FOOD PROCESSING IN INDONESIA: THE DEVELOPMENT OF SMALL-SCALE INDUSTRIES

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ABSTRACT

This paper reviews the processing of food in Indonesia, particularly that carried out by small firms, often family businesses, with less than 20 workers. Of the different types of small-scale food processing, rice milling is the most important, followed by the production of various kinds of chips, and foods made from soybean. The importance of small-scale food processing as a way of raising rural incomes is discussed, and the major constraints faced by such businesses. These include availability of raw materials, finance and marketing. The “foster-parent enterprise” system is described, whereby a large industrial enterprise nurtures a number of small ones.

INTRODUCTION

Agriculture is still an important part of the Indonesian economy, since it provides 49% of total employment and about 18% of the gross domestic product (GDP). However, the industrial sector is increasing rapidly, from 9.2% of GDP in 1970 to 21.3% in 1992. During this time, the poverty level in Indonesia fell from 60% of the population (70 million people) in 1970 to 15% (27 million people) in 1992. Promotion of a small-scale food industry has an important role in developing countries, and has become important in Indonesia with the slower economic growth rate since the 1980s. Even though the small-scale food industry, like other small enterprises, cannot increase the per capita income very rapidly, it opens up more job opportunities than medium- or large-scale industries. The strategy of industrial development not only involves a choice between small and large industries, but a taking advantage of increased trade-offs between the two (Illyas and Esmara 1990).

Production of Food Crops

The main food crops in Indonesia are rice, secondary food crops such as legumes, and tubers (known collectively as “palawija”), vegetables and fruit. Although Indonesia is generally self-sufficient in rice, and exported about 350 thousand mt in 1993, it had to import more than 1.5 million mt of rice in 1994 because of a severe drought. Since 1991, the annual per capita rice consumption has remained constant at about 150 kg. However, there is still a need for better distribution, and more equal access to this staple food.

Of the starchy foods, cassava was the most important crop. However, cassava production has been fluctuating in recent years, while the use of cassava in the food industry has tended to decline, from 5.8 million mt in 1990 to only 3.9 million mt in 1993.

Soybean is the most important legume. The domestic supply in 1993 was about 2.5 million mt, with additional imports of about 700 thousand mt. The per capita consumption of soybean in Indonesia has increased rapidly, from 3.8 kg in 1978 to 12.0 kg in 1993 (CBS 1993). Soybeans are not eaten directly, but are processed into a large range of popular products, mostly by small-scale food processing industries. Of the 17 major vegetable crops, cabbage, chili and potato are dominant, accounting for about 40.7% of total vegetable production. Exports of fruits and vegetable are still only a very small percentage (less than 1%) of total production, while quite large quantities of fruit are imported.

Livestock production has been boosted by government support of beef and dairy cattle raising on small farms. The domestic supply of livestock products increased from 345 thousand mt in 1989 to

Keywords: Cassava processing, issues and problems, rice milling, small-scale food processing, soybean processing.
409 thousand mt in 1993. Production of both poultry meat and eggs showed a marked increase, from 688 thousand mt in 1989 to 983 thousand mt in 1993.

The fishery sector has been performing well, and exports of canned food and frozen seafood rose in 1993. The total production of fisheries products in 1993 was about 3.75 million mt, with 779 thousand mt for export.

Agricultural development in Indonesia during the past two decades has succeeded in increasing food production and achieving food self-sufficiency. In maintaining this economic development, diversification should be strengthened of both production and consumption. Food processing is the major way of achieving this, and adding value to various agricultural commodities.

**CHARACTERISTICS OF SMALL-SCALE FOOD PROCESSING INDUSTRIES**

The long-term objective of Indonesia's economic development is a good balance between a strong industrial sector and a resilient agricultural sector. The development of small-scale rural agroindustry is seen as a strategic step towards achieving this goal.

Besides giving new job opportunities, this strategy also encourages the export of goods other than petroleum and enhances rural development. This helps buffer rural societies against any global economic disturbances, which are often felt at a national level. Among these small-scale industrial activities, the manufacturing of food and beverages is the most important, in terms of the number of businesses (38,271, or 31%) and the number of workers employed (309,603 persons or 31%) (CBS 1993).

Indonesia has a large number of traditional foods which used to be prepared by households for their own use. As the demand for convenience foods grows, the traditional foods which are relatively complex to prepare are being produced industrially, to be sold as ready-to-serve products.

