The World – A Statistical Profile*, Kathmandu, Nepal.

Export of Processed Food Materials

Nepal has been exporting processed food materials, particularly milled rice and edible oil to India, for a long time. With the establishment of modern small- and medium-scale industries in recent year, Nepal's export to India and overseas countries included other products also. The major processed food items exported from Nepal to India and other countries included processed cardamom, ginger, ghee, biscuits, instant noodles, pulses, sal seed oil, rice bran oil, tea and wheat flour. In the last year of the Eighth Plan, Nepal exported these items worth more than NRs.220.9 million. In the year 1997/98, at the beginning of the Ninth Plan, the value of these items exceeded NRs.293.9 million. These figures represent 42.6 percent and 26.2 percent, respectively of the total value of exports to India in these years (Table 5).

Table 5. Export of Major Products of Nepalese Food Processing Industries

(Unit: Value in NRs. million)

Major Products	Country	Fiscal Year		
		1993/94	1995/96	1997/98
Cardamon (processed)	India	147.2	195.4	194.3
Cardamon	Other country	n.a.	n.a.	n.a.
Ginger (processed)	India	23.1	47.2	36.1
Biscuits	India	11.2	31.8	53.5
Ghee	India	46.5	35.4	22.0
Noodles	India	17.8	64.6	75.9
Pulses	India	183.0	314.7	192.4
	Other country	164.3	348.7	858.3
Rice bran oil	India	99.5	129.3	94.8
Sal seed oil	India	n.a.	0.1	n.a.
Tea	Other country	164.3	348.7	858.3
Wheat flour	India	n.a.	0.3	8.3

Source: FNCCI, 1999.

Import of Processed Food Items

Nepal has been importing various products of food processing industries, from India and overseas countries. The major imports of such items include baby food, and milk products (e.g., cheese), powdered milk, sugar, tea, coffee, soft drinks concentrate and edible oils. Among these also include items that are used as raw materials in food processing industries in Nepal, e.g., powdered milk, soft drink concentrate, vegetable oils (in bakery or vegetable ghee industries). The total value of imports of processed foods in the years 1997/98 make up 4.5 percent of the total imports from India (Table 6).

Table 6. Import of Important Products of Food Processing Industries

(Unit: Value in NRs. million)

Products	Country	Fiscal Year		
		1993/94	1995/96	1997/98
Baby food and milk products	India	244.2	425.1	428.6
Powdered milk	Other country	65.3	22.3	55.1
Coffee	India	n.a.	23.1	15.3
Sugar	India	636.3	222.9	267.1
	Other country	n.a.	10.3	17.0
Molasses sugar	India	103.5	98.2	7.7
Tea	India	93.7	48.6	60.1
Pulses	India	n.a.	119.0	76.1
Soft drink concentrate	Other country	n.a.	97.5	61.6
Edible oils	Other country	610.7	419.9	282.2

Source: FNCCI, 1999.

QUALITY CONTROL AND MARKETING CHANNELS OF PROCESSED FOODS

Quality Control of the Processed Foods

In Nepal, the bulk of processed foods are manufactured in small- and cottage-scale units, which do not always maintain strict quality standards. The medium- and large-scale food manufacturing units maintain standards of quality of the product and are packed in hygienic packages. Such manufacturing units have well equipped quality control laboratories for maintaining quality standards. All the food manufacturing companies set up with foreign collaboration maintain high quality of products conforming to international standards. These companies carry out research and development (R&D) and change the range of products and the product mix to suit the consumer taste and preferences.

International Standard Certificate

During the last few years, food processing industries in Nepal have gained a growing awareness about the added advantage of the products with international certification as compared to those without such qualification. For example, instant noodle industry owned by the Choudhary Group of industries in Nepal has obtained the ISO 9000 international quality standard certificate, so the food processing industry has taken a lead in such efforts. A few other industries are in a process of getting ISO 9000 series certification. However, small- and medium-sized industries, including food processing industries have yet to adopt Environmental Management System (EMS) and get the ISO 14000 series EMS standard certificate.

Marketing Channels of Processed Foods

The demand for traditionally processed food items is in rural as well as in urban areas. The demand for modern items of processed food is mainly concentrated in urban areas. The regular channel of marketing consists of the manufacturing unit selling its products to wholesalers located in principal cities and towns, who then sell the products through retailers, mainly the grocers (who retail a wide range of food stuffs). Recently, a number of departmental stores have opened up in Kathmandu and a few larger towns, and these are the preferred places for sale of processed food by the wholesalers or manufacturing units. The manufacturing units of ice creams, fruit, beverages and confectionery sell their products through their own sales outlets, but the percentage of selling directly to consumers is relatively small.

CONSTRAINTS ON DEVELOPMENT OF SMALL -AND MEDIUM-SCALE RURAL-BASED FOOD INDUSTRIES

In recent years the number of small- and medium-scale food processing industries has grown. However, in view of the increased production and diversification of agro- and forest-based raw materials for food

processing, there is still immense potential for development of food processing industries in Nepal. There are a number of factors, which can be seen as main constraints on development of such industries.

Many mountainous parts of the country are not yet accessible by motorable roads. However, they are important production centers for horticultural and forest-based raw materials of food processing industries (e.g., Mustang, Jumla). Establishment of food processing industry particularly, those producing canned or bottled products, cannot be an attractive proposition in such areas where infrastructure facilities are not developed.

A number of wild fruit species such as berries of Seabuckthorn, Diploknema (*D. butyracea*), Chaerospondias (*C. axillaries*), etc. have been experimented with the Research Center for Applied Science and Technology, Tribhuvan University for trial production of juice, jam, marmalade, wine, and oil from their seeds. Industry based on such forest-based resources can be established in the country. Here again, the distance between the raw material centers and feasible localities for such industries discourage entrepreneurs and thus bottleneck the development of such industries.

Lack of trained manpower in the field of food processing technology in the country is another major constraint. Although Tribhuban University has an undergraduate campus in east Nepal for production of food technologists (B.Tech level), the number of students taking the course is very low, due to a perceived very limited scope of employment in the country. Further there is a critical shortage of middle level/skilled manpower for development of rural-based food processing industries.

The credibility of R&D organizations in the country has not been duly established. Some established industrial enterprises have been shut down due to unavailability of required professional help in time, from R&D organizations or professional societies.

Technologies in use have been imported mostly from India and services are often expensive. The engineering capabilities are rather low and immediate services regarding replacement of machine parts is not, in some cases, available within the country. Most professionally capable consultants in the country have not been engaged by local entrepreneurs because of the common tendency to import technologies on a turnkey basis. The process technology is well delivered by local consultants but many of them lack recent information about the hardware part of the technology. The design engineering capabilities have not been developed to the desired extent, due to lack of R&D funds for pilot-scale research.

The products of local food processing industries have to face very tough competition with imported products, and those who can afford to buy imported ones ignore locally produced processed foods. Further, these products do not find a good market in rural areas, as the purchasing power of rural people is very low.

The price of local raw materials is frequently high for the local industries, when competing with imported products.

It is mostly difficult to get bank loans for establishment of food processing industry in rural area, as most banks are located in major towns and cities.

SOME IMPORTANT MEASURES TO ALLEVIATE PRESENT CONSTRAINTS

1. With a view to encouraging establishment of industrial units in different parts of the country and to implement skill development and entrepreneurship development, the Cottage and Small Industry Department opened district offices in 48 districts of the country. Training was provided to 26,521 people during the Eighth Plan period and the target set for the current plan is to train 100,000 people on various income generating areas, including food processing.
2. Potential industrial areas are being identified in 20 districts, based on their available resources. Establishment of industrial districts in less-developed areas will help develop food processing industries, based on local resources.
3. An integrated rural entrepreneurship development program is being launched with the objective of encouraging people in rural areas to create and develop industries.
4. The Industrial Enterprises Development Institute (IEDI), established in the Eighth Plan period, has been carrying entrepreneurship development training, trainers training, management improvement training, and dissemination of technology information and research on entrepreneurship. The IEDI and National Productivity Council (NPC) have been making a positive contribution in enhancing the industrial sector, which also includes the rural-based food processing industries.

5. The industrial pollution control project is developing effluent standards for pollution discharging industries, at the sub-sectoral level. The Ministry of Industry, with the cooperation of DANIDA Environmental Sector Support Program, is conducting training regarding EMS. It is hoped that this will lead to adoption of EMS in food processing small and medium enterprises in the country, and eventually, achieving the ISO 14000 certification, for competitive advantage of their products in the domestic market, and to gain access in international markets.
6. Rural banks are being established in rural parts of the country and some commercial banks and the Agriculture Development Bank are extending their branches in different parts of the country. The rural branches of these banks will help in establishment of industries in rural areas of the country.

TECHNOLOGIES IN USE

Traditional and modern technologies used in the rural-based food processing industry, particularly in the small- and medium-scale enterprises are briefly described as follows:

Traditional technologies have been in use for food processing in rural areas of Nepal for centuries. They have been used for food processing to meet household needs. They include the manual grain grinder like *janto* and *okhal*, the pedal grain grinder called *dhiki* and the traditional *ghatta* (water mill) for grain milling. The oil extraction technologies include manual extraction aids, simple manual oil press *chepuwa*, to animal-driven oil extractors. Traditional fermentation technologies have been used for fermented food products. Traditionally processed food products have been dried in the open sun, with or without a transparent fabric, plastic or glass cover.

Small-scale grain milling is done in rural hillside areas, mostly using waterpower. The modernized watermill called Multiple Power Production Units (MPPU) is run by water channeled from river or rivulet. As the name indicates MPPUs have two functions, grain milling (one or two types of grains, rice and wheat or corn and millet) and oil extraction at the same time. In the evening MPPU can produce electricity for several households in rural areas. In rural and peri-urban areas, electrically operated small- and medium-sized rice mills, using the sheller or huller technologies, are in operation in the country. Small units of electrically operated rice huller or shellers, are also functioning in urban areas like Kathmandu, Lalitpur and Bhaktapur.

Small-scale oil extractors in Nepal consist of screw type oil presses, which are electric-powered. The electric-powered oil *ghani* (designed upon traditional oil crushers) is also in operation. Solvent extraction process is in use in parts of the country, especially in the Terai regions, and these utilize forest seeds (non-timber forest products), such as sal seeds or oil cakes from traditional mills for edible oil extraction. The medium-sized edible oil industries use modern technology, including automatic machines for extraction and purification.

Among the most modern food processing plants, consisting of the batch process or continuos automatic processing plants, include those established within the last two decades for processing of milk and milk products, vegetable 'ghee', bread and bakery products, distillery products, beer and soft drinks, instant noodles, confectionery, and a variety of other instant food products like cheese crackers, cheese balls, etc.

In the processing of dry vegetable fruit and food products, traditional technology consisted of sun-drying in different types of containers with or without a transparent fabric or glass cover. Modern drying involves the use of electric drying ovens or moving belts within driers. Alternate energy technology such as different designs of solar dryers (cabinet type, rack type, tunnel type) are now being used for processing fruits, candies, fish, meat, vegetables and traditional food products like *titaura, masyura, gundruk*, etc.

Packaging

The packaging technology used by rural-based food processing industries in Nepal includes manual filling and sealing aids to semiautomatic and automatic filling and sealing machines; processed food products are filled into paper, plastic or polythene packets, aluminum foil, tetra pak packets/bags, glass/plastic bottles or cans.

POLICY STRUCTURE

The current National Development Plan and Policies of Nepal has given high priority to the development of the industrial sector for meeting employment opportunity and developing sustainability in the export sector, in such a way as to contribute to the domestic economy. The national policy emphasizes labor-intensive technology and development of agro-based industries. There is also provision for tax holidays for a fixed period, allowed to such industries to make small (and cottage) industries export-oriented, for the sake of promotion of employment, income and sustainability.

Agro- and Forest-based Industrial Promotion Policy

The fundamental objective of the agro- and forest-based industrial promotion policy of the current plan, is to help poverty alleviation through enhancing opportunities for income and employment. Agriculture has by far the most potential, in the economic sector ,against the backdrop of natural resources. Without developing agriculture, non-agriculture sector also will have no foundation for its development. For this reason, agro-industrial business promotion will be treated as a focal point; its forward linkages will be facilitated; its backward linkages (a system of producing raw materials required for agro-industrial business sector) will be accorded topmost priority; and an integrated industrial business network will be established. The Ninth Plan adopts a clear policy for development of industrial enterprises, based on such high value agricultural commodities as fruits, off-season vegetables, milk, meat, honey, etc. These are in the form of import substitutes as well as export-promoting and employment-oriented, small- and medium-scale industries.

Arrangements will be made for obtaining necessary land for commercial agriculture, and in this process pocket areas will be selected, to make raw materials available for industrial purposes in sufficient quantities. In such selected pockets, government-owned forest and unoccupied lands will be made available on lease as required. Appropriate policy and service and support programs will be initiated to amalgamate cash crop development to the agro-based industry.

For the promotion of agro-based industry, business and market, regular interaction will be made to solve problems of the entrepreneurs and to extend support through proper initiatives. A separate organization under the Ministry of Agriculture will be established to support entrepreneurs through interaction programs, to promote internal markets and to monitor export feasibility, on a regular basis.

Without agriculture roads linked with highways and without rural electrification, the private sector will not be attracted to invest in agro-industry in rural areas and without the initiatives of the private sector, employment cannot be generated. Keeping in view these aspects, integrated and package programs will be implemented.

To support market development in hilly areas, emphasis will be given to develop ropeways, pulley, suspension bridge on a small scale, to establish collection centers, market stalls and wholesale markets with local initiative and involvement in feasible sites of the country.

A separate institutional arrangement will be made to technically guide agro-economic growth and rural development. A sub-urban center can be developed through the increase of transportation linkages, with a vision for reducing pressure on urban areas, for balanced development. Emphasis will be given to develop agro-based industry as a major primary market source for the consumption of agricultural products.

Industrial Policies and Strategies

The current Plan has adopted the following policy and implementation strategy for promotion of industries:

1. To extend and diversify industrial to commercialize other economic sectors such as agriculture and forest and to expand and diversify industrial production by linking the industrial sector with these sectors.
2. To expand and develop cottage and small-scale industries through integrated programs for providing essential assistance and technical support.
3. To make the one-window system more active and strong enough to direct the services of the system, towards providing infrastructure facilities to the private sector.

4. To declare a special industrial zone for less-developed areas of the country which have no access to physical infrastructure facilities and to encourage industrial activities by extending additional infrastructure facilities, with the help of private sector.
5. To increase the capital base of domestic financial institutions, by allowing capital inflows from foreign financial institutions, in order to facilitate the availability of capital in industries; also to orient the investment of financial institutions towards industry.
6. To encourage cleaner production technology for minimizing the negative impacts of industrialization on the environment.
7. To formulate and implement acts and policies in order to protect the interest of domestic industry and small industries.

The industrial policy (1992) makes provision for the following facilities and concessions to industries including rural-based small- and medium-scale food processing industries. Some examples are:

- no cottage industry shall be levied sales tax, excise duty and income tax.
- no income tax in excess of 20 percent shall be levied on the income derived from any industries producing cigarettes, bidi, cigar, chewing tobacco, khaini and industries producing other goods of a similar nature, utilizing tobacco as their basic raw materials, and alcohol or beer producing industries.
- except for cigarettes, bidi, cigar, chewing tobacco, khaini, industries and industries producing other goods of a similar nature utilizing tobacco as their basic raw materials; industries producing alcohol and beer, and saw mill and catechu industries, or any other industry using 80 percent or more than 80 percent of indigenous raw materials in its products and supplying all its manpower from among Nepali citizens shall be granted a rebate at the rate of 10 percent of the income tax.
- any industry, established in any remote, undeveloped and underdeveloped areas, other than cigarettes, bidi, cigar, chewing, tobacco, khaini industries and industries producing other goods of a similar nature utilizing tobacco as their basic raw material, and industries producing alcohol or beer, shall be granted a rebate of 30, 25 and 20 percent of the income tax, respectively and 35, 25 and 15 percent of the excise duty, respectively for a period of ten years form the date of operation.
- fruit-based fruit processing and cider and wine industries with a fixed asset of up to NRs.2.5 million established in Mugu, Humla, Jumla, Dolpa, Kalikot, Bajura, Darchula, Bajhang, Achham, Mustang, Manang, Solukhumbu, Sankhuwasabha and Taplejung districts shall be entitled to an excise duty and sales tax exemption for a period of 10 years, and fruit-based alcohol industries, shall be entitled to excise duty and sales tax exemption for a period of five years. On completion of such exemption period, His Majesty's Government may grant excise duty and sales tax exemption to the fruit-based alcohol industries for up to and additional period of three years.

THE ROLE OF PRIVATE SECTOR AND DEVELOPMENT GROUPS

The private sector has always played a very important role in development of rural-based small- and medium-scale food processing industry in the country. The private sector established rice processing and oil extraction industrial units in rural areas even prior to launching of planned development efforts in the country. With the establishment of the National Industrial Development Corporation (NIDC) in the Fourth Plan period, the private sector received government support in the identification of probable and feasible industrial projects and also industrial loans from NIDC. However, the role of the private sector in development of industries was realized only in the Fifth Plan. Several medium-scale industries that were established by the government during these development plan periods under foreign aid programs such as the sugar industry, cement industry, etc., are now ailing, owing to inadequacy and weakness in management. They are now awaiting privatization to enable their smooth functioning. The current National Development Plan (Ninth Plan) emphasizes the role of the private sector in the development of small and medium industries. The Ninth Plan also adopts a policy of attracting the private sector for investment in development of infrastructure facilities, such as roads, electricity, agricultural market, etc. for industrial development.

The number and type of cottage and small-scale industries registered in the Eighth Plan period and in the first year of the Ninth Plan are shown in the Table 2. It is evident that they are owned by the private sector, either in the form of individual ownership or as partnership or private limited projects.

During five years in the Eighth Plan period, the private sector investment in the industrial sector was estimated to total NRs.5,489 million in fixed assets. The projected loan flow in agro-industry and processing is assumed to reach NRs.2,736 million by the end of the Ninth Plan period, i.e., 2002 AD (Table 7).

Table 7. Projection of Loan Flow in the Ninth Plan

Objectives	2000/01	2001/02	ADB	Commercial Banks	Rural Banks	Total
High value crops	89	107	288	58	38	384
Agro-industry and processing	597	657	2,052	410	274	2,736

Source: National Planning Commission, 1999, Ninth Plan Document.

In recent years many commercial banks and financing institutions including rural banks and cooperative saving and financing companies, have been established in the country with private initiatives. The private sector has now been more active in the establishment of food processing industries in various parts of the country.

