

No. 38

**A STUDY ON  
INDUSTRIAL SUB-SECTOR  
DEVELOPMENT  
IN THE REPUBLIC OF INDONESIA**

**Part II  
Ceramic Products Industry**

**SECOND YEAR FINAL REPORT**

**DECEMBER 1991**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

MPI

CR(3)

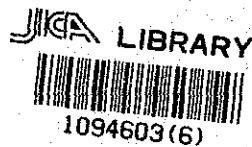
91-120



**A STUDY ON  
INDUSTRIAL SUB-SECTOR  
DEVELOPMENT  
IN THE REPUBLIC OF INDONESIA**

**Part II  
Ceramic Products Industry**

**SECOND YEAR FINAL REPORT**



23088

**December 1991**

**JAPAN INTERNATIONAL COOPERATION AGENCY**





マイクロ  
フィルム作成

# FINAL REPORT

## Table of Contents

### 2. Ceramic Products Industry

<b>Summary</b> .....	<b>II-i</b>
<b>2-1 Method of Survey</b> .....	<b>II-1</b>
(1) Domestic Survey in Indonesia .....	II-1
(2) Domestic Survey in Japan .....	II-4
(3) Survey in Third Countries .....	II-4
<b>2-2 World Trend in Production and Consumption of Ceramics</b> ....	<b>II-5</b>
2-2-1 World Trends in Ceramics Trade .....	II-5
(1) World Trends in Demand .....	II-5
(2) Competition in the International Market and Performance of Indonesian Products .....	II-6
(3) World Demand Outlook .....	II-9
2-2-2 Trends in Production and Consumption, Evaluation of Indonesian Ceramic Products in the Japanese Market ....	II-11
(1) Characteristics of the Japanese Ceramics Industry .....	II-11
(2) Production and Market Trends .....	II-11
(3) Competition in the Import Market .....	II-14
(4) Evaluation of Indonesian Products; Necessary Countermeasures, Items with Potential for Export to Japan .....	II-16
(5) Attitude of Japanese Companies Concerning Joint Venture Investment and Technological Tie-up with Indonesian Companies .....	II-17
2-2-3 Performance and Evaluation of Indonesian Ceramic Products in Major Import Markets .....	II-21
(1) United States .....	II-21
(2) Germany .....	II-23
2-2-4 Ceramic Production and Exports and Industrial Promotion Policy in Competing Nations .....	II-26
(1) Thailand .....	II-26
(2) Malaysia .....	II-27
(3) Sri Lanka .....	II-29
<b>2-3 Overview of the Indonesian Ceramics Industry</b> .....	<b>II-32</b>
2-3-1 Raw materials and Auxiliary Materials Sector .....	II-34
(1) Raw Materials Sector .....	II-34
(2) Auxiliary Materials Sector .....	II-36
2-3-2 Ceramics Manufacturing Industry .....	II-39
(1) Overview .....	II-39
(2) Tableware, Novelties Manufacturing Industry .....	II-46
(3) Sanitary Ware Manufacturing Industry .....	II-48
(4) Tile Manufacturing Industry .....	II-49
(5) Demand outlook .....	II-50
2-3-3 Industrial Associations: Organization and Activities .....	II-54
(1) Capsule History of ASAKI .....	II-54
(2) Current Organization and Activities .....	II-54
(3) ASAKI's Requests.....	II-55

2-3-4	Current Status of Corporate Management, Production and Technology ....	II-56
	(1) Corporate Management .....	II-56
	(2) Current Situation of Production and Technology .....	II-67
	(3) Case Study .....	II-81
	(4) Expectations of the government by ceramic product manufacturers.....	II-85
2-3-5	Current Situation of Joint Venture Investment and Technological Tie-ups with Foreign Companies and Attitude of Indonesian Firms ...	II-87
	(1) Current situation .....	II-87
	(2) Attitude of firms .....	II-87
2-3-6	Promising Ceramics Products and Potential Markets .....	II-90
	(1) Present products sectors .....	II-90
	(2) New products sectors .....	II-91
<b>2-4</b>	<b>Policy Review for the Promotion of the Ceramics Industry .</b>	<b>II-93</b>
2-4-1	The Organization and Activities of Administrative Organizations, Technology Promotion Organizations, and Testing, Research and Development Institutes .....	II-93
	(1) Administrative organizations .....	II-93
	(2) Technology Promotion Organizations and Testing, Research and Development Organizations .....	II-93
2-4-2	Position Among Industrialization Policies .....	II-97
2-4-3	Trade and Investment Policy Related to the Ceramic Industry .....	II-97
2-4-4	Financial Programs .....	II-97
2-4-5	Infrastructure .....	II-98
<b>2-5</b>	<b>Issues for the Promotion of the Ceramics Industry .....</b>	<b>II-99</b>
2-5-1	Selection and Improvement of Quality and Stabilization of Supply of Raw Materials .....	II-99
	(1) Strengthening the development of raw materials .....	II-99
	(2) Provision of standards and guidance for selection and grading .....	II-101
	(3) Improvement of the processing and treatment processes .....	II-102
	(4) Promotion of mixing technology .....	II-105
	(5) Improving the import environment .....	II-106
	(6) Implementation of a full-scale survey on resources .....	II-107
2-5-2	Promotion of Production and Supply Systems for Auxiliary Materials, and Provision of the Infrastructure .....	II-108
	(1) Intensive development of priority fields .....	II-109
	(2) Exchange of information within the industry and smoother distribution .....	II-110
	(3) Improvement in the import environment .....	II-112
	(4) Provision of infrastructure .....	II-112
2-5-3	Improvement of Plant Management .....	II-114
	(1) Securing, training and allocation of staff .....	II-114
	(2) Modernization of equipment .....	II-117
	(3) Improving manufacturing skills .....	II-117
	(4) Safety and hygiene management .....	II-118
	(5) Modernization of management .....	II-118
	(6) Prevention of pollution .....	II-118
2-5-4	Improvement of Quality Control .....	II-120
	(1) Management of raw materials and materials .....	II-120
	(2) Process management .....	II-120
	(3) Quality control of products .....	II-121

2-5-5	Strengthening of Technology and Product Development .....	II-122
	(1) Material mixing technology .....	II-122
	(2) Design development .....	II-122
	(3) Decoration technology .....	II-122
2-5-6	Coordinating Policy and Establishing Support Systems .....	II-124
	(1) Establishment of a policy coordination function .....	II-124
	(2) Creation of Support Systems .....	II-124
	(3) Augmentation of a system for supplying manpower .....	II-130
	(4) Augmentation of technological guidance, skills training and disseminating information on latest technologies .....	II-131
	(5) Completion of industrial standards .....	II-133
	(6) Introduction of an export inspection system .....	II-133
	(7) Promotion of industrial development campaigns .....	II-136
2-5-7	Strengthening Overseas Marketing .....	II-137
	(1) Collection and dissemination of information on overseas markets ...	II-137
	(2) Providing information to overseas buyers .....	II-138
	(3) Participating in overseas trade fairs, holding exhibitions, and holding business talks inside and outside the country .....	II-139
	(4) Holding of trade seminars and training sessions .....	II-139
	(5) Strengthening links with overseas public organizations .....	II-139
2-5-8	Promotion of Introduction of Foreign Capital and Foreign Technology ..	II-140
	(1) Collecting and disseminating information on foreign companies .....	II-141
	(2) Providing industry-related information to foreign investors .....	II-141
	(3) Holding of seminars and training sessions on joint venture investment and technological tie-ups .....	II-141
	(4) Dispatch of investment missions .....	II-141
	(5) Technical guidance by plant manufacturers and obtaining foreign experts .....	II-141
	(6) Strengthening links with overseas public organizations .....	II-141
2-6	<b>Proposal on Measures to Promote Ceramic Industry .....</b>	<b>II-142</b>
2-6-1	Basic Viewpoints .....	II-143
	(1) Overall viewpoints .....	II-143
	(2) Viewpoints divided by products and types of firms .....	II-148
2-6-2	Policy Recommendation .....	II-161
	(1) Strengthening of raw material and auxiliary material production and supply sectors .....	II-161
	(2) Strengthening of product manufacturing sector and marketing sector .....	II-163
2-6-3	Recommendation on Main Programs .....	II-166
	(1) Program 1: Strengthening of development of raw materials and promotion of raw material and auxiliary material industries .....	II-166
	(2) Program 2: Construction of raw material and auxiliary material estate .....	II-168
	(3) Program 3: Augmentation of public testing and research and development institutes and strengthening of ties among institutes and tie with industrial world.....	II-172
	(4) Program 4: Revitalization of activities of industrial organizations ....	II-180
	(5) Program 5: Establishment of policy coordination function .....	II-183
2-6-4	Schedules of Programs .....	II-186



2-7	<b>Information for Promotion of Joint Venture Investment and Technological Tie-ups</b>	<b>II-189</b>
2-7-1	List of Japanese Firms Interested in Joint Venture Investments and Technological Tie-ups with Indonesian Firms .....	II-189
	(1) Firms Interested in Joint Venture Investments and Technological Tie-ups .....	II-189
	(2) Firms Interested in Technological Tie-ups .....	II-190
2-7-2	List of Indonesian Firms Interested in Joint Venture Investments and Technological Tie-ups with Japanese Firms .....	II-193
	(1) Firms Interested in Joint Venture Investments .....	II-193
	(2) Firms Interested in Joint Venture Investments and Technological-Tie-ups .....	II-194
	(3) Firms Interested in Technological Tie-ups .....	II-198

## Contents for Tables and Figures

### (Tables)

Table 2-1-1:	Number of Companies and Organizations Visited by District and Sector .....	II-3
Table 2-1-2:	Number of Questionnaire Recovered by Sector .....	II-4
Table 2-2-1:	Imports by OECD Countries of Ceramic Flags and Paving, Hearth or Wall Tiles .....	II-5
Table 2-2-2:	Imports by OECD Countries or Ceramic Tableware, Kitchenware, Other Household Articles, Statuettes and Other Ornamental Articles .....	II-6
Table 2-2-3:	Imports by OECD Countries from Asian Nations of Ceramic Flags and Paving, Hearth on Wall Tiles .....	II-7
Table 2-2-4:	Imports by OECD Countries from Asian Nations of Tableware, Kitchenware, Other Household Articles, Statuettes and Other Ornamental Articles .....	II-7
Table 2-2-5:	Imports by OECD Countries of Tableware, Kitchenware and Other Household Articles Classified by Main Source Nations (1988) ...	II-8
Table 2-2-6:	Imports by OECD Countries of Novelties Classified by Main Source Nations (1988) .....	II-8
Table 2-2-7:	Trends in Japan's Ceramic Industry .....	II-13
Table 2-2-8:	Imports of Tableware, by Countries (Japan) .....	II-15
Table 2-2-9:	Imports of Novelties, by Countries (Japan) .....	II-15
Table 2-2-10:	Imports of Sanitary Ware, by Countries (Japan) .....	II-16
Table 2-2-11:	Imports of Tiles, by Countries (Japan) .....	II-16
Table 2-2-12:	Trends in Demand/Supply of Ceramic Products in U.S.A. ....	II-22
Table 2-2-13:	Trends in Demand/Supply of Ceramic Products in Former West Germany .....	II-25
Table 2-3-1:	The Degree of Dependence on Imports (Indonesia) for Raw Materials and Auxiliary Materials (Based only on firms that responded to the questionnaire) .....	II-38
Table 2-3-2:	Trends in Annual Average Increase in Production Capacity and Actual Output, and Rate of Operation of Ceramic Manufacturing Industry in the Second-to-fourth Five-year Plan Periods .....	II-40
Table 2-3-3:	Exports of Ceramic Product, 1985-90 .....	II-41
Table 2-3-4:	Imports of Ceramic Products, 1985-90 .....	II-41
Table 2-3-5:	Changes in Trade Specialization Coefficient (%) .....	II-42
Table 2-3-6:	Trends in Demand/supply Relations of Ceramic Products .....	II-43
Table 2-3-7:	Development in the Ceramics Industry (based on figures of government-approval of investment) .....	II-44
Table 2-3-8:	Position of Ceramic Product Manufacturing in Industrial Sector (sector of medium and large enterprises) (1988) .....	II-45
Table 2-3-9:	Production of Tableware and Novelties (1988) .....	II-46
Table 2-3-10:	Exports of Tableware by Countries .....	II-47
Table 2-3-11:	Exports of Novelty by Countries .....	II-47
Table 2-3-12:	Exports of Sanitary Ware by Countries .....	II-49
Table 2-3-13:	Exports of Tile by Countries .....	II-50
Table 2-3-14:	Changes in Domestic Demand of Tableware and Forecast .....	II-52
Table 2-3-15:	Changes in Domestic Demand of Sanitary Ware and Forecast .....	II-52
Table 2-3-16:	Changes in Domestic Demand of Tile and Forecast .....	II-53
Table 2-3-17:	Classification of Ceramics Manufacturers .....	II-56

Table 2-3-18:	Overall Evaluations for Each Corporate Classification (out of a possible 10 points) .....	II-57
Table 2-3-19:	Comprehensive Evaluations by Product and Company .....	II-58
Table 2-3-20:	Management-related Concerns of Managers .....	II-60
Table 2-3-21:	Manufacturing Cost Breakdown by Product .....	II-64
Table 2-3-22:	Manufacturing Cost Breakdown by Type of Company .....	II-64
Table 2-3-23:	Cost Reduction Measures .....	II-65
Table 2-3-24:	Problems with Cost Reduction .....	II-66
Table 2-3-25:	Comparison of Manufacturing Costs (Indonesia and Japan) .....	II-66
Table 2-3-26:	Breakdown of Countries or Territories of Companies Preferred as Partners for Joint Ventures .....	II-88
Table 2-3-27:	Breakdown of Countries and Territories of Companies Preferred as Partners for Technological Tie-ups .....	II-89
Table 2-4-1:	Projection on Production & Export of Ceramic Products in Fifth Five-Year Development Plan .....	II-97
Table 2-5-1:	Representative Raw Materials for Tableware .....	II-99
Table 2-5-2:	Representative Raw Materials for Novelties .....	II-100
Table 2-5-3:	Representative Raw Materials for Sanitaryware .....	II-100
Table 2-5-4:	Representative Raw Materials for Tiles .....	II-100
Table 2-5-5:	Main Auxiliary Materials by Product .....	II-108
Table 2-5-6:	A Sample of Composition of Indian Feldspar .....	II-109
Table 2-5-7:	Example of the Schedule for Education and Technical Training in Japan .....	II-132
Table 2-5-8:	Testing & Analytical Services and Main Test Equipment at Japan Pottery Inspection Association .....	II-135
Table 2-6-1:	Main Issues Classified by Products and Types of Firms .....	II-159
Table 2-6-2:	Main Measures Classified by Products and Types of Firms .....	II-160
Table 2-6-3:	Projection on Production Capacity (Planned) of Ceramic Product Manufacturing Industry .....	II-170
Table 2-6-4:	Testing/Research and Training Facilities Which are Considered to be Necessary to be Installed at IRDCRI .....	II-174
Table 2-6-5:	Example of Training Schedule .....	II-179
Table 2-6-6:	Programs for Promotion of Ceramic Product Industry .....	II-186
Table 2-6-7:	Schedules for Implementation of Promotion Programs for the Ceramic Product Industry .....	II-187