There are several ways of classifying the scale of industries. Indonesia’s Central Bureau of Statistics attempts to classify industrial businesses according to the number of their employees.

- Large • 100 workers
- Medium 20 - 99 workers
- Small 5 - 19 workers
- Home industry, 1 - 4 workers

Indonesian traditional foods are mainly produced by what were originally home industries, which then developed into small ones. Recently, some of these have even developed further into modern enterprises. These small-scale industries play an important role in the economic life of the people, since they are found in every province of Indonesia and have a high capacity to absorb labor. The number of household level food processing industries in 1993 was 833,228, employing 1.48 million people.

**Types of Food Products**

Of the 16 main types of processed foods (Table 1), three are produced by small food processing business. Indonesia’s Central Bureau of Statistics has identified 16 main types of processed food eaten by Indonesian people (Table 1). These include foods with a short shelf life (tofu, tempe, moist snack foods such as buras, tempe and nagasari, cakes, tape), as well as those with a medium shelf life, such as dodol (semi-solid food), and those with a long shelf life, including snacks such as cookies, kerupuk (chips), cassava flour and cassava starch. Small-scale businesses are characterized by small-scale investment, and simple technology which makes a relatively high labor demand.

**Profile of Small-Scale Food Industries**

The Sixth National Development Plan for 1994-1999 emphasized development projects related to small-scale and home level agro-industries in connection with agricultural development. In terms of the number of establishments and the number of workers involved, five food industries were of particular importance: rice milling and polishing; production of chips (kerupuk) and similar products; soybean-based foods; cakes and other bakery products; and processed fish (Table 1). This categorization was also true when the value of the gross output, and the value added at market prices, were taken into consideration (CBS 1989).

Table 2 shows a comparison between small and relatively large food processing enterprises. Among the small-scale industries, the largest number of enterprises, and also the largest in terms of capital cost, consist of rice mills (8302 enterprises), chip or “kerupuk” factories (5,471), and factories making soybean products (3,011). Of the larger food enterprises, the highest ranking are fish processing, (649) followed by food oils (477). Some food processing industries have grown rapidly and now compete successfully on world markets. However, most home- and small-scale industries still struggle to develop their technology, their quality and the stan-
Table 1. Classification of food processing industries, based on the ISIC code classification

<table>
<thead>
<tr>
<th>ISIC Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3111</td>
</tr>
<tr>
<td>2</td>
<td>3112</td>
</tr>
<tr>
<td>3</td>
<td>3113</td>
</tr>
<tr>
<td>4</td>
<td>3114</td>
</tr>
<tr>
<td>5</td>
<td>3115</td>
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<tr>
<td>6</td>
<td>3116</td>
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<td>7</td>
<td>3117</td>
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<tr>
<td>8</td>
<td>3118</td>
</tr>
<tr>
<td>9</td>
<td>3119</td>
</tr>
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<td>10</td>
<td>3121</td>
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<td>11</td>
<td>3122</td>
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<td>12</td>
<td>3123</td>
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<td>13</td>
<td>3124</td>
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<tr>
<td>14</td>
<td>3125</td>
</tr>
<tr>
<td>15</td>
<td>3126</td>
</tr>
<tr>
<td>16</td>
<td>3127</td>
</tr>
</tbody>
</table>


The soybean processing industry is composed of two sectors; traditional food such as tofu (soybean curd), tempe, bean sprouts, tauco, soy sauce and yuba; and processed foods developed abroad such as soybean oil, soymilk, and soybean cakes. There are 252 factories making soy sauce in Indonesia, plus 860 making tempe and 1,672 making tofu. (Note: tempe is moist, fermented whole boiled soybeans; tauco is fermented whole soybeans, mixed with flour and then dried)

...Boiled soybean milk which solidifies in protein layers

Almost 220,000 people are employed in small-scale food processing. Rice milling and polishing employ the largest number of workers (54,677) followed by chip production and soybean-based foods. In general, the number of paid workers in each type of processing industry was much larger than the number of unpaid family workers, although there were a considerable number of the latter.

Generally, the cost of the raw materials took the largest portion of the total input costs of the food industries. The combined cost of fuel, electricity, gas, and water also took a substantial amount (Table 2). This was confirmed by information gathered in a survey of medium-sized vegetable canning factories in East Java. Raw materials took the largest part of total production costs (21-28%) and the combined cost of electricity, kerosene, and water took 13-14% (Simatupang 1988).