Private Consulting Firms

There is a number of private engineering and management consultancy firms which undertake feasibility studies and identify feasible projects for industrial establishments. Although the number of such firms has increased since the 1970s, only relatively few such firms are being operated by full time professionals, and most of these are run by a single or a few individuals on a part-time basis.

R&D Organizations

R&D organizations under Tribhuvan University and government department also get involved in consultancy services. The Food Research Laboratory under the government and the Research Center for Applied Science and Technology (RECAST) have been playing an important role in analysis and identification of raw materials, research and development, adoption and dissemination of appropriate technologies such as oil extraction units, solar dryers, water mills, etc.

Role of NGOs

The role of NGOs has been increasingly important in Nepal in making various activities of local development people-oriented and also in extending services and facilities to the grassroots level. However, NGOs have yet to play a significant role in development of rural-based small- and medium-scale food processing industries.

In recent years, NGOs working in the country with various specific objectives or aiming at specifically targeted groups are growing in large numbers. It has been estimated that the number of NGOs working in the country has reached 15,000 with more than 3,076 engaged in community development (NPC, 1998). However, only a few NGOs that have been in operation are well organized, have adequate resources and are effective in program implementation.

Farmers' Associations, Rural Women

In recent years, Farmers' Cooperative Societies and Women Groups have been organized in various parts of the country. Young enthusiastic and literate farmers and rural women have formed them. They tend to work as an organized NGO in order to enhance production and productivity of cash crops of industrial importance, as well as those where newer technologies such as alternate energy technologies, could be applied to food processing in rural areas.

These groups often take the assistance of NGO/INGOs and R&D organizations and Ministry of Local Development in organization of skill development programs such as in preparation of pickles and preserves, mushroom cultivation, fruit processing, etc. They also involve such social development organizations in the implementation of such programs as entrepreneurship development, marketing management, pricing of

products and record keeping. They contribute not only to the increase in production of raw materials for rural-based food processing industries but also to the establishment of such enterprises in the area of their activity. They take initiatives in the introduction of newer cash crops in their area and also in introduction and testing of newer technologies. They also take initiatives in pushing newer products aggressively in the local market and raising collective concerns, for wider marketing of products that have a very limited local market. They play an important role in development of marketing channels for processed food products as well.

The current national development plan of the country adopts a program strategy to especially involve women in the initiation and operation of small-, cottage-scale and agro- and forest-based industries in the country.

Strategy for Establishment of an Effective Linkage

There are linkage committees/bodies for bringing farmers groups, consumers group and industries together on a common table, e.g., Tea Development Board, at the local levels. The District Development Committees and Village Development Committees involve local farmers and entrepreneurs in development of programs including industrial development.

The Ministry of Local Development has constituted the Remote Area Development Board with representation from Village Development Committee located in remote areas of the country. This board involves rural women, farmers group, NGOs and consultancy firms or private consultants in implementation of training programs on food processing and preservation, utilizing local resources. It also helps establish small-scale food processing enterprises in remote areas of the country, considering, in most cases, the role of the local market or tourist market.

The Food Research Section under the Department of Agriculture has now been upgraded to department level. This step will produce a positive impact for enhancement of rural-based food industries in the country. This new department works to link private sector, R&D organization consumers, as well as the rural groups through meetings and such interactions will lead to positive results in the direction of development of food processing industries in the country.

REFERENCES

Central Bureau of Statistics, 1997. *Statistical Year Book of Nepal*, Nepal.

FNCCI, 1999. *Nepal and the World – A Statistical Profile*.

----------, 2000. *Directory of FNCCI 2000*, Kathmandu.

National Planning Commission, 1998. *Approach to the Ninth Plan (1997-2002)*, HMG, NPC Secretariat, Kathamndu.

----------, 1998. The Ninth Plan (1997/98-2001/002), NPC Secretariat, Kathmandu.

Singh, S. C., 1997. *Flora and Fauna of Nepal*, Across 1:15-16, Kathmandu.

Singh, S. C., T. B. Karki, P. O. Timilsina, 2000. *Feasibility Study for Marketing of Solar Drying Systems in Nepal*, RECAST, Tribhuvan University, Kathmandu.

11. PAKISTAN (1)

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INTRODUCTION

The food and allied products industry accounts for 27 percent of value-added production and is the largest industry in Pakistan. Sixteen percent of the manpower employed by the manufacturing sector, is working in the food and allied products industry. The food processing industry of Pakistan is growing as the use of processed food is becoming common. The size of the food processing industry is fairly large and most of the industrial units are based in or around the major cities and towns of the country. These industries produce dairy products, confectionery, beverages, jams, jellies, marmalades, sauces, pickles, snack foods, bread, wheat flour, cereals, canned fruits and vegetables, ultra heat treated (UHT) pasteurized and powdered milk, ice creams, spices, and edible oils. A profile of the food processing industry is given in Table 1.

Table 1. Profile of Food Processing Industries of Pakistan

Product	No. of Units	Capacity			Production	
Fruit and vegetable	25		45,000	mt	30,000	mt
Sea food	26		253.75	daily	25,000	mt
Biscuit and bread	42		46,830	mt	37,464	mt
Cereals	1	Corn flakes	350	mt		
		Rice cereals	325	mt	100 percent of capacity	
Beverages	100		600	million liter	540	million liter
Fruit juice/pulp	30		500,000	mt	Operating below capacity	
Meat and poultry	3	Meat processing	600,000	kg/annum	Operating below capacity	
		Poultry	8,000	birds/hour		
Dairy	38	Milk processing	795	million liter	Milk: 365 million liter	
		Ice cream	47.5	million liter		
Edible oil	155		2.7	million mt	1.87	million mt
Rice husking and polishing	320		7	million mt	5	million mt
Flour milling	470		25	million mt	19	million mt
Cooking oil/vegetable ghee	166		1	million mt	0.7	million mt
Sugar	77		355,150	mt/day	3.54	million mt/annum
Traditional/brown sugar	350		480,000	mt	480,000	mt

RURAL-BASED FOOD PROCESSING INDUSTRY (RFPI)

The food processing industries, including traditional cottage-scale industrial units, that are generally based in the rural areas are listed below:

- Sugar including brown sugar (*shaker*) and brown sugar cake (*gurh*)
- Milk plants/chillers and dairy products
- Traditional pickles, jams, marmalades and beverages
- Dehydrated fruits and vegetables
- Local brands of carbonated beverages and ice cream

- Edible oil extraction
- Flour mills/mini flour mills
- Fish and sea food
- Spices processing
- Traditional confectionery, sweet meats and vermicelli
- Bakeries, bread and biscuits.

Sugar Industry

Seventy-seven sugar mills with a total crushing capacity of 355,150 mt per day are located in various parts of the country. Most of them are located in the cane growing areas of the provinces of Punjab and Sindh. A total quantity of 3.54 million mt of sugar was produced by the sugar industry during the peak year 1998-99. However, the industry could produce only 2.42 million mt during the year 1999-2000 due to various factors. The main reason for the low production was non-availability of sugarcane due to the low price of the cane paid to the farmers by the sugar mills. As a result a large number of farmers switched over to other crops. A huge quantity of the sugarcane was crushed by the farmers themselves in small crushing units to produce traditional brown sugar (*shaker*) and traditional brown sugar cakes (*gurh*).

Traditional Sugar (*Gurh* & S*haker*) Industry

Prior to the development of modern sugar industry, sugarcane was used for producing traditional brown sugar (*shaker*) and brown sugar cakes (*gurh*). With the installation of a large number of modern sugar mills, the market share of *gurh* and *shaker* industry has decreased to about 5-7 percent. The *gurh* and *shaker* were being produced by some farmers at cottage scale. Now *gurh* and *shaker* are also being produced on a commercial scale by the "mini sugar mills" set up in the informal sector. The total production of *gurh* and *shaker* is now estimated at 480,000 mt per year. The main reasons for the increase in the production of *gurh* and *shaker* are:

- The cane growers were not given a fair deal by the sugar industry; their production was not purchased within a reasonable time and the payment to the farmers was often delayed. The farmers are therefore producing *gurh* and *shaker*, which can be sold against cash payment.
- The net income of *gurh* and *shaker* producers is higher as it is mostly produced in the informal sector, which is not payment general sales tax, or income tax.
- Demand has increased due to the influx of Afghan refugees into Pakistan and increased exports to Afghanistan.

The operation of the "mini sugar mills", which use power crushers for extraction of cane juice and crude methods of refining and conversion of cane juice into brown sugar, is creating serious problems for the sugar industry of North West Frontier Province (NWFP). The modern sugar mills of NWFP are operating at 25 percent of their installed capacity. The operation of the "mini mills" are not considered productive or desirable due to the following:

- Sugar extraction by "mini sugar mills" reaches approximately 55-60 percent whereas the sugar mills extract more than 90 percent of the sugar content.
- The *gurh* and *shaker* produced by the traditional sugar mills is not of good quality.
- Government is losing revenue as most of the "mini sugar mills" are operating in the informal sector and do not pay taxes.

To provide a level playing field for the sugar mills and "mini sugar mills", the following measures are under consideration:

- The "mini sugar mills" to be subject to general sales tax and fixed income tax on the basis of their crushing capacity.
- Production of sub-standard *gurh* and *shaker* to be effectively checked.

Dairy Products

Dairy products such as pasteurized, UHT, condensed and powdered milk, yoghurt, cheese, butter, cream and ghee (butter oil) are being produced by 13 dairy plants located around the country, with a rated capacity of 1.1 million liters per day. About 20 smaller dairy plants, with a rated capacity of about 1 million liters per day are lying closed. The entire production of these milk plants accounts for 5 percent of the annual milk production in the country (21.5 billion liters). Fifty percent of the milk processed by the plants is processed into UHT milk, 40 percent into powder milk and the remaining 10 percent into pasteurized milk, cheese, butter and yoghurt.

Most of the dairy milk plants are based in the rural areas near major cities and towns. The milk is procured from the small farmers at their doorsteps and stored in the chilled tanks located in the rural areas. With the establishment of milk plants, the farmer price of milk has significantly increased. In the past the farmer price was about 33 percent of the retail price of milk in the cities, now the farmer price is more than 50 percent of the retail price. The Government of Pakistan has established a Dairy and Livestock Development Board to encourage the development of the dairy, poultry and meat industries.

Fruits and Vegetables

The production of fruits and vegetables in Pakistan is estimated at 11 million mt per annum. The estimated annual production of various fruits is given below:

Fruits	Quantity (000 mt)
Citrus	2,000
Mango	945
Apple	569
Guava	448
Apricot	188
Other fruits (banana, grape, pear, date, pomegranate, etc.	1,000

The total production of vegetables including potatoes is estimated at 6 million mt. The production of potatoes and onions is estimated at 1,810,400 mt and 1,138,200 mt, respectively.

Most of the fruit and vegetable production is consumed in fresh form. However, there is a small fruit and vegetable processing industry, which is concentrated around the major cities. There are 25 small and medium industrial units, having an estimated capacity of 45,000 mt, engaged in the production of squashes, jams and jellies, pickles and a small quantity of canned fruits and vegetables. The production of canned fruits is estimated at 15,000 mt; jams, jellies and marmalades at 2,000 mt; pickles and sauces at 10,000 mt and syrup and squashes at 18,000 million bottles. Most of the producers of these products are based in the urban areas. Approximately 30 fruit juice pulp processing plants with an installed capacity of 500,000 mt per annum are engaged in the production of fruit juices and fruit drinks.

Traditional Dehydrated Fruit and Vegetable Industry

The traditional fruit and vegetable processing industries preserve a large quantity of various fruits and vegetables, by using traditional methods of preservation. The fruits and vegetables are dehydrated by exposing them to strong sunshine and hot wind. The estimated quantities of fruits and vegetables preserved in this traditional manner are given below:

Fruits	Quantity (000 mt)
Apricot	30
Currant/grapes	35
Pomegranate (*Anardana*)	3
Fig	2
Coconut	30
Vegetables	25

The use of dried fruits and vegetables was quite common in the past. With the development of modern means of transportation, cold storage, etc., the use of dried vegetables and fruits has reduced and as a result the production of dried fruits and vegetables is gradually decreasing.

Traditional Marmalades/Jams

The use of "*Murabbajat*" marmalades, traditional preparations from various fruits, is quite popular in Pakistan. Fresh fruits are converted into marmalades and used as a health food and medicine. The traditional doctors (*Hakeems*) treat a number of diseases with these marmalades. These marmalades are generally produced by the rural-based cottage industry, not using modern processing techniques or machinery. The annual production of *Murrabajat* marmalades is estimated as 30,000 mt/annum.

Sea Food

The coastal areas of Pakistan produce a huge quantity of fish, which is sold at very low prices due to the non-existence of processing facilities. The total production of fish including shrimp, crab, and lobster is estimated at 600,000 mt per annum. The bulk of the production is consumed locally but a small quantity is exported. There are 26 fish processing plants with the capacity to process 253 mt. of fish and shrimp daily. Out of 20 operational plants 17 are involved in production of frozen products, eight in fishmeal and only one in canning. The development of processing facilities can significantly increase the production of fish and its exports. The Pakistan Industrial Development Corporation (PIDC) therefore, is planning to set up a fish processing project at Gwadar, Balochistan.

Sweet Meats, Traditional Confectionery and Vermicelli

The consumption of a large variety of sweet meats and traditional confectionery items, i.e., *tanger* (sweet noodles), *makhaney* (sweet balls), *patashey* and *maroonda* is quite high in the rural as well as urban areas of Pakistan. A large number of cottage industries are engaged in the production of these products. The number of small units producing sweet meats is around 25,000. Around 5,000 units are undertaking production of traditional confectionery items and vermicelli. Almost 95 percent of these industrial units employ less than 10 workers, and about 70 percent of these units are based in the rural areas of Pakistan.

Spices

About 7,000 spices and salt grinding units are operating in the country, with 60 percent of these units based in the rural areas. However, the market share of these rural-based units is gradually decreasing, as a number of modern industrial units with larger production capacity have entered the market, with quality branded products.

Flour Mills/"Mini Flour Mills"

The total number of small and medium flour mills is estimated at 700. The number of "mini flour mills" is around 8,000. Most of the consumers prefer to use their own wheat after getting it milled individually. Ninety percent of the "mini flour mills" are located in rural areas, and about 50 percent of the flour mills are also located in the rural areas. An average "mini flour mill" employs 2-5 workers and a regular flour mill employs about 35-70 workers.

Role of NGOs, Farmers' Association and Rural Women

Almost all the RFPIs are operating in the private sector, with most of the units/cottage industries being managed by single proprietors. About 10 percent of the concerns are being managed by firms, companies. There are a few RFPI, in the public sector (Dairy Product Units of the Armed Forces, etc.)

The industry or trade associations of RFPIs are almost non-existent. However, the Associations of Sugar Mills, Flour Mills, Edible Oil/Vanaspati Ghee manufacturers and producers of dairy products are quite active. The other RFPIs use the forum of local Trade and Industry Associations to convey their point of view to the government agencies.

The participation of rural women in the sugar, flour, oil extraction and dairy industries is negligible, while their participation in the fish, spices, sweets and confectionery, fruit and vegetable industries is 10-30 percent.

CONSTRAINTS ON DEVELOPMENT OF SMALL- AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRIES

Due to the following constraints the rural-based small and medium food processing industries are facing difficulties:

- Migration of rural population to the urban areas, so the market for these industries is shrinking.
- Inability to compete with the urban-based industries, which are using modern machinery and marketing techniques.
- It is difficult for the rural-based small entrepreneurs to access credit facilities. The banks also prefer to extend loans to the larger industries based in the cities, as this reduces their cost of lending.
- The market share of the traditional foods produced by the rural-based industries is shrinking, due to the growing popularity of the modern food and beverages being marketed, by the urban-based large companies and multinationals.
- In the past government policies were not favorable towards the small- and medium-sized enterprises (SMEs) in general and RFPIs in particular.

MEASURES BEING TAKEN TO PROMOTE RFPIs

The promotion of SMEs including RFPIs is now being given high priority by the government. The following measures have been adopted to support the SMEs and RFPIs:

(i) Small and Medium Enterprises Development Authority (SMEDA) has been established to formulate and implement comprehensive support programs for the SMEs.

(ii) Priority is being given to the credit requirements of SMEs including RFPIs. For this purpose adequate funds are being made available by the State Bank of Pakistan, commercial banks and Small Business Finance Corporation (SME bank).

(iii) With the implementation of Poverty Alleviation Programme of the Government of Pakistan, the physical infrastructure (roads, electricity, telephone, gas, etc.) in the rural areas is significantly improving. As a result, RFPIs should be in a better position to compete with the urban-based industries.

(iv) The imposition of General Sales Tax (GST) has increased the sale price of the products of the larger urban-based industries. The impact of GST on the SMEs and RFPIs is far lower, and will facilitate the growth of SMEs.

The efforts being made by the Government of Pakistan for the promotion of SMEs are currently focused on fish processing industry, information technology (IT) industry, etc. However, the constraints on development of RFPIs are being addressed by SMEDA, the Provincial Small Industries Departments/PIDC which is planning to establish a few model food processing projects in the rural areas so that the fruits, vegetables, etc. can be exported/marketed at a higher price within Pakistan. It is expected that the growth of SMEs and RFPIs will be greatly stimulated with the adoption of the above mentioned measures.

12. PAKISTAN (2)

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INTRODUCTION

The agriculture sector is the largest sector of the Pakistani economy, contributing 25 percent to the GDP and involving 51 percent of the total labor force. Food industry is the largest industry of Pakistan accounting for 27 percent of the total value-added production, and 16 percent of the total employment in the manufacturing sector. Total production value of the output of food industry is estimated to be Rs.46 billion (US$767 million).

Major products of the Pakistani food processing industry include dairy products (milk, butter, yoghurt, cheese, ice cream, etc.), edible oils (cooking oils, hydrogenated vegetable oils), fruits and vegetable products (fruit juices, fruit juice drinks, canned fruits, etc.), carbonated beverages, sugar, flour, snack foods (potato crisps, salted nuts, extruded products from rice flakes and corn grits, lentil and gram snacks), processed chicken, jams, jellies, squashes, sauces, pickles, cereals (corn flakes, rice cereal, porridge, etc.), fish, meat, biscuits, breads, confectionery (toffee, bubble gum and chocolate), and spices (pepper, coriander, turmeric, ginger).

For the purpose of this paper, two food processing industries of Pakistan have been selected for analysis, which are dairy and fruit processing.

DAIRY INDUSTRY

Introduction

Of the different agriculture sectors, livestock is the largest, with a total value of Rs.303 billion (US$5 billion). Its contribution to the agricultural value-added is 34 percent and to the total GDP is 8.3 percent.

Milk is the largest commodity from the livestock sector accounting for 51 percent of the total value of the sector. Pakistan is the seventh largest producer of milk in the world with a total production of 21 billion liters of milk (Table 1) from a total herd size of 18 million buffaloes and cows.