**(Figures)**

Fig. 2-2-1:	Overseas Investment Plans of Ceramic Product Manufacturers (Japan) (by type of product) .....	II-18
Fig. 2-2-2:	Purposes of Overseas Investments by Ceramic Product Manufacturers (Japan) .....	II-18
Fig. 2-2-3:	Merits of Indonesia as an Investment Site (Japan) .....	II-19
Fig. 2-2-4:	Drawbacks of Indonesia as an Investment Site (Japan) .....	II-19
Fig. 2-2-5:	Firms Interested in Technological Tie-up with Indonesian Firms by Type of Product (Japan) .....	II-20
Fig. 2-2-6:	Conditions of Technological Tie-up with Indonesian Firms (Japan) .....	II-20
Fig. 2-2-7:	Exports of Tableware by Countries (Thailand) (in 1988) .....	II-26
Fig. 2-2-8:	Exports of Novelties by Countries (Thailand) (in 1988) .....	II-26
Fig. 2-3-1:	Problems Relating to Development (Indonesia) Facing Ceramic Products Manufacturers .....	II-33
Fig. 2-3-2:	Management-related Concerns of Managers (by product) .....	II-61
Fig. 2-3-3:	Process Flow for Tableware .....	II-70
Fig. 2-3-4:	Process Flow for Novelties .....	II-73
Fig. 2-3-5:	Process Flow for Sanitary Ware .....	II-76
Fig. 2-3-6:	Process Flow for Wall Tiles and Floor Tiles .....	II-80
Fig. 2-3-7:	Ceramic Manufacturers' Expectations of the Government .....	II-86
Fig. 2-3-8:	Expected Benefits of Joint Ventures .....	II-89
Fig. 2-4-1:	Flow Chart (Plan) for a Joint Research and Development Activity for the Ceramics Industry .....	II-96
Fig. 2-5-1:	General Treatment Processes and Processing for Stone Raw Materials .....	II-103
Fig. 2-5-2:	General Treatment Processes and Processing of Clay/Kaolin Raw Materials .....	II-104
Fig. 2-5-3:	Problems in Labor Management .....	II-114
Fig. 2-5-4:	Content of Training at Ceramic Product Manufacturers .....	II-115
Fig. 2-5-5:	Government Measures Which Ceramic Manufacturers Expect .....	II-125
Fig. 2-5-6:	Problems with Exports by Ceramic Manufacturers .....	II-137
Fig. 2-5-7:	Countries and Territories about Which Market Information Is Required by Ceramic Manufacturers .....	II-138
Fig. 2-5-8:	Overseas Market Information Necessary for Ceramic Manufacturers .....	II-138
Fig. 2-6-1:	Fishbone Chart of Issues in the Promotion of Ceramic Industry ...	II-147
Fig. 2-6-2:	Flow Chart of Ceramic Industry .....	II-161
Fig. 2-6-3:	Scenario of Industrial Promotion Plan .....	II-165
Fig. 2-6-4:	Core Organizations of Support System (A Supposition) .....	II-172
Fig. 2-6-5:	Measures for Promotion of Ceramic Industry .....	II-185



## 2. CERAMIC PRODUCTS INDUSTRY

### SUMMARY

#### 1. Viewpoint of Industrial Promotion

The ceramic industry is highly labor intensive and requires large amounts of raw materials and therefore may be said to be well suited to Indonesia, which is blessed with an abundant, inexpensive labor force and abundant resources. There is also a giant potential demand in the domestic market. Therefore the potential for development of the industry, judging from both supply and demand side, can be said to be tremendous.

In actuality, the ceramic industry of Indonesia has been entering a stage of rapid development in recent years. The construction boom, the growth of the service industries, the rise in the national income, etc. have been accompanied with a surge in domestic demand for tile, sanitary ware, and other construction materials as well as tableware and kitchenware. Accordingly, capital investment is continuing and the scale of production has been rapidly growing. Domestic demand is expected to continue to move strongly in the future and the interest of companies in investment remains high. The ceramic industry is expected to continue to grow over the long term.

Exports are growing quickly, though still small in scale. The export industry is still a young one, however. The exporters of ceramics are limited to few companies such as foreign capital affiliated companies and companies having technological tie-ups with foreign countries. The majority of the domestic companies are not in a position to enter the international market due to problems in quality, design, product lineups, scale of production, etc. and rely on the domestic market, which requires mostly inexpensive products. However, among the companies dependent on domestic demand, there are also a lot of companies which have the potential for developing into export companies. Half of the companies covered by the survey are considered to have this potential. It is hoped that these companies will make greater effort toward that end. At the same time, it is desirable to strengthen the system for assisting such efforts.

The first goal of measures to promote exports in the ceramic industry is considered to be to provide rear support to export oriented companies and comprehensive assistance to potential export companies. In particular, assistance to potential export companies is important. The key issues here would be the improvement of quality and designs of products and the increase of productivity.

The improvement of quality and designs would require [1] the thorough implementation of TQC in every area from product development and raw material control to the finishing of the final products, [2] obtaining a grasp of the needs of the target markets, and [3] ensuring the stable supply of good quality raw materials and auxiliary materials. To increase productivity, further, [1] improvement of production skills and [2] capital investment would be required. Therefore comprehensive measures should be sought covering all sectors of industry from the upstream to downstream sectors.

It is hoped that a support system would be established by the public and private sectors around the Indonesian Ceramic Association (ASAKI), the Industrial Mineral Association, and other industrial organizations and the Institute for Research and Development of Ceramic Industry (IRDCRI), the Mineral Technology Development Centre (MTDC), and other public research and development institute so as to improve the business environment.

Note that the companies at the bottom of the industry would probably find it difficult to export under current conditions. These would preferably be promoted as

precious suppliers for local demand.

## 2. Issues and Measures

The issues involved in the export promotion of the ceramic industry stretch over a wide range. It is necessary to make repeated comprehensive and continuous studies and develop a proper grand design. Further, it would be desirable to tackle the issues simultaneously and in parallel by selecting high priority, short term action programs and starting them quickly as well as commencing studies for the realization of the important long term programs. The main issues for export industrialization would be [1] the improvement of quality and designs of products, and [2] the increase of productivity as mentioned earlier. The main goals to those end would be [1] the ensuring of stable supplies of good quality raw materials and auxiliary materials, [2] technological promotion and development of human resources in the product manufacturing sector, [3] the strengthening of overseas marketing for sales promotion and the gathering of information, and [4] the introduction of foreign capital and foreign technology aimed at technical innovation and expansion of the size of exports.

### (1) Raw Material and Auxiliary Material Sector and Infrastructure

The ensuring of stable supplies of good quality raw materials and auxiliary materials is extremely important for the ceramic product manufacturing industry, which is a material type industry. In particular, there are many problems to overcome in the sanitary ware, tableware and novelty manufacturing industries. There is a common need for construction of the infrastructure in all fields.

#### [Problems]

[1] Domestically produced raw materials are generally low in grade and are unstable in quality. This is in part due to the grade of the raw materials themselves, but it is considered that there are also problems in the grading and processing and treatment.

[2] The raw material production areas are scattered throughout the country, while the product manufacturing industries are concentrated on Java island, the larger consumption area, so the raw materials have to be transported over long distances. Further, the communication and transportation means connecting two areas are insufficient. These problems result in insufficiency of distribution of raw materials.

[3] Indonesia has been slow to establish a domestic industry for production of auxiliary materials and those which are produced are insufficient in both quantity and quality.

[4] These problems result in large burdens on the small and medium sized manufacturers which cannot purchase large amounts of raw materials. Further, the manufacture of export products and other high class products requires the use of imported raw materials and auxiliary materials, which is a cause behind higher costs.

[5] The infrastructure is slow in being established in all areas, including transportation, communications, power, and fuel supply.

#### [Measures]

[1] The MTDC and the IRDCRI are hoped to jointly establish quality grading standards and provide guidance in sorting and processing technology of raw materials.

[2] Indonesia should start with promotion of investment, including promotion of foreign investment in the field of kiln furnitures and other auxiliary materials so as to improve quality and strengthen supply capacity of the same.

[3] The means of communication and transportation should be augmented in order to smoothen distribution of raw materials. In the long term, it would be desirable to construct a collection and delivery center for raw materials and auxiliary materials in the demand area.

[4] Aside from the above, an important measure in terms of the infrastructure would

be to establish a system of supply of natural gas, the most suitable fuel. This would have a wide range of effects such as the improvement of quality of product, the improvement of heat efficiency, and prevention of pollution.

## (2) Technological Promotion in Product Manufacturing Sector and Securing and Training of Manpower

Along with the rapid development of industry, the shortages of engineers and skilled workers has become increasingly severer. As a result, the improvement of technology, such as factory control, quality control, and technology and product development, has been slow, further, the improvement of productivity and efficient operation of new facilities has been blocked. The augmentation of technical guidance and worker training is an urgent task. Further, public research and development institutes on the service side are also suffering from shortages of manpower and poor facilities and equipment. It will be necessary to start by augmenting the capabilities of the public institutes.

### 1) Improvement of Factory Control

#### [Problems]

[1] All sectors face skilled manpower shortages. Therefore, full use cannot be made of facilities. In the factories manufacturing sanitary ware, tableware, and novelties there is a severe shortage of foremen for work control and in the tile manufacturing factories there is severe shortage of engineers for managing the machinery.

[2] There is little interest in safety and sanitation or in pollution prevention.

[3] The poor work environment and low wages prompts job hopping by employees, which is one cause of the shortage of skilled workers. This problem is particularly great in tableware and novelty factories.

#### [Measures]

[1] The system for development of human resources and retraining of workers at public institutes such as the IRDCRI should be augmented.

[2] Similarly, roving guidance to factories should be strengthened. The emphasis should be placed on the permeation of TQC method.

### 2) Improvement of Quality Control

#### [Problems]

With the exception of the handful of better companies, all companies have been slow to institute proper control of raw materials and auxiliary materials, control of the manufacturing processes, and quality control of products.

#### [Measures]

[1] In addition to the above-mentioned roving guidance and retraining of workers, the testing and analysis service functions for raw materials of the public research and development institutes should be augmented. The possibilities of technical guidance by foreign experts should also be studied.

[2] SII should be completed primarily for tableware and tile. Further, consideration should be given to the introduction of an export inspection system aimed at preventing shipment of poor quality products, covering novelties in addition to the above two products.

[3] The industrial organizations should take the lead and push forward with a campaign to promote technology. This would mainly cover tableware, novelties, and tile.

### 3) Strengthening of Technical and Product Development Capabilities

#### [Problems]

These capabilities are weak overall. In particular, the development of original designs is a task which must be taken up.



[Measures]

[1] Designers should be trained and joint research with public research and development institutes should be strengthened. Consideration should be given to development of specifications aimed at the ASEAN market in the case of sanitary ware, original decorations for tiles, and use of traditional designs tailored for the tastes of the target markets in the case of tableware.

(3) Strengthening of Overseas Marketing

[Problems]

With the exception of the handful of better companies, there is little being done in the way of marketing activities. Overseas marketing should be strengthened for the dual purpose of sales promotion and obtaining a grasp of the needs of the markets.

[Measures]

[1] Cooperation should be sought from the NAFED and other related organizations and effort made to stimulate marketing activities by the industry as a whole. The industry should start with the preparation of PR materials and then broaden its activities to collecting information on target markets such as buyers' lists, sponsoring and participation in trade fairs and business meetings, and dispatch of market survey teams.

Acquisition of guidance for improving products from foreign commodity experts should also be studied.

[2] The products emphasized should be tableware and tiles, in which many companies expressed interest in marketing, and the markets emphasized should be the U.S., the EC, and Japan for tableware and the U.S. and ASEAN for tile.

(4) Promotion of Introduction of Foreign Capital and Foreign Technology

[Problems]

With the exception of the sanitary ware manufacturing industry, not much progress has been made overall in promotion of introduction of foreign capital and technology. Joint venture investment and technological tieups with foreign companies would be extremely effective in the sense of securing management knowhow, advanced technology, and marketing channels. It would also be effective to obtain individual guidance from foreign experts in merchandising and technology. It will be necessary to promote the introduction of foreign capital and foreign technology as one effective means for development of an export industry.

[Measures]

[1] ASAKI should serve as the administrative office and tackle activities to promote investment, technological tie-ups and hire foreign experts. At that time, cooperation should be sought from the BKPM, Ministry of Industry, and other related organizations. The industry should start with the preparation of PR materials and then broaden its activities to the collection of information regarding foreign investors and the dispatch of investment promotion missions.

[2] The fields emphasized should be tableware and tile, where there is great interest of companies, and novelties, where there have been few cases of foreign investment etc. (for tiles the stress should be on technical tieups and hiring experts). The main partners will probably be companies from Japan and the Asian NIE's (with a stress on Italian companies as well in the case of tile).

Table II-1 shows issues mentioned above by fields of products and types of companies putting priority of each issues. Further, figure II-1 illustrates issues and measures for promotion of ceramics industry focusing on companies situated in the middle of the industry and deemed to have potential of export.

The classification of companies are conducted so as to prepare basic material for elaboration on export industrialization of ceramics industry. Accordingly, 29 firms visited were classified into five categories as shown below.

Corporate classification	Corporate type
Type A	Export-oriented firms with international level
Type B	Firms capable of exports
Type C	Local market-oriented firms conditionally capable of exports
Type D	Local market-oriented firms
Type E	Local-cottage industries

Table II-1: Main Area of Issues by Products and Corporate Types

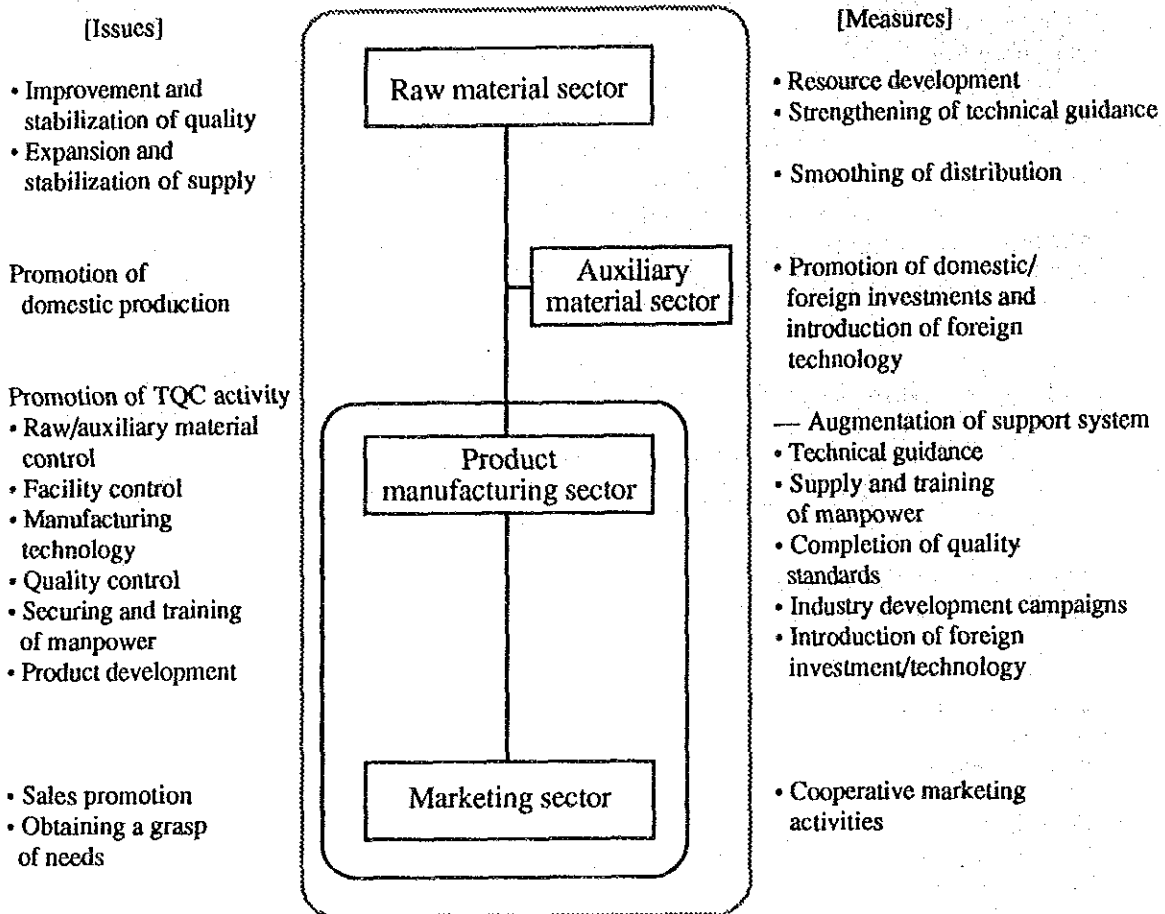
	Sanitary ware (Type A)	Tiles (Type B/C)	Tableware (Type B/C)	Novelties (Type A)	Novelties (Type B/C)
Raw Materials					
Quality	o		*	o	*
Supply	o	Δ	*	o	*
Auxiliary materials					
Quality & supply	o		*		*
Infrastructure	o	o	o	o	o
Factory control					
Manpower	*	*	*	*	*
Facilities			o		*
Technology		*	o		*
Quality control					
Materials		o	*		*
Production process		o	*		*
Products		o	*		o
Technology & product development					
Material		o	o		o
Design	Δ	o	*	o	o
Decoration		o	o		o
Overseas marketing		o	*		o
Introduction of foreign capital & technology					
New investment		o	o		*
Expansion investment	Δ	Δ	*		Δ
Technoogical tie-up, etc		*	*		*


\* Very important area


o Fairly important area

Δ Important area

**Fig. II-1: Main Issues and Measures for Promotion of Middle Class Companies (Types B and C)**



 Main area of issues for tableware/novelty industries,

 Main area of issues for tile industry

### **3. Recommendations on Programs**

Recommendations were made for the ceramic industry as roughly divided into the raw material and auxiliary material sectors and the product manufacturing and marketing sectors. The focus, however, is on promotion of all sectors linking organically. The central body behind the promotion of these programs is envisioned as being the support system mentioned earlier.