SMALL-SCALE FOOD PROCESSING

There are a large number of small-scale food processing enterprises in Indonesia run by farmers, which produce a wide variety of processed...
Table 2. Distribution of food processing industries in Indonesia

<table>
<thead>
<tr>
<th>Industry type</th>
<th>Small-scale food industries</th>
<th>Medium to large-scale food industries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of establishments</td>
<td>Av. investment cost (US$ million)</td>
</tr>
<tr>
<td>Meat and meat products</td>
<td>262</td>
<td>8.1945</td>
</tr>
<tr>
<td>Milk and milk products</td>
<td>135</td>
<td>0.3945</td>
</tr>
<tr>
<td>Fruit and vegetables</td>
<td>117</td>
<td>0.6300</td>
</tr>
<tr>
<td>Fish processing</td>
<td>1,087</td>
<td>14.7180</td>
</tr>
<tr>
<td>Vegetable and animal oils</td>
<td>626</td>
<td>10.8460</td>
</tr>
<tr>
<td>Rice milling and polishing</td>
<td>8,302</td>
<td>164.8105</td>
</tr>
<tr>
<td>Other cereals</td>
<td>215</td>
<td>13.6970</td>
</tr>
<tr>
<td>Peeling and cleaning of roots</td>
<td>9</td>
<td>0.0028</td>
</tr>
<tr>
<td>Cleaning and husking coffee, nuts etc.</td>
<td>136</td>
<td>2.1005</td>
</tr>
<tr>
<td>Copra</td>
<td>784</td>
<td>2.6835</td>
</tr>
<tr>
<td>Wheat flour</td>
<td>16</td>
<td>0.4160</td>
</tr>
<tr>
<td>Other flours</td>
<td>232</td>
<td>3.0360</td>
</tr>
<tr>
<td>Macaroni, noodles etc.</td>
<td>619</td>
<td>6.2055</td>
</tr>
<tr>
<td>Bakery products</td>
<td>1,722</td>
<td>14.9235</td>
</tr>
<tr>
<td>Syrup and sugars</td>
<td>712</td>
<td>11.9765</td>
</tr>
<tr>
<td>Chocolate, confectionary</td>
<td>195</td>
<td>2.0365</td>
</tr>
<tr>
<td>Tapioca and other starches</td>
<td>951</td>
<td>11.5220</td>
</tr>
<tr>
<td>Tea and coffee</td>
<td>568</td>
<td>7.3785</td>
</tr>
<tr>
<td>Ice etc.</td>
<td>781</td>
<td>3.5515</td>
</tr>
<tr>
<td>Soybean based foods</td>
<td>3,011</td>
<td>25.8275</td>
</tr>
<tr>
<td>Chips etc.</td>
<td>5,471</td>
<td>32.7650</td>
</tr>
<tr>
<td>Spices, seasonings</td>
<td>49</td>
<td>0.3715</td>
</tr>
<tr>
<td>Fish preserves, cakes etc.</td>
<td>2,545</td>
<td>15.0830</td>
</tr>
<tr>
<td>Alcoholic beverages</td>
<td>91</td>
<td>0.4735</td>
</tr>
<tr>
<td>Soft drinks</td>
<td>431</td>
<td>2.4130</td>
</tr>
</tbody>
</table>

Total  431  356.0870  3,910  10,911.8035


foods. Table 3 shows the major types of processed food products produced by farmers’ small-scale food enterprises.

**Soybean Processing**

The major source of vegetable protein in Indonesia is soybean. Although other legumes such as mungbean and peanut are produced, they are less popular than soybean.

The food balance sheet of the Central Bureau Statistics (C.B.S. 1993) shows that 90% of the soybean is used for human food, although many processing by-products are used as livestock feed. The large variety of foods based on soybean can be classified into two groups: fermented and nonfermented.

The main fermented soybean products in Indonesia are tempe, oncom, tauco, and soy sauce. Nonfermented products include tofu, soybean sprouts, soybean milk, fried beans (eaten as a snack), beans boiled in the pod (also a snack), and beans cooked as a vegetable or as an ingredient for soup. Major soybean products and how they are processed are presented in Fig. 1. Tempe and tofu are the most popular soybean foods, with a combined average consumption of about 8.8 kg/capita in 1987 (Damardjati and Santos 1989).