Table 1. Comparative Milk Production

Country	Production (billion liter)	Country	Production (billion liter)
U.S.A.	70	Brazil	21
India	70	Pakistan	20
Russia	32	Ukraine	16
Germany	29	U.K.	15
France	25	Poland	12

The majority of the milk in Pakistan is obtained from buffaloes but the share of cow's milk in the total production is increasing gradually.

The demand for milk in Pakistan is higher than its production. This necessitates the use of powdered milk, large amounts of which are imported every year. A certain portion of the shortage is fulfilled by adulteration of fresh milk with water and added solids, to compensate for the dilution. Such practices lead to health hazards for the consumers.

Not only is the milk itself adulterated, but also its flow from the production site to the consumer's house further deteriorates its quality. Most common method is the unprocessed raw milk vending door-to-door by milkman (*gowalla*). This kind of milk is hazardous to human health due to poor hygienic quality and adulteration. Another kind of processed milk sold 'loose' is the boiled milk heated in open flat pans for prolonged hours, that results in the milk losing substantial nutritional value.

Milk Processing Industry

The kinds of technologies used in milk processing industry are pasteurization and sterilization, the principal type of which is ultra heat treated (UHT) treatment.

In Pakistan, modern milk processing in the dairy sector started in early 1960s, and by mid-1970s 23 milk pasteurization and sterilization plants were set up. With one exception, all of them are closed due to low consumer acceptance, the short shelf-life of the product and lack of trained manpower. The first UHT plant was set up in Pakistan in 1977 (Table 2). The success of this plant attracted many other investors also and during 1983-87, 20 new plants were set up. In the current situation, UHT capacity in the dairy industry is more than the demand for the product. Existing plants are operating below capacity and growth in demand is not likely to keep pace with the demand for relatively high-priced UHT milk.

Table 2. UHT Capacity in Dairy Industry

Plant	Startup	Capacity (000 liter/day)
Milko	1977	50
Nestle	1981	450
Pakistan Dairies	1983	40
Halla	1984	75
Chaudhry Dairies	1986	300
Milkways	1987	90
Total		1,005

Constraints to Production

Milk production at the farm level is the weakest link of the dairy industry of Pakistan. Failures in the dairy industry in Pakistan can be largely attributed to the lack of commercial dairy farms, working efficiently to produce high quality milk at economic prices, for a steady supply to the processing units. The current process of collecting milk from a large number of subsistence farmers is time-consuming, costly and prone to adulteration. There follow the main reasons of underdeveloped dairy industry in Pakistan:

1. ***Low Genetic Potential Animals***

Genetic potential of local breeds of cows and buffaloes is one of the major constraints in increasing milk productivity. Establishment of medium to large commercial dairy farms has not been economically viable due to this constraint. No fruitful effort has been made to improve the breeding of cows and buffaloes towards being more efficient milk producing animals. Even the purity of local breeds has been endangered through indiscriminate, unplanned cross breeding.

2. ***Improper Feeding***

A large number of animals is grazed on marginal lands. Stall feeding includes large amounts of wheat straw that has little nutritional value. Concentrate of feed use is very limited. Dirty, non-potable and limited water is offered to the heat stressed animals thereby radically affecting their productivity. Milk yield per lactation is much lower than that in many other countries (Table 3). According to the estimates, 50-100 percent increase in milk yields are possible by adopting correct feeding programs.

Table 3. Raw Milk Production Comparison

Country	Yield/Lactation (liter)	Country	Yield/Lactation (liter)
Pakistan	3,000	Sweden	6,880
Israel	9,200	U.K.	5,506
U.S.A.	6,300	New Zealand	3,400

3. ***Housing***

Animal housing is a low priority area for the farmers. A large number of farmers cannot afford any housing for their animals which are left out in the weather, especially in the heat.

4. ***Animal Health***

Lack of manure management and dirty water are the major sources of diseases and infections in the animals. The Livestock Department is responsible for disease prevention and cure of the animals. There is an acute shortage of funds in the government for dealing with such diseases, which ultimately lead to decreased animal productivity.

Consequences of Not Developing Dairy Industry

- The milk deficit will continue to grow in the urban areas, with consequent increases in unethical practices, in adulteration of fresh milk.
- The diseased milk will increase the burden of social costs to public health.
- Dairy industry can contribute to alleviate rural poverty, but if it is not developed along commercial lines, rural poverty will accelerate the rate of rural to urban migration, putting unsustainable strains on cities.
- Increasing import of powdered milk will lead to problems in balance of payments and trade deficit.

Processed Milk Supply

The processed milk supply can be segmented into two broad segments based upon the two prevailing kinds of processes: UHT milk; and pasteurized milk.

The supply chain for these two types of processes are shown in Figure 1.

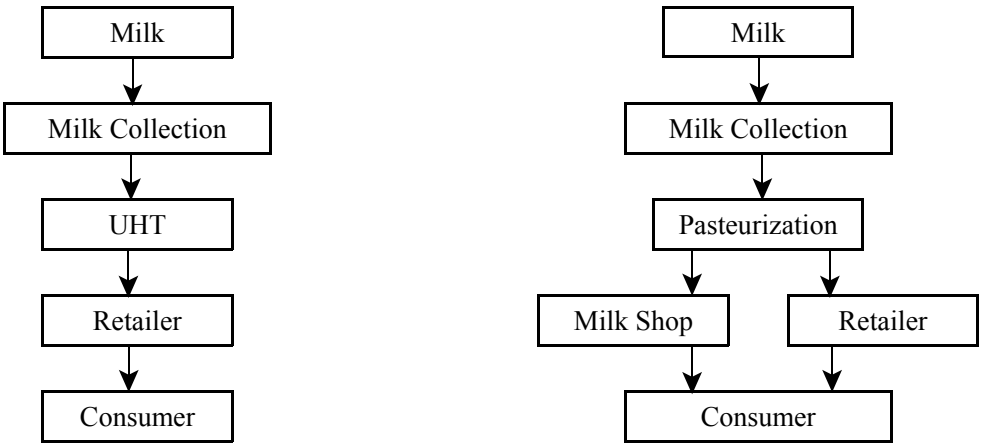

Figure 1. Supply Chains for UHT and Pasteurized Milk in Pakistan

1. ***Supply Chain for the UHT Milk***

In this supply chain, most of the farmers are subsistence level farmers that have a small herd of about 2-4 animals. Most of them live in remote rural areas and do not have access to urban markets. They sell their production to the large companies at relatively cheaper prices.

Milk collection centers are owned by large dairies of Pakistan in remote villages. The collected milk is chilled and loaded on special trucks to be delivered to the processing units. Currently, there are only two companies that have built their own infrastructure of collection centers. Other dairies collect milk from large milk collectors who in turn collect milk from the small farmers. The milk is processed in UHT plants and packed in tetra packs. These are sent to retail shops from where they are purchased by the consumers.

2. ***Supply Chain for the Pasteurized Milk***

The first two steps of the pasteurization supply chain are the same as those for the UHT processed milk. At the next step, the milk is pasteurized instead of UHT then sold in the market through two channels: i) the milk is not packed and is sold through special company retail outlets called milk centers; and ii) the

pasteurized milk is packed in pouch packs instead of tetra packs, which reduces the price to the final consumer.

Milk Selling Channels in Retail Market

1. ***Open Gowalla Milk***

This is the most commonly used channel for supplying milk to the final consumer. In this, raw milk is supplied to home by the milkman (*gowalla*) in traditional ways. It accounts for about 90 percent of the total milk market.

2. ***Open Pasteurized Milk***

The idea behind this is to sell pasteurized milk without comprehensive packaging, through milk centers. Milk is brought to the milk centers in refrigerated vehicles and is stored in the shops in specially developed deep freezers.

3. ***Pasteurized Pouch***

This is the pasteurized milk that is packed in plastic pouches instead of in tetra packs, to save costs. Due to lower shelf-life in the pouch, its circulation to remote areas is limited.

Dairy Development Strategy

From the above discussion, it is clear that dairy industry of Pakistan is at an underdeveloped stage. It has a huge potential for growth but a serious and concerted efforts are required for the development of dairying along modern lines in Pakistan. Keeping this in view, a dairy development strategy has been proposed by Small and Medium Industries Development Corporation (SMEDA). The highlights of this strategy are outlined in the following paragraphs.

There are two basic areas that should be targeted for the development of dairy industry in Pakistan:

- Milk production at the farm level
- Awareness at the consumer level.

The main objective of the dairy development strategy is to develop a milk market that pays a premium on a better quality of milk. This will be achieved through:

- Development of commercial dairy farming sector to progressively replace the subsistence level dairy farming enterprises
- Development of commercially viable milk processing industry
- Development of milk distribution systems so as to minimize middlemen and to eliminate milk adulteration practices
- Create milk production systems of international standards that can enhance domestic milk production for import substitution of milk powder and create possibilities for milk export
- Increase the productivity of animals so that more milk is available from a lesser or the same number of animals.

Strategy Focal Points

The proposed strategy is market-driven and not supply-driven. The primary focus is developing a system for ensuring the payment of a premium for better quality milk. The development strategy is based on a series of projects that fit into an overall scheme of prohibiting the sale of open, unprocessed milk and developing alternative chains of supply that offer quality at reasonable prices.

Model Commercial Dairy Farm

As milk production is the major weak link in the dairy sector of Pakistan, the strategy begins with the development of milk production at the farm level.

The commercial dairy farm is a typical agriculture-based dairy farm that requires at least one acre of land per three animals. This is based on in-house fodder production and long-term herd management plan.

Table 4. Strategy Focal Points

Supply Chain	Proposed Change: Phase I	Proposed Change: Phase II
Existing open un-processed *gowalla* milk	Registration of traders and standardization of milk containers	Banned through legislation
Existing pasteurized milk	Registration of traders and quality checks	Registration of traders and quality checks
Existing UHT milk chain	Apply labeling regulations and quality checks	Apply labeling regulations and quality checks
Proposed commercial dairy farms	Develop from existing entrepreneurs and new entrants (after training)	Developed and operating as models for future dairy production in the country
Proposed mini dairies	Develop in league with clusters of new commercial dairy farms	Developed and installed in adequate number
Proposed cool chain transport systems	Develop and deploy through the new mini dairy chain of supply	Develop and deploy through the new mini dairy chain of supply
Proposed retail milk centers	Develop and link with mini dairy chain of supply	Developed and operative in link with mini dairy chain of supply

The traditional dairy farms are located in rural areas, remote from cities. Dairy activity is an auxiliary activity to the traditional crop farming. The milk sold in the commercial market is the surplus milk left after fulfilling the domestic consumption. The disintegration of agricultural and dairy activity leaves the agricultural surplus potential underutilized and the dairy potential is wasted with subsistence attitudes. The proposed strategy aims at integrating agricultural and dairy activity into one homogenous enterprise. The yield per acre for the farmer can be increased almost three times, by growing high yield fodder and converting it into milk through feeding to the animals. Along with the increase in incomes of the farmers, commercial farming will also improve of supply of milk to the pasteurization units.

For development of model commercial dairy farms, the following interventions are required:

- Development of detailed feasibility study
- Training in herd management, animal feeding, breeding and health
- Provision of standardized shed designs and environment management
- Provision of technology in the areas of milking machines, milk chillers, fodder and manure handling equipment
- Credit package and support
- Marketing integration with a mini dairy processing unit.

Currently, there are very few examples of successfully running commercial dairy farms in the country. The element of risk in livestock projects is relatively high due to many variables that are beyond farmer's control. To ensure the success of commercial dairy farms, it is proposed that:

- milk animals should be insured against the fatal diseases and theft (common in a rural environment). For this, there is a need to convince the insurance companies to become a part of this idea.
- entrepreneur profile should be critically evaluated and selection made of that entrepreneur who preferably has a higher education level, with previous experience of handling animals. In addition to this, a drive for higher incomes, a technological orientation and a preference for rural outdoor lifestyle should also be given due weight, when selecting the entrepreneur.

Mini Dairy

Most of the large-scale milk processing plants have failed in Pakistan due to the non-availability of fresh milk and the logistic difficulties in setting up an efficient milk collection system, from a large number

of widespread rural subsistence dairy farmers. All the surviving units have one common factor, and that is their own milk collection centers. In order to create such a network, smaller, easier to manage processing units are being proposed for which milk collection would be simpler to arrange. These units will collect fresh milk that has not been adulterated, pasteurize and chill it for immediate delivery to the markets.

The proposed mini dairy will be established with a cluster of 10 or more commercial dairy farms. All the milk collected will be chilled through farm cooling tanks, especially designed for this use. Both morning and evening milk will be collected in trucks and they will move on a prescribed route on a daily basis. Trucks will be rented and the tanker will be provided by the mini dairy. Chilling at the farm level will reduce the risk of adulteration since the milk otherwise has to be chilled by addition of direct ice into it. This is necessary because the deterioration of milk is accelerated 3-4 hours after milking. Bringing chilling and pasteurization operations closer to the source will provide a longer shelf-life and will eliminate the need for unhygienic ice.

Milk Collection Enterprise

The concept of the mini dairy can also work with the traditional milk production chain from the traditional farmers, instead of the proposed commercial dairy farms. For this, an additional organizational structure will be required for village level milk collection. The integrated agency will become the milk collection enterprise. It will procure milk from traditional sources and after processing it, offer the pasteurized and chilled milk to large UHT milk processors, other milk distribution networks or set up its own network through retail shops or home delivery. The benefits accruing out of this enterprise are:

- better milk price to the farmer
- elimination of middlemen, thereby a reduction in adulteration
- consistent quality and quantity of raw material to the mini dairy.

The sponsors of the milk collection agency will come from the existing medium-sized milk collectors in the existing chain of milk supplies.

Milk Retail Shop

Currently, the milk is being sold in two types of shops: open milk shops; and company-specific milk centers.

As part of the whole strategy, the idea is to set up new milk shops and also, to convert the existing milk shops into milk centers.

Setting up such milk shops is a very cheap way of creating employment. The demand for pasteurized milk is increasing, as people are becoming more and more health conscious.

Private Veterinary Services

Veterinary services are a vital component for increasing the productivity of milk animals. The services are currently provided by the provincial livestock departments, which have many limitations. The proposed dairy strategy has included a project based on commercial operation of veterinary services, to be operated by independent veterinarians, as an integral part of the strategy.

FRUIT AND VEGETABLE PROCESSING INDUSTRIES

Introduction

Pakistan has a diversity of soil and climatic conditions, which favor cultivation of a large variety of fruits and vegetables. The coastal belt of Sindh and Balochistan is suitable for growing tropical fruits. The uplands in North-West Frontier Province (NWFP), Balochistan and northern areas are suitable for temperate fruits. The plane of the Indus basin in Punjab and Sindh is suitable for most of the subtropical fruits.

Fruit Production

Major fruits grown in Pakistan are citrus, mango, date palm, apple, and banana. Some other fruits include guava, apricot, peach, pears, plums, grapes, pomegranate and almonds.

Vegetable Production

Major vegetables are potato, onion, chilies, tomato and carrot. Other vegetables include garlic, coriander, turmeric and ginger.

Currently, Pakistan has a total fruit production of about 5.2 million mt from a total cultivated area of 550,000 acres. The vegetables are grown over an area of 413,000 acres with total production of 3.6 million mt. Yields per unit area of fruits and vegetables in Pakistan are well below international standard, as average yields are about one-third of the international benchmarks.

Estimates of Fruit Available to Processing Industry

The best grade of the fruits are exported in the form of fresh fruit. The next option for the fruit supplier is the domestic market, for consumption by the local population. The balance of these two markets is available to the fruit processing industry for its primary raw material. Based on the 1998-99 figures, estimated supply of fruits available for the processing industry was 4,325,000 mt.

Theoretically, this quantity should be available to the fruit processing industry, but due to postharvest losses during handling and transportation, the actual quantity available to the industry is lower than the calculated quantity. Also, there is some percentage of small and deformed fruit that is not preferred by the processing industry, which reduces the quantity even further. Taking an estimate of 30 percent currently unavoidable wastage due to the above-mentioned reasons, total fruit available to the Pakistan fruit processing industry was about 3 million mt. There are 24 main fruit processing plants in the country, as shown in Table 5.

Table 5. Installed Fruit Processing Capacity

Sr. No.	Name	Total (000 mt)	Sr. No.	Name	Total (000 mt)
1.	Sunflo Cit-Russ	95.00	13.	National Fruit Juices	14.10
2.	Cargill Pakistan	60.00	14.	Standard Fruits	13.20
3.	Fresh Juices	40.00	15.	Bambino Food Industry	7.50
4.	Hyderabad Beverages	30.00	16.	Fruit Sap	7.50
5.	Shezan	30.00	17.	FADCO	6.00
6.	Milk Pak	30.00	18.	Pakistan Fruit Juices	5.00
7.	Indus Fruit Juices	26.40	19.	Ali Hassan Corporation	5.00
8.	Tops Foods & Beverages	20.00	20.	Monolisa	3.50
9.	Malik Food Industry	15.00	21.	Kamran Distributors	3.00
10.	Shaheen Foods	15.00	22.	Popular Food Industry	2.00
11.	Sinsas Enterprises	14.25	23.	Benz Industries	1.80
12.	Langar-e-Sulaimani	14.25	24.	Mitchells	1.00
Total:		459.50			

Most of the plants are meant for processing citrus, since this is the fruit that is available in Pakistan in the largest quantity. The second largest processing capacity in the industry is that for mango.

Basic Industry Classification

The industry can be classified into two basic types. The first category includes plants which produce fruit pulps, mostly mango, for conversion into fruit drinks (with very small fruit content), for large volume consumer sale in the country. Most of these drinks are sold in tetra packs. The products of such plants also include squashes, ketchup, jams, fruit salads, etc. Most of the companies operating in this category have very conservative strategies, with the result that there has been very little growth in these companies. They have operated at more or less a standard technical and commercial level and have evolved purchasing, control and selling organizations. There is a need to aggressively move into exports, aiming at the development of new markets.

The second category includes the plants for production and export of bulk industrial products (pulps and concentrates). Such plants have been set up starting in the late 1980s. The major product of these plants is citrus concentrate, and they operate only for 3-4 months. The management of these plants appear not to

have realized the existence of intentional markets for other pulps/concentrates like those of banana, tomato, guava, pear and, above all, mango. Fruit processing industry is cyclical and single product units in bad marketing years either close down or suffer losses, only being compensated in better years. Multi-fruit units, on the other hand, must retain the flexibility of switching to different products in accordance with the demands of the market, and must accordingly maintain competent marketing and technical personnel.

A recent victim of such a strategy has been Sunflo Cit-Russ Ltd., the largest fruit processing plant of Pakistan.

