

# 10. MANAGEMENT AND PROMOTION OF INDUSTRIAL DEVELOPMENT

---

## 10.1 Industrial Area Management

### 10.1.1 Industrial Zoning

Purpose of industrial zoning is the environmental management from a viewpoint of : 1) industrial pollution management, 2) cooperation between industry and urban activities, and 3) minimizing of the conflict between agricultural sector and industrialization.

As for the industrial pollution management, the government should regulate industrial location, as well as industrial types and processes, by setting up the industrial zone in order to avoid the scattering of factories. Although industrial estate approach is efficient in this connection, it is not sufficient since some large scale industries may not prefer industrial estate. Our industrial survey shows only 24% and 53% of factories in the UCR and the BMR, respectively, prefer industrial estate for their future factory expansion. In addition, by industrial zoning approach, government can easily implement industrial pollution monitoring system.

As for the cooperation between industry and urban activities, appropriate industrial location creates and stimulates various urban activities such as banking, merchandizing, housing, transportation and education, and it minimizes the conflicts caused by industrialization such as pollution, traffic congestion and excessive concentration of housing. Therefore, industrial zone should be set up in the area with a certain distance from urban centers so that both agricultural and industrial areas can coexist by stimulating each other.

As for the conflict between agricultural sector and industrialization, industrial zone should carefully be selected in order not to discourage agricultural activities. Therefore, industrial zone should not be set up in the areas with high agricultural potential.

From a view point of industry, necessary conditions to establish factories are as follows:

- Basic infrastructure such as transportation, electricity, telecommunication and water supply
- Urban service functions
- Non-flooding area
- Hard foundation to install heavy machinery and plant

Taking these objectives and necessary conditions of industrial zoning into account, the following areas are the most suitable industrial area in the UCR:

- Ban Mo/Tha Rua/Nakhon Luang
- Nong Khac/Wang Noi
- Kaeng Khoi

#### **10.1.2. Management of Industrial Estates**

As of March, 1990, five industrial estates including four IEAT joint venture projects are under construction in Ayutthaya and three industrial estates including two IEAT joint venture projects are under planning in Sara Buri, which supply industrial areas of 9,200 rai in Ayutthaya and 4,700 rai in Sara Buri. This implies excessive concentration of industrial estates, especially in Ayutthaya and will intensify the labor shortage which labor-intensive factories already suffer from at present. Government should take quick action to regulate construction of industrial estates and to supply urban services for new residents. As for the role of industrial estate, they should be developed as a core not only of industrial development but also of regional development.

As for the management of industrial estate, industrial estates should be characterized by 1) industrial types, e.g. agro-industrial estate, hi-tech park, and 2) common objectives, e.g. industrial waste treatment, export promotion, distribution facilities, so that common cost can be shared by participants. By this strategic industrial estate management, the following benefit can be expected:

- Decrease of construction cost because of limited facility requirements for the industries of similar type
- Reduction of conflicts among factories because of their similarity in production activities
- Cooperative business activities such as purchasing materials, developing market, developing technology by exchanging know-how

In order to maximize these positive effects by strategic industrial estates, government should promote establishment of cooperatives among industrial estate participants, which produce another incentives for participating in industrial estates. In addition, participants can expect the following benefit from outside of industrial estate:

- Lobbying activities
- Soft loan from bank and public financial institutions through cooperative of participating factories

### **10.1.3 Environmental Management**

#### **1) Policy**

As mentioned in the preceding section, the UCR is environmentally sensitive. However, our industrial survey reveals that 70 % of the factories in the UCR have no water treatment system for the reason that there is no regulation, while 45 % of the factories have it in the BMR, as shown in Table 59-2 ~ 4. Although more than 70 % factories in the fields of food processing and precision machine / electronics, which definitely discharge polluted water, install water treatment system, this indicates no perfect implementation of environmental regulations has

Fig. 10.1 Downstream Industries of Major Crop

| Crop      | Basic Process in UCR  | Good Processed in UCR  | Goods Not Processed in UCR   | Examples of Possible Application   |
|-----------|-----------------------|--|--|--|
| Rice      | Milled rice           | Vermicelli<br>Starch   | Rice snack   |  |
|           | Rice bran             | Oil  | Alcohol<br>Soap<br>Decoiled cake<br>Wax                                      | Whiskey<br>Animal feed   |
|           | Husk                  | Brick<br>Fuel  |  |  |
|           | Straw                 | Activated Charcoal<br>Animal feed<br>Handicraft  | Mushroom Culture<br>Straw board<br>Straw paper<br>Straw bags                 |  |
| Cassava   | Tapioka flour         | Pellet for animal feed   | Single cell protein<br>Alcohol<br>Modified starch                            | Animal feed<br>Fuel<br>Food material<br>Industrial use<br>Medical use  |
|           |                       |  | Glucose<br>Lysine  | Monosodium glutamate<br>Animal feed<br>Ham/sausage/cracker/fish cake<br>Paper/textile/chemical/adhesives<br>Glucose for intravenous feeding<br>Ajinomoto |
| Sugarcane | Raw sugar<br>Molasses | Refined sugar<br>Animal feed   | Alcohol<br>Acids<br>Chemicals  | Drugs<br>Rum   |
|           | Bagaase               | Animal feed  | Paper board<br>Fuel<br>Activated Carbon                                      |  |
| Maize     | Stalk/leaves<br>Grain | Fodder<br>Animal feed  | Starch<br>Corn oil   | Industrial use<br>Food material<br>Medical use<br>Cosmetic use<br>Dextrins<br>Syrum<br>(residual)<br>food use<br>drug use<br>industrial use              |
|           | Cob                   |  | Activated charcoal<br>refined carbon   | dry battery cells  |
| Soybean   | Soy milk<br>Bean curd | (residue)<br>(residue)<br>Fermented sause<br>Fermented food<br>Confecssionary<br>Baby food<br>Oil extraction | animal feed<br>animal feed<br>(residue)<br>Soy bean oil<br>Defatted soy bean | Industrial use<br>Food use<br>Drug use<br>Animal feed<br>Fertilizer<br>Aminoasid<br>Food use<br>Fermented food<br>Skim milk/condensed milk<br>Ice cream  |
|           |                       |  |  | Glycerin/lubricate oil/paint/soap<br>Margarine/confecssionary  |

been done in operating factories for some reasons, resulting that environmental deterioration is gradually proceeding at present. In order to eliminate this unfavorable situation, explicit policies regarding industrial location and promotion should be articulated from an environmental point of view as follows:

- Promote pollution-free industries or the industries of which the waste materials can be treated technically and economically to an environmentally acceptable extent.
  - Encourage both the public and private sectors to develop industrial parks with sufficient green buffer and common treatment facilities.
  - Encourage factories to locate in the industrial parks.
  - Develop an institution to monitor and control pollution level through joint activities of local people, local government and industries.
- (see Fig 10.1)

## 2) Industrial Waste from the Expected Core Industries

As for food processing industries, the anti-pollution measures to be taken by each enterprise are, first, waste water treatment and, next, solid waste treatment. The operational characteristics of food processing industries are:

- Most of the manufacturers are small or medium size
- The operation rate of plants varies notably due to seasons
- Various types of products are manufactured in one plant
- A great deal of waste water which contains organic residual materials is discharged from factories, even small scale factories.

The characteristics of waste water from food processing industries are:

- The waste water has almost no harmful substances but contains a great deal of organic matter, which is perishable.
- The waste water varies remarkably in both quantity and quality by type of raw material and product

- Even on the same day, the quantity and quality of waste water varies according to the operation type.

Taking the above specific characteristics of food processing industries into account, in order to reduce the investment and operation cost of treatment system for individual factories, the following four approaches are viable:

- Cooperative work to reduce pollution control cost per unit using joint production processes by assembling the similar type enterprises
- Joint treatment to reduce waste water treatment cost using the joint treatment of polluted water collected from the factories of several enterprises
- Recycle to reduce water cost using closed or semi-closed water treatment system
- Resource recovery to utilize excess sludge as feed and manure

In addition, the following another approach, or the natural treatment system, may be possible in the UCR because of its availability of vast land and relatively constant high temperature in which bacterial activities keep high year-round.

