

REPUBLIC OF ZAMBIA  
REPORT  
ON  
INDUSTRIAL DEVELOPMENT  
IN ZAMBIA

DECEMBER 1971

OVERSEAS TECHNICAL COOPERATION AGENCY  
GOVERNMENT OF JAPAN

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**REPORT**

**ON**

**INDUSTRIAL DEVELOPMENT**

**IN ZAMBIA**

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**DECEMBER 1971**

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**GOVERNMENT OF JAPAN**

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## Preface

The Republic of Zambia is one of the leading copper producing countries in the world, together with its neighbor, the Republic of Zaire, whose common borders lie through the Copperbelt. In Zambia, the mining industry, including copper producing enterprises, occupies a large portion of her gross domestic product. As far as the manufacturing industrial sector is concerned, it is progressing by means of "nationalization" promoted by INDECO. In particular, this sector has shown remarkable increase in recent years.

It is no exaggeration to say that Zambia has been untiring in its efforts toward self-reliance through diversification of industries, trying to break of economic relations with Rhodesia. In this respect, it was considered necessary to study the present situation of "industrialization" for the purpose of strengthening the bond of mutual understanding and cooperation between Japan and Zambia. Information available up to that time concerning the status-quo of the economic situation in Zambia was not necessarily sufficient in Japan. Hence, the Overseas Technical Cooperation Agency (OTCA) organized a study team composed of eight members, headed by Mr. Tomijiro Kyozaawa, Executive Director of Japan External Trade Organization so as to fill this gap.

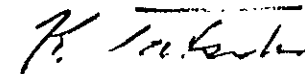
The team visited Zambia for approximately ten days after having completed their assignments in Zaire, and collected data and information required for their final studies in Japan.

After their return to Tokyo, the team prepared this report, based upon the results of their studies made by means of the information obtained during their stay in Zambia.

It is my sincere hope that this report will be of great help to the establishment and promotion of Japanese overseas policies with regard to our economic and technical cooperation with Zambia, thereby contributing to the promotion of rapport between the two nations.

Finally, on behalf of OTCA, I wish to express my deepest gratitude for the hospitality and kind cooperation the Zambian authorities concerned extended to the team while they were in Zambia.

December 1971



Keiichi Tatsuke  
Director General  
Overseas Technical Cooperation  
Agency

## Letter of Transmittal

Mr. Keiichi Tatsuke  
Director General  
Overseas Technical Cooperation Agency

Dear Sir:

Transmitted herewith is a report on industrial development in the Republic of Zambia. In response to a request from the Ministry of International Trade and Industry of Japan, the Overseas Technical Cooperation Agency (OTCA) organized a study team composed of eight members from different governmental agencies, headed by Tomijiro Kyozaawa, Executive Director of the Japan External Trade Organization. OTCA dispatched the team to the Republic of Zaire and the Republic of Zambia for 34 days from February 20 through March 25, 1971 to conduct observations on the status-quo of industrial developments in these two countries.

Upon completion of their investigations in the Republic of Zaire, the team visited Ndola, Kitwe, Lusaka and Livingstone for the purpose of studying the present situation of industrialization in Zambia for a period of about 10 days from March 11. On their visit to various governmental organizations and agencies, Chamber of Commerce and Industry, private firms, etc., the team collected data and findings required for their final studies in Japan.

After their return home to Tokyo, the team conducted a series of studies, based upon the data and information obtained during their stay in Zambia. The results have been incorporated into this report.

As you are aware, Zambia is the third largest copper producing country and one of the leading cobalt producing countries in the world. She exports seven hundred thousand tons of copper per annum. The revenue coming from copper production is an important source for implementation of industrial development and for improvement of the required

infra-structures. Accordingly, Zambia is proud of her prosperous mining industry whose percentage accounts for 30% of her gross domestic product. On the other hand, the number of people engaged in the agricultural sector reaches approximately 75% of the total population while the agricultural earning occupies only 8% of the gross domestic product.

The ratio of the Zambian manufacturing industry reached 7% in 1965 and 10% in 1968, respectively, and has been on the increase in recent years. Among major manufacturing industries are included the food processing industry, textile industry, metal processing industry, etc..

With the declaration of South Rhodesia's illegal independence, the Government of Zambia commenced to take positive measures under the auspice of INDECO with the aim of becoming self-reliant with respect to policy and economy. For example, a large-scale industrial estate to create a new town is being built in Kafue close to the capital of Zambia. In this estate, a textile manufacturing factory and chemical plant are in operation, and other factories are expected to be established in the near future. In line with her industrial development programs, the Republic of Zambia is constructing the "Zan-Tan Railways" with the aid of the Republic of China. The Kafue Gorge Hydroelectric Project is also under construction which will secure a stable supply of electric power for the factories to be constructed in the estate, and this project may be of great value to the acceleration of the construction of the new industrial estate. In view of the above situation, it is my belief that "industrialization" in Zambia will be further promoted in the future.

In closing, on behalf of the team, I wish to extend my deepest appreciation to you, your staff and the Government of Japan for their generous assistance and guidance in the preparation of this report. Also, I would like to take this opportunity to express my sincere gratitude for the valuable assistance and cooperation that responsible officials of the Government of the Republic of Zambia and associated organizations as well as the Embassy of Japan in Lusaká extended to the team while they were in Zambia.

Respectfully yours,

December 1971

A handwritten signature in black ink, appearing to read 'T. Kyozaawa', with a horizontal line drawn through the middle of the signature.

Tomijiro Kyozaawa  
Leader, Japanese Survey Team  
on Industrial Development in  
Africa



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## CHAPTER 1

### INTRODUCTION

## CHAPTER 1 INTRODUCTION

The Japanese Survey Team on Industrial Development in Africa, headed by Tomijiro Kyozaawa, arrived in Zambia, a beautiful country with a determination to develop economic self-reliance, on March 11, and stayed there through March 23, 1971. The team visited Kitwe, Ndola, and other cities scattered throughout the Copperbelt while travelling overland en route from the Republic of Zaire and proceeded to Lusaka, the capital of Zambia and to Livingstone which is a center of her southern region. On these visits, the progress of Zambian economic development symbolized by the international airport, international conference building, Kafue dam and Kafue Industrial Estate on the outskirts of Lusaka caught the eyes of all the team members. Among other things, the team was highly impressed to see the joyful sparkling eyes of innocent boys and girls on their way to school in Lusaka and other municipalities, which eloquently indicates the hopeful future of Zambia. This impression is still vivid in the minds of all the members.