Sunflo Cit-Russ Limited – A Case Study

Sunflo Cit-Russ Limited was incorporated in 1988 as the largest fruit processing plant of Pakistan in Sargodha district. The plant has a capacity of processing about 700 mt citrus fruit (*kinnow*) per day. At a season of 135 days (4.5 months), total crushing capacity is about 95,000 mt of fresh citrus.

Sunflo started its commercial production in 1992. Main product of the Company was frozen concentrated *kinnow* juice (FCKJ). The bulk of this was exported to European and Japanese markets.

Process Flow for Production of FCKJ

Fresh citrus, after weighing, sorting and sizing operations are fed into extractors. The extracted juice is passed through finishing and pasteurization operations. It is then centrifuged for controlling the pulp content. The juice is then passed through a six stage evaporator called TASTE (Thermally Accelerated Short Time Evaporator). The evaporation operations increases the solids content from an average of about 11-12 percent to 66 percent. The concentrated juice is passed into batch tanks for preparing larger batches, in order to ensure the uniformity of the product and reduce the temperature. It is then packed in food grade polyethylene bags and food grade drums and stored at -18ºC.

The Company was also a pioneer in launching a local ready-to-drink pure orange juice in the Pakistani market under the brand name of SunRipe. The juice was a huge success in the Pakistani market, as its quality was very good and it was less than half the price of the imported juices already available in the market. The Company was started as a private limited company but it went public in 1995 and got listed on Karachi, Lahore and Islamabad stock exchanges.

According to the last audited statements of the company in 1996, total sales of the company were Rs.410 million (US$11.7 million).* Of this about Rs.50 million came from the local market by the sale of SunRipe orange juice. 1996-97 was the last crushing season for the Company, after which it was closed down in 1998.

Analysis of Sunflo's Failure

There were a number of reasons for the failure of the Pakistan's largest fruit processing plant. These are described below:

1. ***Single Product Company***

Sunflo, for all practical purposes, was a single product company, making it very vulnerable. The main stream of revenues for Sunflo came from the sale of FCKJ in the export markets. The sale of SunRipe, ready-to-drink orange juice in the local retail market was only 12 percent of the total sales. The result was that when the price of that single product plummeted in the international markets, the Company was not in a position to sustain that drop. The price went to the level, which was not enough to cover even the product's variable cost. The result was that the Company has to opt either to sell at a loss or to wait for the market to rise again. The Company went for the waiting option but carried it for too long till it reached the point of no-return and it had to shut down its operations.

2. ***Overambitious Expansion***

Along with the market crash, the management of the Company also made some unwise decisions that expedited the downfall. The management went for expansion in an overambitious way. Many expansion projects were started at the same time in different areas. Some of these are listed below:

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* At conversion rate of US$1.00 = Rs.35.

(i) *Installing own packaging facilities*

The Company did not have its own packaging facilities for its ready-to-drink orange juice (SunRipe). The juice was packed in a milk packing plant which has excess packing capacity available. The plan of the Company was to install its own tetra pak machines for the juice. This project was under way when the Company closed.

(ii) *Expanding cold storage facilities*

The Company was in the process of building the Pakistan's largest -18ºC cold storage facility at the plant site. The structures were all completed and panels were being fixed when the Company closed down.

(iii) *Launching new products*

After the successful launch of SunRipe Orange, two other pure juices, SunRipe MangOrange and SunRipe MultiFruit were also launched in the local market. Not only this, but at the same time the Company also decided to enter the market of fruit juice drinks and a product was launched under the brand name of Shango. Three different flavors were launched at the same time. This move, on the one hand overloaded the marketing and sales function, and on the other hand, confused the final consumer.

(iv) *Modernizing laboratories*

Sunflo's manufacturing facility is also equipped with the latest laboratories for ensuring the quality of the product. The management also took up the project of expanding and upgrading the existing laboratory facilities. A new building for this purpose was under construction when the project closed down.

(v) *ISO 9000 certification*

In order to streamline its business operations and gain a competitive edge in the international markets, ISO 9000 certification program was initiated. By the time of the Company's closure, the documentation had been completed and implementation phase was in progress.

(vi) *Office renovation*

A massive renovation of the Company's office was undertaken in the time of crisis. This project also resulted in large cash outflows.

All of the above-mentioned expansion and/or diversification programs required huge cash flows. Many of these projects could have been stopped at the right time and the money should have been directed towards streamlining the existing operations of the Company.

3. ***Political Instability***

Political instability was also one of the factors contributing towards closure of Sunflo. Keeping in view the aggressive expansion plans, the Company was in the process of negotiating for getting finance from the banks. The loan was on the verge of final sanction at the end of 1996, when the government was toppled and the caretaker government stopped any further loan sanctioning. After the new elections, the case was pursued with the new government but it was not approved. This led to a serious cash crunch situation for the company. It was serious to the extent that at the start of 1996-97 citrus season, the Company did not have any working capital for running the plant. Most of the money reserved as working capital had been utilized for capital expenditure in expansion projects. This was done on the basis of sureties from the banks for loaning to Sunflo. But due to the change in political scenario, this could not happen.

Problems of the Fruit Processing Industry

1. ***Low Availability of Raw Material***

During the past years, there has been a more than two-fold increase in the demand for fruits. The prime reason for this has been increase in population. Along with this increase in demand, the number of fruit processing plants have also increased. The supply of fruits has not kept pace with increase in demand of fruit. The result has been an underutilized fruit processing industry in the country (Table 6).

Some of the reasons for shortages of fruit are:

- fruit yield per acre in Pakistan is as low as one-third of the international standards
- juice yield per fruit is also very low
- crushing season is very short since there is no effort undertaken for increasing the length of seasons of different fruits.

Table 6. Level of Capacity Utilization in the Industry

Fruit	Installed Capacity	Utilized Capacity	Percent Utilized
Citrus	190,000	60,000	31.6
Mango	190,000	28,000	14.7
Banana	5,400	600	11.1
Apple	4,200	200	4.8

2. ***Working Capital***

The fruit processing industry runs only during the season of any particular fruit, which means that the production done during the fruit season is that which has to be sold during the entire year. Inventory requirements are also high due to storage requirements of material; like bottles required for nationwide marketing. Such factors led to large working capital requirements for the companies. The financial sector is reluctant to provide loans to a new and untested industry like fruit processing.

3. ***Limited Market Research for Export Markets***

A major product exported by the fruit processing industry of Pakistan is fruit juice concentrate. The biggest product in this category is FCKJ. Until 1991, fruit juice concentrate was not listed among the major export items of Pakistan, but after that a number of plants were set up and Pakistan started exporting fruit juice concentrates to markets like Europe and Japan. However, the export market information available to many major players in the industry was not adequate. This resulted in putting many limitations on the Pakistani exporters when exploring the new markets.

13. PHILIPPINES

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INTRODUCTION

The Philippines has a total land area of 300,000 km^2 with a population of 75 million in the year 2000. What foods are available in the Philippines and how do Filipinos eat? Based on the survey done by the Food and Nutrition Research Institute of the Department of Science and Technology (DOST), the average Filipino diet is composed of the following:

Rice	36.1 percent	Fruits	9.6 percent
Fish, meat and poultry	16.3 percent	Other cereals	7.2 percent
Eggs, dried beans, milk	15.6 percent	Fats and oil	2.0 percent
Vegetables	13.2 percent		

The thrust and development of food production and processing are influenced by geography, climate, history and culture.

Our way of eating has been largely influenced by our history. The Filipino diet in the 21st century is being influenced by Chinese, American, Spanish, Italian, Japanese, Korean and Thai cultures. The average Filipino eat five meals a day: breakfast, lunch, supper in addition to two midday snacks. We have a line of seafoods, meat, vegetables with rice as our staple. We enjoy *halo-halo*, a blend of tropical fruit preserves mixed with crushed ice and milk which is Japanese in origin.

RURAL FOOD PROCESSING

Classification

There are more than 200,000 rural-based food processing establishments. They are found in the farming and fishing areas of the towns and barrios. Industries in the country are classified under the following categories:

Category	No. of Employees	Capitalization (PhP)*
Micro industry	1-5	#150,000
Cottage industry	6-9	150,000-1.5 million
Small-scale industry	10-99	1.5-15 million
Medium-scale industry	100-199	15-60 million
Large-scale industry	200 or more	$60 million

Note: * Philippine peso.

Based on the above classification, these processors fall in the category of cottage, micro- and small-scale and are mostly home-based. In the context of the Philippine food processing industry, only about 1-2 percent are registered with the government regulatory agencies. They are dispersed all over the country, mostly near the provincial and municipal capitals, where they have better access to the markets. Many of these processing enterprises are also suppliers to food exporters.

In terms of exports, food represents only 4 percent of the country's total exports. Out of US$35 billion total export trade in 1999, fresh and processed foods, including coconut products, contributed only US$517 million. We are currently ranked No. 35 among the world's food exporters, having an insignificant share of barely 1 percent of total global food trade. Major commodities shipped to foreign buyers are fresh fruits and vegetables (33 percent), processed foods (30 percent), and fresh marine products (28 percent).

In the years 1999 and 2000, our major markets for food were Japan and the United States which together absorb more than 50 percent of our food exports. While Japan imports for the shrimps/prawns and frozen tuna, the United States buys more of the processed foods. Other markets are Hong Kong, Taiwan, Germany, Netherlands, Singapore, Canada, U.K./Great Britain, and the United Arab Emirates.

Our rural-based small and medium food processors handle a wide variety of foods, mainly ethnic recipes which they supply to exporters such as sea foods (dried fish, smoked fish, *Bagoong* (fermented fish), bottled Spanish sardines, frozen boneless milkfish, frozen marinated milkfish), and fruits and vegetables (banana chips, dried mango, preserved *macapuno*, preserved jackfruit, *ube* spread, *saluyot* powder, root crop powder, banana tea, coconut bars, rice-based delicacies like *puto* and *suman*. Rural-based food processing provides employment to more than two million Filipinos and as such provide a source of income in the countryside.

Entrepreneurs

Most entrepreneurs involved in rural-based food processing are not academically trained in food science or food technology. The entrepreneurs are not gainfully employed elsewhere and this becomes their main source of income. There are others who supplement their income by engaging in a food processing activity, like making peanut butter, *nata de coco*, preparing papaya pickles (locally known as "*achara*"), peanut brittle, ube spread, etc. Most of them are in this venture without benefit of a formal business plan and usually operate their home business using common sense.

Methods and Technologies of Seafood Processing

1. ***Seafood Processing***

A significant segment of processed seafood still relies on traditional methods such as salting, smoking, marination, fermentation and drying. The efficiency of salting and drying very much depends on the purity of salt. Two types of salt are made – granular salt which is simply sun-dried seawater, and boiled salt where granular salt is dissolved in water and crystallized through boiling in vats. The latter salt is cleaner but is not devoid of chemical impurities. The large-scale processors use imported refined salt from India or Germany.

Because of rigid requirements for exports, the processors have become aware of the necessity of Good Manufacturing Practices (GMPs), involving standard sanitary operating procedures and Hazard Analysis Critical Control Point (HACCP). The exporters have these products analyzed for bacterial coliform, total plate count, salmonella and amount of histamine, to prevent detention by the receiving country. Standards for these products have been developed by the Department of Science and Technology – Industrial Technology Development Institute. The academic institutions through student and other research projects have studied various aspects of processing these products.

Another product was developed from dried herring or more popularly known as "*Tuyo*". Called "*Gourmet Tuyo*", this is made from dried herring which is fried, filleted and packed in jars in a liquid medium consisting of olive oil and some herbs. It has a moisture content of 12-15 percent and a water activity lower than w.a. 0.65.

Smoked fish (Tinapa) are commonly sold in the wet market. In the supermarkets, they are sold in the chiller section, packed in styrofoam plates and wrapped with plastic. Smoked fish for export are frozen and tested for coliform, salmonella and percent histamine.

Fermented salted tiny shrimps have low water activity between w.a. 0.6-0.7. The bulk of this product is exported for overseas Filipinos. The main constraints are presence of crystallized salt formation of white deposits and the presence of benzoate preservative. Sourcing of materials is carefully done to ensure the absence of filth.

Frozen deboned bangus is a major export. The workforce for these products are members of cooperatives where a skilled worker can remove 359 bones in five minutes. Strict and temperature control and sanitation have to be enforced to prevent product deterioration.

Fruit and Vegetable Processing

1. ***Banana Chips***

The peeling operation is done manually, using sharpened bamboo and flattened spoons. Slicing is mechanically done. Deep frying is done using coconut oil in large works. Workers are so skilled that they can determine frying temperature and end point of frying, by the appearance of oil.

2. ***Sweetened Fruits***

Saba bananas, *macapuno, kaong, langka* are packed in heavy syrup. These are all low acid with the exception of *kaong*. Traditional methods of processing use the gentle impregnation with syrup and the hot water process for pasteurization. Extensive studies had been done by the Industrial Technology Development Institute (ITDI) and by the University of the Philippines (U.P.) College of Home Economics to determine the minimum thermal treatment for commercial 'sterility'.

3. ***Dried Fruits (Mango, Pineapple, Papaya, Langka)***

Improvement of dried fruit technology include:

- peeling and slicing operations standardized to a mere 10 seconds/mango
- control of stage of maturity and ripeness level to get the peak flavor development
- establishment of drying parameters such as temperature, relative humidity and tray load
- establishment of endpoints.

Dried fruits without sugar impregnation has been developed.

4. ***Root Crops, Leaf Flours***

These require careful control of raw material color. The processors are careful about their handling so that microbial count of finished product is below 10,000C FU/g.

5. ***Nata de Coco***

The efficiency of *nata* production require careful control of ingredients, control of temperature, control of contamination and rejuvenation of mother liquor. Quality inspection of *nata* slabs is very rigid for export. Several stages of inspection by trained inspectors are done to ensure the absence of filth.

6. ***Tocino***

There is a cluster of meat processors in Pampanga, a province located north of Manila, producing *tocino*, hotdog and other sausages. Production level reaches from 1-10 mt/day. *Tocino* are tender slices of pork, served for breakfast. Due to addition of natural ingredients, a recovery rate of up to 200 percent can be obtained from raw materials. Moreover, this process improves the tenderness and palatability of the meat, and is considered to be a Filipino invention.

7. ***Chicharon***

This is a popular snack food and an ingredient in some Filipino dishes. It is a by-product utilizing pork rinds. Packaging to stabilize the product has to be done.

8. ***Pastillas de Leche and Kesong Puti (Cheese)***

This is a specialty product out of buffalo milk. The shelf-life is limited to only a week. Packing in glass and sterilization have extended the shelf-life.

A summary of the methods and technologies for the products are found in Table 1.

Manpower

Most of the workers are either high school or grade school graduates, and they become very skilled, being paid on a piece-rate basis.

MAJOR CONSTRAINTS ON THE DEVELOPMENT OF THE FOOD INDUSTRY

Availability of Raw Materials

Quality characteristics vary and agricultural methods have not kept a pace with the industry's requirements such as varying color of *ube*, control of disease in banana, citrus and other fruits.

Table 1. List of Products, Raw Materials Used, Method of Processing, Equipment and Institutions Involved in Product Development

Commodity	Raw Material	Product	Method of Processing	Equipment	Institution Involved in Product Development
Seafood	Herring	Salted, dried fish	Salting and sun-drying	Salting vats, sun-dryers	Traditional; standards developed by ITDI-DOST
		Smoked fish (*tinapa*)	Salting, steaming, smoking and freezing	Salting vats, sun-dryers, smokehouse and freezer	Traditional
		Spanish style sardines	Salting, partial drying and thermal processing	Salting vats, sun-dryers and sterilizers	Traditional and minimum thermal process requirement tested by ITDI and food technology – U.P. College of Home Economics, Diliman
	Tiny shrimp	*Bagoong*	Salting, fermentation, bottling and thermal processing	Fermentation vats, cookers and sterilizers	Traditional and minimum thermal process requirement done by U.P. College of Home Economics
	Bangus (milk fish)	Frozen boneless *bangus*	Chilling, deboning and freezing	Chillers, stainless pans and tweezers, and freezer	Process of deboning standardized by ITDI-DOST and Bureau of Fisheries and Aquatic Resources (BFAR)
Fruits and vegetables	*Saba* bananas (green manure)	Banana chips	Washing, peeling, slicing, first frying, soaking in syrup, second frying and packaging	Peelers, slicers, kettle fryers and sealers	Traditional; process of frying, packaging requirement and processing behavior related to their chemical constituents done by ITDI-DOST
	Saba bananas (firm ripe)	Sweetened *saba* in bottles	Washing, blanching, peeling, bottl-ing, thermal processing, cooling and packing	Blanchers, peelers, steamers, sterilizing vats and cooling tanks	Traditional; minimum thermal process studies done by ITDI-DOST and Department of Food Science, U.P. College of Home Economics
	Kaong, macapuno, langka, ube	Sweetened *kaong*, sweetened *macapuno*, sweetened *langka* and *ube* spread	Pulp of raw material blanching, size reduction, filling in bottles, syrup addition, exhausting, sealing, thermal processing, cooling and packing	Cookers, blanchers, fillers, exhausting sterilizers, cooling tank and packing	Traditional method of preparation; minimum thermal process requirement determined by ITDI-DOST, U.P. College of Home Economics, Food Development Centre, National Food Authority

... To be continued

Table 1. Continuation

Commodity	Raw Material	Product	Method of Processing	Equipment	Institution Involved in Product Development
Fruits and vegetables	Mango, papaya, pineapple and *langka*	Dried mango, dried papaya, dried pineapple and dried *langka*	Washing, peeling, slicing, dehydration by soaking in syrup, drying, sweating and packing	Peelers, blanchers, soaking vats, dryers and sealers	Traditional method; standardization done by ITDI, DOST, Department of Food Science and Nutrition, U.P. Diliman, Department of Agriculture
Root crops	*Ube* (purple yan), *gabi* (taro), *camote* (sweet potato) and arrow-root	Flours	Washing, soaking in solution, blanching, peeling, slicing, cooking, drying, pulverizing and packing	Soaking vats, steamers, forced draft dryer (locally fabricated) and sealer	U.P. College of Home Economics, Department of Agriculture; developed product were initiated by local small- and medium-scale industry
	Malunggay saluyot	Flours	Washing, steaming, air-drying, drying, pulverizing and packing	Soaking vats, steamers, forced draft dryer and sealer	Product were initiated by local SMEs and standardized by academic institutions and the Department of Agriculture
Other fruits	*Calamansi, dalanghita, guayabano* and tamarind	Concentrate or nectars	Washing, cutting, extraction, blending, pasteurization, filling and sterilization	Cutters, mixers and other jigs for extraction, kettle, fillers and vats	Traditional process standardized/improved by academic and government research institutions
	Coconut	Coconut bars	Grating, cooking with sugar and packaging	Electrical coconut graters and cooking vats	Traditional process but standardized by academic and government institutions and NGO
		Coconut jam	Grating, extraction blending with sugar and evaporation	Electrical coconut graters, extractor and cookers	
		Nata de Coco	Preparation of formulation fermentation (7 days), harvesting, deacidification, blanching, cooking in syrup, filling, exhausting, sealing and sterilization	Blending tanks, plastic moulds, blanchers, cookers, fillers, exhaust line, sealer and sterilizers	
	Corn	Cornicks	Sorting, steaming and lye peeling, drying, frying or toasting	Steamers, vats for frying, sealer and packing	Academic institutions; Don Mariano Marcos State University in Ilocos Norte

... To be continued

Table 1. Continuation

Commodity	Raw Material	Product	Method of Processing	Equipment	Institution Involved in Product Development
Meat	Pork, beef and chicken	*Tocino*	Chilling, trimming, slicing, curing, tumbling with ice, packing, sealing and freezing	Slicers, curing vats, tumblers, ribbon blender, sealer, freezers and chillers	Traditional process but standardized by academe, government research institution and NGO
Dairy	Buffalo milk	Native cheese (*Kesong Puti*)	Pasteurization, addition of salt and vinegar, coagulation and packing in banana leaf	Cookers and moulders	Traditional; standardization done by academics – U.P. Los Baños
			Pasteurization and addition of salt and coagulation using enzyme from the omasum	Cookers, cutters and packaging	
		Pastillas	Pasteurization, addition of sugar, and slow, controlled heating to concentrate	Cookers, cutters and packaging	Traditional

Domestic sugar prices are quite high compared to neighboring countries. The price of sugar is PhP25/kg against the equivalent of only PhP12/kg in other countries in the ASEAN region. The quality of Philippine salt is poor, not reaching 99.9 percent pure. The quality of raw materials fluctuate. We are still in the process of defining the point where the cost of production can be low enough to be absorbed by the market.