Improvement of the soybean processing industry requires an improved knowledge of the raw materials, as well as better processing techniques, the development of new products, and marketing.
management. The production system particularly needs better quality control, hygienic practices and handling of wastes.

**Cassava Processing**

According to Indonesia’s Food Balance Sheet of 1991 (C.B.S. 1992), total cassava production was 15.95 million mt, 56.7% of which was consumed as human food, either cooked or processed in some way. Of this total cassava production, 20.9% was processed into chips, 41.2% into pellets for export, and 48.8% put to industrial use. Around 7.7% of cassava was made into tapioca starch, mostly for export. For domestic purposes, most of the tapioca starch is used to make chips, while the rest is used in other processed foods, textiles, paper, glucose and the pharmaceutical industry.

Cassava utilization in Indonesia differs from place to place. On Java, where 60.0% of the population lives, cassava is consumed primarily as a human food. Rural people, who are the producers and major consumers of cassava, utilize approximately 62% of the fresh cassava and 49% of the dried cassava they produce for their families’ needs. A number of processed foods are made from cassava and the flour or starch extracted from it (Damardjati et al. 1992). Major cassava food products and details of their processing are shown in Fig. 2. Other types of traditional food products made from cassava flour are given in Table 4.
Fig. 1. Processing of major soybean products in Indonesia

Fig. 2. Processing of cassava products in Indonesia
If there is no breakthrough in either new markets or new products for cassava, the demand for this crop in Indonesia seems to have reached a plateau. Nevertheless, some experts anticipate an increase in the domestic demand for food during the next decade, while the expansion of the industrial sector may further increase demand.

**Banana Processing**

Table 4. Traditional cassava products processed by farmers

<table>
<thead>
<tr>
<th>Local name</th>
<th>% of cassava flour</th>
<th>Other flours</th>
<th>Brief description</th>
</tr>
</thead>
</table>
| *Bala-bala* | 50                 | Wheat        | - Mixture of flour, water, vegetables and spices  
                                          - Fried |
| *Cimplung* | 50                 | Wheat        | - Mixture of flour, water, sliced jackfruit, salt  
                                          - Fried |
| *Nagasari* | 70                 | Maize        | - Mixture of cassava flour, coconut milk, sugar, salt, vanilla, maize flour  
                                          - Cooked, wrapped in banana leaf, filled with sliced banana  
                                          - Steamed |
| *Jongkong* | 50                 | Rice         | - Mixture of cassava flour, coconut milk and salt  
                                          - Cooked, filled with sliced palm sugar, covered with thick coconut milk, wrapped in banana leaf  
                                          - Steamed |
| *Ongol*    | 65                 | Wheat        | - Cassava flour mixed with water and sugar then cooked  
                                          - Formed, cooled and sliced  
                                          - Served with grated coconut |
| *kal or Awug* | 100              | –            | - Cooked cassava flour mixed with water and salt  
                                          - Shredded palm sugar put into dough  
                                          - Served with grated coconut |
| *Biji Salak* | 100              | –            | - Small balls made from cassava flour dough  
                                          - Cooked  
                                          - Served with sweet coconut milk and sliced jackfruit |
| *Baki Ambou* | 35                | Rice         | - Cassava flour mixed with egg, fermipan and coconut water, worked into a dough (I)  
                                          - Sugar and coconut milk cooked together until oily (II)  
                                          - (I) and (II) mixed together, baked |
Fruits such as banana often rot, because of transportation problems or because they are not sold to consumers in time. Cooling and cold storage can prolong the shelf life of fruit, but they are not widely practiced in Indonesia. In order to prolong the shelf-life, banana are sometimes processed into sale (dried candied banana), flour, juice or wine.

**Dodol Processing**

*Dodol* is a very popular snack food prepared from glutinous rice flour, coconut milk and sugar, sometimes with the addition of permitted food additives (Indonesian Industrial Standard 1616-90). It is made in various shapes and flavors. This product has a very special meaning in the cultural life of people in many parts of Indonesia, as it is served to celebrate special events such as a marriage or the birth of a child. It has now become a popular snack food which has good market potential, both locally and for export. Countries where demand for this product exists include several of those neighboring Indonesia and in the Middle East.