#### **Program 1: Strengthening of development of raw materials and promotion of raw material and auxiliary material industries**

It is recommended to [1] "conduct a full-scale survey of resources of raw materials" with the aim of development of raw materials and [2] "strengthen technological guidance to raw material producers" and "introduce foreign capital and foreign technology into the auxiliary material industries" with the aim of promotion of raw materials and auxiliary materials industries as well as provision of stable supply system for high quality raw materials and auxiliary materials for product manufacturers. The resource survey and technological guidance should be handled by the MTDC and IRDCRI and the introduction of foreign capital and foreign technology should be handled by the Industrial Mineral Association, ASAKI, and the large companies.

#### **Program 2: Construction of raw material and auxiliary material estate**

It is recommended to construct a comprehensive collection, delivery, and processing center for raw materials and auxiliary materials in Java island, the main consumer area. The aim of this idea is to fundamentally resolve the problems in communication and distribution arising due to the great distance between the raw material production areas and the product manufacturing centers so as to promote the raw material and auxiliary material sectors and also improve the environment for procurement of raw- and auxiliary materials in the product manufacturing sector. It is hoped that the two industrial organizations and the companies under them, the central and local governments, and the public research and development institutes will extend their understanding and cooperation.

#### **Program 3: Augmentation of public testing and research and development institutes and strengthening of ties among institutes and ties with industrial world**

It is recommended that [1] the capabilities of the IRDCRI be strengthened, [2] the ties between the IRDCRI, MTDC, and other research and development institutes be strengthened further, and [3] the ties between research and development institutes and industrial organizations, companies be strengthened. This program aims at augmenting and comprehensively mobilizing the functions of the research and development institutes and launching practical technical promotion activities tailored to the needs of the industrial world. In particular, it is hoped that this will be effective in strengthening the testing and analysis services, technological guidance, and human resource development and training.

#### **Program 4: Promotion of activities of industrial organizations**

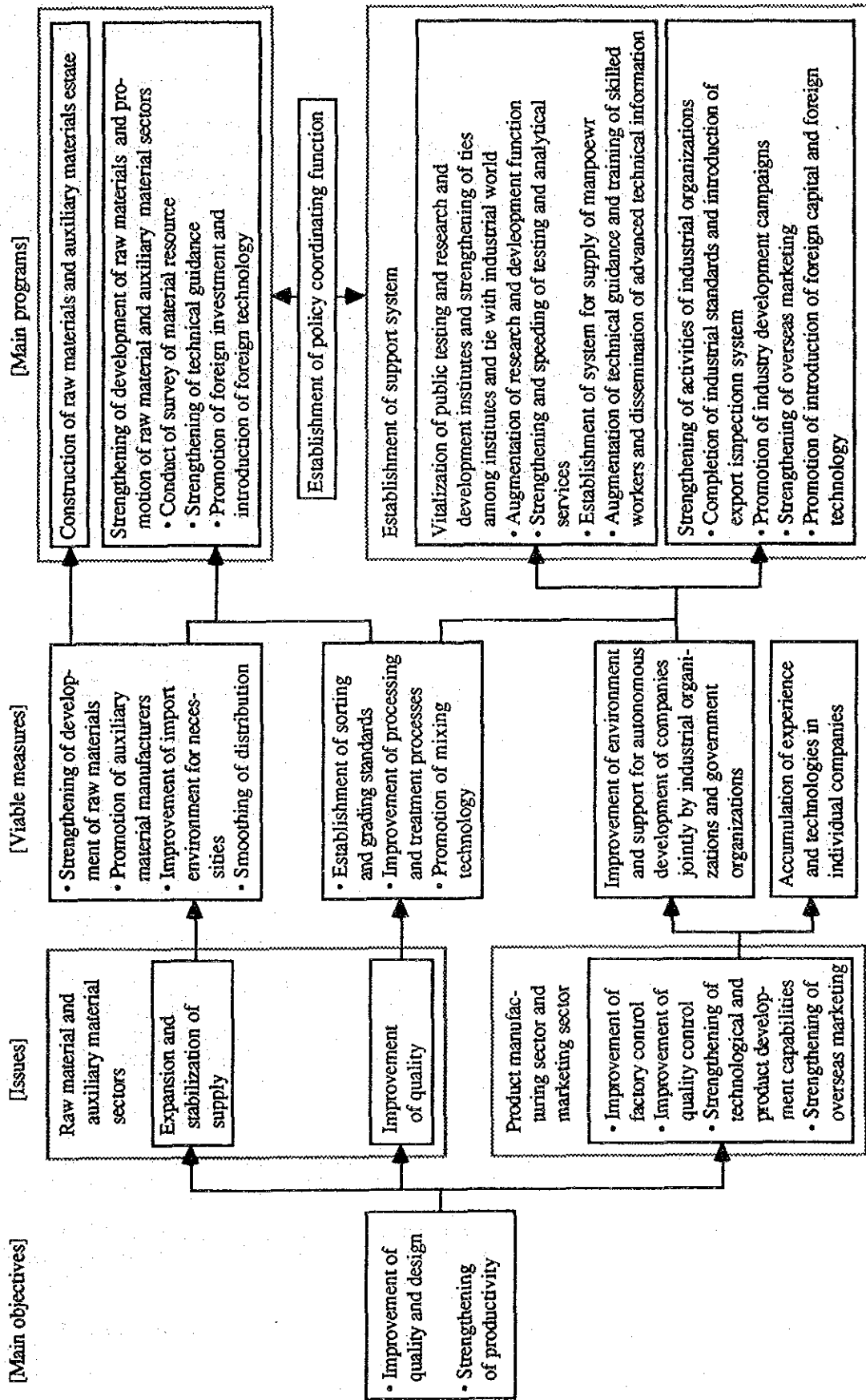
In particular, it is recommended to revitalize the activities of ASAKI. The fields to be stressed in these activities are envisioned as being [1] the strengthening of overseas marketing, [2] the promotion of the introduction of foreign capital and foreign technology, [3] the promotion of industrial development campaigns and [4] the completion of industrial standards and introduction of an export inspection system. These activities of the organization are considered timely for the Indonesian ceramics industry which is in the process of development. It is hoped that member companies will coordinate activities and cooperation will be obtained from related ministries, research and

development institutes, the Industrial Mineral Association, etc.

**Program 5: Establishment of policy coordination function**

It is recommended that a consultative body comprised of the related ministries and agencies, public institutes, and industrial organizations be organized and coordinate policies and activities for promotion of the ceramics industry so that they match with each other. It is hoped that the relevant parties extend their understanding and cooperation in this regard. It is recommended that a "Indonesian Ceramic Conference" be held about once every half year and that a taskforce be created to consider the feasibility of the plan of "construction of raw material and auxiliary material estate."

Fig. II-2: Measures for Promotion of Ceramic Industry





## 2-1 Method of Survey

### (1) Domestic Survey in Indonesia

The ceramics industry is characterized by a deep interdependence among all steps from the processing of raw materials to final product finishing. Problems in any one of these steps will prevent the manufacture of a satisfactory product. Taking this into account, this survey attempted to gain an overview of conditions from a broad variety of perspectives, ranging from problems of raw materials to manufacture and marketing.

The goal of this survey was not a study of the raw material sector in particular but rather the exploration of ways to promote the ceramic industry as an export industry. As such it focuses on manufacturing. Work on the problem of raw materials was limited to a grasp of outlines through information provided by manufacturers and government research and development institutes. Two raw material sites in West Kalimantan were observed at the request of the Ministry of Industry, but the data obtained was insufficient to support any discussion of the raw material problem. A full scale survey of this sector would be likely to require great amounts of money and time. But its implementation is thought to be an important task. A long-term consideration of this issue is desirable.

Areas covered by the survey are as shown below (figures in parentheses represent HS, Harmonized Commodity Description and Coding System).

(1) Tableware and novelties (69.11 - 69.13)

Tableware, kitchenware and decorative items

(2) Tiles (69.07 - 69.08)

Mainly floor and wall tiles; does not include bricks and blocks

(3) Sanitary ware (69.10)

Includes all sanitary ceramics; excludes metal components, drainage pipes, etc.

Seven districts and 42 companies and institutes were selected for the survey based on discussions with the Indonesian Ministry of Industry. The latter figure can be further broken down as follows; eight tableware manufacturers, six novelties manufacturers, 13 tile manufacturers, three sanitary ware manufacturers, three producers of raw and auxiliary materials, and a total of nine government agencies (excluding Ministry of Industry offices), official research and development institutes and industrial associations. Details are offered in Table 1-1-2. It should also be noted that some of these firms produce several types of products, and when these are counted separately, the total amounts to 45 companies and organizations.

The initial estimate, based on Indonesian government-approved investment statistics, was for a total of 51 manufacturers of tableware, novelties, and construction materials, but after taking into account those which were not in operation, fell outside the scope of this survey, or did not want to participate in the survey, the final figure was only 30 firms. It is thought, however, that this reduction did not have a significant impact on the final results of the survey.

The Japanese survey team consisted of three members: a trade and investment specialist, a corporate management specialist, and a production and technology specialist.

The Indonesian side comprised three individuals from the Directorate General of Multivarious Industries of the Ministry of Industry who were to participate in the survey one at a time.

The survey involved interviews, questionnaire surveys, and the collection of related data.



Due to the limitation of time, the interviews focused on problems and future business plans at the companies. The production and technology specialist offered detailed comments on current plants and products, pointed out problem areas for each of the companies visited and, when requested, offered advice on possible means of improvement. All of the companies expressed strong interest in the technical guidance offered by the specialists.

The goal of the questionnaire surveys was to gain an overview of current conditions and problem areas at the companies as well as to sound out their requests to the Indonesian government. Since the questionnaires covered a wide range of items and were expected to require considerable time to complete, they were distributed in advance for recovery at the time of the visit. Due to extenuating circumstances, some of the questionnaires were returned later through the Directorate General of Multivarious Industries or through regional offices of the Ministry of Industry.

26 of the 32 distributed questionnaires were returned, representing a recovery rate of 81%.

Table 2-1-1: Number of Companies and Organizations Visited by District and Sector

	Jakarta and surrounding areas	Cirebon	Bandung	Semarang	Surabaya and surrounding areas	Bali	Pontianak	Total
Ceramics manufacturers	16	1	-	3	6	2	2 (1)	30 (1)
Tableware	4	-	-	2	2	-	-	8
Novelties	2	-	-	-	-	2	2	6
Sanitary ware	2	-	-	1	-	-	-	3
Tiles	8	1	-	-	4	-	(1)	13 (1)
Floor and wall tiles	7	1	-	-	3	-	(1)	11 (1)
Mosaic tiles	-	-	-	-	1	-	-	1
Split tiles	1	-	-	-	-	-	-	1
Auxiliary materials and refractory brick	(1)	-	-	-	1	-	(1)	1 (2)
Raw materials	-	-	-	-	-	-	2	2
Research and development institutes	-	-	3	-	1	1	-	5
Industrial associations	1	-	-	-	-	-	-	1
Government agencies (excluding the Ministry of Industry)	3	-	-	-	-	-	-	3
<b>Total</b>	<b>20 (1)</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>8</b>	<b>3</b>	<b>4 (2)</b>	<b>42 (3)</b>

Note: Figures in parentheses indicate those firms producing more than one type of product and which are therefore not counted in the total number of visits.

**Table 2-1-2: Number of Questionnaire Recovered by Sector**

Sector	Number of questionnaires recovered
Tableware, novelties	12
Sanitary ware	2
Tiles	11
Other (auxiliary materials)	1
Total	26
<hr/>	
Number of questionnaires distributed	32

**(2) Domestic Survey in Japan**

A survey of the current situation of the ceramic industry and appraisal of Indonesian products in Japan was conducted using as its basis various kinds of statistics, interviews with industrial associations and firms and a questionnaires to manufacturers of ceramic products (conducted in October-November of 1990).

Questionnaires were sent to 362 firms, selected from members of various industrial associations on the basis of advice from industrial associations and experts. Of the firms, 131 or 36.2 percent responded.

**(3) Survey in Third Countries**

A survey in competing countries was conducted in Sri Lanka. The situation in Thailand and Malaysia was introduced referring to available materials.

A survey in importing countries was conducted in Germany and the United States. The two nations were selected on the basis of OECD statistics.

The survey in competing countries aimed to grasp the current situation of the ceramic industry and measures employed to nurture it, while the survey in importing countries aimed to grasp the trend of ceramic product imports and appraisal of Indonesian ceramic products.

The surveys were conducted by research firms of various nations on assignment.

## 2-2 World Trend in Production and Consumption of Ceramics

### 2-2-1 World Trends in Ceramics Trade

#### (1) World Trends in Demand

After falling off in the early 1980s, world ceramics trade has recorded significant growth in recent years.

Import trends in the OECD countries, which were responsible for the majority of imports worldwide, were as follows. Imports of tiles (including those used for paving roads) dropped at an annual average rate of 6.7% during 1980-85, but this was followed by sharp increases averaging 25.4% during the years 1986-88, with total 1988 imports amounting to \$2,747.15 million. Glazed products accounted for 89.5% of this total.

The leading importer was France, responsible for 20.2% of total imports in OECD, followed by West Germany, with 17.1%, the United States, with 15.1%, and the United Kingdom, with 7.5%. Japan was responsible for only 0.9% of the total. Imports by France, West Germany, and the United Kingdom are growing at a fairly rapid pace. Japanese imports, while limited in scale, are also beginning to show signs of growth. In contrast, growth in U.S. imports remains sluggish.