Slow Adoption of Technology

Cost and availability of equipment suited for the production level of small and medium enterprises; also lack of communication between the entrepreneurs, the academics and other research institutions are major reasons that slow down adoption of technology.

Lack of Support Services

Postharvest facilities are not available in the rural area. Systems of handling contribute to postharvest losses. Accredited laboratory facilities for analysis of foods, are not available in the regions.

Lack of Packaging Materials

There is a limited selection of glass jars available. Similarly light-weight glass jars are not locally made. Heat-resistant PET (polyethylene terephalate) bottles can be very costly.

Access to Financial Assistance

Loans for food processors are available on a medium-term basis at an interest rate of 16-20 percent. This arrangement becomes a constraint for small- and medium-sized enterprises (SMEs) whose products are paid for on 30-90 days credit.

Continuing Reliance on Single or Traditional Markets

Exporters continue to rely on the overseas Filipino market.

ROLE OF GOVERNMENT POLICIES FOR THE PROMOTION OF RURAL-BASED SMEs

The following departments and agencies have programs that directly assist the SMEs in the food industry:

- ***Development Academy of the Philippines*** – training in Green Productivity, Total Quality Management (TQM) and 5S
- ***Department of Trade and Industry*** – holding trade fairs and ethnic food show: awareness of the development of food beyond our borders and technology training for livelihood
- ***Food Development Centre and the Philippine Trade and Training Centre*** – training in HACCP, GMP, sensory evaluation
- ***Department of Agriculture*** – funded a project on Product Quality Systems for Global Competitiveness
- ***Department of Trade and Industry and the Food Development and Training Systems*** – Product Adaptation and Quality Improvement of Processed Foods for Export
- ***ITDI-Department of Science and Technology*** – developing of standards for dried fish, mixes
- ***Department of Agrarian Reform*** – market matching between farmers and processors
- ***Food and Nutrition Research Institute, Department of Science and Technology*** – fortification of foods.

ROLE OF NGO: THE PHILFOODEX

Vision Statement

"To be an internationally renowned Philippine food organization which adopts practices that will contribute to environmentally sustainable businesses, enhancing competitiveness in the global market to benefit members' employees, consumers, stockholders and the community in which we operate."

The Philippine Food Processors and Exporters Organization, Inc. (Philfoodex) was established in 1986 with the sole objective of achieving world class stature for Philippine food products.

Philfoodex is a non-stock, non-profit organization of small-, medium- and large-sized food manufacturers and exporters. The organization numbers more than 200 members to date. Its roster of members includes those from allied industries.

Major services rendered by the PHILFOODEX are: information dissemination, marketing and promotions, policy research and advocacy, training and seminars, technology update, raw material sourcing, liaison with government agencies, bar coding services, and technical assistance.

As the single and recognized voice of food manufacturers and exporters, Philfoodex focuses on the planning, development and sourcing of raw materials, on research and technology development in producing world class qualify products, on the improvement of manufacturing efficiency and productivity and the promotion of sound trade practices in order to be competitive and responsive to the changing international food market trends.

Philfoodex enjoys the unique privilege of working closely with both government and private industry circles on critical issues that affect the Philippine food sector to ensure that the industry achieve and sustain global competitiveness and excellence, to help government in its thrusts on food security and abundance, and to sustain the country's economic growth.

REFERENCES

Department of Science and Technology. *Annual Report 2000*, Industrial Technology Development Institute (ITDI).

----------. *Annual Report 2000*, Food and Nutrition Research Institute.

Department of Trade and Industry. *Annual Report, 2000*, Bureau of Export Trade Promotions.

Development Academy of the Philippines. *Annual Report 2000*, Productivity Centre.

National Census and Statistics Office, National Economic and Development Authority, 1999.

14. SRI LANKA

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INTRODUCTION

Sri Lanka is an agricultural country as nearly half of the rural population (44.2 percent) are totally dependent on agriculture for income and employment, many surviving on less than two acres of land. The food and agriculture sector is the second largest contributor (26 percent) to the GDP of the country. Many entrepreneurs have taken to small-scale food processing business as their livelihood. The status of agro-industries in Sri Lanka and their contribution to value-added are presented in Tables 1 and 2.

Table 1. Value-added, Number of Firms and Employment in Agro-industries, 1997

Sub-sector	Value-added (Rs. million)	Share (percent)	No. of Firms	No. of Workers
Food	20,534	18.3	654	63,619
Liquor	2,805	2.5	n.a.	n.a.
Beverages	6,732	6.0	17	5,288
Tobacco	5,498	4.9	159	6,999
Sub-total	35,569	31.7	830	75,906
Leather	1,749	1.6	30	3,959
Rubber products	3,336	3.0	213	31,041
Total manufacturing	112,213	100.0	3,030	477,644

Source: Central Bank Annual Report.

Table 2. Details of Agro-industries Registered with the Ministry of Industrial Development, 1997

Industry	Total Employment (No. of persons)	Total No. of Enterprises
Meat/poultry	875	13
Dairy products	1,461	21
Vegetable products	2,883	41
Fish products	405	14
Oils and fats	986	19
Grain mill	1,255	13
Bakery	4,600	28
Sugar refinery	6,222	3
Cocoa and confectionery	2,053	15
Unspecified food products	3,410	68
Animal feeds	1,617	17
Blending spirits	6,694	17
Soft beverages	1,564	11
Tobacco	1,943	6
Agricultural machinery	418	24
Total	36,386	310

Source: Ministry of Industrial Development.
Note: Data available only for registered enterprises.

A study conducted by the project Small- and Medium-Scale Enterprise Development (SMED) in 1998, revealed that most of the small- and medium-scale enterprises (66 percent) are located in urban or semi-urban areas. However, the prevailing policies in Sri Lanka do not really acknowledge the value of small-scale enterprises in rural areas, but mainly the multinational, larger companies. These include legislation, licenses, subsidies, pricing policies, taxation, and protectionism.

In comparison to developed countries, Sri Lanka's small-scale food processors have been insufficiently supported by research and development efforts, and have inadequate support from, and access to resources such as capital and market. The present free trade agreement among South Asian countries is currently in action, however, the impact of that particular agreement on rural-based food processing industries still has not been identified. There could be speculation, that policy changes may impose a strenuous future for the SME sector, due to uneven competition and the low productivity of local industries.

The technologies of rural-based food processing industries in Sri Lanka do not go beyond the intermediate type, which are highly dependant on human labor. Most of those technologies derive from India, Taiwan or China. Many producers are still following traditional production processes. Availability of appropriate packaging is an unsolved problem for the rural-based food processing sector. High costs of laminated packaging materials have resulted in limiting the rural producers to using single-layer flexible plastics for many applications.

There are a number of governmental and non-governmental institutes working for the development of the SME sector, but hardly any for rural-based food processing. The prominent government institutions which are working for the SME sector, such as the Department of Agriculture, Department of Industries, Department of Rural Development have separate departments for postharvest technologies, and food processing and packaging in general. But these are not very specific for rural-based food processing industries.

The Cathy Rich Memorial Food Processing Training Centre, started as a collaborative project between the Government of Sri Lanka and a British-based NGO named Intermediate Technology Development Group, is functioning as an independent non-profit institution, entirely working for the development of rural-based food processing industries in the country. The UNDP has selected the Centre as a resource center for one of their programs named Technical Cooperation among Developing Countries (TCDC), thereby it offers different programs for Asia at the regional level.

However, it has been clearly identified by all parties involved in development, including the government, NGO, and donors, that the development of rural-based food processing industries is a possible path to enhance the Sri Lankan economy. This latter combines a high level of literacy and life expectancy with a low GNP per capita, poverty, and a protracted civil war.

TECHNOLOGY AND RURAL-BASED FOOD PROCESSING INDUSTRIES

The present status of technology of rural-based food processing industries in Sri Lanka is not modernized or sophisticated. Many industries rely on traditional forms of machinery, which are manually operated or simply motor-driven. The fuel sources in industry are diesel or kerosene and electricity.

Considering this sector on an industry basis, it has been shown that production of dehydrated fruits and vegetables is gaining popularity among small producers. Those products are exclusively for the export markets. In this particular production, more sophisticated and imported dryers are widely used because it is a novel process in Sri Lanka. Also there were a number of wood-fired tea dryers and coconut dryers, operating for decades. Dehydration of cashew is a leading rural-based industry, which creates a great deal of rural employment as well as foreign currency earnings to the country. The Intermediate Technology Development Group of Sri Lanka has introduced a local dryer to dehydrate cashew, which uses alternative energy sources such as paddy husks and sawdust. The small-scale cashew processors in Sri Lanka have valued that dryer very much. Simultaneously the Cathy Rich Memorial Food Processing Training Centre has introduced a cottage-level dryer, which is heated by electricity. That small dryer also gained much popularity among cottage level producers.

There was a trend to set up coconut oil processing units even in very remote areas of Sri Lanka. The Cathy Rich Memorial Food Processing Training Centre has worked together with a rural workshop to develop an intermediate type of oil expeller. Locally fabricated oil expellers were widely used and the quality of oil was quite acceptable. The Centre has introduced one oil expeller to a very remote village of Sri Lanka,

as a model business and collects data from a place where there was no such industry available. A significant growth of that particular rural industry has been shown within one year. The expeller owner bought another machine unit to expand his business, then six new oil-expelling industries came up within 10 km radius of that particular expelling unit.

Machinery and equipment are mainly imported from countries like India, Taiwan and China. Brands imported from Western countries and Japan are not widely available, due to the cost factor. High inflation and the current trend of devaluation of the Sri Lankan rupee against the U.S. dollar, may influence the demand of locally fabricated machinery. However, neither dealer nor local fabricator of such equipment and machinery is keeping any stocks of machinery, because of that uncertainty. They import or fabricate machinery and equipment after receiving an order from customers. Meanwhile there is a scarcity of good quality equipment for quality food processing industries' development.

Single-layer flexible plastics are widely used for packaging throughout the rural based industries, ignoring the adverse effects to the keeping qualities of the product. Though laminated packaging materials are hardly used by the small producers, on several occasions a few small producers managed to cooperate with a larger firm that consolidated distribution, and developed an attractive multilayer packaging for their products.

There are a number of institutions working to improve the technology that is accessible to the small- and medium-scale food processing sector. Government organizations such as the Industrial Development Board of Sri Lanka, Institute of Technological Studies, National Institute of Engineering Research, Industrial Technological Institute and Department of Agriculture have separate departments, to develop technologies which are suitable for the SME (food) sector. As an NGO the Intermediate Technology Development Group of Sri Lanka is also involved in developing appropriate technologies that cater to the needs of small producers. The Cathy Rich Memorial Food Processing Training Centre is highly involved in the development of technologies for rural-based food processing industries, simultaneously strengthening the rural-based light engineering workshops, continuing the fabrication of such machinery in a marketable way.

Once the Centre has received a request for a technology development, from an enterprise or an institute, a prototype would be developed in a rural-based light engineering workshop, by providing consultations from professionals of technology as well as of marketing. After a thorough inspection of each aspect of the machinery by the Centre, the machine is released to the open market for sale. That light engineering workshop would do the marketing of such equipment or machinery, while the Centre provided marketing assistance, by linking the request to the manufacturer, while certifying the quality of the product.

That was found to be quite a successful approach and the Centre has been able to provide a number of machines to the open market in a competitive manner. It has introduced a tiny oil expeller, a batch type yoghurt incubator, an electric dryer for drying cashew nuts, a hand operated noodle cutter, and several other small items of equipment which are very useful in small-scale operations. Meanwhile the Centre has developed a number of processes (software) in response to requests made by small- and medium-scale food producers, e.g., low cost process on fruit pulp preservation, low cost method to purify sunflower oil, nutritional improvement of bakery products and so on.

ECONOMIC AND POLICY ENVIRONMENT

Sri Lanka has registered a moderate economic growth rate of 4.3 percent and narrowly escaped from the recent economic crisis that was experienced by many Asian countries. Recently the Sri Lankan Government has decided to release the control of foreign currency and allowed the Sri Lankan rupee to float against the U.S. dollar. The government expected to encourage exports while discouraging imports, through this exercise. Now all the economic indices are fluctuating unpredictably and the impacts are still not clear. Similarly the government took measures to protect the local agriculture sector, by implementing tariff and non-tariff barriers. Raw materials and machinery not manufactured in Sri Lanka were made subject to a tariff rate of 5 percent while a 10-percent rate was applied to food items. Agricultural products were afforded even higher protection, by keeping the import duty rate for those commodities at 35 percent.

However, due to the increase of costs of relief programs, security costs as well as rehabilitation of war-affected areas, the government has increased the National Security Levy (NSL) up to 5.5 percent and a Goods and Services Tax (GST) of 12 percent. This adversely affects the purchasing power of consumers in general,

hence the sales volume of rural-based industries. That impact would not be only on the food sector but also all other production items.

The poverty reduction programs of the government are continuing and they are now searching for new avenues, that provide sustainable development for those vulnerable groups in the society. That program was named "*Sammurdhi*" (prosperity) and covered about 2 million families. The cost of the program was over Rs.8 billion in 1999. The policymakers are very keen on this program to find new ways and means to develop those families in a sustainable manner.

The *Sammurdhi* movement has already started a group savings scheme among their membership and at the end of 1999 they have established 840 *Sammurdhi* Rural Banking Societies (SRBS) throughout the country. The paid up capital of the shareholders, numbering 1,198,167, amount to Rs.548 million at the end of 1999.[1] The value of other deposits made by the members amounted to Rs.656 million. The SRBS has granted number of loans to a value of Rs.805 million to members to start small-scale business. That program may heavily influence the small-scale food processing sector, particularly because many rural entrepreneurs prefer food processing as their start-up business.

INSTITUTIONAL SUPPORT AND RURAL-BASED FOOD PROCESSING INDUSTRIES

The USAID launched a project named AgEnt specially to cater to the needs of agribusiness sector of Sri Lanka, in the 1990s. At the end of the project period it was succeeded by an organization named the National Agribusiness Council (NAC). The objective of NAC is to strengthen the small- and medium-scale agribusiness sector of Sri Lanka. That organization is functioning as the main agribusiness forum of Sri Lanka. The NAC is now coordinating the activities of Sri Lanka Food Processors Association (SLFPA). The SLFPA has 100 members at the moment and this is the largest association of food processors. The SLFPA is publishing a newsletter named *Agri-Food Business* which they use as a main tool for networking among the small- and medium-scale food processing industries.

The development of small industries, headed by women entrepreneurs, are a prominent activity area of NGO-based business support institutes. A leading women banking society of Sri Lanka is named Janashakthi[2] Banking Society, having special loan schemes to help women entrepreneurs, who are mainly involved in cottage-scale food processing industries.

There is also a project funded by GTZ named Vocational Training for Women and Youth (VTW), a prominent NGO that aims at improving access to employment opportunities for rural women and youth. They are mainly training the rural workforce, which is gainfully employed in rural-based food processing industries. There are many other institutes who offer different services for the small-scale industrial sector, including rural-based food processing industries.

Agro-based industries are now becoming a major focus area for many business development institutions in various ways. This dose not mean that they consider all the factors which are significant in rural base food processing industries. The Cathy Rich Centre has multilateral programmes to develop the rural-based food processing industries in Sri Lanka. Training, research and development, and dissemination of information for entrepreneurs are the three main programs coordinated by the Centre. The Cathy Rich Centre has a range of training programs depending on the requirement and the target group. Presently the Centre has the capacity to train 25 participants at a time, providing seminar facilities as well as a modern, spacious processing unit with machinery and other equipment needed for all aspects of food processing.

There are three categories identified as potential target groups, such as small- and medium-scale rural-based food processing industries, trainers and industrial extension workers who are working for other business development organizations, and students who are following food science courses. Since 1997 the UNDP has selected the training center as a resources center for their TCDC program and so far it has conducted three international training programs consecutively. However, it has considered the training needs of each category separately and developing training modules in order to fulfil their technological gaps.

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[1] Central Bank Annual Report 1999.

[2] Janashakthi Banking Societies were first set up in 1989 as informal savings and loan associations by Women's Development Federation, an NGO mainly operating in southern part of the Sri Lanka.

Meanwhile the Cathy Rich Centre is being used as a resource center by rural-based small- and medium-scale food processing enterprises. That includes the use of the Centre by entrepreneurs to try out their new products, permitting the entrepreneurs to improve or develop their existing products and facilitate their enterprises to train their workforce, in order to capitalize on the market trends. The Centre has become very involved in dissemination of information in this sector. It has gathered information on suppliers and dealers of food ingredients, machinery and equipment suppliers, wholesale buyers, etc. Those data and information are in the form of a computerized database and are disseminated to small- and medium-scale food processors in response to their requests.