- First, discharge waste water into fish pond and let fishes eat wastes
- Second, transfer waste water in bacteria pool for treatment of residual waste by bacteria
- Third, discharge treated water into river

As for cement/ceramic industries, the problems of industrial wastes are not so serious. Cement industry causes air pollution such as dust, smoke, SOX and NOX, which, however, can be treated by anti-pollution equipment. Ceramic industry may causes water pollution, which, however, can be easily treated by keeping waste water in stabilization pond.

As for light processing industries, they do not have any industrial waste which cause serious problems.

As for precision machinery/electronics, possible industrial waste are 1) water from cooling and machining process, 2) solid waste such as plastic and sludge, 3) waste oil from machining process, 4) organic solvent from washing process and 5) heavy metal from electroplating process.

Since waste water from cooling process does not include any hazardous waste, it can be discharged after cooling water or it is recommended to be reused by recycle system for the purpose of water saving. However, waste water from machining process, including oil and media, have to be carefully treated. The common solution is sedimentation of oil and medium by chemical treatment, which is collected by filter and is discharged as suspended solid (SS). Site for discharge SS has to be carefully selected and sealed in order to avoid leakage into underground.

Solid waste like plastic can be reused. However, since volume of sludge from precision machining is too little to be reused economically, it is usually discharged in some place which have to be carefully selected and sealed not to leak into underground.

Waste oil from machining process can be recycled after separation of other components from oil. Finally, it can be burned up by incinerator.

Organic solvent like Trichloroethylene is usually recycled by semi-closed system, in which organic solvent used in washing process is heated to evaporate and is collected by cooling. However, recycled organic solvent is finally sold to outside waste treatment company with specific system to readjust its chemical characteristics. (Perfect closed system is impossible to set up because of its small leakage into the atmosphere by evaporation in washing process.)

Electroplating liquid is usually recycled to collect valuable heavy metal. However, finally it is treated at outside treatment center like

Bangkhuntien industrial hazardous waste treatment center established by MOI, located in the southwest of Bangkok.

Although many dangerous industrial wastes come out from precision machinery/electronics industries, the suitable treatment measures in order to avoid environmental problems should be available for all industrial wastes economically and technologically. For developing these industries in the UCR without any environmental problem, the following two actions are strongly and urgently recommended since these industries have already started growing in the UCR.

- Set up the area to discharge solid waste such as SS and sludge with concrete sealing in order to avoid leakage into underground
- Establish industrial hazardous waste treatment center with functions to treat the used organic solvent and the electroplating liquid (The treatment center with the same purposes is under planning to establish in Rangsit and Pathum Thani by MOI)

## **10.2 Promotion of Agro-processing Industries**

Since three industrial types i.e. construction materials, light processing and precision machining/electronics will mainly be developed by large-scale companies, government roles are not significant to promote these industries except preparation of basic infrastructure and industrial zone/estates and environmental management. Therefore, the government roles to promote only agro-processing industries is discussed here.

### **10.2.1 Present Situation**

The UCR is the distribution center of major agricultural commodities such as rice, cassava, maize and sugarcane and possibly soybean in the future, because of its strategic location. However, only very basic processes are done in the UCR and are shipped to the BMR and overseas. Because of the vast variety of downstream industries after these basic processes as shown in Fig. 10.2, the UCR has been losing a huge amount of value added. Because of industrial



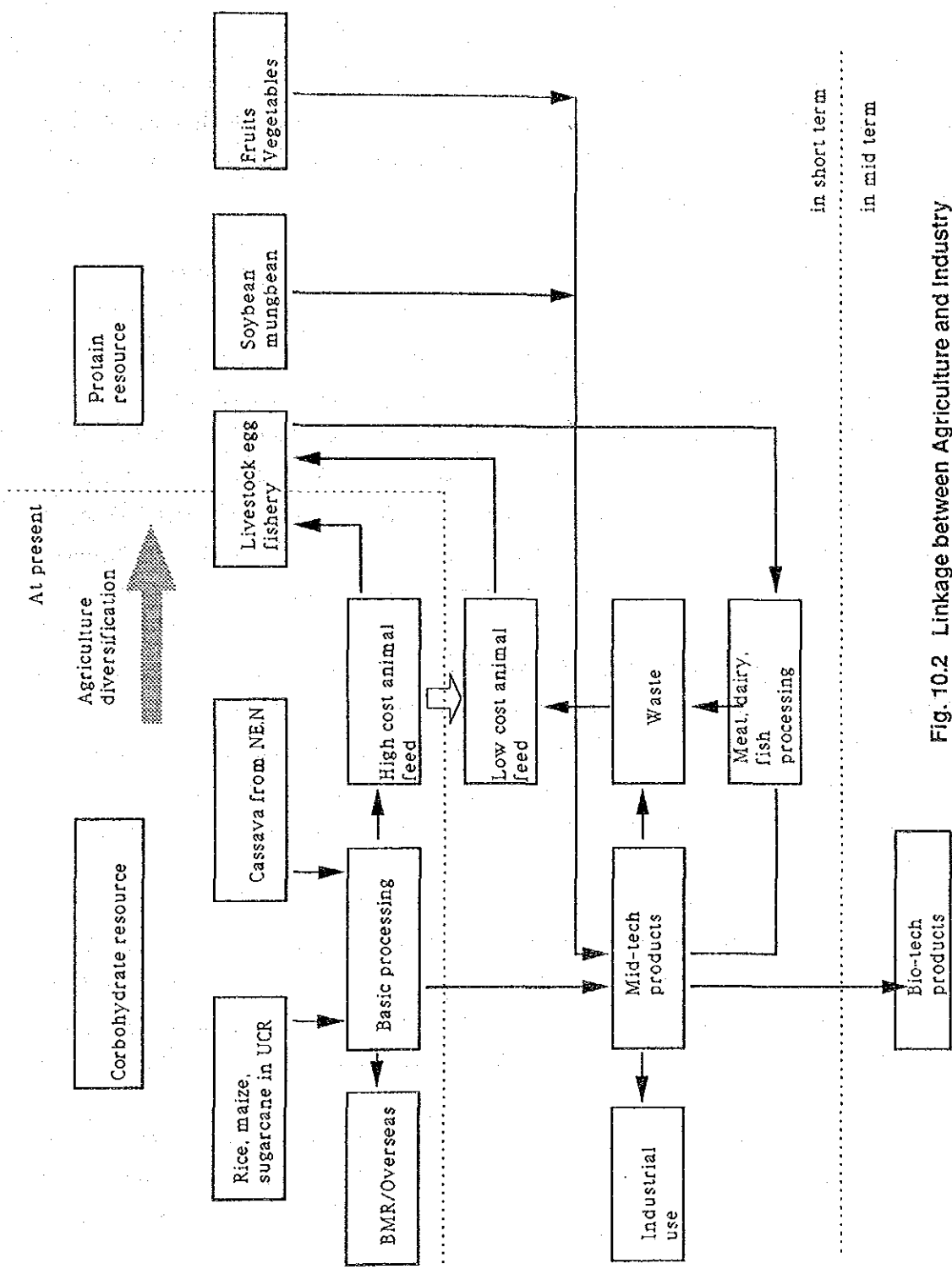


Fig. 10.2 Linkage between Agriculture and Industry

linkages, the growth of these downstream industries will contribute to strengthening the relevant industries.

In addition, it makes animal feed more cost competitive since animal feed can be produced by residuals after processing these downstream industries. This, in turn, makes livestock industries strengthen by reducing their production cost, as shown in Fig. 10.3.

#### 10.2.2 Government Rules

Although the technologies to develop these downstream industries have already been developed and widely used in many industrialized countries, these medium level technologies have been rarely introduced in Thailand because most of agro-processing industries are 1) small-medium scale ones which neither own sufficient self development ability nor sufficient ability to introduce new technology from overseas and 2) merchandise origins which are interested only in trading but not much in technology.

This situation implies the need of government actions to promote downstream industries of major crops by introducing and defusing the medium level processing technologies, which contribute 1) to strengthen linkage between agriculture and industry, 2) to promote agricultural diversification, and 3) to strengthen industrial structure in the UCR by growth of small-medium scale industries.