Imports of tableware and novelties fell by an average figure of 0.8% during 1980-85 but recovered to post average growth of 7.9% during the period 1986-88, reaching a figure of \$2,766.14 million in 1988 (tableware accounted for \$2,041.3 million; novelties, for \$724.84 million). During the early 1980s U.S. imports grew while European imports fell; this state of affairs was reversed in the latter half of the decade.

The United States was the largest single importer of tableware, with 30.8% of the total, followed by West Germany, with 9.5%, France, with 7.8%, and the United Kingdom, with 4.7%. The Japanese share was 3.2%.

The European market for novelties is a large one. West Germany is the largest importer, with an 18.7% share of total imports, followed by the United Kingdom, with 15.4%, the United States, with 13.8%, and France, with 10.9%. Japan posted a share of 6.5%, and imports by this nation are on an upsurge.

Data for sanitary ware is not available.

**Table 2-2-1: Imports by OECD Countries of Ceramic Flags and Paving, Hearth or Wall Tiles**

(Unit: thousands of dollars)

Importing country	1980	1985	1986	1987	1988
USA	204,729	334,400	382,391	451,020	413,790
West Germany	473,112	229,657	321,625	410,333	469,899
United Kingdom	65,636	76,904	108,112	154,434	204,743
France	511,199	277,261	380,029	493,610	555,804
Japan	15,267	13,535	15,405	19,628	24,775
OECD countries total	1,968,404	1,393,419	1,854,545	2,412,430	2,747,145

Source: OECD trade statistics

**Table 2-2-2: Imports by OECD Countries of Ceramic Tableware, Kitchenware, Other Household Articles, Statuettes and Other Ornamental Articles**

(Unit: thousands of dollars)

Importing country	1980	1985	1986	1987	1988
USA	728,574	1,102,922	1,211,241	1,435,872	628,266
West Germany	274,834	160,012	213,217	299,323	329,977
United Kingdom	110,792	89,541	140,931	171,952	207,782
France	163,449	112,445	170,189	212,248	237,929
Japan	34,195	35,438	54,574	79,241	112,344
OECD countries total	2,293,544	2,201,496	2,708,927	3,347,080	2,766,142

Source: OECD trade statistics

## (2) Competition in the International Market and Performance of Indonesian Products

Italy was the leading exporter of tiles (including flags and paving, hearth), accounting for fully 56.1% of all exports to OECD countries in 1988. This country specializes in the manufacture of high-grade tiles. Other major exporters were West Germany, with a 12.5% share, and Spain, with 10.9%.

The Japanese share of exports amounted to 2.6%; R. Korea, Taiwan, and other Asian NIEs (Newly Industrialized Economics), to 1.2%; and the five ASEAN nations, to 1.3%. Europe is the main market for tiles, presenting something of a disadvantage for Asian products.

Imports from the five ASEAN nations, however, grew at the high annual rate of 34.5% during the years from 1985 to 1988. Most of these shipments originated in Thailand, with imports from Indonesia and other nations being extremely limited.

West Germany was the leading exporter of tableware, accounting for 17.9% of all shipments, followed by Japan, with 17.4%, the United Kingdom, with 15.5%, and Italy, with 6.1%. Exports by China (5.4%), Taiwan (5.4%), and R. Korea (4.7%) also grew and are gaining a presence in the market. The average price of imports from United Kingdom and West Germany are at highest level, while those from Japan and Taiwan are one-second of the same, Korea, one-third, China, one-sixth. Tableware imports can be broken down into two groups, one of famous brands and other high-grade products and one of low-priced products capable of meeting certain quality standards. Imports from the ASEAN nations are also increasing, but their share remains limited at 1.6%. Most of these shipments originated in Thailand, with exports from Indonesia and other countries remaining extremely small in scale.

Taiwan was the leading exporter of novelty items, accounting for 17.4% of all shipments. Taiwan was followed by Italy, with 15.2%, Portugal, with 9.9%, West Germany, with 7.8%, and Japan, with 7.6%. Significant growth has also been posted by China, accounting for 6.7% of all exports. As shown in the favorable performance of Taiwanese or Chinese products, the highly labor-intensive novelty market can be said to offer great room for inroads by Asian products.

Imports from ASEAN nations are also on the rise, but their share remains limited at 2.1%. The majority of shipments originated in Thailand and Malaysia, with exports from Indonesia remaining very limited.

**Table 2-2-3: Imports by OECD Countries from Asian Nations of Ceramic Flags and Paving, Hearth on Wall Tiles**

(Unit: thousands of dollars)

Exporting country & territories	1980	1985	1986	1987	1988
R. Korea	30,070	9,030	12,078	17,203	21,310
Taiwan	419	8,851	10,217	13,436	12,111
Hong Kong	46	174	248	370	230
China	593	205	340	729	1,085
Indonesia	1	156	158	397	1,092
Malaysia	31	-	106	149	782
Thailand	9,822	14,045	18,556	24,780	33,003

Source: OECD trade statistics

**Table 2-2-4: Imports by OECD Countries from Asian Nations of Tableware, Kitchenware, Other Household Articles, Statuettes and Other Ornamental Articles**

(Unit: thousands of dollars)

Exporting country & territories	1980	1985	1986	1987	1988
R. Korea	78,012	91,123	102,589	138,554	116,362
Taiwan	199,115	290,012	375,140	594,437	235,503
Hong Kong	14,817	24,086	31,578	45,731	28,440
China	49,893	69,904	94,362	153,841	159,802
Indonesia	225	84	82	153	1,443
Malaysia	828	4,993	5,733	8,593	6,516
Thailand	2,846	3,026	4,798	12,118	29,695

Source: OECD trade statistics

**Table 2-2-5: Imports by OECD Countries of Tableware, Kitchenware and Other Household Articles Classified by Main Source Nations (1988)**

(Unit: thousands of dollars)

Importing countries	OECD	USA	Japan	W.Germany	U.K.	France
Exporting countries & territories						
1 W. Germany	365,324	25,978	6,624	--	10,952	38,064
2 Japan	356,497	235,471	--	12,285	18,049	9,365
3 U.K.	317,023	90,650	26,069	42,151	--	14,087
4 Italy	125,207	20,614	4,270	26,416	5,114	31,561
5 China	111,221	52,566	2,629	6,067	--	6,789
6 Taiwan	109,428	55,069	1,113	14,117	7,656	6,421
7 R. Korea	96,001	52,543	3,709	8,020	7,053	6,217
8 France	91,033	18,847	5,130	17,521	8,731	--
9 Benelux	60,383	--	--	21,657	--	8,648
10 Portugal	59,208	10,472	--	12,308	5,659	10,277
Thailand	22,507	9,295	1,060	657	1,421	5,638
Indonesia	1,328	1,164	23	1	--	--

Source: OECD trade statistics

**Table 2-2-6: Imports by OECD Countries of Novelties Classified by Main Source Nations (1988)**

(Unit: thousands of dollars)

Importing countries	OECD	USA	Japan	W.Germany	U.K.	France
Exporting countries & territories						
1 Taiwan	126,075	n.a.	4,957	25,617	20,504	17,224
2 Italy	110,303	n.a.	9,091	34,942	12,572	19,122
3 Portugal	71,794	n.a.	--	16,937	11,925	10,783
4 W. Germany	56,923	n.a.	2,762	--	4,174	3,523
5 Japan	54,744	n.a.	--	5,629	17,275	3,943
6 Netherlands	52,456	n.a.	--	17,450	12,403	1,872
7 China	48,581	n.a.	4,200	8,272	7,110	7,946
8 United Kingdom	29,407	n.a.	3,050	2,656	--	--
9 Spain	28,031	n.a.	1,871	3,121	5,293	4,131
10 R. Korea	20,361	n.a.	--	--	--	2,348
Hong Kong	14,004	n.a.	736	1,057	5,745	574
Indonesia	115	n.a.	36	12	31	--
Malaysia	4,324	n.a.	136	315	1,072	325
Thailand	7,188	n.a.	591	1,670	732	721

Source: OECD trade statistics

### (3) World Demand Outlook

No existing data giving an outlook of world demand for ceramic products are available.

Japanese industrial sources related to the matter contain the following view.

#### [1] Tableware

Demand in advanced nations is expected to rise steadily.

Quantitative volume is estimated to grow by the population increase ratio plus the ratio of per capita income rise in real terms of each nation.

Growth in value is expected to be larger than that in quantity, because the global orientation toward higher-grade products in recent years is thought likely to spread further in the future. The high-grade product market in Japan, for instance, has been expanding year after year due to a rise of disposable income owing to an increase in the number of double income families as well as the spreading of consumers' orientation toward higher-grade products.

Also a rich assortment of various kinds of products will be required in order to respond to the diversification of consumers' needs. Needless to say, however, the current situation of coexistence of the high-grade product and inexpensive product markets will continue in the future. But, even for inexpensive products, a certain level of quality will be required. The market of "cheap goods of poor quality" will become smaller year by year.

The Asian market is expected to experience greater growth than that of the advanced nations.

A considerable growth of demand is expected in the markets of the Asian NIEs including R. Korea and Taiwan due to a larger growth of income than in the advanced nations and the spread of nuclear families. The high-grade product markets also are expanding there.

In ASEAN nation markets as well, a considerable increase in demand is expected. A pattern of buying ceramic tableware replacing glass or metal products when incomes exceed a certain level is observed in these markets. Thus, there is a possibility that the market of medium to low-priced products will grow rapidly.

#### [2] Novelties

Sales of novelties strongly oriented toward taste fluctuate depending on the birth of hit products or the trend of interior decoration. So much so the extent that forecasting the market is not a simple task. But as a long-term trend, sustained rise in demand is expected.

High-grade novelties for adults will show promise in advanced nation markets. Growth in demand for low-priced products for children is hard to expect because competition from other material toys and ornaments is set to become fiercer.

In the Asian market, demand for medium and low-priced products is expected to grow.



### [3] Tiles

Demand for tiles depends on construction of office buildings, dwelling houses, paved roads and parks. Furthermore demand moves differently according to the structure of demand of individual markets.

For example, tile demand in the Japanese market is roughly composed of exterior decoration which amounts to 50 percent, paving that accounts for 25 percent and interior decoration the remaining 25 percent.

Most of the exterior decoration demand is for office buildings. Recently, such demand has become increasingly oriented toward high-grade products and the use of tiles for fine decoration is becoming more common. Currently, it is estimated that tiles are used for 60 percent of office building exterior decoration. Since this trend is expected to continue in the future, growth in demand for tiles for exterior decoration will be sustained. Demand for pavement also will grow to some extent due to expansion and reconstruction of sidewalks and parks. Demand for interior decoration is expected to slow down in the future because the housing construction has tended to slowdown and a resin product based unitization of toilet and bath equipment is spreading. As a whole, therefore, growth of demand for tiles is expected to slow down in the future.

Growth of demand in the United States and European markets are likely to be a little below that of the Japanese market.

Demand in the Southeast Asian markets is chiefly for interior decoration of office buildings and dwelling houses. Lately, however, demand for office building exterior decoration is also increasing. Since construction demand in Southeast Asia will grow at a higher rate than of advanced nations in the future, expansion in demand for tiles will be sustained.

A worldwide overcapacity exists for tiles currently. This is due to an expansion of capacity in the Asian NIEs and a stagnation of demand in the United States. This situation is expected to remain for the coming one or two years.

### [4] Sanitary ware

Demand for sanitary ware also depends on trends in office building and dwelling house construction.

Like tiles, therefore, growth of demand in advanced nation markets is expected to slow down. Nevertheless, because of greater requirements for high quality and fine design than that for tiles, growth in the value of sales can be expected to continue in the future due to increased demand for higher value added merchandise.

Addition of new functions and unitization of dwelling houses have given rise to the birth of new products. In Japan, the spread of flush toilets has brought about a replacement demand for toilet stools. The peculiarities of individual markets should be carefully noted when forecasts for sanitary ware demand are made.

According to the situation stated above in the section on tiles, demand for sanitary ware in the Asian markets will grow at a higher rate than in the markets of advanced nations.

## **2-2-2 Trends in Production and Consumption, Evaluation of Indonesian Ceramic Products in the Japanese Market**

### **(1) Characteristics of the Japanese Ceramics Industry**

Japanese ceramics industry firms are concentrated on around raw material producing districts, including Aichi, Gifu, and Mie prefectures in the Tokai region, Saga and Nagasaki prefectures on the island of Kyushu, Kyoto, Shiga and Ishikawa prefectures. In each of these areas, the ceramics industry has developed in accordance with the characteristics of local raw materials.

The division of labor has proceeded in each of these districts, with most firms specializing in the manufacture of prepared body, glaze, green body, sagger, gypsum plaster and over glaze decorator. In other words, an integrated manufacturing process has been established throughout these districts, and the division of labor and resulting concentration of peripheral industries have resulted in cost reductions and diverse product lineups.

Another characteristic of the industry is the prevalence of small and medium-sized companies. As of 1988 there were 9,182 manufacturers of ceramics and related materials. 99.7% of these firms were small and medium-sized companies with fewer than 300 employees. Moreover, 84.4% had nine or fewer employees. In the leading producing nations of Europe, on the other hand, the typical ceramics manufacturer has a payroll of 150-200 employees (excluding individual studios). Most European manufacturers carry out everything from raw material refining to over glaze decorating in-house, resulting in a larger corporate scale than is typical in Japan, where industry is characterized by a high degree of division and specialization.

Although the producing districts are generally located in raw material producing districts, firms rely on imports for a significant portion of their materials. Recently, in particular, imports of high-quality materials have been increasing in response to a shortage of quality domestic materials and a shift towards higher-grade products. Examples include kaolin from Korea and New Zealand, gypsum ore from Morocco and China, and feldspar from India, all of which are indispensable to the industry as materials for high-quality products.

Another recent trend has been the increasingly evident moves toward rationalization, labor conservation, and the upgrading and diversification of product lineups. This is in response to intensified international competition as well as the upgrading and diversification of domestic consumer needs. According to a survey done between October to November 1990, many of the companies gave as their mid- to long-term management objectives "technological innovation and a focus on high-grade products" (43% of the total) and "thoroughgoing cost reductions via automation and labor conservation" (33%). In addition, a major shift is being seen in fuel from heavy oil to liquid natural gas. This is in consideration of the LNG's good fuel efficiency, the upgrading of product quality, and attempts at pollution prevention, but is also due to the increasing use of small-volume gas shuttle kilns, which are suited to high-variety, low-volume production systems.

### **(2) Production and Market Trends**

Production of construction materials such as sanitary ware and tiles sagged during the first half of the 1980s, but starting in 1987 production picked up as the result of increased domestic demand. 1989 production of sanitary ware was up 35.4% from 1985 to 180,655 tons, while production of tiles grew by 21.3% to 1,289,823 tons. It is estimated that the domestic consumption (NB) of sanitary ware increased 40.2% over the

same period, to ¥70,648 million (approx. \$512.1 million), while domestic consumption of tiles was up 60.3%, to ¥230,162 million (approx. \$1,668.3 million). Exports, however, continued to drop as the yen appreciation and rising labor costs damaged international competitiveness. 1989 exports of sanitary ware and tiles were at only 50% and 39.5%, respectively, of their 1985 levels.

Production of tableware and novelties has recovered somewhat, but remains sluggish. 1989 production figures for tableware and novelties were down 10.2% and 11.4% from 1985 levels to 412,316 tons and 53,714 tons, respectively. Domestic shipments of both of these items have shown steady growth. Domestic consumption of these items during the same period grew 23.1% and 51.3%, respectively, to ¥148,223 million (approx. \$1,074.4 million) and ¥27,704 million (approx. \$200.8 million). Exports, however, continue to fall, and this had had an adverse effect on this highly export-dependent industry. 1989 exports of tableware and novelties were at 65.8% and 44.8% of 1985 levels.