All technical enquiries have been monitored and the quality of information is being upgraded periodically. The Centre has coordinated a network of past trainees who followed the Training of Trainers (ToT) program. That makes a very effective network among those business development organizations that also are working for small-scale food processing industries. There is a newsletter circulated among those partner agencies named *Cathy News*, coordinated by the Centre.

MAJOR CONSTRAINTS AND ISSUES

As described earlier the rural-based food processing sector faces numerous problems and constraints for many reasons. At present there is no single government ministry or agency taking the lead on food industry policy reform. Authority for rural-based food processing industrial policymaking is highly fragmented, amongst many ministries and provincial governments, responsible for agriculture, livestock, fisheries and natural resources, industrial development, rural industries, trade, investment and export promotion.

National policies on taxation of agricultural commodities and food items are one way of protecting the food and agriculture sector, which then increases the prices of imported raw materials. This mainly affects the small- and medium-scale enterprises, because these larger companies get duty free facilities for their commodities under the Board of Investment (BOI) of Sri Lanka.

Packaging is now becoming a serious issue for rural-based food processing industries in Sri Lanka. High duties on packaging materials and limited capacity to produce packaging materials, raises costs and hinders the development of products suited to the global market. Most packaging materials are subject to a 30-percent import tax. The high cost of materials, lack of professionals services, and high cost of quality printing, make rural-based small producers use very primitive types of packaging systems. Meanwhile the BOI firms can import packaging materials duty free. That produces very uneven competition, which drastically affects the smaller producers.

The rural-based small- and medium-scale food processing sector lack market information for local and export market opportunities, through the Export Development Board. The BOI and a number of other ministries offer programs aimed at identifying markets facilitating exports and increasing trade awareness. Larger companies are using the Internet to find market information. Similarly large manufacturers have access to general fiscal and credit incentives, while smaller producers do not. Even many export incentives favor non agro-industries (Table 3). Many small food processors are facing credit access problems.

A dearth of suitable technology is another constraint faced by the sector. While research and development activities done by many institutes tends to be supply-driven, making little use of socio-economic or financial analysis, they have limited impact on innovation in the small food processing sector. Meanwhile extension of the above has weak village links.

The next major issue is food hygiene. Domestic adoption of improved hygiene standards in rural-based food processing industries is very uneven and that weakens the industries' ability to penetrate export markets, that are tightening their quality requirements. Many rural-based food processing industries are unable to afford the Sri Lanka Standard Institute (SLSI) health quality inspection service or obtaining SLSI certification, due to high costs. Skilled manpower is a serious issue for the sector, because the rural areas suffer from labor shortages and rising costs. Rural food processing industries suffer from skill and management shortages. Many rural vocational training programs focus on handicrafts and urban-oriented services.

Table 3. Main Agro-industry Incentive Scheme

Scheme/Requirement	Incentive Offered
Inland revenue/agriculture and animal husbandry companies (employ 50 persons, invest at least Rs.4 million)	10-year tax holiday; dividend exemption, deduction of agricultural research and cost of opening new land, 15 percent concessionary tax rate; and one year import duty free on machinery and equipment
Inland revenue/use of advanced technology (employ 50 persons, invest at least Rs.4 million)	Tax holiday of five years; dividend exemption; and one year import duty free on machinery and equipment
BOI agro-processing: new and existing companies must invest Rs.2.5 million, add 20 workers and 5 ha of land and must export at least 50 percent of total output	Provided 10-year tax holiday; 10-year concessionary tax at 15 percent; and duty free raw materials for the export goods
BOI agriculture marketing: no minimum investment, employment or new land required and must export at least 90 percent of output from a new company	Provided 5-year tax holiday; 15-year concessionary tax at 15 percent; duty free raw materials for the export goods; and exemption from foreign exchange control
BOI investment in difficult areas: no minimum investment required, minimum of 50 percent export and 150 new employees	5-8-year tax holiday; concessionary tax rate 15 percent for 8-12 years; duty free capital goods and duty free raw materials used for exports; and exemption from exchange control if 90 percent is exported
BOI investment in designated zones: minimum of 50 per-cent export and 150 new employees	5-8-year tax holiday; concessionary tax rate 15 percent up to 20 years; and duty free capital goods and duty free raw materials used for exports
Out-grower schemes: minimum cultivation area of 5 ha for export of fresh and processed fruit and vegetables	10-year tax holiday for out-grower farms; and duty free equipment, machinery and land
Greenhouse agriculture: minimum investment of Rs.10 million	10-year tax holiday
Agriculture marketing	100 percent investment allowance; duty free import of refrigerated trucks; and tax holidays for up to five years

Source: BOI, Ministry of Finance and Ministry of Industrial Development.

CONCLUSIONS

The development of rural-based food processing industries is essential to the overall development of Sri Lankan economy. There is a need for continuous analysis of the context and facilitating a more favorable policy environment for rural-based food processors. Also needed is development of appropriate and accessible technologies, and promotion of healthy business development support services. Most importantly making available accurate market information of local, as well as of international markets, are key elements to achieving the above goal.

15. THAILAND

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PRESENT STATUS OF RURAL-BASED FOOD PROCESSING INDUSTRY

Thailand is an agricultural country, with the capacity to produce foods for herself and a surplus for others in the world. Before 1960, agricultural products were exported as primary products, with drying was the main technology used. In rural areas, the agricultural products were seldom processed. There existed only rice milling and coconut oil extraction. Between 1960-70, technology for sweetened condensed milk and canned vegetables and fruits were imported from Taiwan and Japan.

Later, instead of processing for import replacement, food industries were expanded for export potential. Technology was imported from Europe and U.S.A., in terms of processing technology as well as management systems. The four main groups of food industry for export are: animal products industry, fishery products industry, vegetable and fruit industry, and cereal and tuber products industry. Besides food products for export, there are quite a number of food industries that produce food products mainly for local consumption. The products in this group are typical foods for household use such as seasoning mix; import replacement foods such as coffee, tea, non-alcoholic, alcoholic drink; for modernized lifestyle products such as bread, breakfast cereal, sausage and ham, milk and dairy products, snacks. A summation of processed foods in Thailand is shown in Table 1.

Table 1. Processed Foods in Thailand

Category	Processed Foods
Animal products	Chilled and frozen chicken
	Sausage, ham, bacon, meat balls, Thai style sausage
	Fermented pork sausage
	Chinese style roasted pork (shredded, sliced)
Fishery products	Chilled and frozen shrimp
	Chilled and frozen squid
	Frozen ready-to-eat fishery products
	Canned tuna fish in brine, in oil
	Canned sardine in tomato sauce
	Canned shrimp, crab meat
	Canned sandwich spread
	Fish oil
	Dried shrimp, squid, anchovy, fish, jelly fish, mussel
	Fish sauce
	Fermented shrimp, shrimp paste
	Salted fish
	Fish ball
	Surimi and products

... To be continued

Table 1. Continuation

Category	Processed Foods
Vegetables/ fruits	Canned pineapple Canned pineapple juice Canned tropical fruits Canned tropical fruit juice Canned vegetable (corn, bamboo shoot, mushroom, beans, etc.) Dried fruit (banana, longan, lychee, etc.) Osmotic dried fruit (pineapple, papaya, guava, etc.) Dried vegetable (pepper, chili, carrot, green onion leaves, onion, garlic, mushroom, herbs, etc.) Preserved fruit (durian, pineapple, banana, etc.) Pickled fruit (mango, guava, peach, etc.) Fried vegetable and fruit (zucchini, pumpkin, durian, jackfruit)
Cereals/tubers	Milled rice Canned cooked rice Flours (rice, cassava, corn) Modified starch Vermicelli Rice noodles Rice sheets Mung bean noodles Instant noodles, instant soup, instant rice Spaghetti, macaroni
Vegetable oil products	Cooking oil (palm, coconut, soybean, sunflower, rice bran, cotton seed) Margarine, shortening Mayonnaise, salad dressing, salad cream
Drinks	Carbonated drink (canned, bottled) Tonic drink (canned, bottled) Drinking water, soda water, mineral water Alcoholic drink (beer, wine cooler, wine, whisky) Coffee, tea (dried, ready-to-drink bottled, canned) Ice block and chips
Snacks	Extruded snacks Chips (potatoes, banana) Crackers Chocolate, wafers Gelatin products Roasted nuts, seeds (peanut, sunflower seed, pumpkin seed, watermelon seed)
Dairy products	Pasteurized milk (pouch, bottle, paper box) Sterilized milk (can, ultra heat treated [UHT], bottle) Sweetened condensed milk Cheese, butter
Bakery products	Bread Cake Cookies
Seasonings	Seasoning mix, sauce Vinegar Soup broth Monosodium glutamate (MSG)
Others	Sugar (cane, coconut, palm) Traditional Thai foods, etc.

It can be seen from Table 1 that there is a wide range of processed foods which can be considered on the basis of their processing technologies. Dried fish has less technology and investment compared to UHT sterilized milk. Board of Investment of Thailand (BOI) classifies registered food industries into three classes according to their investment level.

Small-scale industry has investment of less than ฿10 million (US$1 = approx. ฿45); medium-scale, between ฿10-100 million; and large-scale, more than ฿100 million. The number of food industries in each class is shown in Table 2. The number of large industries which play a major role in the country, earning income from export, is very low (2.81 percent), while the small industries, which usually have low production efficiency are in the highest number (87.99 percent), and the medium ones are in between at 8.91 percent. It should be noted that after the economic crisis in 1997, food industries are seen as the major country income earners because they do not depend on imports. About 80 percent of their raw materials are locally produced. The related government agencies pay more attention to small and medium food processing industries. With efficiency and productivity improvement, they are helping the country to recover from the economic crisis.

Table 2. Number of Registered Food Processing Plants Classified by Investment

Food Commodity	Small	Medium	Large	Total
Non-fishery	417	43	15	475
Milk	48	37	11	96
Fishery	346	129	40	515
Vegetable/animal oils	193	59	21	273
Vegetable and fruits	366	158	28	552
Seed and tuber	4,516	170	32	4,718
Starch and flour	1,456	123	24	1,603
Sugar	128	12	52	192
Coffee, cocoa, chocolate and confectionery	475	59	18	552
Seasoning	393	57	8	458
Drinking water and non-alcoholic beverages	209	46	24	279
Total number	8,547	893	273	9,713
Percentage	88.00	9.19	2.81	100.00

Source: BOI, 1997.

The food processing industries listed by BOI do not cover very small industries run by groups of villagers. Their establishment is so small that they need not to register with the Department of Industry. The villagers operate the food processing industry on a small scale, consisting of 5-10 members, working in one of their houses or in the village meeting hall. The villagers are very keen on their appropriate technology and their own style of processing, for instance, they use banana leaf to wrap some products (fermented fish, fermented pork). Some still use manual blending of the meat and seasoning. However, now small and cheap machines are used, for instance, women groups use a blender to cut up chilies, lemon grass and so on; moreover, a small dryer is used for drying ingredients for making chili paste.

Important to note is that the rural food processing industry owned by villagers' groups faces difficulties in terms of business skills, especially, marketing, standardization of production, packaging management, technology for production and investment funding. Thus, most rural food products are distributed and sold in local areas. It is very difficult for the products to enter a modern supermarket, let alone an international market.

Most processing plants are located in area where raw materials are easily collected. Fishery processing plants are located along the Gulf of Thailand, from Songkhla in the South to Samutsakorn near Bangkok. Pineapples are in the pineapple growing areas such as Prachuap Khiri Khan and Chonburi, while vegetables and fruits are grown in the North, e.g., Lampang. Whilst village industries are scattered around the country, still, they are close to their raw material sources. It can be said that most industries in Thailand are rural-based, and that a community develops around food processing plants until the area becomes a new urban area. Large processing factories are however,usually located in peri-urban districts.

MAJOR CONSTRAINTS ON DEVELOPMENT OF SMALL- AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRY

Raw Materials

Most vegetables and fruit production is seasonal, so that in high season, they are in oversupply and prices are very low. The food processing industry can then choose good quality raw materials. In low season, all this is reversed, though alternating abundance and scarcity is also caused by production planning errors. Farmers will grow vegetables that got the highest prices last season, thus facing the inevitable surplus, get the low price then decide not to grow the same crop next season. Competing for raw materials is common in low season, and the richer or most powerful processor usually succeeds. Natural harvesting of fish from the ocean can cause the same problem, which affects all processing industries, but has more impact on small industry with less capital.

While the larger industry can partly solve the problem by contract farming or future trading, the small and medium industries must turn themselves to processing other vegetables and fruits or stop production. To solve the raw material supply problem for small and medium food processing industries, the Department of Agricultural Promotion can help in raw material production planning, in addition to the usual support services.

Work Force

Small- and medium-sized food processing industries are labor-intensive. Operating workers usually have a low level of education that inhibits them from acquiring higher skills. The intermittent production due to lack of raw materials, causes workers to leave, especially those who are rice farmers, that must leave work to tend the farms at necessary times. New workers are then recruited with no skills, thus production efficiency is low.

The other important members of the work force are technicians who operate and maintain machines and food scientists who overlook the production and quality control. There is a trend that processing will shift from labor-intensive to more technology, therefore, technician and food scientist are more in demand. Many small- and medium-sized industries try to reduce the cost of production by limiting the number of technicians and food scientists. The ones remaining have no time to improve their knowledge, which would be useful in improving the production efficiency, productivity and product quality.

Training at all levels, from operating workers to management, will improve their performance and result in production efficiency and product quality. A ‘friendly’ working environment, suitable workload and payment will maintain the workforce levels in the industry. Educational institutions can supply qualified personnel to meet the requirements of the industry if these are conveyed to them. Industry and educational institutions should cooperate in the production of trained human resources for food industries.

Technology

Thailand is an agricultural country wherein industrially trained human resources are not well developed and are insufficient to serve industry needs. Large food industry can import equipment along with processing technology, on a turn key basis; the small and medium industries cannot do the same. Small and medium industries are left behind with simple processing equipment that does not require high technology. For typical food products, for example, noodles, preserved fruits, the processing lines are usually developed on a ‘homemade’ scale with pieces of simple, locally made equipment, added in stages that often require high labor input. For higher technology processing, for example, canned vegetables and fruits, equipment and process alike are secretly copied from large industry or already operating industry.

Research and development in small- and medium-scale food industry is rare because of high expenses. Technology lies idle from the beginning of the manufacturing process. If the equipment and process are not well designed, the production efficiency is low and the product quality is not stable. When a change of equipment is recommended, the management is reluctant to accept because of the high investment costs. The provision of a loan with a holiday period or a low interest rate, with the support of consultancy inputs by an expert in the field, may encourage the management to spend for upgrading its technology.

Quality Management

Apart from low production efficiency or productivity, poor quality and safety of the products are the main challenge for the industry development. This is especially so for products with export potential, because importing countries require a proof of quality and safety. For example, Japan, Canada, New Zealand and Australia require ISO 9000 certification; and U.S.A. requires HACCP procedures for fishery products.

The other techniques that food industry should have, to ensure safety and quality, are 5S and Good Manufacturing Practices (GMP). Implementation of any techniques requires clear understanding, and investment in setting up the system. In the case of Hazard Analysis and Critical Control Point (HACCP) or ISO 9000, all the food industries find them difficult to understand, not only the small- and medium-scale industries, thus each industry must hire quality systems consultants at high cost. Government institutions can help by conducting training courses and providing consultancy services, at affordable costs.

To implement and maintain a quality system of any type, management skills play a major role. The management must be able to equip all personnel with quality awareness and be willing to work in a team to continually improve their performance, for the continuous improvement of quality.

TECHNOLOGIES USED IN THE RURAL-BASED FOOD PROCESSING INDUSTRY

Technologies used in small- and medium-sized food processing industries depend on types of product, ranging from simple or traditional ones such as drying, and fermenting, to modern high technology such as canning and UHT sterilization. For traditional food products, simple technologies are developed by replacing heavy or tedious work by machines. In some cases, equipment is used to save time as well as improving quality. For example, a motorized stirrer is used to replace manpower in heating fruit puree for fruit preserve making, a gas or electric dryer is used instead of solar drying of fruits.

When many technologies are needed in a processing operation, the food industry will survey local and oversea equipment manufacturers, for equipment to meet their need. An example of this kind is dried noodle manufacturing. The industry starts at the household production level to supply fresh noodles to the everyday market. When noodles have export potential, dried noodles are then made by adding a drying step to the production line. To increase the production scale, items of equipment are selected and installed in the processing line. Occasionally, the equipment selection does not turn out right, then the industry suffers throughout the life time of the equipment, which lesson is learned by the next processor of the same product.

We can say that most traditional processing technology still remains the same, while equipment technology leans toward more modern technology. However, most equipment using high technology must be imported.

When considering processing technology, the traditional technologies used in small and medium food processing industries are drying, fermentation and special technology for traditional foods. The modern technologies are imported and used for conventional processed food products, these are chilling, freezing, pasteurization, sterilization and special technology for specific food products. Some of the food products produced under each technology are shown in Table 3.

GOVERNMENT POLICY FOR THE PROMOTION OF SMALL- AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING INDUSTRIES

Industrial promotion is the main responsibility of the Department of Industrial Promotion, Ministry of Industry. However, there are other government agencies that have related activities that unavoidably overlap. A few of the names and their related activities are listed below:

- Department of Agricultural Promotion, Ministry of Agriculture and Cooperative (MAC) helps farmer groups to create income by food and non-food processing of agricultural produce.
- Department of Cooperatives, MAC, assists farmers in forming cooperative groups for doing useful activities, including food processing.
- Department of Fishery, MAC, overlooks and promotes fishery businesses starting from harvesting to finished product manufacturing.

- Office of Industrial Product Standard, Ministry of Industry, promotes standardization and quality systems in all kinds and levels of industry.
- National Science and Technology Development Agency promotes the application of science and technology in manufacturing.
- BOI promotes investment in rural areas.

Table 3. Food Products Classified by Processing Technology

Technology	Food Products
Traditional drying	Dried pork (roasted, shredded or sliced)
	Dried fishery products (shrimp, squid, anchovy, fish, jelly fish, mussel)
	Dried vegetables and fruits (bamboo shoot, chili, pepper, herbs, carrot, green onion leaves, onion, garlic, mushroom, pineapple, longan, lychee, banana)
Fermentation	Shrimp paste
	Fish sauce
	Salted fish
	Fermented fish
	Fermented pork
	Soybean sauce
Extrusion	Noodles (rice, mung bean)
	Vermicelli
	Snack foods, etc.
Chilling and freezing	Chilled and frozen fishery products (shrimp, squid)
	Chilled and frozen chicken
	Frozen ready-to-eat food
	Frozen vegetables and fruits
Pasteurization	Fresh milk
	Fruit juices (guava, orange)
Sterilization	Canned fishery products (tuna, sardine, spread)
	Canned vegetables and fruits (corn, bamboo shoot, mushroom, pickled vegetables, beans, pineapple, longa, lychee, water chestnut, rambutan, mango, etc.)
	Canned ready-to-eat food (curry, rice, soup)
	Canned milk
	UHT milk
Special process	Vegetable oil and oil-derived products
	Processed meat products (sausage, ham, bacon)
	Drinks
	Instant noodles, etc.