The objectives assigned to the team by the Government of Japan were to inform its responsible officials and leading people in business circles of the economic situation of Zambia which is blessed with an enormous potential for advancement and would directly be observed by the team so as to span a bridge for establishing new rapport between Zambia and Japan. Up to this time, a close relationship between the two countries has mainly been concentrated on the trade of copper, but it is essential that relations be further expanded into various fields.

During their stay in Zambia, the team was furnished valuable advice and assistance by a number of officials of the Ministry of Trade and Industry, Industrial Development Corporation and many other associated organizations despite of their busy commitments. All the team members have come to be awakened to the significance and importance of mutual understanding and cooperation as members of a modern industrial society, and will never spare their efforts toward the promotion of such cooperation. Partly because

"industrialization" in Japan commenced relatively early in comparison with Asian and African countries, her agriculture, fishing and manufacturing sectors have been progressing in the manner of stimulating one another. Consequently, about 60% of the total population reaching approximately 100 million is engaged in economic activities in one form or another. In order to accelerate and strengthen relationship with African countries which were regarded as far away from Japan in the past, the most important thing is that the understanding of such countries should be deepened on the basis of detailed and sufficient information. It is believed that the mutual understanding mentioned above will lay a foundation for realizing mutual cooperation and assistance. Since people engaged in economic activities cover various fields, a long-range way of thinking must be required to transform "mutual understanding" into the form of "mutual cooperation". Each member of the team desires to distribute his first-hand information and experience gained in Zambia to many people in Japan, and the team would also be most delighted to become an "impellent force" to promote mutual cooperation between the two nations.

Due to time limitation, the team could hardly make friends with many people engaged in economic developments in various fields. However, in spite of the team's short visit to this vast land, they could become acquainted with the immeasurable potential which Zambia has with the untiring efforts of her people toward the attainment of prosperity. It is the team's intention that they will not only submit to the Government of Japan a report on the economy of Zambia prepared in as systematic manner as practicable, based on each member's experience and information obtained during his stay in Zambia but also deliver it to people engaged in the industrial world in Japan. In this report, every possible emphasis has been placed upon the introduction of Zambia, aspiration for her economic advancement from various aspects, such as the mining and manufacturing industries as well as infra-structures including transport, electric power and related energies and public utilities. The lively figures of Zambia's ambitious economic development activities which have been progressing under her systematically arranged development policies

come to the fore in the report.

A mining investigation team visited Zambia in 1968 and another one was also dispatched following on the heels of the team's visit in 1971. Through such interchange with Zambia, it is understood that the foundations for "mutual understanding" will gradually become a reality.

Such missions visiting the Republic of Zambia were always given invaluable cooperation by the Zambian authorities concerned. It must be reiterated at any rate that the true features of the Zambian political and economic situation must be widely known among Japanese people in different realms in order to arouse and develop the mood of "cooperation".

The team is satisfied with the fact that the report is the first attempt to introduce the present situation of industrial development in Zambia, other than the previous descriptions of her mining industry.

During the course of preparing the report, the team came to feel that it would be desirous to send some parts of the report to Zambia for its reference. The following papers prepared from such a point of view deal with a résumé of themes selected from the said report.

## **CHAPTER 2**

### **MINING SECTOR VERSUS AGRICULTURAL SECTOR**

## CHAPTER 2 MINING SECTOR VERSUS AGRICULTURAL SECTOR

### 2.1 Contributions of Mining and Agricultural Sectors to National Economy

The basic economic structure of Zambia today is based on the copper industry. When seeing the copper ore which was on display in the lobby of the International Air-Port on the outskirts of Lusaka and on the team's visit to cities in the Copperbelt, this impression became stronger. Copper is a source of all the wealth that Zambia has and has been functioning as a "lever" for economic development. In fact, present relations between copper and the national economy could be summarized as follows:

Zambia is the largest copper producing country in the world immediately after the U.S.A. and the U.S.S.R. as well as one of the leading copper exporting countries. Earning from copper production accounts for approximately 2/3 of the Zambian national revenue and reaches about 95% of its total export.

The progress of the Zambian economy related to the international economy is the history of the development of copper production in itself. Policies for solidifying the state's foundation are to be continued in the future in the same manner as in the past and present with great emphasis placed on the copper industry, taking the abundance of mineral resources into account. Growth in the production of copper in recent years clearly indicates this trend. It is the policy of the Zambian Government that increased purchase capability, thanks to the growth of copper production, is to be directed toward the acceleration of economic development. However, in comparison with the mining sector which has, in recent years, been occupying a remarkably heavy portion of the national economy, the contributions which the agricultural sector has made to the economy are said to be overshadowed by the former.

For Zambia which is a vast land and blessed with the grace of the sun throughout the whole year, why does the agricultural sector occupy such a low status in the national



economy? Superficially the most plausible reason seems to be that the mining sector has the greatest affluence. Upon consideration of other reasons, however, the problem seems to be more deeply rooted. It is probably due to the historical background that emphasis was placed mainly on the mining sector while the agricultural sector remained "un-developed".

As far as agricultural production in recent years is concerned, its staple products such as maize, tobacco, peanuts, etc. show a tendency towards stagnation. The ratio of agricultural earnings in the gross national product which is a measure of calculating the degree of contributions to the national economy dropped to 8.8% in 1968 from 11.5% in 1964. However, it would be inappropriate to draw a simple conclusion on the basis of such figures only. The reason for this is because about 70 to 75% of the total population relies upon agriculture in one form or another. Consequently, adequate considerations should be bestowed on the agricultural sector, giving it equal priority to the mining sector in the enforcement of the national policy.

## 2.2 Relationship between Mining and Agricultural Sectors

It will be of use to mention reasons why both sectors are dealt with at the same time despite of the difference in their nature. In countries where the weight of the mineral resource industry is dominant, this industry is regarded as the most sensitive industry. No one doubts that the development of mineral resources brings about "big push" leading to the expansion of the economy and a favorable propagation effect.