(NB) Domestic consumption has been calculated by adding domestic shipment value and import value. The domestic shipment value was taken from the "Yearbook of General Merchandise Statistics" of the Ministry of International Trade and Industry and the import value from the "Japan Exports & Imports" of the Japan Tariff Association. The statistical bases of the two sources are different because the former is based on a questionnaire survey and the latter on customs clearance. As a result, a completely accurate numerical value of domestic consumption is not available and the numerical value given above is merely a provisional figure.

The Japanese ceramics industry, which in the past had experienced prosperity as an export industry, is turning its attention to the domestic market while gradually being forced out of the international market by fierce competition from high-grade European products and low- and middle-grade Asian products.

Imports, on the other hand, have posted significant growth reflecting the rising domestic demand and the sagging cost competitiveness of Japanese products. 1989 imports of sanitary ware grew 6.3-fold over 1985 to ¥1,865 million (approx. \$13.5 million); imports of tiles, 38% to ¥4,512 million (approx. \$32.7 million); imports of tableware, 2.5-fold to ¥12,883 million (\$93.4 million); and imports of novelties, 2.2-fold to ¥7,438 million (\$53.9 million). As a result, the share of imports is increasing on a yearly basis, accounting for 8.7% of tableware demand and 26.7% of novelty demand.

The share of imports in the domestic market is still small at 2.6 percent for sanitary ware and 2.0 percent for tiles. This situation, which is common in other countries as well, is largely due to the specific characteristics of building materials in each country. Domestic products have an advantage in every country because building materials must have designs and color tones which are harmonious with the building style of the nation concerned and the cost of transportation is rather high relative to product prices.

With the exception of tile imports, which grew 19.2 percent from a year earlier, imports in 1990 showed huge increases. The growth rate reached 120.6 percent for sanitary ware, 46.6 percent for tableware and 48.8 percent for novelties.

Taking into account the harsh operating environment faced by the Japanese ceramics industry in recent years, including a labor shortage, pollution-related problems, and the difficulty of plant location, Japan's import dependence is expected to show steady growth. Thus Japan's import market can be said to have great potential for development.

**Table 2-2-7: Trends in Japan's Ceramic Industry**

	1985	1986	1987	1988	1989
<b>Sanitary ware</b>					
No. of business establishments	48	39	41	43	
No. of employees	4,758	4,649	4,798	5,304	
Production (t)	133,468	135,846	155,164	175,484	180,655
Shipment (¥ million)	50,885	51,933	57,095	63,946	69,177
Exports (¥ million)	788	483	336	393	394
Domestic Sales (¥ million)	50,096	51,450	56,760	63,554	68,783
Imports (¥ million)	297	556	704	1,567	1,865
Domestic consumption (¥ million)	50,393	52,006	57,464	65,121	70,648
<b>Tiles</b>					
No. of business establishments	675	712	702	712	
No. of employees	14,485	14,625	15,078	15,451	
Production (t)	1,063,463	1,021,928	1,086,957	1,191,790	1,289,823
Shipment (¥ million)	159,976	159,923	176,036	208,722	233,428
Exports (¥ million)	19,669	13,179	9,020	8,243	7,778
Domestic Sales (¥ million)	140,307	146,744	167,016	200,479	225,650
Imports (¥ million)	3,264	2,612	2,807	3,167	4,512
Domestic consumption (¥ million)	143,571	149,356	169,823	203,646	230,162
<b>Tableware and Kitchenware</b>					
No. of business establishments	3,860	4,094	3,586	3,649	
No. of employees	44,082	39,421	37,492	36,408	
Production (t)	469,151	423,760	405,528	414,614	412,316
Shipment (¥ million)	173,367	162,567	158,620	163,970	173,551
Exports (¥ million)	58,074	47,848	39,564	35,731	38,211
Domestic Sales (¥ million)	115,292	114,718	119,056	128,239	135,340
Imports (¥ million)	5,101	5,381	6,216	8,411	12,883
Domestic consumption (¥ million)	120,393	120,099	125,272	136,650	148,223
<b>Toys and ornaments</b>					
No. of business establishments	1,272	1,291	1,188	1,207	
No. of employees	8,708	8,232	7,064	6,762	
Production (t)	60,599	55,631	51,220	53,457	53,714
Shipment (¥ million)	32,939	30,123	27,585	27,476	28,313
Exports (¥ million)	17,959	14,580	10,864	9,203	8,046
Domestic Sales (¥ million)	14,980	15,543	16,721	18,274	20,266
Imports (¥ million)	3,330	3,765	5,274	5,996	7,438
Domestic consumption (¥ million)	18,310	19,308	21,995	24,270	27,704

**Sources:** Figures indicating the number of business establishments and number of employees have been taken from "Census of Manufactures" of the Ministry of International Trade and Industry.

The volume of production and shipment value have been taken from "Year book of General Merchandise Statistics" of the Ministry of International Trade and Industry.

Import value has been taken from "Japan Exports & Imports" of the Japan Tariff Association.

Domestic consumption is calculated by adding domestic shipment value and import value.

Note: Ministry of International Trade and Industry statistics are based on questionnaire surveys and Japan Tariff Association statistics on customs clearance results. Therefore, the two statistics have different bases.

### (3) Competition in the Import Market

The distribution of shares in the market for imported ceramics varies greatly by product.

U.K. products maintain an overwhelming superiority in the tableware market, followed by products from other European countries such as Denmark, Germany, Italy and France. In 1990, products from these five countries were responsible for 94.8% of total import. Japanese consumers are becoming increasingly enamored of high-grade products, and most hotels and restaurants also emphasize a high-class image. As a result, the popularity of famous European brands and other high-grade products has been increasing recently. In the past demand for European products centered around tableware sets, but recently demand for individual pieces has also been rising resulting in securing new customers in spite of their high price. In addition to imports of these products, licensed production of famous brands is also becoming common so that price competitiveness has also been improving. In such cases, the design are often modified somewhat for the Japanese market.

R. Korea, China and Taiwan are responsible for most imports from Asia, but their combined share amounts to only 4.1%. It may be said that, with the exception of original products which are acceptable to some consumers, sales promotion is difficult in Japan's tableware market where high quality and excellent design are required.

Italian products boast an overwhelming superiority in the novelty market. In 1990, import from Belgium and United Kingdom increased remarkably. Imports from these three countries were responsible for 60.3% of total import. R. Korean, Chinese and Taiwanese products are also competitive and have a combined share of 36.6% in this market. Because this field is labor-intensive, Asian products are very competitive. Asian producers have developed their own characteristics in response to the Japanese market. Some examples include Korean flower vases which are similar to the famed Japanese Arita ware, traditional designs from China, and ordinary patterns from Taiwan. In many cases of Taiwanese products, half-finished pieces are imported from Japan for processing and re-export.

Imports from ASEAN countries such as Thailand, Malaysia, and the Philippines are also increasing, but their market share remains limited.

The tile market is dominated by Italian products, which are responsible for fully 59.3% of the total. Glazed, high-grade tiles form the core of Italian products, which are extremely competitive in terms of design, coloring, and product lineup. Other imports include German tiles and low-priced items from Spain, Korea and Taiwan. Korean and Taiwanese imports are increasing year by year, and their combined share has risen to 14.6%.

ASEAN products from Thailand, Malaysia, and Indonesia are very competitive in the sanitary ware market, with shares of 32.9%, 20.8% and 15.0% for the three nations. Most of these products are manufactured by joint ventures with Japanese companies or in the form of OEM based on technical tie-ups with Japanese companies, and they have come to represent a stable source of supply.

**Table 2-2-8: Imports of Tableware, by Countries**

(Unit: ¥1,000)

	1985	1986	1987	1988	1989	1990
U.K.	2,008,178	2,176,167	2,461,254	3,338,145	5,896,030	8,842,072
Denmark	504,826	600,121	697,086	897,067	1,247,342	2,201,884
West Germany	576,691	502,793	621,210	849,713	1,265,634	1,769,826
France	337,524	396,057	487,995	658,266	984,907	1,464,086
Italy	378,572	369,106	444,283	547,644	913,001	1,386,875
Other Asian countries & territories						
R. of Korea	205,324	246,069	342,072	475,521	317,274	319,365
China	356,013	358,016	327,636	337,796	356,713	244,184
Taiwan	38,816	88,383	104,269	142,540	153,867	117,309
Thailand	1,603	26,603	46,562	135,825	125,807	178,843
Malaysia	341	245	--	1,801	854	3,521
Indonesia	505	--	--	2,931	12,759	2,129
<b>Total</b>	<b>4,408,393</b>	<b>4,763,560</b>	<b>5,532,367</b>	<b>7,387,249</b>	<b>11,274,188</b>	<b>16,530,094</b>

**Table 2-2-9: Imports of Novelties, by Countries**

(Unit: ¥1,000)

	1985	1986	1987	1988	1989	1990
Italy	1,110,670	1,117,869	1,373,202	1,166,718	1,621,126	2,385,086
Belgium	--	3,377	4,126	2,970	6,091	1,040,071
U.K.	130,055	196,551	305,705	390,047	408,979	971,492
R. of Korea	396,960	600,396	996,914	1,318,627	1,199,651	961,448
China	259,475	273,067	435,742	537,983	644,410	861,689
Other Asian countries & territories						
Taiwan	273,907	510,611	633,857	635,367	736,914	844,648
Thailand	9,703	19,545	36,080	75,839	204,245	195,902
Malaysia	15,598	12,351	1,007	17,648	62,707	18,140
Indonesia	2,322	1,251	1,657	4,653	15,692	14,759
<b>Total</b>	<b>2,198,690</b>	<b>2,735,018</b>	<b>3,788,290</b>	<b>4,149,852</b>	<b>4,899,815</b>	<b>7,293,235</b>

**Table 2-2-10: Imports of Sanitary Ware, by Countries**

(Unit: ¥1,000)

	1985	1986	1987	1988	1989	1990
Thailand	4,892	1,329	12,289	6,958	11,541	602,303
Malaysia	--	--	96,609	298,939	343,723	380,602
USA	182,155	173,870	152,689	62,150	97,612	323,661
Indonesia	--	--	32,745	310,861	314,057	275,186
West Germany	12,908	25,358	70,940	32,902	40,820	135,186
Other Asian countries & territories						
R. of Korea	1,057	5,565	93,969	5,111	2,875	60,023
China	--	--	--	2,075	--	--
Taiwan	3,544	8,645	20,264	16,143	18,779	52,999
<b>Total</b>	<b>204,556</b>	<b>214,767</b>	<b>479,505</b>	<b>735,139</b>	<b>829,407</b>	<b>1,829,960</b>

**Table 2-2-11: Imports of Tiles, by Countries**

(Unit: ¥1,000)

	1985	1986	1987	1988	1989	1990
Italy	1,775,195	1,324,371	1,385,858	1,264,369	2,021,966	2,680,825
West Germany	566,863	517,778	652,857	696,284	746,246	828,837
R. of Korea	119,467	91,902	137,501	271,583	368,977	345,291
Spain	204,539	172,659	134,032	102,622	294,153	341,312
Taiwan	70,122	40,828	141,198	337,878	341,066	314,167
Other Asian countries & territories						
China	--	6,801	13,052	6,105	2,995	291
Thailand	1,166	10,115	13,274	40,295	7,924	6,327
Malaysia	--	--	--	10,310	6,491	--
Indonesia	11,663	17,968	--	--	--	1,002
<b>Total</b>	<b>2,749,015</b>	<b>2,182,422</b>	<b>2,477,772</b>	<b>2,729,446</b>	<b>3,789,818</b>	<b>4,518,052</b>

Source: "Japan Exports & Imports" Japan Tariff Association

**(4) Evaluation of Indonesian Products; Necessary Countermeasures, Items with Potential for Export to Japan**

With the single exception of sanitary ware, the Indonesian share of the Japanese import market remains extremely limited. Figures in 1990 were as follows: tableware, 0.01%; novelties, 0.2%; and tiles, 0.02%.

As a result, the Japanese market has so little familiarity with Indonesian products that it is impossible to collect information on their reputation in the market. Following, however, is a summary of the opinions of some industry sources based on their experience.

**1) Tableware and novelties**

It will not be easy for Indonesian products to penetrate the high quality-oriented Japanese tableware market. Full-fledged exports to Japan would have to be preceded by joint venture investment or technical tie-ups with Japanese companies.

Since the highly labor-intensiveness novelty sector is well suited to Indonesia, it is thought that penetration of this market would be comparatively easy.

In the case of both tableware and novelties, it will be important to take advantage of unique Indonesian strengths and characteristics. Possible means of achieving this include: [1] modifying traditional Indonesian designs specifically for Japanese consumers; and [2] providing low-cost daily goods with ordinary Japanese designs.

#### 2) Tiles

Tiles must maintain a harmony with the building as a whole, and as a result locally-produced tiles have an edge on imported products, for which the import market is limited and competition fierce. Penetration of this market would be difficult, and any attempt at exports to Japan will have to be preceded by a thorough study of the composition of the Japanese tile market. Generally speaking, 50% of Japanese tile demand is for exterior walls, while pavement tiles and interior tiles each account for another 25%. Specifications for each type are clearly distinguished, and it would be difficult to sell products intended for both wall and floor use, a practice which is common in Indonesia.

Exports of these products to Japan would require that the following preconditions be met: [1] sufficient quality control measures must be implemented; [2] delivery dates must be established and met consistently; and [3] the products must be cheaper than similar products from competing nations. [1] and [2] in particular will be imperative if Indonesian products are to earn the trust of Japanese buyers. The gradual building of trust over a period of years will provide a foundation for future full-scale campaigns in the Japanese market.

#### 3) Sanitary ware

Indonesian exports of sanitary ware to Japan are expected to increase steadily in the future. However, exports will be not easy for companies other than joint ventures with Japanese corporations or companies which have introduced technologies from Japan thus have their Japanese partner for product development, quality control and marketing.

### (5) Attitude of Japanese Companies Concerning Joint Venture Investment and Technological Tie-up with Indonesian Companies

#### 1) Attitude Towards Joint Venture Investment with Indonesian Firms

Foreign investment by the ceramics industry remains limited in comparison with other industries. The main reasons for this have been the small size of the typical companies and lack of sufficient funding and personnel to engage in such projects. As a result of the local labor shortage and rising production costs, however, an increasing number of firms are expressing interest in foreign investment. Indonesia in particular has been the subject of a great deal of interest.

In an October - November 1990 survey of the ceramics industry (362 firms were surveyed, with responses obtained from 131), only 12 of the responding firms (9.8% of the total) had undertaken foreign investment in the past (the main sites were Taiwan and Malaysia, indicated by six companies each). Seven of the respondents, however, indicated that they were "currently examining specified projects" for future foreign investment, and 15, that "there are no concrete proposals under examination, but foreign

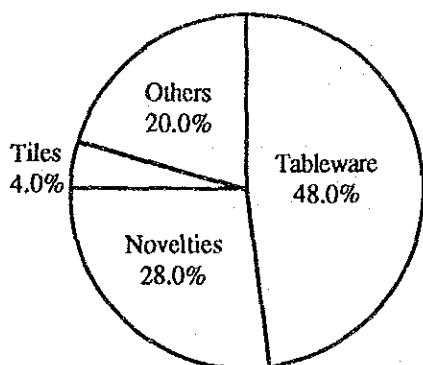


investment is being considered." Thus, foreign investment was planned or at least being considered by 20.2% of the companies.