Besides technical assistance, in order to maximize integration effect among various downstream commodities, the industrial estate specialized in agro-processing industries should be established in the present distribution centers along Pasak River where commodities are transported to existing storage facilities.

## **10.3 Promotion of Small and Medium Scale Industries**

### **10.3.1 Development of Local Entrepreneurship**

Regional small and medium scale industries have been contributed to the development of local economy in terms of labor absorption and resource utilization.

However, those enterprises are, at present, facing with a difficult situation due to the changes in the surrounding economic environment such as structural changes of industries, competition with large scale enterprises, etc.

Thai economy cannot be dependent solely on efficient labor as the source of high growth for long period. Industries must shift from simple manufacturing to more sophisticated manufacturing. In addition to this, they have to put a greater emphasis on building backward linkages by encouraging the manufacturer of materials, parts, components and machinery rather than concentrating on assembling.

Under such circumstances, small and medium scale industries have to respond to the situation by developing new product, diversifying and sophisticating their products.

In case of large scale enterprises, which have the strong management ability and resources in the region, they are capable of establishing cooperative business relations with the enterprises outside the region such as large scale enterprises in the BMR and foreign countries. In this sense, large scale enterprises can adapt themselves smoothly to the ever changing internal and external economic and social environment.

In this way a change is taking place in the rural economy of the UCR, which brings the industrial structure with widening gap between small and medium scale enterprises and large scale enterprises.

Main constraints of the local economy are the lack of efficient government and business service, information flows for management and technology and

marketing access. Consequently, promotional measures should be implemented to overcome present situation and to strengthen linkage from local small and medium scale enterprises to large scale sector and to urban and export sectors.

### **10.3.2 Problems of Present Industrial Policy and Promotional Measures**

Although the important role of small and medium scale enterprises as regional industry and supporting industry in the development of Thai economy, the present industrial policy and various promotional measures have been often criticized as unfavorable and limit the growth potential of small and medium scale industries, especially in the rural area.

The major restricted factors for the promotion of small and medium scale industries are as follows.

- Investment incentives of BOI are based on the project screening principle of economy of scale and short term and direct profit raising such as export.
- Tax incentive, namely "Business Tax", seems to be biased against small and medium scale industries and bringing cascade effect that discourages the development of supporting industries.
- Government assistance are mainly carried in the field of technical guidance and lacking behind in the field of soft side such as management, finance and marketing.
- Cooperate activities such as Chamber of Commerce and Federation of Industries are less active and organized ratio is rather low among small and medium scale industries/rural industries.
- Concentration to the BMR or lack of branch office network of institution which implement government promotional measures is bringing the accessibility limitation to rural industries which comprise many small and medium scale industries.

Functions of existing promotional measures are subdivided into policy and tax incentives, technical and management guidance, organizing activities and

financing. The followings are some comments for future development of each measures.

### 10.3.3 BOI Policy

BOI's stated target areas are defined as agro-industries, labor intensive industries, export oriented industries, energy saving industries and regional industries.

**Table 10.1 Differential Factors of Government Incentives**

| Incentives   | Investment | Finance      | Technology | Management | Organization |
|--|------------|--------------|------------|------------|--------------|
| Implementing institutions<br>(Difference by business scale)          | BOI        | IFCT<br>SIFO | DIP        | TMDPC      | FTI<br>TCC   |
| Large scale industries   | ○          | ○            |            |            | ○            |
| Small and medium scale industries<br>(Difference by business region) | △          | △            | ○          | ○          | △            |
| BMR (Urban)  |            | ○            | ○          | ○          | ○            |
| UCR (Rural)  | ○          | △            | △          | △          | △            |

Note : ○ = preferable, △ = less preferable

However, regarding eligible project scale, the investment promotional measures of BOI seems to still remain, to some extent, unfavorable to small and medium scale industries.

Based on recent policy changes which put a more stress on the importance of small and medium scale industries, the minimum amount required for the investment has been reduced especially in the field of export-oriented industries.

Though these adjustment might have brought some improvement, remaining investment size requirement and administrative procedures tend to work rather restrictive to small and medium scale industries and it keeps the image of BOI as a promoter of large scale projects.

It seems BOI should pay more attention to the development of regional small and medium scale industries. For this purpose, BOI could offer special one stop regional window service network with simpler criteria and procedure.

#### **10.3.4 Tax System**

The primary problem of present tax system against the development of small and medium scale industries is "business tax". This tax is levied on almost all turnover of the firms which engage in the manufacturing, trade and services. Exemption of this tax applies only for the areas such as retail trade, farming, domestic trade in food stuffs and manufacturing for export.

The business tax is levied on intermediate transactions as well as final sales. This results in a "cascading effect" that encourages firms to produce their components and parts for input to the maximum amount and discourage them to procure components and parts from outside or subcontractors.

The development of subcontractors/supporting industries has a significant meaning as a major step to realize the division of labor as well as efficiency and competitiveness among Thai manufacturers.

The government's recent emphasis on the development of supporting industries is shown in their efforts to introduce "Value Added Tax (VAT)" in stead of business tax. The replacing of the business tax with VAT would be expected to remove the most serious bias to supporting industries/small and medium scale industries.

#### **10.3.5 Technical and Management Guidance**

Department of Industrial Promotion (DIP) of the Ministry of Industry is primarily responsible for the development of small and medium industries/rural industries. DIP extends technical, management and financial assistance through its divisions and affiliated institutions mentioned blow. The guidance and assistance are offered in the form of training, consultancy, seminar etc. In addition to this, other ministry such as Ministry of Science, Technology and Energy extends guidance activities from technical side.

### Technical Guidance

- Industrial Service Division (ISD)  
(Furniture, Ceramics, Handicraft etc.)
- Textile Industry Division  
(Textile, Garment)
- Cottage Industry Division
- Metalworking and Machinery Industry Development Institute (MIDI)
- Thailand Institute of Scientific and Technological Research (TISTR)

### Management Guidance

- Thailand Management Development and Productivity Center (TMDPC)  
(Quality Control, Financial Management etc.)

### Financial Assistance

- Small Industries Finance Office (SIFO)

The constraint of budget restricts DIP and other government agency's full fledged guidance and assistance activities for the development of small and medium scale industries, particularly in rural area. Consequently, the guidance and assistance extended by DIP mainly consist of technical training and lacked or limited in the services in the field of management, financing, marketing and information dissemination.

#### **10.3.6 Organizing Activities**

Although there are industrial associations such as Thai Chamber of Commerce (TCC) and Federation of Thai Industries (FTI), in the field of small and medium scale industries, associations are neither so active nor enrollment ratio is so high.

TCC has about 1,500 member firms and FTI has about 1,800 member firms, respectively. Their member firms mainly consist of large scale industries in the BMR. Though they have subregional coordinating bodies such as provincial chamber of commerce and provincial federation of industries, the organizing activities of those sub bodies are comparatively less developed.

TCC and FTI are actively involved as major industrial associations in representing the commerce and industrial sector at discussion and negotiation with the government. While, TCC and FTI work very closely with the government and form the Joint Public and Private Consultative Committee (JPPCC) to promote the close cooperation between public and private sector in solving the national economic problems.

For strengthening the industrial structure of Thailand, cooperative activities among rural areas/small and medium scale industries are especially important in view of the promotion of self government mutual aid and recipient body of government guidance and assistance.

The expected area of cooperative activities are shown below:

- Joint purchase and process,
- Joint sales and marketing,
- Joint storage and distribution,
- Coordination of information exchange,
- Coordination of fund raising, and
- Coordination of government assistance.

#### 10.3.7 Financing

Four types of financial institutions-commercial banks, finance companies, Industrial Finance Corporation of Thailand (IFCT) and Small Industries Finance Office (SIFO) - are major players in the field of industrial financing.

Especially, in the area of small and medium scale financing, government affiliated financial institutions which comprise IFCT and SIFO have a greater role due to the hesitation of private banks being involved in high risk taking area.

However, inadequacy of financial support has been pointed out as one of the most serious bottlenecks in small and medium scale industry development.