In Zambia, that sensitive sector is the mining industry, which is considered an important key to economic development and prosperity. Fruit borne by this sensitive sector has given and will give rise to new progress. The problem is how to develop the agricultural sector with the mining industry as the pivot to also function as a sensitive sector in Zambia.

The team wishes to give here an example of the implementation of agricultural

development with the mineral resource industry as the central sector;

In Jamaica in Latin America, an American firm named Kaiser Ltd. has been engaged in the development of bauxite for the past 20 years. Land for operation of the factory covers over 10% of the total country's area and this firm's amount of export reaches approximately 50% of the total export. Relations between Kaiser and the local government is becoming closer in connection with how to deal with the mining industry as a sensitive sector. In fact, Kaiser Ltd. has founded an affiliated company named "Kaiser Development Corporation"(KDC) and is supplying loans and credits to local enterprises for implementation of projects which are considered valuable to economic advancement and thereby finally contributing to the advancement of the whole country. This firm is also extending necessary assistance and advice with respect to technical, administrative and managerial matters in addition to the financial assistance described above. It is noteworthy that KDC intends to turn vacant land where mineral ores have already been exploited into arable land. Some crops to be harvested in this land are to be utilized for food-stuff processing. In this case, considerations must be given to the fact that this development could be undertaken with considerable ease, as this project is only to excavate bauxite to limited depths underneath the surface of land. It is considered informative and valuable to state how the mining industry as a sensitive sector will be incorporated into a schema for development.

- (1) In the case of KDC, the firm assumed a social responsibility as a member of the regional society.
- (2) This firm ventures to proceed to the field of management from project finding work, with priority given to the field of sales.
- (3) Areas liable for development have been developed not as only "dot" but "line" or "facet".

It is naturally assumed that the copper producing industry of Zambia must be completely utilized. During the period from 1960 to 1970, the methods of development have been formulated based on the pivot of three organizations; INDECO, MINDECO and

FINDECO. A tendency of consolidating individual development projects into a grand scheme is gradually becoming prevalent.

In line with the "totalization" of project development European and American enterprises are changing their business transaction patterns from the export of only a "plant" to that of "planning". Of late, the implementation of overall agricultural development projects, whose components cover cultivation, processing and sales of products, to contribute to regional development projects has come to be necessitated. Consequently, such a tendency toward totalization is to be expected in the future.

### 2.3 Forecast for the Future

In view of this tendency it was observed that the agricultural sector has gradually been bearing its fruit. Measures for encouraging the agricultural sector together with the regional development are in progress as scheduled in accordance with the First Five Year Development Plan. Although the production amount of tobacco, maize and peanuts is slightly stagnant, improvement of agricultural structures has gradually been taking place. Positive measures for developing new potentials in the agricultural sector are also being taken by the Government of Zambia. It was a typical and epoch-making development strategy adopted after independence that the historical emphasis of focusing upon the mining sector because of the abundance of mineral resources has fundamentally been reviewed.

It is a manifestation of a new approach to the development of agricultural projects for realizing the totalization of project implementation in Zambia that a "finely-dressed" new organization called the National Agricultural Marketing Board made its debut. As the name indicates, it was felt that the sales problems of agricultural products should be taken up as important ones in Zambia, according to an official who guided the team. Improvement of storing facilities and betterment of processing devices clearly indicates recent trends involved in the increase in the sales of agricultural products. As far as

tabacco which is one of the main agricultural products in Zambia is concerned, its harvesting and auctioning have been made centered on the neighboring countries. However, Zambia completed an auction floor in Lusaka in 1965 and the Zambia Tobacco Industry Board constructed its treatment and processing plant to expand its business into the field of manufacturing. In addition, it is worthy of note that bags for collection of tabacco used in this factory are made of kenaf which is locally produced. This example is indicative of Zambia's new development strategy.

The success of the sugar plantation which is being undertaken by Nakambara Estate in the suburbs of Mazabuka is also worthy of attention because of the fact that it shows a new agricultural development pattern which is becoming reality. The project is an overall regional development project which is composed of a sugar cane plantation, refinery, sales and development of a new town. In this respect, this project is said to have great significance for Zambia. When the team visited this site, it found that farm land covered 5750 acres which was supplied irrigation water through well-equipped canals and approximately 3000 laborers were engaged in work on this farm. The number of employees engaged in the mining sector reaches 16% of the number of all wage earners. If any projects in the agricultural sector which has a large effect on creating employment are implemented, the efficiency of realizing increased opportunities of employment throughout Zambia can be greatly anticipated. Up to the present, some programs for encouraging agricultural products including coffee, tea, etc. have already been formulated by the Zambian Government. As seen in the case of the utilization of kenaf described above, it would be advisable to give considerations to the utilization of relatively new agricultural products.

It is believed that many results realized in the agricultural sector will favorably influence the national culture and the minds of the citizens. Therefore, development in the field of the agricultural industry should be implemented in parallel with that in the mining sector in order to overcome various defects due to urbanization and to remedy the situation of increased unemployment.

## **CHAPTER 3**

### **MINING SECTOR VERSUS MANUFACTURING SECTOR**

## CHAPTER 3 MINING SECTOR VERSUS MANUFACTURING SECTOR

### 3.1 Progress of Industrialization

The function of mining as a sensitive sector can also be seen with respect to the manufacturing sector. There is a close relationship between both these sectors. The mining industry is inclined to seek instant efficiency for economic development and will show the way to industrialization. (Refer to mechanism of the mining industry to promote the manufacturing industry in Chapter 6 for details). The outline of Zambian manufacturing industry is as follows:

In contrast to the stagnant tendency shown by the agricultural sector, the growth of the manufacturing industry is remarkable. Its share in the gross national product increased to the order of 10% in 1968 from approximately 6% in 1964. This increase is extremely great, compared with all other sectors. This is due to the policy of economic self-reliance on consumer goods from the South. The center of the manufacturing industry is the Copperbelt, mostly in densely populated areas. The time for "industrialization" has been getting ripe in Lusaka and Livingstone in recent years. The Kafue Industrial Estate is especially worthy of attention with respect to taking full advantage of industrial water taken from Kafue River and the use of cheap and reliable electric power required for the operation of factories. The share of the respective products on the basis of the gross national product in 1968 is as stated below:

Foodstuff 10.2%, Drinks & Tobacco 40.3%, Textile 6.69%, Non-ferrous Metal 7.3%, Metal 12.9%, Chemicals 6.1%, Paper & Printing 5.09%, Machinery 3.9%, Electrical Appliances 2.7%, Sawmill & Furniture 2.2%, Rubber Processed Goods 1.4%.