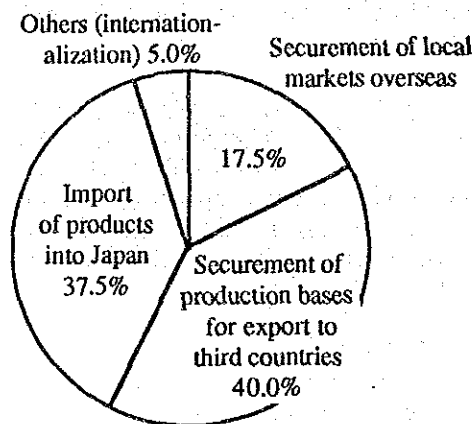
The great interest in foreign investment was shown by companies in the highly labor-intensive tableware (12 firms) and novelty (seven firms) sectors. The leading objectives indicated for foreign investment were "establishment of a base for production and export to third countries," indicated by 16 firms (40.2% of the total), and "export of finished products to Japan," noted by 15 firms (37.5%). "Securing of access to local markets" was noted by only seven firms (17.5%).

From now on, it is expected that overseas investments by ceramic manufacturers will gradually become more active. This investment will come from enterprises in labor intensive industries and will center on investment aimed at an international division of labor designed to serve both the domestic and overseas markets.

**Fig. 2-2-1: Overseas Investment Plans of Ceramic Product Manufacturers (by type of product)**



**Fig. 2-2-2: Purposes of Overseas Investments by Ceramic Product Manufacturers (multiple response)**



Source: Questionnaire survey

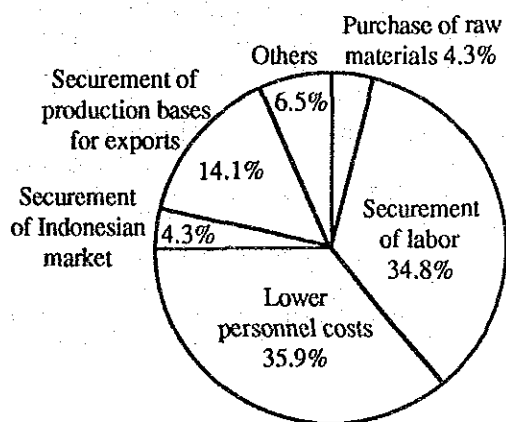
Indonesia, with nine firms, was the most frequently-noted among planned sites of investment, followed by Malaysia with seven. This demonstrates that many of the firms aiming at an international division of labor take note of the advantages of the two nations as manufacturing bases for exports. Four firms indicated that they were "currently examining specified projects" for investment in Indonesia and five firms that "there are no concrete proposals under examination, but investment in Indonesia is being considered." By type of industry (main products), the nine firms are four tableware manufacturers, three novelty makers, one tile producer and two other manufacturers (ceramic plants, engineering, firebricks, etc.).

The most commonly-noted merits of Indonesia as an investment site were "inexpensive labor costs" (33 firms, 35.9%) and "availability of labor" (32 firms, 34.8%). These were followed by "securing of a production base for export" (13 firms, 14.1%). This may be said to show that the shortage of labor and rise of wages, problems common to all industries of Japan, are responsible for the mounting interest of the ceramic industry in overseas business development.

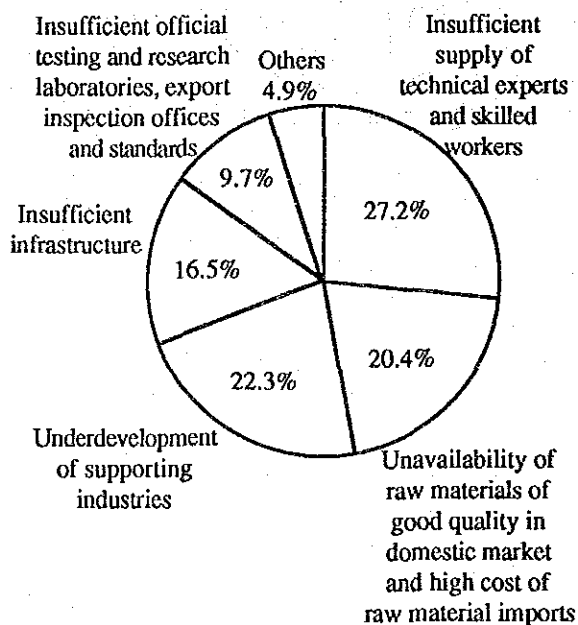
On the other hand, the following problems with Indonesia as an investment site were commonly noted: "lack of technicians and skilled laborers," 28 firms; "underdevelopment of supporting industries," 23 firms; "difficulty of obtaining high-quality raw materials locally and the high cost of imports," 21 firms; "inadequate infrastructure, including electrical power, communications, and roads," 17 firms; and "insufficiency of public testing and research and export inspection facilities and standardization-related systems," 10 firms.

It is notable that the interest in labor is very high with respect to both merits and demerits in Indonesia. The success or failure of Indonesia's nurturing of personnel is likely to become a big factor in future investments in Indonesia by Japanese firms.

**Fig. 2-2-3: Merits of Indonesia as an Investment Site (multiple response)**



**Fig. 2-2-4: Drawbacks of Indonesia as an Investment Site (multiple response)**



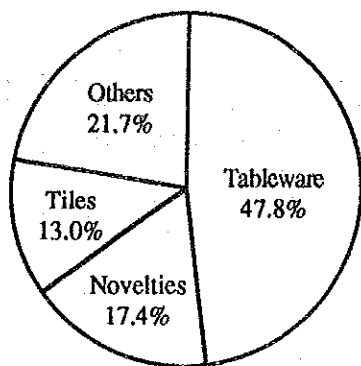
Source: Questionnaire survey

## 2) Attitude Towards Technological Tie-up with Indonesian Firms

Concerning technological tie-up with Indonesian firms, 23 firms (19.8% of the total) responded that such tie-up "is possible." One apparent attraction of technological tie-up is that it involves little capital or personnel burden in comparison with joint ventures investment. By type of industry (main products), the 23 firms are 11 tableware manufacturers, four novelty makers, three tile producers and five other manufacturers (industrial supplies, ceramic plants, firebricks and building materials).

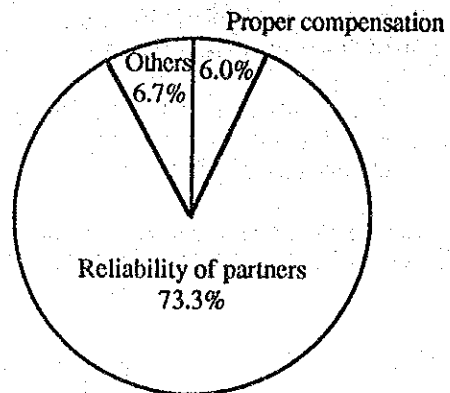
The most commonly-noted condition for the technological tie-up was that "the potential partner can be trusted," indicated by 22 firms, or 73.3% of the total, with other conditions being only seldom noted for example "fair royalty," was indicated by only six firms. It was obvious here as well that Japanese firms are clearly more interested in securing a source of supply than in obtaining royalties and other direct profits.

**Fig. 2-2-5: Firms Interested in Technological Tie-up with Indonesian Firms by Type of Product**



Source: Questionnaire survey

**Fig. 2-2-6: Conditions of Tie-up with Indonesian Firms (multiple response)**



## 2-2-3 Performance and Evaluation of Indonesian Ceramic Products in Major Import Markets

### (1) United States

Domestic demand in U.S. for ceramic products in 1989 totaled \$3,682 million and could be broken down as follows: tiles, paving, hearth \$1,085 million; sanitary ware, \$866 million; and tableware and kitchenware, \$1,006 million, novelties, \$724 million. During the period 1980-89, local demand for tiles grew at an annual average rate of 8%; sanitary ware, at a rate of 6%; and tableware and kitchenware, at a rate of 3.7%, novelties, at a rate of 11.8%. The average yearly increase for the four categories combined was 7.0%. Demand for tableware and kitchenware was sluggish. Due to sagging new housing starts, demand for building materials -- i.e., tiles and sanitary ware -- was sluggish in the second half of the 1980s. Novelties posted considerable growth.

Domestic production during this period was also sluggish, with annual average growth amounting to only 4.2%. (an increase of 6.4 percent for tiles and paving supplies, a 5.2 percent rise for sanitary ware, a 2.7 percent fall for tableware and kitchenware and a 6.7 percent climb for novelties)

Imports, on the other hand, showed a steady growth of 11.6 percent (an 11 percent rise for tiles and paving supplies, a 21.6 percent climb for sanitary ware, an 8 percent increase for tableware and kitchenware and a 21.7 percent rise for novelties) and satisfied 50 percent of the increase in demand. As a result, the market's dependence on imports has grown year by year, and by 1989 imports accounted for 77.7% of all tableware and household good demand, 61.9% of novelties demand and 39.7% of all tile demand. Imports alone expanded their share in the relatively sluggish market. Although increasing in recent years, the market share for imported sanitary ware remains relatively low at 8.4%.

The shares of each country in the import market differ greatly according to the item. The tile sector, for example, is dominated by Italy, which maintains a share of nearly 50%. Due to the weight of and resulting high shipping cost posed by sanitary ware, fully 83% of all imports are from nearby Canada, Mexico, and the countries of Central and South America. Imports from Latin America have posted especially high growth. In the field of tableware and household goods, the East Asian nations of Taiwan, Japan, and China are competitive and have a combined share of 68% of all imports. The strong yen and rising wage costs have damaged the competitiveness of Japanese goods, however, thus this country's share has fallen to only 24%, less than half of its former share. The resulting vacuum has been filled by increasing sales of Taiwanese and Chinese products. As a result, a pattern has been established in which Japanese products hold the high end of the import market, Taiwanese products the middle range, and Chinese products the low end.

Indonesian products have only begun to penetrate the import market, and market shares remain less than 1% for all products. As a result, Indonesian products are virtually unknown in the U.S. market, and they have yet to establish a reputation among those in the industry. It was indicated by some source, however, that "they have considerable potential." As evidence for this, (1) exports of Indonesian clothing and textiles to the United States are on the rise, thus U.S. consumers are gradually becoming familiar with Indonesian products; and (2) the reduced cost competitiveness of Japanese products and uncertainties concerning the delivery of Chinese products have led to a general feeling that the time has come to develop other Asian products in their place.

According to industry sources, the following points should be taken into consideration in any future attempt to increase exports of Indonesian ceramic products to the United States:

(1) In the market for building materials -- i.e., tiles and sanitary ware -- new housing demand is expected to remain sluggish for the time being, while growth can be predicted for the home repair and improvement sectors. (According to U.S. Industrial Outlook 1990, production and imports of tiles are expected to increase at an annual average rate of 6 percent in 1990-1995.) Consequently, success in the market will depend on whether manufacturers can supply products for the upgrading of homes and having design and coloring that will not conflict with existing housing patterns.

(2) Reduced consumer spending is expected to result in continued sluggish demand in the tableware and novelty markets. Moreover, greater safety concerns will lead to increasing problems concerning the lead contained in glazes. Coloring and design selections will also become more strict. The greatest care should be paid during the manufacture of tableware to avoid any possibility of lead noxiousness, and greater attention should be paid to fashion trends as well as pricing.

**Table 2-2-12: Trends in Demand/Supply of Ceramic Products in U.S.A.**

(In \$ million)

	1980	1985	1986	1987	1988	1989
<b>Tiles and paving</b>						
Production	384.5	568.8	665.9	624.6	675.4	671.7
Exports	7.3	7.5	7.5	8.0	12.4	17.8
Imports	167.7	266.2	315.5	378.1	410.9	431.1
Domestic consumption	544.9	827.5	973.9	994.7	1,073.9	1,085.0
<b>Sanitary ware</b>						
Production	528.5	706.7	772.3	714.1	811.1	835.1
Exports	26.8	17.5	15.6	19.4	36.8	41.1
Imports	12.5	42.5	71.8	67.0	72.3	72.6
Domestic consumption	514.2	731.7	828.5	761.7	846.6	866.6
<b>Tableware and kitchenware</b>						
Production	349.6	324.0	290.8	341.8	278.4	272.4
Exports	17.2	15.8	16.9	23.9	35.0	48.4
Imports	391.8	562.5	623.1	751.7	772.2	782.2
Domestic consumption	724.2	870.0	897.0	1,069.6	1,015.6	1,006.2
<b>Novelties</b>						
Production	159.8	169.6	163.7	229.6	259.3	286.8
Exports	10.0	8.1	8.1	9.2	12.6	10.8
Imports	76.3	105.0	140.7	166.3	146.5	448.2
Domestic consumption	226.1	266.5	296.3	386.7	393.2	724.2

Sources: Production: "Census of Manufacturers, 1987, July 1989" (Bureau of Statistics)

Exports: "U.S. Exports, Schedule B, 1980-1989" (Department of Commerce)

Imports: "U.S. Imports for Consumption, 1980-1989" (Department of Commerce)

Domestic consumption:

Calculated by "production minus exports plus imports" consumption

## (2) Germany

Statistics of the former West Germany show that the value of exports and imports are very large compared to that of output. The exports and imports mainly involve other EC countries. This may be said to demonstrate that intraregional transactions are extremely active in the EC ceramic market.

### 1) Tableware, Novelties

The domestic market continued to falter through the mid-1980s but turned around in 1987 and has been growing ever since. Imports of tableware fell at an annual average rate of 0.7% during the 1980-86 period, but then grew 12.1% annually during 1987-89 to 357.7 million marks in 1989. After growing at an annual pace averaging only 0.9% during 1980-86, novelty imports increased at an average rate of 8.0% annually during 1987-89 to 255 million marks in 1989. As a result, the ratio of dependence on imports of tableware rose to 32.5 percent and that of novelties reached 63.8 percent. In each of these categories, most of the shipments originated in the United Kingdom, Italy, Belgium, France and other EC nations, although East Asian nations such as Taiwan, Japan and China were also responsible for a sizeable share.

Generally, the European imports fall into the high range of the market; Japanese imports, into the mid- to high range; and other Asian imports, into the low range. Japanese products have a good reputation for quality. Many importers, however, feel that Japanese products are too costly in comparison with other Asian products. Despite less-than-superior quality Asian products are relatively inexpensive. A sizeable portion of these imports consists of imitation products purposely ordered by German importers, a practice with which manufacturers are said to be badly unsatisfied since it creates turbulence on the market. ASEAN sources of imports include Thailand, Malaysia, and the Philippines, but scale remains very limited.

Imports from Indonesia are extremely limited in value and are virtually unknown. Consequently there was no way of determining their reputation among industry sources. Some of the importers handling Chinese products, however, have indicated that "Indonesian products have potential for sales based on their low price." Their advice concerning Indonesian products can be summarized as follows:

- (Although this goes without saying) Products should be of high quality and low cost.
- Lineups should include products produced in small lots in addition to mass-produced items.
- In order to allow for follow-up purchases to replace damaged items, etc., manufacturers should be able to guarantee supply of the same model for a specified period of time after shipment.
- Delivery schedules should be strictly observed.
- Any claims should be resolved quickly and clearly.

### 2) Tiles, sanitary ware

Consumption of tiles (including paving) increased gradually from 104 million m<sup>2</sup> in 1980 to 106 million m<sup>2</sup> in 1989 by an annual average growth rate of 1.5%. During this

period, domestic production fell from 47.76 million m<sup>2</sup> to 41.59 million m<sup>2</sup> while dependence on imports increased significantly. 1989 imports amounted to 63.73 million m<sup>2</sup>, representing 60% of domestic consumption. Meanwhile, the German tile manufacturing industry has emphasized a shift towards high-grade products, leaving mass-produced products to the imports.