The preparation of *dodol* by small industries is shown in Fig. 3. The main steps of processing are preparation and cooking of the dough, addition of concentrated coconut milk, cooling, cutting, wrapping, and packaging (Herman and Setiadi 1992).

**Other Small-Scale Food Industries**

Other small-scale food industries which need further development are those producing fish-

<table>
<thead>
<tr>
<th>Foster-parent enterprise</th>
<th>Types of food industries of concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pupuk Sriwijaya (Fertilizer factory)</td>
<td>Fish crackers Palm sugar Shell-fish</td>
</tr>
<tr>
<td>Pupuk Kujang (Fertilizer factory)</td>
<td>Mushrooms Cassava processing</td>
</tr>
<tr>
<td>Pupuk Kaltim (Fertilizer factory)</td>
<td>Palm sugar Horticultural crops</td>
</tr>
<tr>
<td>Pupuk Iskandar Muda (Fertilizer factory)</td>
<td>Palm sugar Chips</td>
</tr>
<tr>
<td>ASEAN Aceh Fertilizer (Fertilizer factory)</td>
<td>Gnetum* chips Coconut products</td>
</tr>
<tr>
<td>Semen Padang (Cement factory)</td>
<td>Palm sugar Brown cane sugar Spices (cinnamon)</td>
</tr>
<tr>
<td>Semen Tonasa (Cement factory)</td>
<td>Palm sugar Cashew nuts</td>
</tr>
<tr>
<td>Krakatau Steel (Steel)</td>
<td>Palm sugar Coffee grinding</td>
</tr>
<tr>
<td>Aneka Gas Industri (Gas)</td>
<td>Preserved fruits and vegetables</td>
</tr>
</tbody>
</table>


*Gnetum: Tropical shrub with cone-like fruits which can be made into edible chips. (Ed.).
Fig. 3. Flow diagram of dodol* processing
Source: Herman and Setiadi 1992
* Dodol is a traditional sweet cake made from glutinous rice.
pastes products, *kerupuk* (chips or fried crackers), and bakery products.

**Major Constraints, and Efforts to Solve The Problems of Small-Scale Industries**

Generally, small-scale industries in Indonesia have little capital, and are managed in a traditional manner. They face technical as well as economic problems. Since they are not able to solve their problems by themselves, the government has decided to assist them.

The main constraints of small-scale food processing industries in Indonesia can be summarized as follows (Ilyas and Esmara 1990)

1. They have very little capital. In some cases, labor is almost the only production factor used.
2. Maintenance costs are often uneconomic.
3. They use simple, traditional technology.
4. The quality of the product is relatively low.
5. Their access to markets is limited.
6. Marketing expansion is difficult, in the face of regional government organizations as well as limited demand.
7. There are credit problems, and often they lack access to banks.
8. They lack facilities. Generally, there are more facilities available to medium- and large-scale industries than to small industries.

The majority of entrepreneurs (i.e. about 70% of those interviewed in 1986) complained about various difficulties they faced in running their businesses (C.B.S. 1989). Lack of capital and marketing difficulties were the most important problems (experienced by 33% and 29% of business, respectively). Raw materials, especially uncertainties of supply, were another important problem. The need for better technical and managerial skills was also felt by a considerable number of entrepreneurs interviewed.

**Finance**

It is interesting to note that the lack of capital was claimed as a problem by the largest proportion of the respondents. The Indonesian government operates several programs of financial assistance for small-scale food processors, but these have not been fully adopted by the entrepreneurs. It would be of great interest to find out what constraints are involved, and how these can be overcome.

**Materials**

Problems of raw materials were mostly related to their availability, reliability of the supply, and price. Entrepreneurs complained of discontinuity in the supply, and lack of uniformity. A discontinuous supply is a logical consequence of the seasonal pattern of agricultural production. The lack of uniformity is mainly due to the diversity of the cultivars grown by farmers.

**Marketing**

Markets are generally competitive. Small entrepreneurs lack skill in aggressive marketing, product diversification, market penetration, quality control and continuous product development. A long marketing chain also reduces efficiency.

**Management**

Small entrepreneurs’ lack of understanding of management procedures, and unwillingness to delegate authority, often lead to inefficiency in operations.

**Manpower**

The personal relationships which are important in small family businesses are not always conducive to good working conditions or the best performance by workers.