Realizing that small- and medium-sized enterprises (SMEs) in the manufacturing sector are the major population and also major income earners for the country, along with the recent trends of trade liberalization and open market where products must compete by price and quality, the Thai Government is seriously promoting SMEs.

The Thai Government has drafted legislation on SME promotion, which lays down a foundation for the urgent development of SMEs, systematically and continually. The National Committee on SME Promotion will be set up and is authorized to harmonize the SME promotion framework of related agencies. An office of SME promotion will be also established, which will act as a coordinator among various related agencies, at the same time studying and analyzing suitable SMEs to be promoted. The food processing industry is one of the target groups.

The implementation of SME promotion can be in many forms, such as low interest rate loans, monetary market development, human resources development, science and technology transfer, product and market development and information services.

ROLES OF GOVERNMENT, PRIVATE SECTOR, NGOS AND VILLAGE GROUPS IN DEVELOPMENT OF RURAL-BASED FOOD PROCESSING INDUSTRIES

Role of Government

Before the economic crisis in 1997, the promotion and development of rural-based food industries was in the hands of various government agencies as their normal activities. Since then until 1999, the Thai Government has put more effort into SME assistance, in the hope that they will help the country to recover from the crisis. An SME manufacturing sector restructuring plan was established. Under the plan, was a project on efficiency development of SMEs run by the Department of Industrial Promotion, with the collaboration of universities around the country. The objective of the project was to assist target groups, including food processing industry, to upgrade and improve their capability in running their enterprises, through efficiency improvement in the areas of production, management and product quality. Special services were given to 500 selected SMEs in 1999. The Department hired professors in the required fields to serve as consultants to the SMEs, for six months in each industry. The consultants could assist in production problem solving, productivity improvement, product development, marketing and finance management.

Specific to the quality systems in manufacturing, there were three government agencies who provided this service: the Office of Industrial Product Standard, Ministry of Industry; Center for Productivity Promotion, Ministry of Industry; and the National Science and Technology Development Agency. The first one emphasized on ISO 9000, while the latter two agencies emphasized on their own developed quality systems which are more appropriate to SMEs.

Role of Private Sector

The private sector involvement in food processing industry consists of industry itself; suppliers of raw materials, other food ingredients, packaging and machinery. Each plays a role in food processing industry development. In most rural-based food processing industries, the production efficiency is low and product quality is unstable, also trade information is not accessible. The food processing industries must help themselves in finding information on every aspect, through other concerned parties and government agencies in the area. With this information they should be able to make good judgements in the development of their own industries in the areas of productivity, quality and management. Hence food industries themselves play a major role in their own development. The expansion or setting up of an affiliated production unit in a remote area, closer to the raw materials, is another form of rural-based development.

Role of NGOs

Usually, one of the objectives of NGOs concerns the well-being of the public, hence some can become involved in rural-based food processing industry. For example, the Population and Community Development Association (PDA), NGO in Thailand has created and implemented the Thai Business Initiative Rural Development (TBIRD) Project.

Role of Village Groups

People in rural areas earn their living mainly in agriculture. Their incomes are low, so the government agency in the area always encourages them to form a group for doing another business in their free time. When the business goes well, it can become a main income earner. The businesses always derive from agricultural produce in the area, such as food products like dried banana and ginger drink. The village group should be formed voluntarily, with commitment, to play a role in the development of food industry, doing their job with full responsibility and an attitude for continual improvement.

Linkages among Government, Private Sector, NGOs and Village Groups

In the past, government, private sector, NGOs and village groups worked separately. Information and linkages among them rarely happened because of factors such as poor communication systems, low technology, no supporting agencies, and lack of funding. Many sectors were involved in and supported rural food processing, especially, government agencies such as universities, the Department of Industrial Promotion, and the Department of Community Development and NGOs also work well and seek for coordinators to join in rural food processing. The villagers themselves try to improve their food preservation, in terms of quality, taste, and marketing.

For easy understanding, the TBIRD Project has been created and implemented by the PDA, an NGO in Thailand. The TBIRD Rural Industry is a concept focusing on "bringing the factories to the rural people instead of bringing rural people to the factories". Thus, all industrial sectors, for instance, agriculture, non-agriculture and food processing industries have been encouraged to locate in rural areas.

The concept is to alleviate poverty in rural areas of Thailand, based upon the belief that rural people are poor because they lack business skills essential to their economic security, such as organizing, financing, producing and most important marketing. In other words, they do not know how to do business or to be entrepreneurs.

From this concept and the concrete success example under the TBIRD Rural Industry Project, is the improvement of quality of rural life, by creating job opportunities for the rural poor, who have had to depend on agricultural income, relying on the weather patterns and on seasons.

From this remarkable success, the government realized that tripartite collaboration between government agency, private sector and NGO is important in the Promotion of Rural Industrial Development (PRID) Project. PRID was a joint activity between NGOs such as the PDA, and government (the Department of Industrial Promotion under the Ministry of Industry). This strengthened the NGOs in recruiting the private sector to branch out their manufacturing into rural areas, with an aim to provide training and to create employment opportunities for the villagers in the poor rural areas.

In the PRID Project, each party has a role as follows:

Population and Community Development Association

1. PDA locates villages to be involved in PRID by surveying the potential for skilled labor in industrial development. The qualifications of the target villages for production unit by PDA are as follows:
   - C PDA is concerned about the commuting distance to and from home and workplace or factory in relation to road safety of the workers.
   - C Must have basic infrastructure, i.e., electricity, roads, telecommunications and water supply.
   - C Participating villages/villagers must have a good understanding and relationship with NGOs (PDA) to ensure a smooth operation and minimize problems.
2. PDA staff then recruits private business sectors to participate in the project. PDA also ensures that the private businesses to be involved in PRID are financially sound and stable as well as appropriate to the villages.
3. Once the potential area has been located, PDA will analyze and evaluate the type of industrial activity and villages' background, to motivate skilled villagers to participate in the production unit.
4. Upon selection of the villages, the business must be able to communicate with the villagers effectively in order to ensure that the transaction will complete its term successfully.
5. PDA also facilitates contract negotiations to ensure a fair process and outcome.
6. PDA acts as a coordinator amongst concerned agencies to supervise and evaluate the progress of the project implementation.
7. PDA organizes public relations in promoting project activities to all interested parties.

Department of Industrial Promotion

- C Formulates policies and measures for the implementation
- C Organizes public relation to promote the project
- C Provides partial funding for the villagers' training, managed jointly with the private sector
- C Provides training sites and production sites for the early stages
- C Provides low interest loans to village groups, working groups, private sectors and NGOs in order to finance and facilitate their needs in project implementation, to ensure the success of the project.

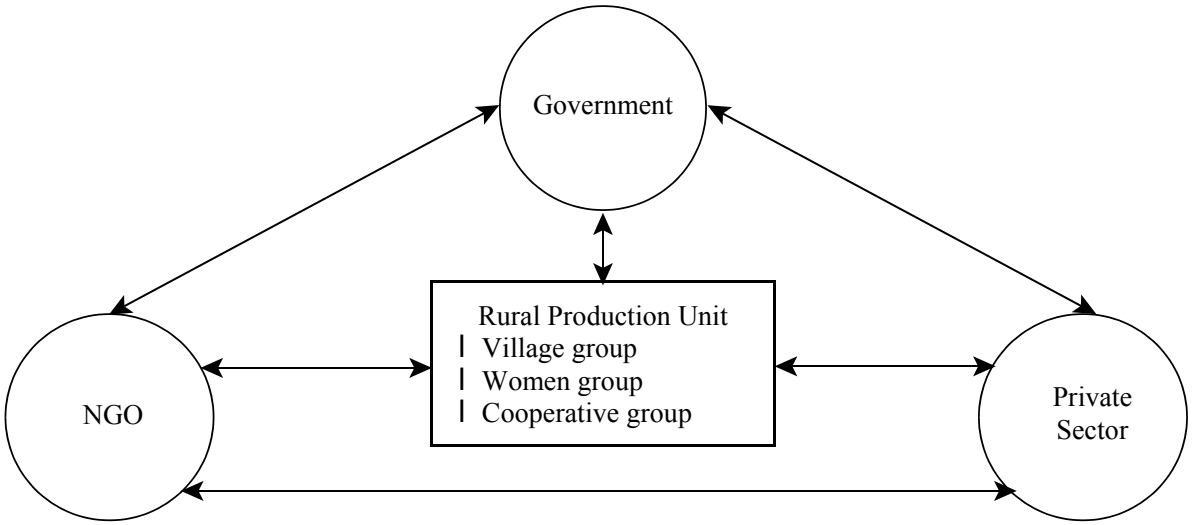
Private Sector

- C Assists in marketing
- C Provides training on production and business management
- C Initiates investment
- C Takes responsibility in the provision of raw material, technological production and machinery.

Village Group (Farmer, Women)

- Coordinates in building community business and linkages among the development activities
- Provides information such as village profile, labor force, villagers' skills, raw material sources, local appropriate technology, etc.
- Develops the potential of village groups and strengthen them
- Participates in order to invest, produce and also provides entrepreneurs.

Above linkage among government, private sector and NGO can be depicted as follows:



16. VIETNAM

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INTRODUCTION

Vietnam is primarily an agricultural country. Agriculture plays a vital role in the national economy and contributes 30 percent GDP and 40 percent total export earnings. Population density is high (214 people/km^2) with 80 percent of the population living in the country side, 73 percent of them being engaged in agricultural production and other allied activities. In the past 12 years, the renovation policy "*Doi moi*" together with extension of improved production technologies in agriculture, has brought the nation from being food insufficient to food self-sufficiency status. The GDP has grown at an average rate of 6-8 percent in recent years. Rapid growth was achieved through liberalization and structural reforms.

However, most of these achievements are confined to well-endowed environments like the Red River and Mekong Delta, while many rural areas are still underdeveloped, with several problems. The agricultural land area per capita is lowest in the world (1,000 m^2 for upland crops and 600 m^2 for rice).

Various challenges, constraints, and problems for further development of agricultural and rural areas especially the sloping land ecoregion could be summarized as follows:

- *Physical constraints*: broken terrain and steep slopes, poor soils and natural hazards.
- *Environmental constraints*: deforestation and land degradation.
- *Infrastructure constraints*: inadequately developed communication and transportation.
- *Economic constraints*: subsistence orientation, commitment to autarchy and inadequate development of markets and trade.
- *population problems*: rapid growth rates, poor distribution and high rates of unemployment (24-30 percent).
- *cultural constraints*: persistence of traditional pattern of behavior, low levels of education and knowledge and ethnic relations.
- *intellectual constraints*: inadequate scientific knowledge of the sloping land eco-regions and the lack of suitable strategies to guide development and planning.

To overcome this situation there is an urgent need to provide greater stability to production and household income. Diversification of cropping systems, alternate land uses (agri-horticulture, agri-silviculture and silvipasture) based on the land capability, promotion of rural industries, food processing and value addition are some of the important steps to help create rural employment and contain growing rural poverty and migration to urban areas. The eco-region is also an excellent niche for the cultivation of a number of medicinal, aromatic and dye yielding plants. The global demand for such plant material is expected to rise substantially in future.

CURRENT STATUS OF RURAL-BASED FOOD PROCESSING INDUSTRY

With the spectacular growth in agriculture production during recent years, the rural-based food processing industry has made remarkable achievements:

- GDP of agro-processing industry has a growth rate of 12-14 percent per annum. In comparison to the GDP of agriculture production, it has increased from 33.8 percent in 1995 to 42 percent in 2000.

- Most of the major processed products have increased both in quantity and quality (Table 1). For example in 1997 production increases in coffee beans were 695.2 percent (400,000 mt); cashew nut, 400.0 percent (140,000 mt); sugarcane (sugar), 71.9 percent (550,000 mt); and milled rice, 76.5 percent (15 million mt), compared to that of 1990.
- Proportion of processing industry has increased from 12.4 percent to 15.7 percent between 1990 to 1995. In the South-East Asian region it has increased from 20.1 percent to 24.9 percent.
- Improved technologies were introduced and underwent modernization especially in the fields of rice milling, sugarcane, and confectionery.
- Foreign exchange earnings have gone up considerably and represent about 20 percent earnings from exported goods.
- Product and packaging quality of many processed goods has improved considerably and captured the domestic market. Vietnamese products have started to make a dent in the international market.

Table 1. Growth of Agro-processing Industry and Quantity of Processed Material

Sector	Quantity of Processed Material (000 mt)			Percent Increase (B/A)
	1990 (A)	1995	1997 (B)	
Rice milling	8,500	13,000	15,000	+76.5
Exported rice	1,400	2,000	3,500	+150.0
Coffee bean	50.3	150	400	+695.2
Tea	14.8	50	45	+204.1
Sugar	320	350	550	+71.9
Cashew nut	28	110	140	+400.0
Coconut oil	-	115	-	-
Fruit and vegetables	6,000	7,500	8,000	+33.3
Meat, milk	-	1,500	-	-

Source: Department of Agro-Forestry Product Processing and Rural Agriculture, Ministry of Agriculture and Rural Development (MARD), 2000.

These achievements can be ascribed to:

1. ***Governmental Contribution***
- Development and implementation of national agricultural policies with emphasis on eco-regional potential.
- Introduction of improved and cost-effective production technologies particularly in export potential sectors like rice, coffee, sugarcane, cashew nut, rubber, and spices.
- Liberalization and structural reforms.
- Shifting from collective farming to individual farming.
- Land ownership rights establishment.
- Establishment of private enterprises permitted.
- Favorable foreign direct investment policies.

2. ***Industrial Contribution***
- New policies have opened up opportunities for local and foreign investors to start up enterprises with multiple economic components and agro-processing units.
- Some enterprises have actively invested to establish material or product areas besides improved their productivity.
- Some processing sectors have infused considerable investments to procure the latest equipment and improved technologies, to meet the global market demands.
- Rice processing industries are equipped with seed grading, classification, extraction, and polishing machines to meet required quality standards for exporting good quality rice. The industry simultaneously acquired and introduced Japanese technology in three milling factories with a capacity of 240-600 mt per day of high grain proportion and good milled rice quality.

- The tea processing industry has acquired processing technologies from Japan and Taiwan for green tea, and black tea processing techniques from India.
- The sugarcane processing industry has upgraded old factories and established about 30 new ones. Some factories have been equipped with modern facilities such as sugarcane diffuser, automatic sugarcane boiler, automatic sugar content measuring equipment.

CONSTRAINTS AND OPPORTUNITIES FOR INDUSTRY FOR SMALL- AND MEDIUM-SCALE RURAL-BASED FOOD PROCESSING ENTERPRISES

Constraints

The food processing industry in Vietnam is currently engaged in general processing and specialization is yet to be developed. Low labor productivity, high production costs, traditional technology, slow reforms in economic structure are other bottlenecks and are discussed below:

- The availability of processing units is still low, compared to the production of raw material in sugarcane (55 percent), tea (55-60 percent), fruit and vegetables (5 percent) and meat (1 percent). Processing industry changes in terms of structure and development, for animal and plant products, are inadequate.
- Low product quality, poor marketing strategy and weak competitive ability.
- Lower price (10-15 percent) for the produce in the international market.
- Low diversification and comprehension of product processing. Exported products are only given primary processing.
- High field and postharvest losses (food, 8-10 percent; fruit and vegetable, 7-8 percent; sugarcane, 30 percent).
- Most units possess old equipment, outdated technologies compared to the region and the world, resulting in low efficiency and high cost of production.

Opportunities

The processing industry in Vietnam has following advantages:

- Capital requirement for establishment of processing units is not high, but can provide remarkable returns, and investment can be redeemed in short time.
- Infrastructure facilities need not be as good as that required for other sectors.
- Management is easier since it is easy to coordinate household and rural business enterprise.
- The agro-product processing industry has big potential because of its huge domestic market demands (with 80 million population), tourism, and the export potential of tropical foodstuffs.
- Although rural labor has limited professional and marketing skills, but basically, it is large and easily available. In addition, the proportion of young labor is high, with basic education.
- Abundant availability of raw material from forestry and agro-forestry.

Therefore, we need to look for ways and means to address constraints and utilize opportunities to establish and strengthen the rural-based food processing industry. Some actions that can help in this direction are:

- strengthen investment in food processing industry in accordance with the rhythm of agricultural production. Until recently, the innovative coefficient for equipment was only 7 percent per year (compared to 30-50 percent minimum rate of other countries).
- focus on strengthening raw material supply based on requirements of the product processing industry, to balance processing productivity and material production.
- need for suitable plans and policies for concentrated material production areas, introduction and improvement of new varieties and transfer of suitable production technologies.
- develop marketing strategies for agro-products, for stable export and domestic market demands.

- invest in the development of infrastructure facilities such as roads, bridges, parking places near factories, electricity, communication and water supply.
- provide timely credit support to farmers and availability of inputs (seeds, fertilizers, pesticides, machinery, etc.) to produce sufficient raw material for processing industry.
- government encouragement through suitable policies that stimulate the economy and private participation in development of the agro-product processing industry.
- impart training to administrative staff, scientific and technical personnel to get acquainted with the latest market trends, global requirements and product development.

TECHNOLOGIES USED IN RURAL PROCESSING INDUSTRY

The machines and other equipment used in most rural processing plants are traditional or with little modification, except in some recently built plants. Mechanization, especially processing at household level, is still at a very low level, accounting for only 37-40 percent. Many machines are second hand and introduced from the cities. Instrument investment is VND6,114 thousand (Vietnamese dong) per household in northern Vietnam, this investment in southern Vietnam is 1.22-1.37 times higher. Again investment in the public sector is 3.2 times higher than that of private sector. According to experts, instrument investments for rural food processing accounts for only 40-60 percent compared to that in the urban areas, resulting in low product quality and poor competition with exotic products. Data regarding present status and future outlook of processing of major agricultural/food commodities in Vietnam are presented in Table 2.