1989 imports were valued at 956.2 million marks, of which fully 94.1% were glazed. Nearly 80% of all tile imports originated in Italy. Other leading suppliers included France, the Netherlands, and Spain. It might also be noted that, among the Asian nations, Thai products have secured a consistent share, albeit it a small one, in the German market.

The growth rate of domestic consumption of sanitary ware has been low, averaging a mere 0.9 percent annually from 68,110 tons in 1980 to 73,569 tons in 1989. During the period, domestic production and exports declined at an annual average rate of 2.4 percent and 2.7 percent, respectively, while imports rose steadily at an annual average rate of 5.3 percent. As a result, the degree of dependence on imports of sanitary ware in 1989 climbed to 50.5 percent. It may be said that sanitary ware manufacturing is moving in the same direction as tile production.

The value of sanitary ware imports in 1989 was 144 million marks, 70 percent of which was from four EC countries: Italy, France, Belgium and Luxembourg. Notable volumes among the remaining imports were from the two neighboring countries of Austria and Turkey. Imports from Asia were almost zero.

The import structure of the German market poses a considerable problem for Asian entry into the EC construction material market, particularly the sanitary ware market.

Imports from Indonesia have not yet reached a point capable of calculation. Naturally, no broad reactions to Indonesian products could be obtained, but the views of a few importers were summarized below.

- Penetration of the German market by Indonesian products will not be easy. If quality improvements and cost reductions can be achieved, however, there is a possibility. In fact, products from neighboring Thailand have succeeded in securing a market share based on relatively high quality and low price.

- There is a need for further study of current prices on the international market. Inquiries were received from Indonesia concerning mosaic wall tiles, but prices were extremely high. Tiles made in Poland, Czechoslovakia, and South America are very inexpensive.

**Table 2-2-13: Trends in Demand/Supply of Ceramic Products in Former West Germany**

(In million marks)

	1980	1985	1986	1987	1988	1989
<b>Tableware and household articles</b>						
Production	1,213.0	1,322.6	1,328.1	1,354.7	1,381.6	1,451.8
Exports	480.9	629.5	639.0	627.7	673.5	707.2
Imports	301.4	256.4	254.5	296.0	340.9	357.7
Domestic consumption	1,033.5	949.5	943.6	1,023.0	1,049.0	1,102.3
<b>Novelties</b>						
Production	350.0	361.8	371.4	341.6	300.6	319.6
Exports	190.6	208.1	203.4	171.9	169.7	174.9
Imports	191.6	205.7	202.4	235.9	235.6	255.0
Domestic consumption	351.0	359.4	370.4	277.6	366.5	399.7
<b>Tiles and paving</b>						
Production	1,084.5	946.0	918.1	896.1	874.4	929.5
Exports	684.9	638.2	631.6	618.4	653.5	681.4
Imports	658.0	673.8	695.1	737.2	824.5	956.2
Domestic consumption	1,057.6	981.6	981.6	1,014.9	1,054.4	1,204.3
<b>Sanitary ware*</b>						
Production	357.6	368.2	349.7	401.7	445.4	486.1
Exports	66.2	69.0	76.4	85.8	104.4	113.8
Imports	75.6	122.4	117.6	126.7	124.5	144.0
Domestic consumption	367.0	421.6	390.9	442.6	465.5	516.3

\* Confined to pottery products.

Source: Production, exports and imports have been taken from Federal Statistics Bureau figures.

Domestic consumption has been calculated by "production minus exports plus imports."



## 2-2-4 Ceramic Production and Exports and Industrial Promotion Policy in Competing Nations

### (1) Thailand

As seen in Section 2-2-1 above, the Thai ceramics industry is gradually securing a share in markets across the globe. Although the size of this share remains limited at present, Thailand has outperformed all of the other ASEAN nations.

The Thai ceramics industry began to develop in earnest in the 1960s. Today, tiles, sanitary ware and tableware are produced in large quantities using modern facilities.

The tableware sector consists of ten large-sized manufacturers (of which nine received investment incentives from the Board of Investment: BOI) and 60-70 small and medium-sized factories. Most of the ten large manufacturers have introduced technology from foreign companies such as Japanese or German manufacturers for the production of mid- to high-quality tableware. Virtually all of the equipment is imported, although simple machines, kiln furnitures, and electrical systems can be procured locally. Buyers include local hotels, expensive restaurants, and high-income households in addition to foreign markets. The ten large firms constitute the nucleus of the tableware export industry. Most of the products produced by the small and medium firms are destined for the local market, although in recent years exports have been increasing at these firms as well.

There are no large firms in the novelties sector; 90-100 small and medium businesses and cottage industries are responsible for producing a variety of items. Most of the products are destined for the local market, but recently exports, mainly of superior products, have increased significantly.

Exports of tableware and novelties began to rise in 1987, and increased sharply in 1988. The main destinations were the U.S. and the EC including Belgium, Holland and the United Kingdom. Exports to Japan also increased.

Fig. 2-2-7: Exports of Tableware by Countries (in 1988)

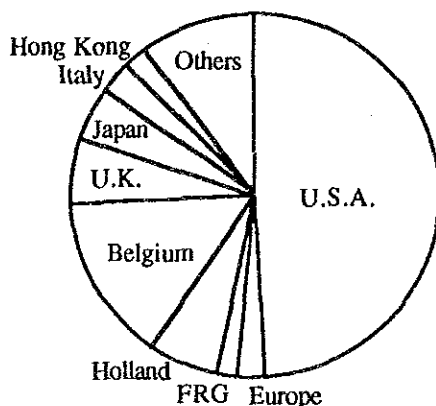
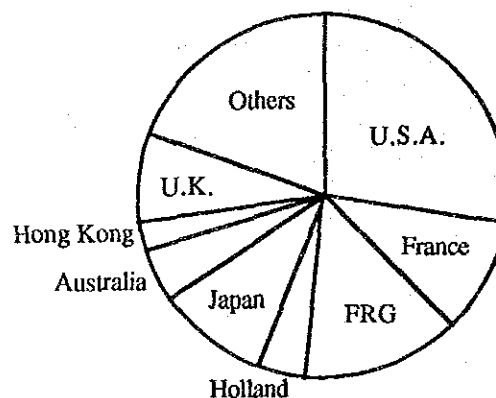


Fig. 2-2-8: Exports of Novelties by Countries (in 1988)



In Thailand also, fluctuations in the quality of local raw materials are a problem. Most machinery and equipment is imported. Siam Cement, however, has begun production of kiln furnitures, and this would provide ceramics manufacturers with a greater choice of equipment as well as contributing to cost reductions.

In the Lampang district in the north, quality levels at small and medium factories are generally low. The celadon porcelain products of the Chiang Mai area are made attractive by a hand-made feeling. Products manufactured by the large firms, foreign affiliates, and medium-sized companies in Bangkok and surrounding areas are generally of high quality and can be treated as medium-grade products even on the international market. It was the opinion of the foreign experts interviewed during the field survey in Indonesia that, in terms of quality, Thai products remain a rank above those of Indonesia.

Thailand's Ministry of Industry has decided to establish a Ceramic Center in the Lampang district as a showcase of its ceramics industry promotion policies. Issues concerning this project are as follows:

- (1) The Center should provide a comprehensive range of services, from the analysis and grading of raw materials to training in production technology, research and development, training in management and marketing, and technology and information services.
- (2) The Center should work to satisfy industry needs while maintaining close ties with local industry and industrial associations in particular. Furthermore, it should incorporate the principle of "those who benefit should bear the cost" as much as possible and work to secure its own income for the improvement of facilities and services.
- (3) Even assuming that the Center's services are limited to the Lampang district for the time being, future operations should be expanded to cover all of Thailand.

## (2) Malaysia

As stated in Chapter 2-2-1, Among the ASEAN member countries, Malaysia ranks a distant second behind Thailand in ceramics exports to the OECD nations.

Ceramic ware exports from Malaysia began on a full scale in 1982, when a subsidiary of a U.S. firm started producing ceramic statuettes and other ornaments in the country. Exports further expanded in 1986 with the start of production by a Japanese tableware manufacturer.

According to a 1981 survey, the number of pottery manufacturers was estimated at around 350 in West Malaysia alone. Most of these were small-sized firms not specialized in any particular type of product. For instance, tiles and tableware were often manufactured in the same factory together with drainage pipes, flowerpots and ornaments. Therefore, the number of manufacturers specialized in tableware and novelties is limited.

As of 1988, there was only one manufacturer specialized in tableware in Malaysia. A joint venture with a Japanese firm, the manufacturer had 450 employees and production capacity of a million units a year. It shipped products to the domestic and foreign markets. At that time, another Japanese enterprise was preparing to produce in Malaysia.

There were two high-grade novelty manufacturers. One was a wholly-owned subsidiary of a U.S. firm and the other a wholly-owned affiliate of a Japanese enterprise. The operations had 1,200 and 480 employees, respectively, and both exported all of their products.

The technology of the above three firms has reached the internationally acceptable level. The two novelty manufacturers, in particular, are conducting quality control on the basis of very rigid standards fixed by their parent firms to maintain their brand images. The two manufacturers have succeeded in producing articles of high quality by utilizing Malaysian workers' craftsmanship skills.

The overseas marketing of the three firms is carried out through the parent companies or their overseas subsidiaries, seemingly without problems.

The activities of the three firms are presumed to have contributed a great deal to the rapid growth of Malaysia's ceramics exports since 1988. In other words, it may be said that open policies for the attraction of foreign capital introduced by the Malaysian government, including the allowance of 100 percent ownership of subsidiaries, and the utilization of the country's deft labor force and rich ceramic resources have resulted in the realization and expansion of pottery exports.

On the other hand, it is also a fact that a great many domestic firms with no foreign affiliations have not yet emerged from the sphere of traditional industry based only on the domestic market.

Current problems in the Malaysian pottery industry are as follows:

[1] Quality of raw materials

Malaysia has abundant raw materials for ceramics such as kaolin, clay, limestone and silica. Feldspar, glaze and a small volume of chemicals used as ornamental pigments are imported.

High quality kaolin is produced in Johore and silica sand can be obtained without problems in terms of volume and quality. But the quality of plastic clay is inconsistent.

Generally speaking, domestic raw materials are insufficient in terms of processing and treatment and as a result manufacturers of products for export depend on imports for most raw materials.

[2] Delay in development of peripheral industries and dual industrial structure

The development of raw and auxiliary material industries is lagging behind. There are two kaolin processing mills in Ipoh, but their products are mainly for paper and other industries. As a result, manufacturers of products for export rely on imported raw and auxiliary materials and manufacturers for the domestic market produce low-grade articles using low-quality domestic raw materials. Such a dual industrial structure remains to be rectified.

[3] Insufficient official assistance

There are currently no test laboratories, research and development organs or training institutes specialized in the ceramic industry. Hardly any assistance is given to domestic firms which are lagging behind in terms of technology.

[4] Corporate management and marketing

With the exception of some manufacturers of products for export, most of the domestic firms are small family concerns. As a result, consciousness of the need for improvement, let alone know-how, is lacking in all fields including manufacturing technology, quality control and marketing.

Production lots are becoming increasingly small because the domestic market is small and consumer needs are diversifying, giving rise to pressure on the operation of domestic firms. Generally speaking, they have great difficulty in raising funds and there are few chances for them to expand their business and modernize their facilities.

This situation has given rise to the following issues which must be overcome to strengthen the overall structure of the industry.

[1] Revitalization of activities by industrial organizations

There is a Ceramic Association but it includes very few tableware or novelty manufacturers. It is desirable that the association be more strongly organized and actively undertake technological exchanges among manufacturers and the collection of market information.

[2] Establishment of a public assistance system

In particular, establishment of testing and research organizations and training institutes has become an urgent necessity.

[3] Expansion of raw material supply system

Mining and mapping of resources, development of raw material mixing and refinery technology and establishment of raw material supply companies and organs have become issues for long-term consideration.

Among manufacturers, joint procurement of raw materials has become an issue requiring urgent consideration.

[4] Assistance in management and marketing

Training of managers, assistance in overseas marketing, expansion of export finance systems and financial assistance for the modernization of facilities are desired.

### (3) Sri Lanka

The Sri Lankan ceramics industry is still small in scale. Exports are also limited. However, a handful of state-owned and foreign-affiliate corporations are in the process of establishing a foothold for development as an export industry. Thus Sri Lanka's industrial structure might be of reference when considering policies for the promotion of leading companies in Indonesia.

Full-scale commercial production of ceramics in Sri Lanka began in 1959 with the establishment of Ceylon Ceramics Corporation (now known as Lanka Ceramics Ltd., = LCL). Exports of ceramic ware started in 1972 by a manufacturer of tableware (the current Lanka Porcelain Pvd Ltd.). In 1975, Lanka Walltiles Pvd Ltd. was established to begin export of wall tiles.

Also in 1975, the Central Research and Development Laboratory (CRDL) was set up (upgraded in 1984 with assistance from UNIDO) to provide technological assistance to enterprises. The raw material supply system was strengthened with the construction of a ball clay factory in 1976 and a kaolin refining plant in 1977.

Thus, export product manufacturers, official research and development organs and raw material suppliers were all set up in the 1970s, the preconditions for export-oriented industrialization could be said to be provided.

It appears that the scale of production and exports from the ceramics manufacturing industry of Sri Lanka have not been growing significantly in the past several years. But the profit margins of all of the firms have risen considerably. This is

presumed to be the result of successful rationalization, improvement of productivity and realization of higher added value.

There are eight large ceramics manufacturers in Sri Lanka. Four of these are either state-owned corporations or subsidiaries thereof. One is a joint venture between the subsidiary of a state-owned firm and a private company, and three are joint ventures with foreign corporations.

[1] Lanka Ceramic Ltd. (LCL)

Sri Lanka's largest corporation, established in 1950. Fully-owned by the government and managed by the Ministry of Industry. Engaged in the manufacture of sanitary ware and tableware, mostly for sale on the local market.

[2] Lanka Porcelain Pvd Ltd.

A joint venture owned 60% by LCL and 40% by a Japanese corporation. Engaged in the production of tableware, of which 72% is exported.

[3] Lanka Walltiles Pvd Ltd.

A subsidiary owned 80% by LCL. 48% of the wall tiles produced are exported.

[4] Lanka Tiles Pvd Ltd.

Owned 25% by LCL and 75% by a private company. The wall and floor tiles produced here are destined for export.

[5] Dankotuwa Porcelain Ltd.

A joint venture owned 50% by a Japanese firm and 50% by the Sri Lanka Employment Trust Foundation. Engaged in the production of tableware, of which 42% is exported.

In addition to these firms, the Korean-affiliated Ceramic World Pvd Ltd. and Japanese-affiliated Lanka Dainichi Ceramics Ltd. are engaged in the production of statuette for export. Lanka Refractories Ltd., a subsidiary of LCL, produces refractory brick, a material used in the manufacture of ceramics products.

Sri Lanka has been successful in promoting its core firms around the state-owned and foreign-affiliate enterprises. Despite its limited industrial foundation, the country has also succeeded in attracting large foreign companies. The following factors are partially responsible for this success:

- Based on the provisions of the Greater Colombo Economic Commission (GCEC), which has jurisdiction over export-oriented investment projects, the following drastic incentives have been adopted to encourage export-oriented foreign investment: (1) investment projects are eligible for a corporate tax holiday of up to 15 years, a 50% reduction for five years afterwards, and exemption from raw material import taxes and sales taxes; (2) there are no restrictions on investment; and (3) there are no restrictions on the hiring of foreign employees. In addition, the government itself is making efforts to attract large foreign firms.