Among industrial projects which have, in recent years, been completed are included the expansion of a cement factory, completion of an oil refinery plant in Ndola following the completion of pipe lines linking Ndola and Dar-es-Salaam in September 1958, sugar

refinery and textile factory in the Kafue area and so forth. The last three projects were all completed during the period from 1969 through 1970. Of these, the most typical project is the Kafue Textile Industry of Zambia which was completed at the total construction cost of 7 million kwacha. This factory commenced its operation in early 1969 with an annual production scale of 104 million yards of drill and poplin. INDECO which was founded to play a leading role in industrial development participates in the implementation of these projects. Enterprises under the jurisdiction of this organization have a tendency to produce an extensive variety of goods. INDECO participated in the capital investment for enterprises which are considered to be largely concerned with demand and supply of the people's livelihood. There are some important historical points which should not be neglected, in dealing with industrialization in Zambia.

Before the independence of Zambia, she belonged to the Federation of Rhodesia and Nyasaland, and wealth obtained from copper in Zambia was spent for development in areas other than Zambia. The Development Project of Kafue dam in Zambia must have been preceded by that of Kariba dam and the development of Nkandbwe colliery in the country sacrificed itself for the advancement of Wankie colliery in the South to secure the monopolistic supply and advancement of its coal to the Copperbelt. In these circumstances, priorities of development were given entirely to the South, hence the industrial progress of Zambia was laid aside for years. In other words, income from the mining industry was not turned back into Zambia but rather appropriated to development works in the South. As a result, Zambia came to be characterized as a consuming area for industrial products of the South. It would be reasonable to note that the present industrialization is an attempt to reorganize the industrial structures formed through a long historical process.

### 3.2 Transition from Import - Substitute Industry to Export - Oriented Industry

As stated above, industrialization in Zambia is being undertaken with an aim of reorganizing the economic structures which have historically been shaped. It is quite

natural that the first target is the local production of consumer goods for which Zambia completely relied upon the South in the past. Industrialization plans adopted by the government places emphasis on the establishment of import-substitute industries; food processing industry, tailoring industry, etc.. This thinking is reflected on the features of the projects of industrialization as substitutes for import. They include steel and iron, canned pineapples, leather, plastic pipe, metal tube, glass bottles, bicycle assembling, refrigerator assembling, dry batteries, etc..

Selection of these kinds of industries is considered reasonable and appropriate in light of the historical background. It can be anticipated that they will be realized upon completion of studies made on the economy and the feasibilities of the projects. Their completion will contribute to increased opportunities for employment and savings of foreign exchange causing an increase in its foreign exchange reserves, thereby enhancing the efficiency of the total economy thanks to the introduction of new techniques.

It is worthy of praise that INDECO, which is assigned to carry out feasibility studies, is well-staffed and systematically organized. Nevertheless, it should not be forgotten that many bottlenecks will arise during the course of promoting further industrialization. These difficulties are well-known to the persons concerned, after having seriously considered them in their daily life. One of bottlenecks likely to impede economic development is probably the limited sphere of markets. Besides, Zambia is a dualistic society which was formed before its independence. That is to say, there are the modern aspects symbolized by the mining industry while on the other hand there are the retarded fields which are not being furnished provisions for advancement and are being ignored. In order to explain this phenomena, the terms, "Line of Rail and Off Line of Rail" are commonly used. It is considered more important that markets to include this "Off Line of Rail" area should be formed so that industrialization to establish import-substitute industries may become a reality. Disparities between the "Line of Rail" area and "Off Line of Rail" area are indicated by the following examples;



There are large-scale farms in the former and agriculture of subsistence level in the latter, for instance, and many gaps between both areas can be found with respect to infra-structures such as education, transport, communication and electric power. In overcoming the above shortcomings, it is essential to take the following necessary measures in order to establish and encourage different industries including smaller scale enterprises.

- (1) Nurturing of engineers and managerial staff
- (2) Formation of large-scale markets upon consolidation of scattered small-scale markets
- (3) Improvement of transport and communication facilities
- (4) Improvement of credit-supply institutions to cope with the lack of capital

It is possible to mention another important matter which should be undertaken in parallel with the items (1) through (4) stated above. That is the establishment of possible export-oriented industries after getting rid of the status of import - substitute industries.

Fortunately, Zambia is blessed with natural resources called "copper resources" which are not readily found in the world. In view of demand - supply balance in the world market and of improved exploitation techniques, the exploitable amount of mineral ores is satisfactorily large. In this country, foundations have been laid in refining copper ores at sophisticated smelting furnaces and in exporting their processed products. This is a system which need not be assigned to any enterprises to undertake refining and processing, as seen in British Columbia of Canada or Peru for these years. Needless to say, Zambia's advantage in the mining sector stems from the fact that because it is an inland country, transportation was a problem of great importance which brought about a favorable situation including the development of appropriate techniques in the smelting and refining of copper as well as sophisticated facilities. However, such systems should be further improved to give a more advantageous situation in the future.

It is reiterated that the mining industry is a sensitive sector in the national economy. Especially, techniques which will be introduced in the process, including the processing of mineral ores, are to be of an extensive nature, even when only considering the maintenance and repair of facilities, hence there will arise a great potential for developing industries. However, if management impatiently introduces excessively modern techniques, it might cause the impendance of economic reasonableness. Consequently, a gradual approach to the targets is recommended, and it will lead to the possible creation of export-oriented industries in order that techniques involved in copper refining and in maintenance of mining facilities and equipment are to be fully utilized for industrialization. In recent years, sound projects assuming such features as stated above have gradually been making their appearance. This could be worthy of attention.

There is a favorable news that kenaf bags have been adopted with some contrivances for collection of tobacco to be finally exported. It is understood that the latest manufacturing of domestic products such as kenaf in a manner relating to the export industry indicates a new development strategy of Zambia, which would be further promoted.