The percentage of the loan outstanding advanced to small and medium scale industries by private banks is still very small compared with the one advanced to large scale industries. In addition to this, the loans extended to small and medium scale industries by private banks are mainly in the form of short terms and long term low interest stable funds are difficult to obtain from private sources.

Under these circumstances, there have been government effort to alleviate the financial difficulties of small and medium scale industries, though, still at present, the amount of loan and loan conditions extended by IFCT and SIFO are very limited.

As for industrial financing in rural area, the rural branch offices of private banks are mainly playing the role of deposit collecting for the financing in urban areas or in large scale projects. Furthermore, those government affiliated financial institutions are very limited in the extension of office network and this take away the accessibility to rural industries.

## **10.4 Promotion of Cottage Industries**

### **10.4.1 Present Situation**

There exists several kinds of cottage industries in the UCR, including blacksmith works, weaving works, wicker works etc., providing job opportunities for seasonal unemployment in agriculture sector. Although the Royal Project of Folk Arts and Crafts for Farmers offers the training course of basic craft skills to the local people, the handicraft products in the UCR are producing only low value added because of lack of information and technology from business sector.

In addition, the recent industrialization in the southern part of the UCR is causing labor shift from agriculture sector to these modern industrial sector, resulting weak agriculture sector and in turn, no successor of handicraft industries.

#### **10.4.2 Government Roles**

Agriculture is the backbone not only of the UCR but of the country. In order to maintain the agricultural production, government should provide additional income sources to farmers by providing options to choose occupation, that is, handicraft manufacturing.

It is important to introduce modern management, technology and design to produce sophisticated crafts with high value added. This implies that the business oriented and package type assistance is effective.

# 11. PROJECTS

---

The following projects are indispensable for industrial development of the UCR. The projects are summarized in Fig.11.1 and Table 11.1.

## 11.1 Agro-Tech Center

### 11.1.1 Background and Objectives

The UCR is a national distribution center of five major crop i.e. rice, cassava, maize, sugarcane and soybean. However, since only very basic processes are done in the UCR, regional value added is very limited at present. As shown in Fig.11.1, vast application of downstream industries from these five major crops is possible by using the medium level technologies which are widely utilized in industrialized countries.

The followings are the constraints to develop and diffuse these downstream agro-processing industries:

- Limited capability to develop processing technologies because the industries consist mainly of small-medium scales
- Limited interest in developing the processing technologies because most of the businessmen are merchandize-oriented
- Limited activities of TISTR in the areas outside the BMR

In order to eliminate these constraints, it is recommended to establish the Agro-Tech Center in the UCR with the following objectives:

- Diffusion of existing medium level technologies for small and medium scale industries in the short and medium terms
- Development of local-oriented bio-technologies in long term
- As a result, increase of local value added by efficient use of local raw materials

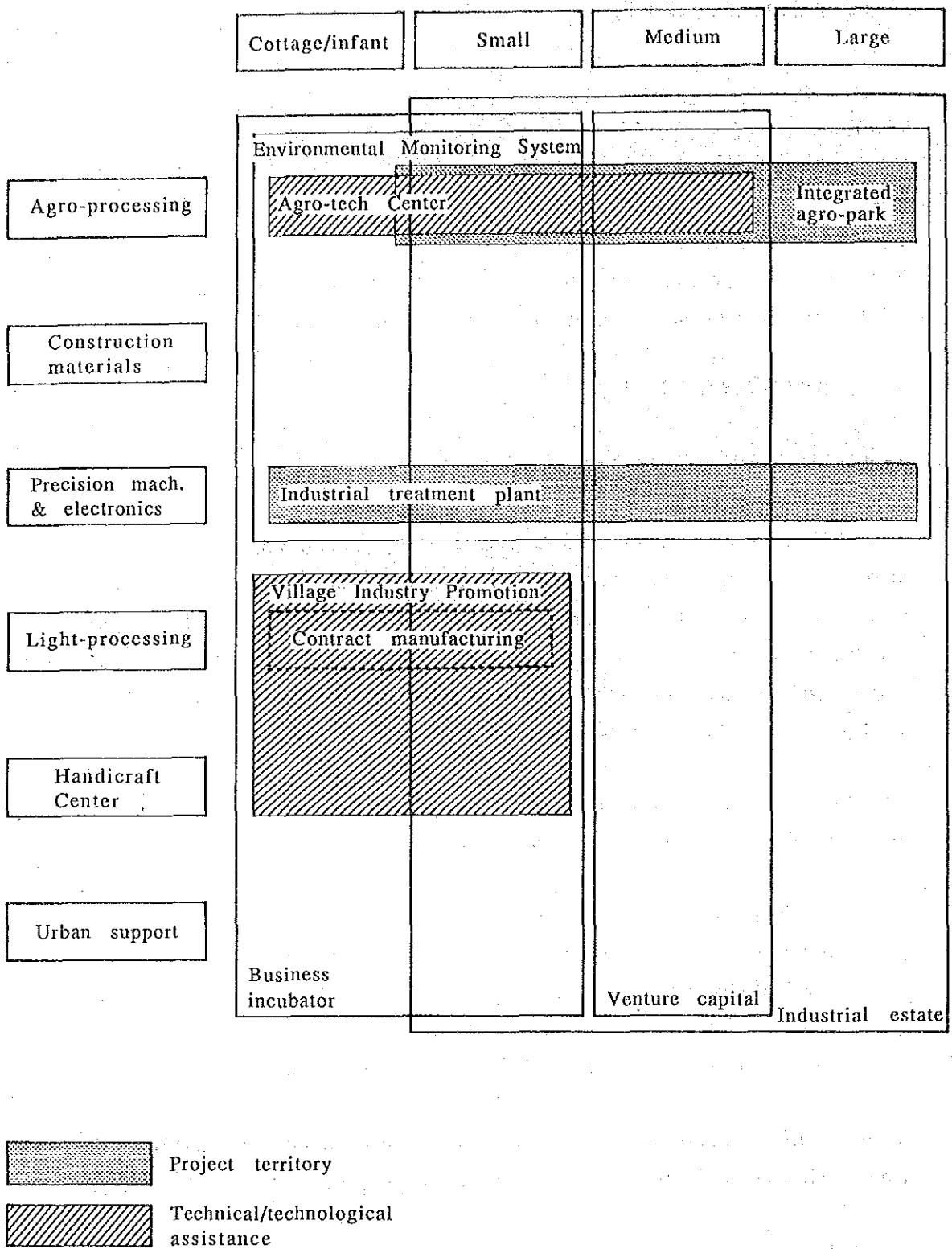


Fig. 11.1 Target of Company Size

Table 11.1 Summary of Projects

| Project                           | Problem  | Objective  | Function/Activity  | Who                               | Initial Fund          | O & M                                  | Site                              |
|-----------------------------------|--|--|--|-----------------------------------|-----------------------|--|-----------------------------------|
| Agro-Tech. Center                 | No VA after agricultural product<br>Weak activities of TISTR in BKK<br>No capability of S-M scale factories to develop processing technology | Diffusion of existing tech. for S-M scale factories<br>↓<br>Increase local value added                             | Develop mid tech. Quality inspection<br>Trial production<br>Technological service  | MOSTE<br>TISTR                    | Government            | TISTR<br>Service fee basis (+ subsidy) |                                   |
| Integrated Agro-Park              | Scattered agro-factories<br>Less integrated effort & environmental problems  | Integration effort of processing<br>Strengthen/stabilize agro-sector   | Truck terminal<br>Storage<br>Agro-industrial estate<br>Inspection<br>Waste water treatment plant   | IEAT with private sector          | Private sector        | IEAT<br>service fee basis              | Tha Rua in GSIC                   |
| Village Industry Promotion Center | No Organization<br>No gargening power<br>In favourable middleman's activities<br>No modern tech/design<br>Low value added                    | Develop high value added craft<br>Additional income for farmers<br>↓<br>Seeds of supporting industry in the future | Technology assistance<br>→ injection of modern tech/design from BKK<br>Managerial assistance<br>→ Joint marketing, mach maker<br>→ Purchase materials by large lot<br>→ Promote contract manufacturing | M. of Ind.<br>Chamber of commerce | Chamber of commerce   | Private Committee<br>Service fee basis | Ayutya (Tourism spot)<br>Chai Nat |
| Business Incubator                | Dual industry structure between large-cottage/outsider-local<br>Lead by outsider<br>No function to encourage local entrepreneur              | Promote local based small industry to use local potentials   | Provide business infra. such as space, telecom, computer<br>Managerial assistance<br>Technological assistance<br>Find fund source from private organization to start up business                       | MOI<br>JPPCC                      | Government<br>Private | Government<br>Private                  | Sara Buri                         |
| Venture Capital                   | (Same as Business Incubator)   | Follow up graduates from Business Incubator<br>Assist to promote supporting industry for large scale ind.          | Capital investment<br>Consulting service for business plan and operation   | JPPCC<br>Fund-Domestic<br>Foreign | Private               | Private                                | Sara Buri                         |