**Supporting Activities**

Realizing that these problems exist, the Indonesian government has been taking supportive measures since the beginning of the first five-year development plan in 1968. This support has taken the form of regulations, extension activity, financial assistance, and the development of necessary infrastructure.

**Cluster Infrastructure**

Sometimes assistance is given to clusters of small industries. ‘Clustering’ refers to a group of small industries of the same type which are located
together in one location, usually in rural areas. The basic scheme used is shown in Fig. 4. The market situation is the first consideration in developing clusters of small industries. Other government structures available for supporting small-scale industries are:

- Likungan Industri Kecil (KIK), or small-scale industrial areas,
- Perkampungan Industri Kecil (PIK), or small-scale industrial villages,
- Sarana Usaha Industri Kecil (SUIK), or business facilities for small-scale industries.

More recently, Industrial Centers for certain products such as tofu, tempe or chips have been introduced. These offer technical advice and training.

Foster-Parent Enterprise System

A scheme which provides complete support is known as the ‘Nucleus-plasma’ system. In these, a large industrial enterprise, generally a public one, serves as a “Perusahaan Bapak Angkat” (Foster-parent of enterprise), nurturing a number of small-scale enterprises. These do not necessarily all produce the same type of product. Several foster-parent enterprises and the food processing activities they support are listed in Table 5.

The main type of support these foster-parent enterprises are asked to provide is help in marketing. Cooperation between foster-parents and small industries could, for example, take the form of the foster-parent acting as trading agents for small industries. Sometimes the foster-parent may assist the small industries by introducing to them some appropriate technology, designing equipment to increase the value added of their products, or other forms of up-grading the technology used by small industries.

Financial Support

The government supports small-scale food processing by granting tax exemptions or reductions, and by allocating business permits exclusively to Indonesian citizens. Financial assistance is given in the forms of Credit for Small-scale Investment (KIK) and Credit for Fixed Capital (KMKP). In 1989, the limit for both KIK and KMKP was Rp. 15
million (US$6,600) per household enterprise.

Funding for the financial support of small industries comes from state-owned enterprises, which can earmark funds amounting to 1-5% of the net profits of the company for this purpose. Support from banks is encouraged by a regulation that 20% of bank credit be allocated to small-scale businesses to accelerate their development.

To support the export capabilities of these small industries, in 1995 several PIK were provided with banks with special permission for foreign exchange transactions.

**Extension and Promotion**

Extension is conducted at a village level. In areas with good potential for small-scale industries, Industrial Offices are staffed with extension workers. In several provinces, extension activities are supported and coordinated by an Information Center for Small-scale Industry.

The government also tries to promote the products of small businesses by means of exhibitions, festivals and other activities.

**Research and Development**

To assist small food processing enterprises to solve their problems, a number of research institutes, especially those belonging to the Ministry of Agriculture and the Ministry of Industry, are involved in conducting applied research, and extending the results to small-scale industries.

In 1995, the Ministry of Research and Technology launched a new program called the Partnership Research Program. Research institutes collaborate with private companies to propose joint research projects to develop technology which will be adopted by the private company for commercial use. In the first year of the project, the government contributed up to 80% of the total budget. This contribution was gradually reduced to about 20% in the third year. The total budget of the project was US$1 million per year.

**CONCLUSION**

- The development of small-scale food processing industries represents one way of diversifying agricultural products. It has the potential to increase farmers’ incomes, open up new job opportunities in rural areas, and support the eventual development of advanced food processing industries.
- Small-scale food processing enterprises comprise more than 95% of the total number of food industries in Indonesia. More than half these small enterprises are processing rice, soybean or fish.
- Small-scale food industries still need support to develop their production efficiency, quality control, and hygiene.
- The main constraints in the development of small-scale food industries are related to lack of capital and skills, level of technology, marketing, and lack of facilities. Several supportive policies have been implemented, including regulations, extension activity, financial assistance, and the development of necessary infrastructure.
- Marketing in particular is a major problem. Several large state-owned industries have been appointed foster-parents of a group of small enterprises, to provide them with financial, technical and marketing assistance.
- To improve local technology and increase the adoption by industry of innovations developed in Indonesia, the government has launched a Partnership Research Program. This supports and speeds up technology generation and its transfer from research institutes to industrial enterprises as the users.

**REFERENCES**