## **CHAPTER 4**

### **COMMENTS ON INDUSTRIALIZATION IN ZAMBIA**

## CHAPTER 4 COMMENTS ON INDUSTRIALIZATION IN ZAMBIA

### 4.1 General

During their stay in Zambia, the team observed that this country is making serious efforts to develop industries under the able leadership of INDECO. Among various industrial development projects promoted by INDECO are included the construction of a nitrogen chemical manufacturing factory and a textile factory (from spinning to weaving) in conjunction with the creation of the Kafue Industrial Estate in the suburbs of Lusaka. On the other hand, there are many newly built modern factories equipped with sophisticated machinery and devices, such as the Metal Fabricators of Zambia in Luanshya, which is a manufacturer of cables and conductors, Zambia Sugar Co., Ltd. and its affiliated sugar estate in Nakambara.

The team felt the enthusiasm of industrialization in Zambia when considering the vigorous activities of such factories which have recently been constructed. The team could understand how Zambia entertains a great desire for industrial development according to the ambitious industrialization programs formulated by INDECO, the Ministry of Trade and Industry and associated agencies. Although such a series of development programs are seemingly of a general nature, it can be pointed out that they have deliberately been drawn up in reality in full consideration of the special characteristics of the Zambian national economy. To their great regret, the team could not obtain data on information concerning the background of how the decisions were made for the development plans, locational conditions of enterprises, production scale, etc. to describe the present states and future prospects of the Zambian industrialization. Accordingly, it might be appropriate to avoid making remarks on this subject. However, the team would like to take this opportunity to venture making necessary comments, based upon their limited information and experience obtained during their visit to this country.

The ratio of the Zambian manufacturing industry accounted for 6% in 1964 and 10%

in 1969 of her gross domestic product, respectively. This remarkable growth, attained in such a short period, is due to the industrial development programs promoted by INDECO. During the course of undertaking this industrial development, Zambia has tried to break off economic ties with South Rhodesia, hence it can be supposed that Zambia has had encountered many difficulties which have successfully been overcome. It is understood that the attitude and manner of this industrialization aims at the attainment of self-reliance from South Rhodesia with respect to her economy. As far as the present industrial development projects undertaken by INDECO are concerned, they are progressing to establish substitute industries for import upon careful consideration of the domestic demand in Zambia.

The following is the team's view of the situation of the manufacturing industry of Zambia, including the food processing industry, textile industry, wood and wood product industry and machinery industry.

#### 4.2 Food Processing Industry

Some progress can be found in the food processing industry including the oil fat industry (margarin, food oil, soap, etc.), grain mill industry, beer beverage industry and soft drink industry. In connection with processed meat products and dairy products, a considerable quantity of goods are imported from overseas countries. Therefore, new enterprises for producing such products should be established in order to secure a stable supply of animal protein for the daily life of the Zambian citizen. It is also essential to study the utilization of fresh-water fish as a source of animal protein in the eastern part of Zambia. Later feasibility studies would be advisable for formulating measures to encourage the live-stock industry. However, these measures must be preceded by the improvement of refrigerating devices.

It is very interesting to note that a series of production processes from the plantation to processing were observed, as partly seen in the case of the tobacco manufacturing

industry and sugar refinery industry. In this respect, it is considered necessary that studies be made on agricultural cultivation. Soft drinks and canned fruit juice should also be systematically studied from the point of view of crop cultivation.

#### 4.3 Textile Industry

It is the team's impression that the textile industry, exclusive of the tailoring industry is considerably under-developed in Zambia. However, the Zambian Government is taking a forward-looking attitude toward encouraging the development of the textile industry by means of establishing Kafue Textiles of Zambia Ltd. and Kabwe Industrial Fabrics Ltd..

As a rule, the textile industry is one type of industries which is developed at the initial stage of development. However, there is only Kafue Textiles of Zambia Ltd. in Zambia which is the first one with respect to undertaking coherent work from spinning to weaving on large scale.

As for secondary textile products, such as knit and canvas, their enterprises are small in number, and there are only a few major manufacturers including Zambia Textiles Ltd. in Livingstone and Dudhia Textile Mills Ltd. in Lusaka. There exist approximately 90 tailoring enterprises including tiny ones scattered mainly in Ndola, Livingstone and Lusaka.

It will be a basic principle in the future that some institutions and/or measures should be established in order that such tailoring enterprises may obtain raw materials for threading and weaving. In this case, attention should be paid to the existence of Kafue Industrial Estate where only Kafue Textiles of Zambia Ltd. is in operation as the sole textile manufacturer.

The estate is a new town where no tailoring enterprises have yet been established. Kafue Industrial Estate has great geological advantages with respect to the plentiful supply of industrial water, electric power and potential customers due to its proximity to the

capital. In view of these advantageous conditions, its future progress can be fully anticipated. Hence, it would be a new idea for an industrial area of textile enterprises producing their secondary products, including the dyeing industry and tailoring industry supporting the later activities of Kafue Textiles of Zambia Ltd. to be secured within the estate.

#### 4.4 Leather Industry

Studies should be made on the possibility of establishing a leather industry from the view point of supply of raw materials. In connection with footwear and leather products appearing on the list prepared by the Ministry of Trade and Industry, it would be advisable to avoid emphasis on natural leather, taking into account the recent remarkable progress of artificial leather. Bata Shoe Ltd. occupies a monopolistic share in the production of footwear, hand-bags, baggages, etc. in Zambia. However, there is still room left for the production of sandals made vinyle and the possibility of a plastic manufacturing industry should also be studied in the future.

#### 4.5 Wood and Wood Product Industry

Zambia is short of lumber resources, and only the Zambia Sawmills Ltd., 51 percent of whose stocks is held by INDECO, is in operation in Livingstone. Demand for wood products is large, as construction works for houses and buildings are actively being undertaken. Consequently, there are enterprises of construction materials including timber, window frames, panels, wooden furniture, etc.. These factories are maldistributed in Lusaka, Ndola and Kitwe. Saw mills are located in Livingstone which is comparatively rich in lumber resources, but this city has no factories that manufacture the secondary product. The team had no opportunity to visit saw mills, and has no information on the kinds of trees and for what purpose lumber is used. However, judging from a standpoint of locational conditions with respect to the supply of materials, it would not be useless to study the possibility of establishing a wood and wood product industry in Livingstone.