### 11.1.2 Functions and Activities

Agro-Tech Center provides total technological consulting services for mainly small and medium scale industries, specialized in the applied technologies to process major five crops produced and brought in the UCR. Although Food Industrial Department of TISTR offers similar services, local-oriented institute is necessary to promote the technologies appropriate to specific mix of local conditions. In other words, Agro-Tech Center can be a branch laboratory of TISTR, specialized in the agro-processing industries related to the five major crops. It is important to notice the difference in target commodities of agro-processing between the UCR and the northern region, where vegetables and fruits are promising rather than major crops.

Technological consulting services offered by the Center are:

- Development of applied technologies, upon request by private firms, with cooperation of central institutions, universities, and foreign public/private institutions.
- Trial production to identify and solve technological problems
- Quality inspection to meet with domestic and foreign standard.
- Technological services through seminars, training courses and reference books/reports.

### 11.1.3 Management

Government and private cooperation is a key factor to effectively manage the Center since main users of the Center are the small and medium scale industries which do not have sufficient financial and personnel capabilities. Desirable supporting groups are:

#### Public Sector

Central government (MOSTE/TISTR,MOI)

Provincial government

#### Private Sector

Industrial federation (central and provincial)

Chamber of commerce (central and provincial)

Relevant associations

### Research institutes

Universities (domestic and foreign)

Research institutes (domestic and foreign)

The initial cost for establishing the Center should be provided by the central government, desirably with contribution from private organizations. Operation cost should, however, be generated mainly by the Center itself through member fee, research fee, and other service fees.

The project office should be in Sara Buri City, being the urban service center of GSIC. Integrated Agro-Park at Tha Rua should be a major beneficiary of this project.

## **11.2 Integrated Agro-Industrial Park**

### **11.2.1 Background and Objectives**

Although a huge volume of agricultural products such as rice, cassava, maize, sugarcane and soybean are transported for basic processing into the UCR, these warehouses and mills are scattered along Pasak River in Tha Rua and Bang Shai, Ayutthaya. This indicates little integrated and linkage effect utilized in the UCR, resulting a limited value added generated.

Integration of the agro-processing industries would generate the following benefits:

- To reduce production cost by cost sharing of common facilities such as truck terminal, storage, shipping and waste treatment plant
- To reduce transportation cost in case that raw materials are the by-products produced in the Agro-Industrial Park
- To strengthen linkage among downstream products
- To strengthen cost competitiveness by both the economies of scale and efficient resource use by recycling
- To develop new products by exchanging information and products among participant industries in the Agro-Industrial Park

Taking these integrated and linkage effects of agro-processing industries into account, it is recommended to establish the Integrated Agro-Industrial Park with the following objectives in order to strengthen the industries to process the five major crops:

- To develop downstream industries of the five major crops
- To strengthen linkage among these products
- To encourage agricultural diversification by offering the market of agricultural products for industrial use
- To support livestock production by reducing animal feed cost through efficient use of residuals from agro-processing

#### **11.2.2 Functions and Activities**

There has been no industrial estate specialized in specific industrial types in Thailand. In order to maximize integrated and linkage effects, the government should take the strong leadership to guide agro processing industries to participate in the well-planned Integrated Agro-Industrial Park, which can function as one huge agro-processing plant with product flow connections among factories. The Agro-Industrial Park has the following functions and activities:

- Truck terminal
- Various types of storage
- Agro-processing area
- Water recycling system with industrial waste water treatment plant
- Shipping port for barges
- Product quality inspection facilities
- Basic infrastructure
- Administrative office

#### **11.2.3 Management**

Industrial Estate Authority of Thailand (IEAT) has to play important role in managing the Agro-Industrial Park as an industrial planner together with private organization. The following strict policies should be adopted in order to maximize the integrated and linkage effect of the Agro-Industrial Park;



- To accommodate only agro-processing industry
- To arrange factories so as to maximize industrial linkage effects
- To set up water recycling system with treatment plant and to monitor the aggregate industrial pollution load
- To encourage cooperatives to be organized by industries in the Aglo-Industrial Park in order to:
  - a. Solve common problems such as environmental management and use of common facilities,
  - b. Develop new technologies and products by exchanging know-how and products/by-products among industries in different fields,
  - c. Arrange the soft loans guaranteed by cooperatives,
  - d. Do lobbying activities against central and local governments,
  - e. Provide joint training courses/seminars, and
  - f. Promote joint recruitment activities

Although initial cost should be born by private organizations, IEAT should manage design, operation and maintenance of the Agro-Industrial Park.

The project should be at Tha Rua along Pasak River because of:

- Existing distribution facilities,
- Inland water transportation,
- Water availability of both surface and underground and
- Railroad transportation possibly to be expanded in the future.

### **11.3 Village Industry Promotion Center**

#### **11.3.1 Background and Objectives**

There are several kinds of handicraft being produced in the UCR. Particularly, blacksmith industries are concentrated in Aranjuk village, Nakhon Luang, Ayutthaya, where cutlery and agricultural tools are produced by 500 families or 2000 craftsmen.

Because of the limited coordination and communication among craftsmen, however, neither modern management nor advanced technologies have been introduced, resulting in the 1) weak bargaining power of craftsmen to purchase materials and to sell products and 2) low quality and productivity, respectively. This makes village industries less attractive for young successors, under the modern industrialization trend, in which modern industries come into Ayutthaya and create job opportunities with better working condition. Consequently, the village industries are shrinking due to labor shift to modern industrial sector.

Under this unfavorable condition for the village industries, however, no financial and technological assistance from outside the region have been made. Since middleman's interests are only in the short term profit, no investment to improve technology by using advanced materials and equipments have been made. Although the Royal Project of Folk Arts and Crafts for Farmers in Ayutthaya offers basic handicraft skills training course, there exist difficulties for trainees to apply these basic skills for high value added products. MOI and Ministry of Interior also offer opportunities for farmers to obtain basic skills but without business oriented training.

Thus, no business-oriented assistance is available from either private or public, with a result that this industry is suffering from the lack of chance to improve their old-fashioned skill and design. Therefore, it is recommended to establish a village industry promotion center with the following objectives:

#### Economic Aspect

- To develop the high value added products for which works are attractive for villagers compared to modern industries
- To strengthen industrial structure by developing local based technologies

#### Social Aspect

- To strengthen agricultural sector by generating additional income source of farmers and absorbing seasonal unemployment
- To preserve valuable traditional techniques/skills by application of advanced technology on them

Another effect in the long term is that these craftsmen with modern management skill and advanced design/technology can be candidates of local entrepreneur.

### 11.3.2 Functions and Activities

The village industry promotion center provides comprehensive services in both technological and managerial aspects with corporation from the business sector which provides the latest market information and design/technology. In other words, this center functions as a matchmaker between the local craftsmen and the business sector outside the region, including foreign countries.