- LCL has established refractory brick factories and kaolin refineries as part of efforts to develop the local supply structure for raw and auxiliary materials and thereby improve the corporate environment.

- LCL has pursued practical and multifaceted policies including its major role in the establishment of joint ventures between domestic and foreign private enterprises and encouragement of private investment both by domestic and foreign companies.

- Linkage between large and small and medium firms has been regarded as an important factor in the promotion of exports and nurturing of small enterprises.
- CRDL has played a central role in providing official assistance for research and development, training and other activities.
- Deregulation has been progressing through the relaxation of the import licensing system and other measures.
- The Export Development Board (EDB) has assisted firms in overseas marketing by holding business meetings abroad, organizing participation in international trade fairs, providing subsidies and setting up trade counters in major cities abroad.

The Sri Lankan government is placing great emphasis on the attraction of foreign capital in the future as well. It has fixed the following guidelines for promoting it:

- Authorization of foreign capital investments, which is currently handled by two or more organizations, should be unified into the Greater Colombo Economic Commission (GCEC).
- Under the new GCEC system, foreign capital investments should be automatically authorized.
- Business Promotion Centers should be set up in major cities around the world.

### 2-3 Overview of the Indonesian Ceramics Industry

The world ceramics industry has made great strides towards mechanization in recent years. Many of the processes involved rely on manual labor, however, and in principle ceramics industry is considered a labor-intensive sector. In addition, while the mastery of advanced technologies requires repeated trial-and-error and experience accumulated over a long period of time, it is relatively easy for new companies to enter this field provided they have acquired the necessary facilities.

Another characteristic of this resource-dependent industry is the fact that raw materials account for a large percentage of total costs. It also requires many days and considerable plant space for the numerous processing steps, from the treatment of raw materials to processing, molding, and finishing, and for storage.

As a result of these characteristics, the ceramics industry can be said to be suited to Indonesia, which boasts the largest labor force and land area in Southeast Asia coupled with abundant natural resources.

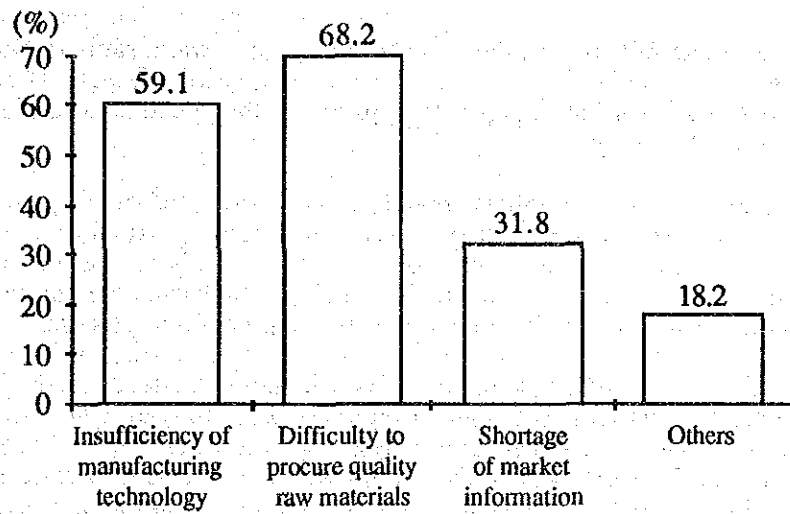
In fact, the Indonesian ceramics industry is now entering a phase of rapid growth, propelled by increased local and foreign demand in recent years. Production capacity grew at an annual average rate of more than 17% during the three and a half years from December 1986 through June 1990. Enthusiasm for capital investment at both local and foreign companies remains healthy, and continued growth is expected in production capacity. It is quite possible that Indonesia will become one of the powerful bases of supply for ceramic products in the Asian region.

Despite this potential for quantitative development, however, it must also be noted that the industry faces many qualitative problems in areas such as the industrial structure, management, design and quality.

This business requires thorough management of all steps in the production process, from the mining and processing of raw materials to final finishing, and mistakes or miscalculations in any one of these operations will make it impossible to manufacture a quality product.

In fact, problems that ceramic products manufacturers in Indonesia are acutely aware vary widely from "difficulty in the procuring quality raw materials" to "insufficiency of manufacturing technology" and "shortage of market information."

**Fig. 2-3-1: Problems Relating to Development Facing Ceramic Products Manufacturers\***



\* Multiple response. Figures indicate the ratio of firms which selected the items to the whole responding firms.

Source: Questionnaire survey

In nurturing the industry, it seems necessary to comprehensively improve all sectors of the industry from upstream to downstream, correlating each sector with the other sectors to produce coordination in the industry.

Based on these viewpoints, this chapter provides studies from a wide variety of angles on the latest situation and problems of the ceramic product manufacturing industry of Indonesia.



## 2-3-1 Raw materials and Auxiliary Materials Sector

### (1) Raw Materials Sector

The main materials used in the manufacture of tableware, sanitary ware and tiles include kaolin, feldspar, plastic clay, pottery stone, and silica. Other materials include supplementary material for glaze, pigment, gypsum for the gypsum molds, kiln furniture materials, and refractory clay.

The most important of these materials are produced locally in Indonesia. However, the raw materials currently in use are not of particularly high quality. Typically-used raw materials include kaolin produced on Belitung and Bangka and feldspar produced at Lodoyo in East Java. Plastic clay, which can be found in the vicinity of the factories, is then added to these materials for the production process.

During this study it was not able to visit the main raw material producing districts, but the kaolin mining district in the Mandor region of western Kalimantan was observed. At present, this district remains in the testing stages and has yet to begin full-scale production. It is believed, however, that kaolin deposits are scattered throughout this district, so that in the future a thorough survey of kaolin distribution and reserves would be necessary.

Concerning raw materials produced in other districts, the Ceramic and Research Development Institute (IRDCRI) of Ministry of Industry in Bandung has conducted wide-ranging studies, but at present it appears that satisfactory data concerning reserves and quality fluctuations has yet to be obtained.

The Ministry of Mines and Energy has jurisdiction over raw material exploration and development, but no full-scale development is being undertaken. The IRDCRI carries out collection of samples and application tests of the same. Satisfactory data concerning reserves and quality, however, cannot be obtained.

Most of the raw material producing districts surveyed or developed up until now were Java, Sumatra, and West Kalimantan districts, while only a handful of sites in Sulawesi and Irian Jaya have been surveyed.

#### 1) Producing Districts and Production Items; Quality

##### a) Kaolin

The kaolin produced on Belitung and Bangka Islands is typical. Both islands are home to relatively large-scale production, and kaolin produced there are one of the most commonly-used raw materials in Indonesia. In fact, the development of the Indonesian ceramics industry can be said to depend greatly on the kaolin produced on these two islands.

According to the report of a joint study by the New Energy and Industrial Technology Development Organization and the Ceramic Society of Japan on the situation of basic material resources including ceramics, Belitung Island's Kaolin resources are divided into sedimentary mineral deposits and weathering eluvium deposits from their origin. The grade of kaolin in the sedimentary deposits is as high as 45 - 60 percent. After sedimentation, the grade rises to 75 - 85 percent and, with its high degree of whiteness, it is evaluated as of good quality. On the other hand, weathering eluvium kaolin contains many impurities such as quartz and sericite and is evaluated as of low grade. Kaolin on Bangka Island contains much iron and titanium and is problematic as a main raw material of high-grade white porcelain.

Belitung's kaolin is classified as primary clay; Bangka's, as secondary clay. Mining techniques are also different. On Belitung Island, the wet grinding technique, in which the kaolin is washed in water to cause the sand to sediment and separate, is used, while on Bangka Island mining is done manually.

There are two methods of refining kaolin: the sedimentation technique using a sedimentation tank; and the modern water cyclone method. Today, the latter method is more common.

Other kaolin-producing districts include West Java, North Sumatra (Bamdarpulo), West Kalimantan, and Sulawesi (Manado). Kaolin is used as a raw material in these districts, but development has been limited.

#### b) Feldspar

The feldspar produced at Lodoyo in East Java is typical. In addition, feldspar from Bojong is used at some companies in the Bandung district.

Lodoyo feldspar is the most important and common feldspar material in Indonesia, and it is used at virtually in all tableware, tile, and sanitary ware factories.

Other varieties of feldspar include sand taken from the Kisaran coast of Sumatra, which is considered to be a good source of feldspar and which is reportedly used as a raw material for ceramics production in Java. The region is far away from Java, however, and the sand itself is flawed by a large quartz content.

The sand scattered in east coast of Sumatra is called Kuwarusa silica. This contains quartz and high temperature feldspar. The reserve is estimated vast.

At the IRDCRI, feldspar samples from Lampung, Tanjuntiram, Banjarnagara, and other regions are being evaluated and tested. The existence of high-quality materials, however, has yet to be confirmed.

#### c) Plastic Clay

Indonesia boasts no varieties of high-quality plastic clay equivalent to, for example, the *Gairome* and *Kibushi* varieties found in Japan.

Consequently, plastic clay for use in the production of high-quality products must be imported from Japan or the United Kingdom.

For ordinary products, plastic clay produced in Belitung is often used. In addition, some companies use the relatively high-plasticity clay found throughout Java. Typical producing districts include Parungpanjang, Tubrn, and Sukabumi.

#### d) Silica

Silica produced in Belitung has a high silicic acid content and a low impurity content, and it is used in large quantities in the manufacture of glass. Silica in Balikpapan is also of high quality. It is imported into Japan and utilized as raw material for silicic acid soda and cast metal.

The ceramics industry uses only small quantities of silica. Kaolin, feldspar, and clay already contain silicic acid ( $\text{SiO}_2$ ), and silica is used to supplement this.

#### 5) Pottery Stone

Pottery stone, which is used in the manufacture of tableware and sanitary ware, was discovered in Talang, and the possibility of using it was studied at the IRDCRI. It lacked in whiteness, and was not of sufficient quality. According to the survey report

introduced earlier, however, inner part is white and fine, thus judged to be able to be moulded even by itself, if selected to separate inner part only and grinded. At present, a high-quality source of pottery stone remains to be found.

High-quality pottery stone is characterized by plasticity and the property of vitrification even by itself, making it one of the effective raw materials for ceramics production. The main component minerals are quartz, sericite, kaolinite, halloysite, and pyrophyllite, and the temperature of vitrification depends on the composition.

## 2) Problems Faced by the Manufacturers

Ceramic manufacturers show little interest in the "utilization of domestically-produced materials" (Table 2-3-2). But this does not mean their expectations of domestic materials are small. Rather, it may be interpreted as an expression of their lack of hope of using domestic materials at present because of quality problems. In fact, many firms cite the problem of "difficulties in procuring raw materials," as stated earlier (Fig. 2-3-1).

The greatest problem for factories is quality fluctuations in raw material shipments. Such fluctuations render the raw materials virtually useless. In the current survey, it was found at some of the plants that quality varied in each truckload, presenting considerable problems.

In the case of natural materials, the presence of impurities is unavoidable. Raw materials produced in Indonesia, however, are generally in excess of acceptable level. This depends on the size of the deposit, the condition of the layer, mining, the ore selection technique, the condition of the storage area, and transportation methods, but basically it is thought that problems are in the mining and grading operations.

In addition to screening and selection to separate high-quality portions and low-quality portions containing impurities during mining, stocking and management by grades is also important. Improvements are especially needed for those materials which do not allow use of sedimentation refining.

The next problem facing the manufacturers is insufficient plasticity in the clay. The IRDCRI has conducted joint research with the Government Industrial Research Institute, Nagoya, Japan and carried out tests on the plasticity of various types of clay, and it seems clear that Indonesian clay is inferior to Japanese varieties.

The following results were obtained from plasticity tests conducted on Indonesian clay and kaolin. The materials are ranked in order of their plasticity, from highest to lowest:

- |     |                                  |
|-----|----------------------------------|
| 1st | Pantul clay                      |
| 2nd | Parungpanjang clay, Cipundi clay |
| 3rd | Gunung guru clay, Belitung clay  |
| 4th | Bangka kaolin, Bamdarpulo kaolin |
| 5th | Belitung kaolin, Kalaha kaolin   |

The effects of adding substances to improve plasticity has also been studied, but to date there have been no satisfactory results. As a result, some companies use high-plasticity imported clay.

This is probably the easiest means of providing clay with stable plasticity.

## (2) Auxiliary Materials Sector

Auxiliary materials necessary for the manufacture of ceramics include kiln furnitures such as sagger, slab and support, and other materials such as plaster of Paris, transfer paper, pigment, frit, feldspar, zinc oxide, alumina, barium carbonate, zircon, calcium carbonate. Of these, the major auxiliary materials consumed in large quantities are kiln furniture, plaster of Paris, pigment and transfer paper.

In this survey, there was almost no chance to study the sector of auxiliary materials through actual visits. However, through the field survey visits to ceramics product manufacturers, the status of this sector was verified to be in an under-developed stage. First of all, there is the fact that there are very few producers related to this sector. In addition, all producers of these auxiliary materials are all small in size. Only a few of the frit manufacturing companies have membership in the Indonesian Ceramic Association, ASAKI.

The under-development of the auxiliary materials sector in Indonesia is considered to have resulted from the Indonesian industrial structure.

In Indonesia, an in-house production method through which the materials is formed into final products is adopted by most of the major ceramic manufacturers as is the case with the European ceramic industry. Therefore, it can be said that the division of labor has not developed very far, resulting in an environment where domestic mutual business transactions for the auxiliary materials in Indonesia are obstructed

The quality of auxiliary materials is also inferior. The kiln furniture and Gypsum molds found in a tableware factory in this survey verified this inferiority both in terms of quality and of manufacturing technology. They were either in-house products or domestically produced ones. Kiln furniture should mainly be made of highly durable synthetic materials. However, the domestic kiln furniture has a short life because it is made of only natural raw materials.

Gypsum molds made in Indonesia of fired gypsum are poor in quality and have low endurance. The technology for manufacturing molds is also of a low standard.

As a result, imports are completely relied upon for these auxiliary materials used by most of the ceramic product manufacturers.

There are also problems in the manner of usage of the auxiliary materials by the manufacturers. Only a few manufacturers regulate the conditions of utilization or limit frequency of use etc.. For example, gypsum molds are replaced simply according to their external appearance and without any regard to material control. This seems to be the natural reason for the quality of final products not improving to date.

Increasing the level of knowledge of the usage of materials by the product makers is considered to be very important as well as the fostering of the auxiliary material sector.

Raw materials and auxiliary materials which are imported or domestically produced in Indonesia are shown in Table 2-3-1.

The degree of dependence on imports for auxiliary materials is remarkably high while there are many manufacturers who rely upon imports for raw materials as shown in Table 2-3-1. This shows that there are certain problems in the supply of domestically produced materials in general.

**Table 2-3-1: The Degree of Dependence on Imports for Raw Materials and Auxiliary Materials ( Based only on firms that responded to the questionnaire)**

Main Materials	(1) Number of firms utilizing domestic materials	(2) Number of firms utilizing imported materials	(2) / (1) (%)
Frit	1	13	93%
Pigment(color)	3	21	88%
Gypsum Mould	3	12	80%
Slab & Support	4	12	75%
Aluminum Powder	8	13	62%
Transfer Paper	8	9	53%
Sagger	10	10	50%
Zinc Oxide	10	6	38%
Dolomite	13	5	38%
Feldspar	20	6	23%
Calcium	15	4	21%
Plastic Clay	23	4	15%
Silica	23	3	13%
Kaolin	22	3	12%

Source: Same as Fig. 2-3-1