#### 4.6 Chemical Industry

As far as the basic chemical industry is concerned, the Nitrogen Chemicals of Zambia Ltd. must be mentioned foremost. In addition to this firm, there is an enterprise manufacturing oxygen and acetylene for welding in Lusaka. Nevertheless, this firm is not responsible for supplying raw materials to the chemical industry. In most cases, the chemical industry is of a basic nature and does not make progress unless associated industries have grown up around it to some extent. A measure to calculate the progress of the chemical industry would be the existence of the acid and alkali industries. Since the glass manufacturing industry and paper-pulp manufacturing industry, which consume a great deal of acid and alkali are not fully developed in Zambia, the chemical industry is yet to undertake domestic production of chemicals sufficient to meet local demand.

With regard to the chemical industry serving final consumers which uses products furnished by the basic chemical industry, the oil fat industry and the paint industry are approaching the stage of meeting the local demand in Zambia.

The Nitrogen Chemicals of Zambia Ltd. in Kafue started its business to produce chemical fertilizer. This factory also produces nitric acid and ammonium nitrate which are materials for gunpowder and supplies some of them to Lafironda Ltd. in Mufulira. In view of the nature of the chemical industry, which greatly relies upon the progress of other related industries, it is advisable to lay emphasis upon encouragement of the chemical industry to supply its goods to final consumers. In this context, the manufacturing industries of plastic moulding, mixing fertiliser, glass bottles, etc. adopted by the Zambian Government are worthy of being studied in the future so as to determine the later directions of the chemical industry.

#### 4.7 Ceramics Industry

Glass is yet to be locally produced in Zambia. In consideration of the prevailing tendency to drink beer, coca-cola and soft drinks in Zambia, a glass manufacturing indus-



try might be feasible if raw materials including silica are made available.

In particular, glass production will accelerate the use of soda ash which will provide a foundation for a basic chemical industry. In Zambia, there are a few enterprises producing porcelain, tiles, ceramics, etc.. One company is located in Lusaka and another in Kitwe.

Generally, it is possible for the ceramics industry to make progress as a local industry on a small-scale. Therefore, there is a possibility of further development in this industry. As for the manufacturing of glass and ceramics, it is considered necessary that geological studies be made on the availability of silica, porcelain clay, clay, etc.. As for the manufacturing of brick, cement, concrete, etc., it can be said that this sector has comparatively been well developed. Large scale factories are producing brick, cement and concrete because of thriving construction works mainly for the mining industry which are being carried out in Ndola and Kitwe as well as in Lusaka where the construction of buildings is also positively in progress. Zambia has only one cement company named "Chilanga Cement Ltd." in Luanshya. Consequently, it is considered necessary to increase the number of sites where cement factories are to be built in the future.

#### 4.8 Steel and Metal Works Industry

The steel and metal works industry in Zambia can be divided into the manufacturing industries of steel, steel fixture, steel furniture, etc.. Scaw Tow Foundries Ltd. has a cast metal producing factory with employees of more than 500 in Kitwe. Steel Supplies of Zambia Ltd. (Lusaka) has commenced the production of zinc plate, besides being engaged in the sales of steel plate and steel frame. Despite the existence of these enterprises, the steel and metal works industry is not necessarily well-developed. It is felt that there must be a considerable demand for cast metal including machinery for mining because this country is the third largest copper producing country throughout the world. On the contrary, it seemed to the team that the number of cast metal producing factories were too small.

Since Zambia is not rich in forestry resources, she has a considerable number of steel and metal works factories to substitute for the lack of wood. In particular, Auras Industries Ltd. (Lusaka) produces steel furniture, steel window frame, aluminium sash, steel lattice, nails, etc. and is typical of metal processing enterprise in Zambia. Zambia has a number of factories to produce quarry-ducts, tanks, etc. used in mining collieries mainly in Kitwe and Ndola. In addition to these factories, production system of metal products including wire, crown, springs, pipes, valves and others can be found. However, attention must be paid to the fact that the nonferrous metal industry is not fully developed. In other words, there are hardly any copper product manufacturing and/or processing factories of zinc and lead taken from Broken Hill, with the exception of Zamefa which started to produce cables made from copper in 1970. It is quite natural to state that zinc and lead themselves are important goods for export for Zambia even though they are not processed. Nevertheless, in order to enhance the degree of processing nonferrous metal, it is advisable that feasibility studies be made on commercialization of die cast made from brass, for example.

#### 4.9 Machinery Industry

The machinery industry in Zambia has been developed centered on the production of machinery for mining collieries, construction works and transport. Besides, electrical equipment including switchgear, control-gear, etc. is being manufactured while portable radios, gramophones, etc. are being produced by ITT Supersonic Zambia Ltd. in Livingstone.

However, this firm's main business is to conduct the import and sales of the electrical devices stated above. Also, its emphasis is placed upon sales rather than production. The same thing can be said in the case of machinery and instruments for office work.

Machinery for mining, construction and transport forms the biggest market in Zambia while the repair of rock drills, land Rovers, crushers, etc. for mining is fairly

well developed in Ndola, Kitwe and other places. Even some parts of the said machinery and devices are being manufactured. Major automobile manufacturers in the world have their own sales points in this country. There are a considerable number of assemble factories, and some parts and bodies of automobiles are being locally produced.

Although the establishment of various kinds of enterprises will make outstanding contributions to providing a firm basis for industrialization in the future, it is considered imperative that a system to consolidate the machinery industry be also established by adjusting the variety of standards applied to parts among enterprises in order to gradually attain industrial development in the future. Since the mining industry assumes the nature of a raw-material supply industry, it will be of help in arousing local demand. In this respect, this industry is said to be influential upon the establishment of a heavy industry. In particular, in light of the fact that Zambia is extremely abundant in mineral resources, it is considered that the present scale of the mining industry will make possible the establishment of a heavy industry.

**CHAPTER 5**

**COMMENTS ON KAFUE INDUSTRIAL ESTATE**

## CHAPTER 5 COMMENTS ON KAFUE INDUSTRIAL ESTATE

### 5.1 General

It is understood that the purpose of "Kafue Industrial Estate" is to create a new town assembling various enterprises in an estate, where workers' residences are to be built close to their job sites, mainly taking advantage of the abundant hydraulic potentials available in the vicinity of the estate and thereby contributing to the regional prosperity.