Major contents of the assistance to diffuse advanced technologies and modern design are:

- To organize training courses/seminars to diffuse new technologies in coordination with MOI, the Royal project, foreign international cooperation agencies and foreign business sectors
- To provide advanced equipment for craftsmen to develop new products
- To do fundamental research/development for the use of new materials and equipment

Major contents of the assistance to introduce the modern management know-how are:

- To develop domestic and overseas market channel by various market promotion such as exhibitions, promotion missions and events
- To encourage craftsmen to organize cooperatives in order for them to strengthen the bargaining power in purchasing materials and selling products
- To function as a matchmaker between craftsmen and traders
- To follow up the graduates from the Royal project by providing 1) soft loans to start up business and 2) business opportunity through introduction of traders and market

### **11.3.3 Management**

Managerial committee of the village industry promotion center should be set up through coordination between public and private as follows:

#### Public

- MOI
- Ministry of Interior
- Royal Project of Folk Arts and Crafts for Farmers

#### Private

- Thai Chamber of Commerce
- Provincial Chamber of Commerce
- Craftsmen's cooperatives

The committee, which is the third sector organization, should provide the initial cost to establish the Center. However, operation cost should be collected on service fee basis so that the Center can be operated by its own budget.

In order to generate higher value added, the target products should be for practical use with the modern design and high quality, which makes them different from handicrafts in Chiang Mai, which are mainly for decoration purposes with traditional Thai design. The potential products can be divided into two categories; 1) metal works such as cutlery, tableware and agricultural tools and 2) light processing products such as artificial flowers, Christmas flowers, basket, dressmaking and glassware.

## **11.4 Business Incubator and Venture Capital**

### **11.4.1 Background and Objectives**

Traditionally, the scope of business of small and medium scale industries is rather limited, while their management resources are scarce. Therefore, it is a prerequisite for small and medium scale industries to effectively utilize the available external management resources for the activities of new product and technology development.

Therefore, it is necessary to consider the comprehensive and incentive measures to encourage many start up entrepreneurs and existing regional small and medium scale industries on long term basis.

Incubator has a function of complementing the management fragility of small and medium scale industries, especially in soft fields such as marketing, administration and information network.

For this purpose, the incubator can provide a catalyst to promote the interactions between small and medium scale industries, outside experts, large scale industries, government agencies, research institutes and financial institutions. This type of cooperation allows small and medium scale industries to obtain by themselves the technology, management and marketing information/ business seeds which are otherwise not available with them.

Establishing the "Incubator" as a core institution for the business coordination and interactions could expedite local industrial growth. By strengthen regional guidance and assistance, the incubator could respond to the demand for regional services from small and medium scale industries.

#### **11.4.2 The Role of "Business Incubator"**

Common managerial problems of the local small and medium scale industries are as follows:

- Recruiting engineers and technical staff
- Fund raising for research and development
- Acquisition of office and laboratory
- Acquisition of machinery and equipment for research and development
- Establishment of sales network for new products
- Technical and financial appraisal of the feasibility of development projects
- Build up latest technology information network

On the other hand, generally speaking, there are several conditions for the local businessmen to start up and grow up as a successful entrepreneur. These conditions are:

- Encounter with excellent management advisor
- Utilization of external management resources
- Start up capital in rapidly growing business field
- Entrepreneurship (enthusiasm and ambition)

Incubator extends the following merits to potential entrepreneur of small and medium scale industries:

- Acquisition of credibility (finance and marketing)
- Improvement of company image (recruiting and marketing)
- Cost reduction (joint office and business facilities)
- Experience of management know-hows in short term (balanced know-hows of technical and management aspects)
- Fostering of local business community (mutual assistance and competition among entrepreneurs)
- Establishment of business network (external management resources such as public institutions, private industries, universities and financial institutions)

#### **11.4.3 Function and Facilities**

Incubator provides a comprehensive package of hardware and software to guide and encourage the entrepreneurs to develop. The hardware including office space and various utilities would be offered at preferable conditions and consulting and information services would cover management, technology, marketing and finance.

Functions and facilities of the incubator service should be set up in consideration of the following 6 characteristic roles and policies.

- Providing flexible business space
- Providing cost-saving business utilities
- Comprehensive management and technology consultancy
- Competitive atmosphere