Table 2. Some Items of Major Food Processing in Vietnam in 2010

Sector	Unit	2000	2010
Rice production:	Million mt	28.8	34.2-36.0
Industrially processed	Million mt	25.9	30.8-34.4
Percentage of processed product	Percent	90	90
Coffee bean:	000 mt	430	550
Industrially processed	000 mt	430	550
Percentage of processed product	Percent	100	100
Tea:	000 mt	66	170
Industrially processed	000 mt	46	130
Percentage of processed product	Percent	70	76
Sugarcane:	000 mt	1,000	1,600
Industrially processed	000 mt	800	1,400
Percentage of processed product	Percent	80	88
Cashew nut:	000 mt	50	100
Industrially processed	000 mt	50	100
Percentage of processed product	Percent	100	100
Coconut:	000 mt	1,500	2,000
Industrially processed	000 mt	1,500	2,000
Percentage of processed product	Percent	100	100
Vegetables:	000 mt	6,000	10,000
Industrially processed	000 mt	480	2,000
Percentage of processed product	Percent	8	20
Fruits:	000 mt	5,000	10,000
Industrially processed	000 mt	600	2,500
Percentage of processed product	Percent	12	25
Meat:	000 mt	1,900	4,000
Industrially processed	000 mt	250	1,200
Percentage of processed product	Percent	13	30

Source: Department of Agro-forestry Products Processing and Rural Agriculture, MARD, 2000.

Rice

1. ***Food Conservation and Processing***

Processed rice is estimated to reach 32 million mt, accounting for 90 percent of total rice production in 2010, and 39 million mt in 2020, of which 4 million mt is proposed for yearly export.

2. ***Food Conservation***

Different drying methods are being used to dry agricultural products to meet critical moisture content, high quality and give less produce losses. Sun-drying is very common during the dry season. Drying machines are used only when it is absolutely necessary, especially in summer-autumn rice crop in Cuulong River Delta. There are number of drying machine chambers, ranging from 0.5 to 10 mt. The fuel is flexible, it could be rice husk, coal, or electricity. The simple drying machine can be made locally, however, advanced dryers need to be imported.

3. ***Food Processing***

Rice for domestic use is milled in small hullers producing 0.8-1.0 mt per hour, while medium complex hullers produce 1-2 mt per hour. Rice for export requires high quality and there is a need for a large complex mill with grader. The complex mill can process about 100-200 mt in eight8 hours. Drying machine and storage are included in the processing chain.

4. ***Value Addition***

Gradual development of rice processing units to produce value-added rice products such as rice noodles, cakes, rice flour, to meet domestic requirements and some for export.

5. ***The Area***

Concentrated in Cuulong and Red River Delta.

Sugarcane

Sugar production is estimated to increase from 1 million mt in year 2000 to 3 million mt in 2020 to meet domestic requirements, with per capita consumption similar to other countries in the region, and about 1 million mt for export.

1. ***Technology and Instrumentation***

The number of sugar factories increased rapidly since 1994. Twelve sugar factories were built in 1994, 20 and 42 were built in the years 1997 and 2000, respectively, resulting in sugar production reaching 1 million mt. Most factories produce at 30 percent of their capacity in the first year and reach 60 percent in the second year. Thus most new factories are facing difficulties to meet loan repayment schedules.

2. ***Scale and Progress***

If the sugar factories are run at full capacity, the factories can produce sufficient quantities of by-products like molasses that can be of considerable value, and add to the total income, in addition to enhanced sugar processing.

3. ***Modernization and Construction of Larger-scale Factories***

Until the year 2005 domestic engineering companies can supply only 50 percent of equipment needed by sugar factories, with a capacity of 2000 mt/day and around 30 percent of equipment needed by large-scale sugar factories. After 2005, imports could be limited to generators and another essential equipment.

The major areas for sugar processing are in the southeast of the southern part, Cuulong River Delta, northern coast of the south and central part of the country.

Coffee

At present, pre-processing equipment has diverse modes and sizes, grouped as follows:

1. ***Manual Equipment***

Simple machines are used widely at the household level. These include hand controlled, foot controlled, and mechanized ones with a capacity of 1-1.5 kw/h and are used to crush coffee pods. Coffee growers undertake primary processing of 80 percent of the coffee produced in the country.

Advantages of these machines are that they are at the household capacity level, user friendly, easy maintenance, and fairly priced. Disadvantages are low quality of coffee after processing viz. high cracking

percentage, low purity, and unclassified coffee beans. As a result, for export, the enterprises must re-process the coffee beans and classify them once again.

2. ***Coffee Bean Processors***

The domestic manufacturers have made coffee bean processors which use the wet method, Raoeng type with a capacity of 750-3000 kg/h, accompanied with a drier system. This device is being used in some coffee farms. It gives a good processed product quality, economizing the drying court area used and is especially efficient in the event of harvesting under unfavorable climatic conditions. A major disadvantage of this device is it consumes high energy inputs and huge quantities of clean water.

These devices are classified according to their manufacture. There are two categories: locally made and imported. The domestic manufacturers, on the basis of overseas designs, have produced prototypes and supply equipment to farms with a capacity of 800-1200 kg/h. These devices work to produce dried material with moisture content of 13-14 percent, and percentage of cracked beans 0.5 percent. They separate material into four seed categories. They also have designed some drier systems with a capacity of 1-6 mt/batch.

The dried coffee processors that are currently under use were imported after 1975, such as assembled lines for dried coffee for a Vietnamese-German joint venture, with a capacity of 5,000 mt/year; assembled lines of Dellab Company (UK) with a capacity of 2,000 mt/year for export by the coffee manufacturer (VINACOFEXIM). In general, coffee processors with imported equipment have improved technology and produce good quality coffee.

At present, some coffee processing assembled lines with a capacity of 2000 kg/h, are provided to Vietnam coffee growers, under an agreement between Vietnam and Germany.

There are also devices available for processing instant coffee, although currently coffee exports from Vietnam are mainly in the form of raw material. A new instant coffee processing plant has been established in Bien Hoa city, with equipment imported from Germany, and a capacity of 800 mt per year, of which 100 mt instant coffee is consumed in the domestic market.

In short, both coffee pre-processing and post-processing techniques still face many difficulties. An imbalance of investment in coffee growing and production areas (80 percent pre-processing of the raw beans is done by the household sector) and improper investments in the areas of research, manufacturing equipment and market orientation, are holding back the production and export of high quality processed coffee.

Tea

During the year 2000, tea was grown on an area of 81,000 ha with a production of 66,000 mt. By the year 2010, it is planned to increase the growing area of tea plantations to 100,000-110,000 ha with exports of 150,000 mt raw and 110,000 mt processed tea. At present, processing by industry accounts for 70 percent of the produce, while the remaining is manually or semi-machine processed tea.

There are 1,300 plants under industrial, manual/and semi-machine processing categories, of which 76 industrial plants have 1,100 mt per day processing capacity. Most of these processing plants were established during 1957-77 with machinery from the Soviet Union. Recently, a number of joint venture companies, equipped with modern processing machinery from Japan, Taiwan, and Belgium have been commissioned. However, their contribution to total production is still very small.

Currently, Vietnam is using CTC and OTD technologies. CTC technology is used for black tea and OTD technology for black and green tea production. Nevertheless, these operations are still backward and slow to catch up with improved technologies, so that the product has not been able to meet the world market quality demands. This has led to cheaper export prices compared to the international market prices.

To have more efficient processing and quality products, there is a need to strengthen these processing technologies. The product quality could be improved by adopting the following suggestions:

- Current plants should be upgraded, expanded, and equipped with modern machines to improve product quality and product diversification.
- Factories need to adopt the latest technologies and apply industrial hygiene and quality standards to meet global market demands.
- Need to establish 4-6 new black tea processing plants with a capacity of 12 mt raw material per day equipped with domestically made equipment and with technical support from India and Soviet Union.
- Machinery with a capacity of 12 mt raw material/day should be used for regular tea marketing.

- Machinery with 24 mt daily capacity can be used for concentrated raw material and 4-6 mt capacity for remote, scattered raw material areas, using modern technologies from Japan, Taiwan, and China.
- CTC and OTD techniques for black tea processing should apply continuous technology upgrading and modernization of current plants, to improve product quality.

Cashew Nut

In 1988, Vietnam had only three plants for cashew nut processing with a capacity of 1,000 mt/year. By 1997, the number of plants went up to 60 with a capacity of 1,000-10,000 mt/year with a production capacity of 160,000 mt/year. The professional skills of the staff in the plants can be rated as average but manual labor skills are high. On average, a plant with 350-400 workers can process 2,000 mt/year.

To process all the available material, there is a need to improve productivity of current plants and establish 15-20 new processing plants immediately and additional 40-50 plants by 2010. It is necessary to import cashew nut processing technologies and equipment, to increase income, also to contain environment pollution caused by the disposal process. There is a need to undertake a product diversification program, to meet overseas competition and increase export turnover.

Meat, Milk, and Animal Feed

1. ***Meat***

During the year 2000, 2 million mt of raw pork and 200,000 mt of processed product was produced, of which 50,000 mt was exported. By the year 2020, there are plans to produce 6 million mt of raw pork, 5 million mt of processed product of which 1.55 million mt is for export.

Technologies and equipment:

- Investment in two big enterprises is envisaged to produce quality meat for export.
- Coordination of animal raising, processing and export activities is needed for medium- and small-scale enterprises. In addition there is a need to be equipped with higher technologies and modern facilities.
- Procure abattoirs for animal slaughter together with proper hygiene and veterinary testing, storage and transportation for processed meat, to meet the demand of cities and industrial sites.
- Develop technologies for processing secondary products like liver pate, sausages, etc.

2. ***Milk***

In the year 2000, Vietnam produced 84,000 mt of milk and met 17 percent domestic demand. Plans are underway to produce 500,000 mt milk by 2010 to meet 56 percent domestic consumption demand.

Technologies: There is a need to adopt technologies and modern equipment similar to other countries in the region.

- Six milk processing plants, with an annual capacity of 36 million liters of fresh milk, 24 million liters of yoghurt, 5,300 mt milk for children, and 9.5 million liters of soybean milk were established in the year 2000.
- Plans are finalized to have plants in Lam Dong and Hai Phong, the old fourth region.

3. ***Animal Feed***

There is a need to establish modern and high tech plants for processing animal feed with a capacity of 30,000-100,000 mt/year. It is planned to process 8-10 million mt by 2020, of industrial animal feed.

Fruit and Vegetables

1. ***Technologies and Equipment***

There is a need to establish plants with medium capacity, modern equipment and technologies from America, France, Germany, and Italy. There is also a need to have suitable technologies and equipment for small-scale plants and domestic manufacturers.

2. ***Future Plans***

In horticulture concentrated areas plans are underway to establish plants with capacity of 10,000-50,000 mt/year while 1,500 mt/year plants need to be established in limited production areas.

GOVERNMENT POLICIES TO DEVELOP RURAL-BASED FOOD PROCESSING INDUSTRY OF MEDIUM- AND SMALL-SCALE ENTERPRISES

Policies of Land Use

- All enterprises belonging to all sectors and communities are given equal opportunities to lease land for construction of processing units. Tax reduction and holidays will be granted for rural enterprises.
- In abandoned areas and denuded hills, the processing enterprises (including state owned, cooperative, or private sector) will be provided land for raw material production.

Policies of Loans

- Processing enterprises in each income generating area are given priority for loans by the government, with low interest rates.
- Households and enterprises will be funded through development aid programs for planting, animal raising, and forestation, to establish areas for raw material. The loans can used for material production and loan repayments will be adjusted as per the duration required, for income generation through agriculture, horticulture and animal husbandry production activities.
- Funding procedures have been simplified, so that in case of natural calamities like typhoon or disease outbreaks, households will be compensated and additional assistance will be provided to re-establish the enterprise.
- Cooperative and joint venture enterprises will be encouraged with funds from multiple sources.

Policies of Labor

- Agro-processing enterprises are supported with tuition fees to train their human resources.
- Human resource training must be anticipated, intensified and investment strengthened to train technicians, administrative staff and workers.
- Special compensation policies are needed for technicians and skilled workers who work in remote areas and difficult region.

Policies of Science and Technologies

- Policies on import of machines, and processing equipment, should encourage domestic industry which can met quality standards.
- Agro-processing enterprises will be supported by government's agro-forestry, industrial extension systems by human resource secondments and technology support.
- Provincial agriculture and rural departments will decide the support for each case depending on the needs and requirements.

Infrastructure Construction Policies

The local people's committee assigns priority to infrastructure construction plans near raw material production areas and processing enterprise locations. This includes irrigation systems, roads, water, electricity and communications. These infrastructure facilities utilized by the processing units are charged, so their product prices include 10 percent charges towards the infrastructure construction fund.

Marketing Policies

Agro-processing enterprises are established to support concentrated raw material areas and allowed to purchase required raw materials from other sources, except raw material from other enterprises' investment.

- Enterprises or individuals are free to do their marketing and export.
- There is a need for aid policies for products that serve the export drive.

Tax Policies

- Tax is exempted for first 3-5 years depending on the processing enterprise type, the kind of output and region.

- Tax is exempted in new land areas and from agriculture.
- Taxes are reduced over time to encourage enterprises to expand their production.
- Every illegal demand for enterprises' contribution is strictly forbidden.

EFFICIENCY OF RURAL-BASED FOOD PROCESSING INDUSTRY

Economic Affects

- Agro-product processing industry turnover is estimated at VND100,000 billion in 2000 and projected to be VND260,000 billion in 2020.

Social Affects

- Contribute employment opportunities: the processing industry provides employment for 15,000-20,000 laborers directly and up to 200,000 laborers indirectly per annum (Table 3). In future, the processing industry could provide employment for 30,000-40,000 rural people, and 300,000 laborers engaged in processing industry. It is estimated that this figure could go up to one million by 2020.
- Further development of the processing industry would improve opportunities for agriculture growth and generate further employment.
- This also improves incomes, on average, the income of farmers at the raw material production sites would increase by 5-7 percent/year. Direct labor incomes in the processing plants could increase by 6-8 percent/year and in the service sector by10-12 percent/year.

Table 3. Labor Demand of Rural Food Processing Industry

(Unit: Person)

Year	Technician	Engineer	Manager	Total
2000	17,800	1,300	900	20,000
2001-05	35,700	2,570	1,730	40,000
2006-10	43,100	4,130	2,770	50,000
2011-20	86,200	8,260	5,540	100,000

BIBLIOGRAPHY

Dang, Be Viet, 1993 (ed.) *Nhung Bien Doi ve Kinh Te-Van Hoa a cac Tinh Mien Nui Phia Bac* (Economic and Cultural Changes in the Northern Mountain Provinces), Nha Xuat Ban Khoa Hoc Xa Hoi, Hanoi.

Department of Agro-forestry Product Processing and Rural Agriculture, 1998. "Technologies for Improving Quality and Efficiencies of Processed and Export-based Food:, MARD (unpublished).

----------, 2000. *Current Status Evaluation and Future Development of Rural Industries to 2010*, MARD.

Quy, Chu Huu, 1995. "Overview of Highland Development in Vietnam: General Characteristics, Socio-economic Situation, and Development Challenges" in A. T. Rambo, R. R. Reed, Le Trong Quc, and M. R. DiGregorio (eds.), *The Challenges of Highland Development in Vietnam*, pp 319, East-West Center, Honolulu.

Rambo, A. Terry, 1995. "Perspectives on Defining Highland Development Challenges in Vietnam: New Frontier or Cul-de-Sac?", in A. T. Rambo, R. R. Reed, Le Trong Quc, and M. R. DiGregorio (eds.), *The Challenges of Highland Development in Vietnam*, pp. 21-30, East-West Center, Honolulu.

Statistical Publishing House, 1999. *Statistical Year Book.*

Toan, Bui Quang, 1993. "San xuat nong nghiep o trung du mien nui va van khai tac dat mot vu" (Agricultural Production in the Midlands and Mountains and the Problems of Exploiting Single Crop-lands), in Vien Quy Hoach va Thiet Ke Nong Nghiep *Nong Nghiep Trung Du Mien Nui. Hien Trang va Trien Vong*, pp. 59-67, Nha Xuat Ban Nong Nghiep, Hanoi.

Annex 1. Estimates of Investments for Rural Food Processing Industry

(Unit: VND billion)

Year	1998-2000	2001-05	2006-10	2011-20
Amount	12,600	16,500	24,200	106,500

Annex 2. Investments for Rural Processing Industry in 2000

(Unit: VND billion)

	Amount
Food processing and storage	2,400
Coffee	2,600
Cashew nut	3,400
Rubber	5,100
Tea	3,100
Sugarcane	55,200
Fruit and vegetables	4,500
Wood and forestry products	11,400
Salt	2,800
Other	16,000

Source: Department of Agro-forestry Products Processing and Rural Agriculture, MARD, 2000.

Annex 3. Structure of Household in Rural Area of Vietnam

(Unit: Percent)

Parameter		Average	Northern Vietnam	Southern Vietnam
Household:				
Absolute – agriculture		63.42	67.78	59.06
Semi-agriculture		26.49	23.91	27.95
Non-agriculture		11.29	8.31	12.99
Of which:	Agro-forestry processing	1.99	1.98	2.00
	Industry, handicraft, construction	3.66	3.47	3.77
	Services	5.64	2.86	7.22
Enterprises				
State-owned		14.16	20.35	9.47
Cooperatives		5.76	6.98	4.85
Private		80.08	72.67	85.68

Source: Department of Agro-forestry Products Processing and Rural Agriculture, MARD, 2000.

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2. PROGRAM OF ACTIVITIES

(6-13 March 2001)

Date/Time		Activity
Tues., 6 March		
	Forenoon	Opening Session Video Session (In the Garden of Productivity and Agro-Industry Development in Japan)
	Afternoon	Presentation and Discussion on Topic I: *Characteristics and Problems of Agribusiness for Rural Development in Japan* by Dr. Sueo Futatsugi Presentation and Discussion on Topic II: *Status of Rural-Based Small and Medium Food Processing Industry in Japan* by Mr. Isamu Sakurai
Wed., 7 March		
	Forenoon	Presentation and Discussion on Topic III: *Issues and Strategies in Development of Rural-Based Small and Medium Food Industry in Asia and the Pacific* by Dr. Alastair Hicks
	Afternoon	Leave Tokyo for Nagoya
Thurs., 8 March		
	Forenoon	Visit JA Gujo Myogata Ham Plant to observe food processing facilities Visit Meiho Ladies Company to observe food processing facilities
	Afternoon	Visit JA Hida to observe beef processing facilities
Fri., 9 March		
	Forenoon	Observe Takayama Early Morning Market
	Afternoon	Visit Visit Piachure to observe food processing facilities
Sat., 10 March		
	Forenoon	Leave Nagoya for Mishima and Kannamicho
	Afternoon	Visit Oratche Unit to observe dairy processing facilities Leave Mishima for Tokyo
Sun., 11 March		Free time
Mon., 12 March		
	Forenoon	Presentation of Country Papers by Participants
	Afternoon	Workshop to discuss major issues and make recommendation
Tues., 13 March		
	Forenoon	Summing-up and Concluding Session