The following is an introduction to the systems of the industrial estate similar to the Kafue Industrial Estate in our country. In Japan, the idea of establishing an industrial estate is to encourage her small and medium scale enterprises by assembling many enterprises in a locality with the aim of realizing an appropriate scale of respective enterprises in the estate and thereby enhancing the efficiency of investments.

It is the team's pleasure that this report dealing with industrial estates may be of some help in the further development of the Kafue Industrial Estate.

### 5.2 Objectives of Establishing Industrial Estate in Japan

As a rule, industrial estates are established for the purpose of realizing the following objectives.

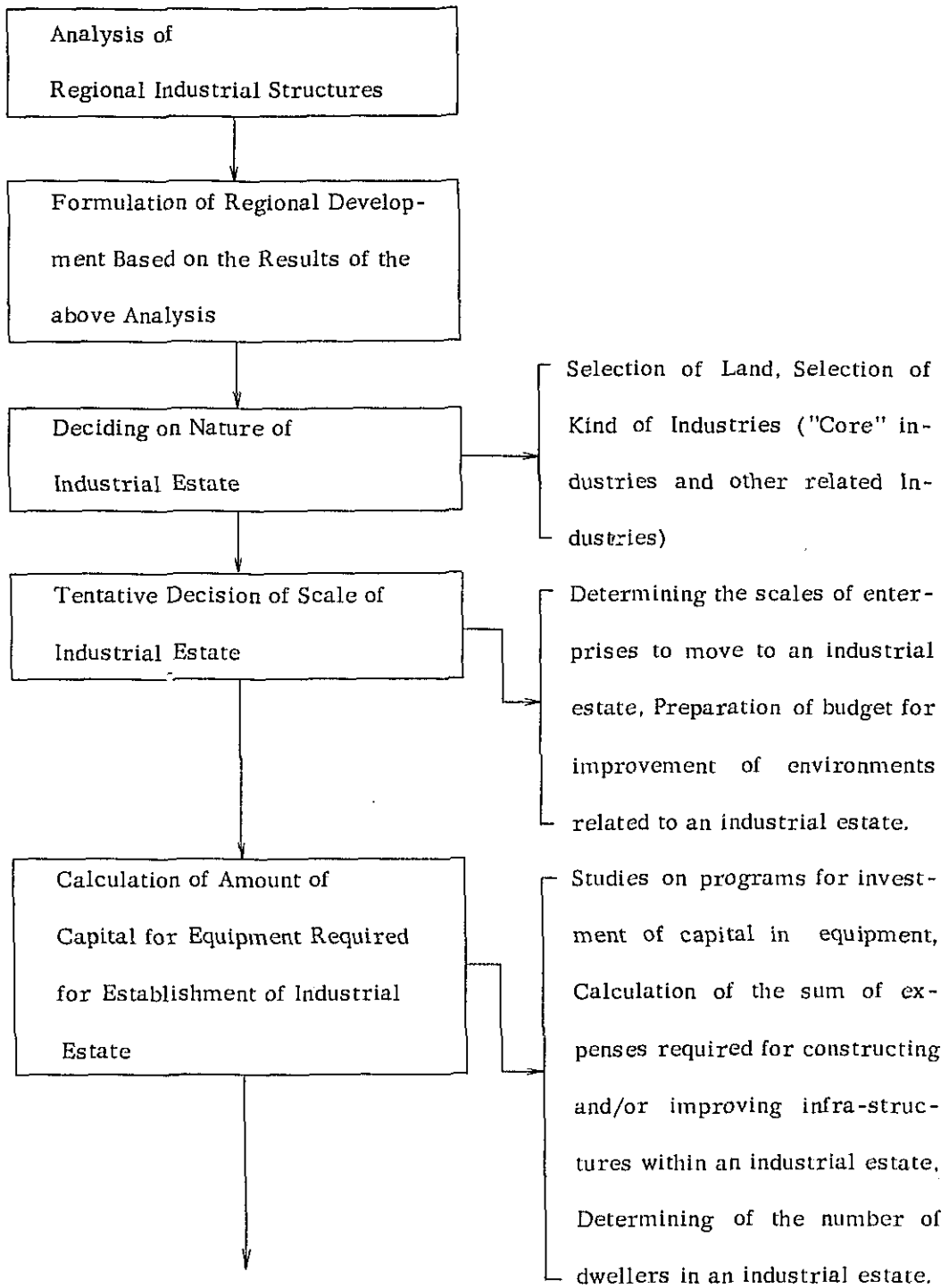
- (1) To conduct the joint purchase of raw materials and related devices for the industrial estate.
- (2) To facilitate the sales and purchase of products among industries in an industrial estate so as to stabilize their managerial foundation.
- (3) To enhance the standard of living of people in a region where an industrial estate is to be developed.
- (4) To improve the efficiency of capital investments.

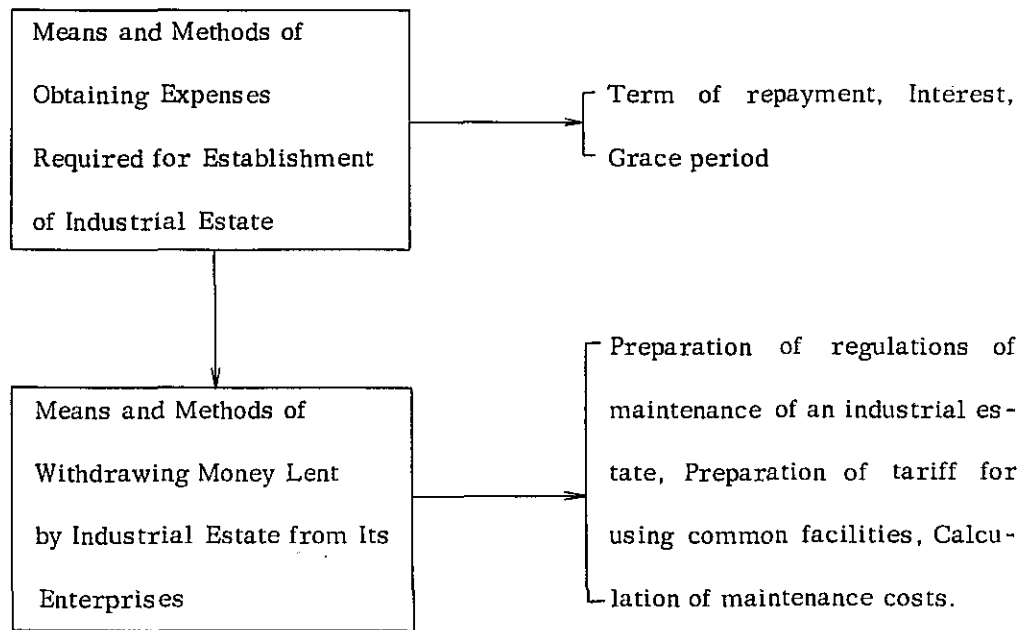
In establishing new industrial estates, the following objectives are generally kept

in mind in Japan.