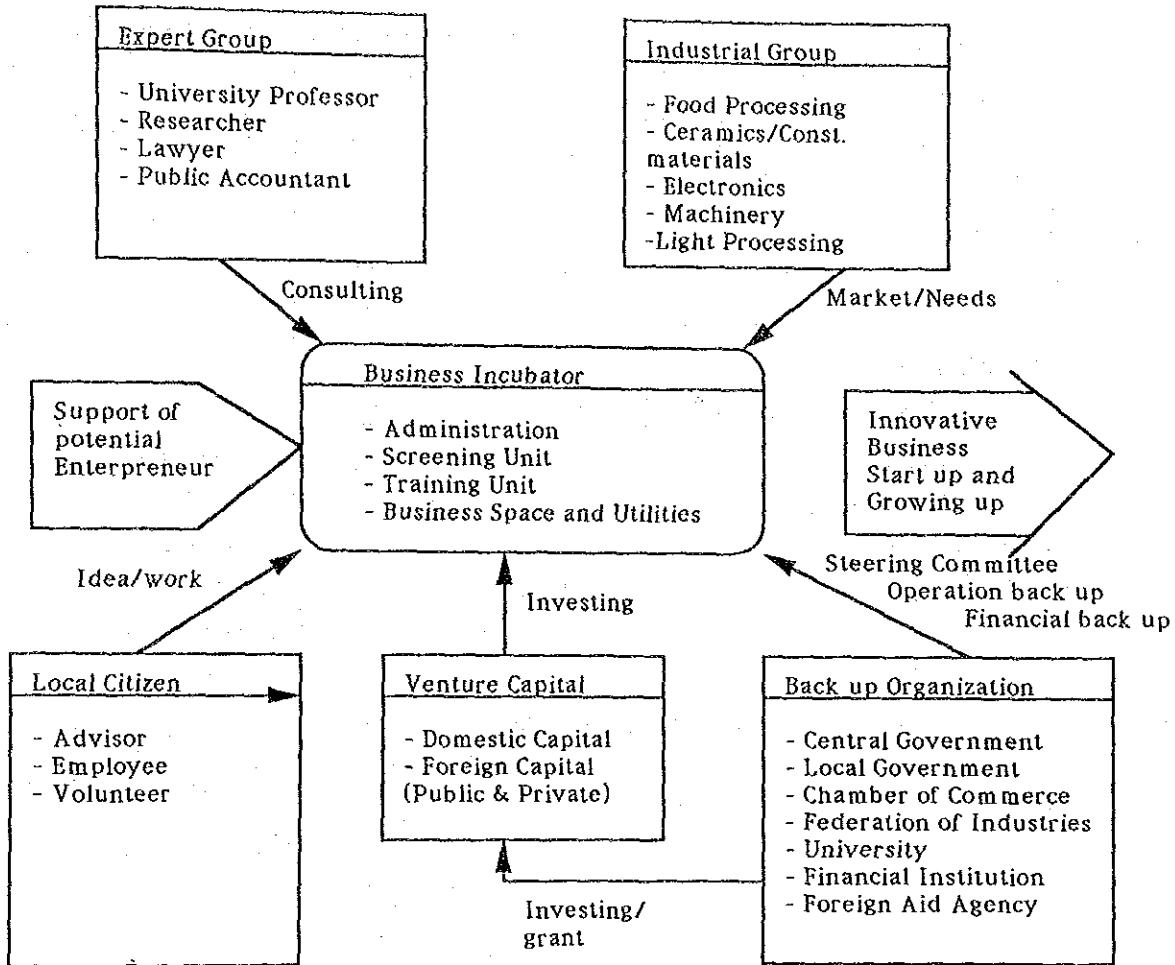


Fig. 11.2 System and Service Network of Incubator

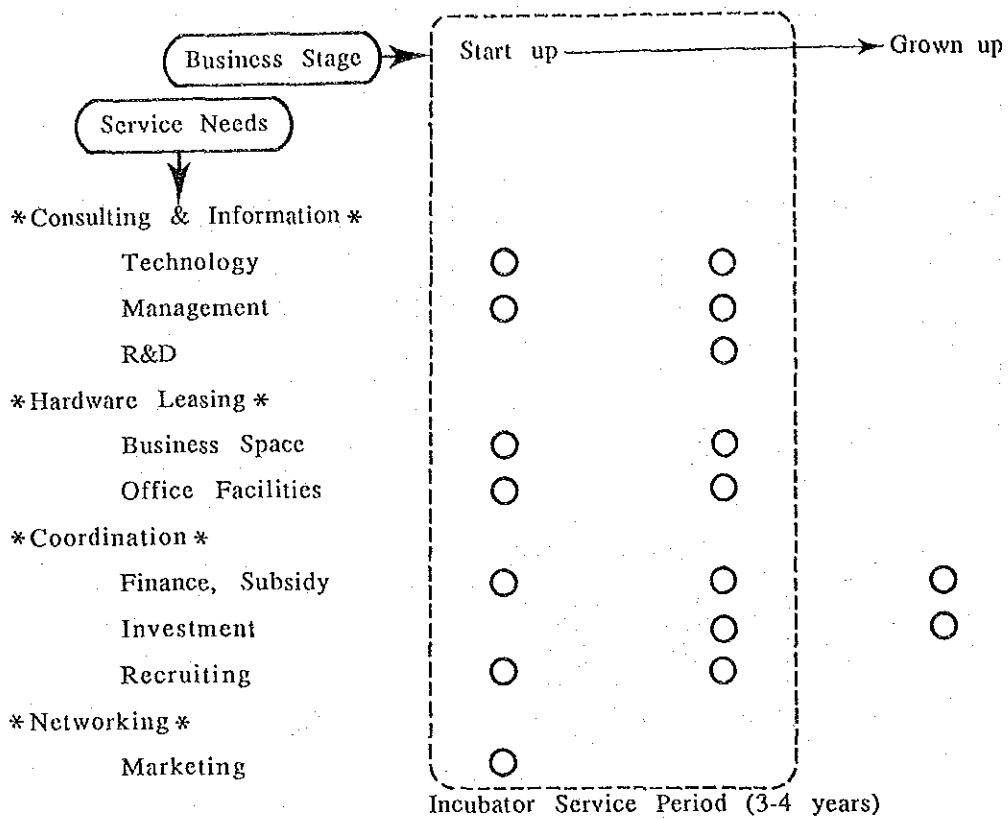


Fig. 11.3 Expected Service Fields of Incubator

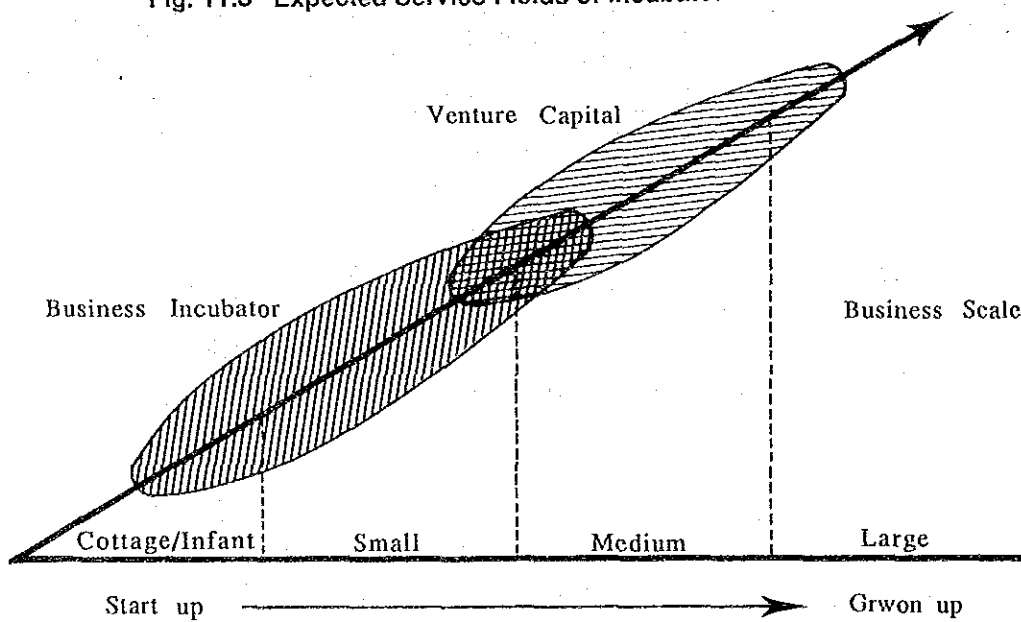


Fig. 11.4 The Role of Incubator and Venture Capital



- Short-term graduation policy
- Financial coordination
- Regional promotion center

Incubator services would be classified into the following three fields:

Business Service

- Telephone
- Typing
- Reproduction
- Facsimile
- Mail
- Computer Service (stock management, financial management, etc.)
- Product transportation
- Lease of furnitures and office equipment
- Employee training
- Technology information service
- Marketing information service

Office Service

- Business space leasing
- Basic utility (air condition, lighting etc.)
- Reception service
- Office management and maintenance
- Security system
- Conference room and cafeteria

Management Service

- Business planning assistance
- Management consulting
- Technical consulting
- Financial and investment coordination
- Coordination for joint business undertaking

#### 11.4.4 Management

Administration/steering committee of incubator should be set up based on public and private cooperation. Good cooperation between the government (central and provincial) and the private sector should be as one of the most important criteria for the development of regional industries. In addition to this, collaboration with research institutes and universities should be promoted.

##### Public Sector

- Central government (MOI, MOSTE)
- Changwat administration

##### Private Sector

- Federation of Thai Industries
- Thai Chamber of Commerce
- Thai Bankers Association
- Provincial Industrial Federation
- Provincial Chamber of Commerce

##### Research Institute

- University
- Technical college
- Research institute
- Management consultant

To implement incubator activities more smoothly and more effectively, close coordination between the incubator and the supporting and cooperation groups should be established. The following groups can be listed as useful and helpful ones.

##### Expert Group (providing consultancy and information service)

- University professor, researcher, lawyer, public accountant, etc.

##### Industrial Group (providing market/needs information)

- Potential local industries such as food processing, ceramics/ construction materials, electronics, machinery and light processing.

Local Citizen (supporting and joining in idea creation and incubator activities)

- Cooperate as advisor, employee and volunteer.

#### 11.4.5 Potential Entrepreneurs and Industrial Preferences

Source of potential entrepreneur would be categorized into the following four types:

- Venture business section of big businesses
- R & D section of medium scale industries
- Successor of local businessmen and landlords
- Spin out from industries or universities

Potential entrepreneurs should be screened out in consideration of : 1) business mind (entrepreneurship), 2) administration/management skill, 3) creativity, 4) marketing network and 5) financial resources.

#### 11.4.6 Creation of Venture Capital

To strengthen the function of incubator and financial base of start up entrepreneurs/small and medium scale industries and to supplement the role of existing private and public financial institutions, the function of venture capital, or equity participation, should be encouraged by mobilizing financial resources of domestic and overseas market.

In recent years, although several venture capital companies were established, risk capital money is particularly insufficient. In order to cope with this situation, a possibility to create new venture capital should be studied by mobilizing the fund not only from the domestic private sector but from some bilateral aid agencies which could offer low interest rate and long term in maturity and grace period.

However, such venture capital should be set up as autonomous independent entity entrusted for management/administration of fund in order to ensure flexible and efficient operation on purely commercial basis, without long legal and bureaucratic procedures. Also, a management/administration body should be formed based on the accumulated experience in financial appraisal and project screening.

Furthermore, in order to get fruitful result from this investment activity, emphasis should be placed on the limited field in stead of scattering the valuable but limited fund. In this sense, a close linkage must be maintained between incubator and venture capital.

### **11.5 Environment Related Projects**

Sector Report 3: Environmental Management fully discusses the policies and measures for controlling industrial pollution. Major proposals derived from the discussion include the following which is closely related with industrial development:

- Industrial hazardous waste treatment plant and its dumping site
- Monitoring system based on both scientific method and people's perception.

**APPENDIX 1. LIST OF STUDY REPORTS AND PAPERS**



## APPENDIX 1. LIST OF STUDY REPORTS AND PAPERS

### 1. REPORTS

Design for the Study

Inception Report

Inception Report: Amendment

Progress Report

Interim Report

Executive Summary

Master Plan Report

Technical Reports

- Vol. 1 Spatial Framework for Development
- Vol. 2 Environmental Management
- Vol. 3 Land Use and Agricultural Development
- Vol. 4 Industrial Development
- Vol. 5 Distribution
- Vol. 6 Water Resources Management
- Vol. 7 Transportation
- Vol. 8 Economic Environment
- Vol. 9 Local Government Finance
- Vol. 10 Energy
- Vol. 11 Landsat Analysis

Draft Final Report

Executive Summary

Master Plan Report

Sector Reports

- Vol. 1 Spatial Framework and Network for Development
- Vol. 2 Urban Management
- Vol. 3 Environmental Management
- Vol. 4 Water Resource Management, Agricultural Development and Land Use Management
- Vol. 5 Industrial Development
- Vol. 6 Distribution and Marketing
- Vol. 7 Energy
- Vol. 8 Social Development in Rural Economies
- Vol. 9 International and National Economic Environment
- Vol. 10 Human Resource Development
- Vol. 11 Landsat Analysis

Final Report

Executive Summary

Master Plan Report

Sector Reports

- Vol. 1 Spatial Framework and Network for Development
- Vol. 2 Urban Management
- Vol. 3 Environmental Management

- Vol. 4 Water Resource Management, Agricultural Development and Land Use Management
- Vol. 5 Industrial Development
- Vol. 6 Distribution and Marketing
- Vol. 7 Energy
- Vol. 8 Social Development in Rural Economies
- Vol. 9 International and National Economic Environment
- Vol. 10 Human Resource Development
- Vol. 11 Landsat Analysis

## 2. PAPERS

Papers for Seminar, Sara Buri, November 2-3, 1989

1. Development Framework, Strategies, and Production
2. Urban, Land Use and Infrastructure Development
3. Critical Issues for Development Management

Papers for Seminar, Pattaya, July 28-29, 1990

1. Agriculture and Water Resources: Policies and Programs
2. Industry and Energy: Policies and Programs
3. Urbanization and Infrastructure Facilities: Policies and Programs
4. Development Administration and Environmental Management: Policies and Programs



## **APPENDIX 2. STAFF INPUT**



## APPENDIX 2. STAFF INPUT

### Members of UCR Study Project Staff of NESDB

- |     |                             |   |
|-----|-----------------------------|---|
| 1.  | Mr. Vithya Siripongse       | Deputy Secretary-General and Project Director                             |
| 2.  | Dr. Utis Kaothien           | Director of Urban Development Coordination Division and Projector Advisor |
| 3.  | Mr. Manu Sattayateva        | Director of Central Region Development Center and Project Manager         |
| 4.  | Mr. Weera Sritaranondha     | CRDC Official and Counterpart Team Member                                 |
| 5.  | Mr. Teerapat Kaiyarit       | - do -  |
| 6.  | Mr. Numthip Pattanaskul     | - do -  |
| 7.  | Mrs. Somsiri Protitikul     | - do -  |
| 8.  | Mr. Sumeth Srisangthaisuk   | - do -  |
| 9.  | Mr. Kiattikul Lueangwattana | UDCD Official and Counterpart Team Member                                 |
| 10. | Ms. Piyachat Sonkom         | CRDC Official and Counterpart Team Member                                 |
| 11. | Mr. Poolwit Bua-on          | - do -  |
| 12. | Mr. Mana Ligkachai          | - do -  |
| 13. | Mr. Sumitra Pooltong        | - do -  |
| 14. | Mr. Chokdee Srisomboon      | - do -  |

### Members of JICA Advisory Committee for UCR Study

- |    |                       |  |
|----|-----------------------|--|
| 1. | Mr. Koichiro Katsurai | Chairman of the Committee, Institute for International Cooperation, JICA |
| 2. | Mr. Koichi Nonaka     | Member of the Committee, Institute of Developing Economies               |
| 3. | Mr. Koji Taniguchi    | Member of the Committee, IDE   |
| 4. | Dr. Kunitoshi Sakurai | Member of the Committee, IFIC, JICA                                      |

5. Mr. Atsushi Matsumoto Member of the Committee and Officer in Charge, JICA

TEAM EXPERTS

1. Dr. Jinichiro Yabuta Leader, Regional Development, IDCJ
2. Dr. Masahiko Honjo Advisor, Regional Development, IDCJ
3. Mr. Yoshinobu Nomura Deputy Leader, Regional Development, PCI
4. Dr. Masahiro Nakashima Water Resource and Environmental Management, IDCJ
5. Mr. Tadashi Kume Land Use and Environmental Management, PCI
6. Mr. Toru Ishibashi Industrial Development, ECFA
7. Dr. Michiaki Hosono Agricultural Development, PCI
8. Mr. Katsuhide Nagayama Spatial Framework for Development, Urban and Environmental Management, PCI
9. Mr. Atsushi Saito Distributional Marketing, PCI
10. Dr. Charit Tingsabadh National Economic Environment, CUSRI
11. Mr. James M. McBride Transportation Development, PCI
12. Dr. Masayuki Doi Transportation Development, IDCJ
13. Ms. Abha Sirivongs Na Ayuthaya Water Management Institution, CUSRI
14. Mr. Masamichi Ogawa Industrial Development, IDCJ

- |     |                     |   |
|-----|---------------------|---|
| 15. | Mr. Masahiro Hamano | Local Authority Finance,<br>SOMC                            |
| 16. | Mr. Masumi Ishida   | Energy and Regional Economy,<br>IDCJ                        |
| 17. | Mr. Kazuto Yamada   | Environmental Management,<br>PCI                            |
| 18. | Mr. Kenji Domoto    | International and National<br>Economic Environment,<br>IDCJ |
| 19. | Mr. Toshiyuki Imai  | Private Investment and Industrial<br>Development,<br>IDCJ   |

|        |   |
|--------|---|
| CUSRI: | Chulalong Korn University Social Research Institute |
| ECFA:  | Engineering Consulting Firm Association             |
| IDCJ:  | International Development Center of Japan           |
| PCI:   | Pacific Consultants International                   |
| SOMC:  | Shinko Overseas Management Consultant               |

#### CO-EXPERTS

- |    |                        |   |
|----|------------------------|---|
| 1. | Dr. Surin Setamamit    | Environmental Management,<br>Chulalong Korn University                              |
| 2. | Dr. Chamnien Boonma    | Agricultural Economy,<br>Kasetsart University                                       |
| 3. | Dr. Kamol Sudaprasert  | Human Resource Development,<br>Nonformal Education Department                       |
| 4. | Dr. Jacques Amoyot     | Social Development in Rural Economies,<br>Chulalong Korn University                 |
| 5. | Dr. Wisoot Wiseschinda | Social Development in Rural<br>Economies,<br>Chulalong Korn University              |
| 6. | Mr. Suvit Vibulsresth  | Landsat Analysis,<br>Thailand Remote Sensing Center                                 |
| 7. | Mr. Satoshi Machida    | Landsat Analysis,<br>Pacific Consultants Co. Ltd.                                   |
| 8. | Dr. Krai Tungsonga     | Survey of Industry, Distribution and<br>Marketing,<br>Asian Engineering Consultants |

- |     |                                  |   |
|-----|----------------------------------|---|
| 9.  | Dr. Kraiyudht<br>Dhiratayakinant | Local Government Financing,<br>Chulalong Korn University          |
| 10. | Dr. Jesada Kaewkulaya            | Water Management,<br>Kasertsart University                        |
| 11. | Dr. Daranee Thavinpipatkul       | Urban and Human Settlement Analysis,<br>Chulalong Korn University |
| 12. | Ms. Shujit Pongtong              | Tourism Development,<br>Tourism Authority of Thailand             |

**ADMINISTRATIVE SUPPORT STAFF**

- |    |                     |   |
|----|---------------------|---|
| 1. | Mr. Yasunobu Kawato | General Manager, Planning Division,<br>IDCI |
| 2. | Mr. Tsuneo Sakano   | Resident Representative,<br>PCI Bangkok     |



JICA