- (1) Upon completion of an industrial estate, people living in the neighboring places will be able to enjoy an improved environment and be rendered increased opportunities for employment. No doubt, the revenue from taxes and levies received by the region will be greatly increased so that overall prosperity in the region can be anticipated.
- (2) It is possible for industries to be constructed in an industrial estate to improve the efficiency of their capital investments through the joint utilization of infra-structures required for the operation of their factories.
- (3) Manufacturers who use raw materials will be located in an industrial estate so that their transportation costs will be significantly lessened.
- (4) As far as investments for machinery and associated equipment are concerned, the common use of the said facilities are to be made possible to some degree, and economy of investment can be easily anticipated.
- (5) Products of "high added value" will be obtained by assembling various kinds of industries at the same work site.
- (6) It will be possible to provide a common high level of training to employees of different kinds of industries.
- (7) Through full division of work, operation and/or handling on experience will be lessened, so that high productivities of the respective enterprises can be anticipated.

5.3 Process of Establishing New Industrial Estate





Consultations and guidance in connection with investment programs of individual enterprises in an industrial estate are deliberately made by a group of specialists and professional consultants in various fields.

The outline of their services is as stated below:

- (1) Whether or not managerial advantages can be anticipated by the collective move of enterprises to an industrial estate?
  - a) Can the later activities of the respective enterprises be in conformity with the characteristics of the industrial estate?
  - b) Can managerial advantages be anticipated by the joint use of common facilities?
  - c) Can advantages be anticipated from the fact that geographical proximity will allow cooperation among the different enterprises in an industrial estate?
  - d) Can reduction in costs be anticipated with respect to the purchase of raw materials and of the sales of products?
- (2) Whether or not management staff is sufficiently capable?



- (3) Whether or not sales programs are appropriate from a standpoint of marketability?
- (4) Whether or not production capability and durability fully satisfies the requirements of the sales program?
- (5) Whether or not engineering techniques of the respective enterprises are sufficiently reliable enough to maintain business?
- (6) Whether or not working capital and capital for equipment can be obtained?
- (7) It it possible to repay borrowed money out of profits gained by the enterprises?

Studies and consultations regarding enterprises' programs of operation and the present situation of enterprises are conducted with respect to the items — (1) through (7) stated above.

Necessary advice and suggestions will be made from time to time in case defects are found or if there is any way in which such suggestions will be useful for the future activities of industrial enterprises in an industrial estate.

Upon full understanding of the said advice and suggestions, they will modify their programs so as to correct the defects or improve their present managerial activities according to the suggestions.

The Japanese government is positively taking measures to assist smaller enterprises whose employees are less than 300 in collectively moving to industrial estates. It is noteworthy that besides the guidance and consultations rendered by the various agencies concerned described above, special favorable loans are supplied to smaller entrepreneurs, who are not fully capable of obtaining loans from ordinary city banks, in accordance with the provisions of Japanese laws. The term of loan is 2.7% interest, period of repayment of 15 years, etc., and this favorable treatment is of great help in facilitating the collective move of smaller-scale businesses to industrial estates.

This system gave a birth to a number of industrial estates in Japan. The total number of such estates reached 146 as of the end of March 1971 for 10 years from 1962, and

this trend is expected to continue in the future.

#### 5.4 Concrete Examples of Japanese Industrial Estates

For reference, some concrete examples of Japanese industrial estates are as follows:

(Case I) Kagoshima Industrial Estate for Production of  
Machinery

Koagoshima is at the southern extremity of Japan (approximately 900 miles south of Tokyo) and is in a coastal line with favorable bays convenient for the transport and/or purchase of raw materials and products to and from the said locality.

In spite of the above geological condition, Kagoshima was a source of laborers for large industrial areas such as Tokyo, Osaka and other leading municipalities in our country for many years due to the non-existence of large scale enterprises in Kagoshima. On the other hand, there were a considerable number of small and medium size enterprises of a conventional type in this prefecture. But, their facilities, machinery, etc. were out of date and inefficient. The entrepreneurs decided to collectively move to the present estate site with their attention focused on the geological conditions with which Kagoshima is blessed. They moved to the site together in 1967 and started to operate their businesses in 1968 in order to accomplish the abovementioned objectives.

The group was composed of manufacturers of steel and iron, construction machinery, cast metal, small ships, ordinary machinery and related implements as well as repair shops for automobiles.

Common facilities such as transformation facilities, power distribution lines, docks for common use, etc. were constructed.

As a result, increase in the productivity of the respective enterprises reached 82% in comparison with that before the completion of the estate. The rate of profit was also increased by 50%.

It is noteworthy that medium-scale shipbuilding (the order of 1,000 tons) which had never been attempted came to be realized in this prefecture through the cooperation among the newly built industries in this industrial estate.

It must be emphasized that the industries in the estate are playing a leading role in encouraging regional development throughout Kagoshima Prefecture. This industrial estate provided a clue to various regional development schemes suitable to develop areas in the prefecture so that it is becoming a trend for a considerable number of laborers to return home from densely populated areas including Tokyo, Osaka and other highly industrialized cities.

(Case II) Mizushima Industrial Estate for Production of  
Machinery and Metal

This industrial estate is in Okayama Prefecture, approximately more than 400 miles west of Tokyo. There had been a number of basic industries surrounded by many smaller scale industries of a conventional type in this prefecture. Some of them collectively moved to the industrial estate upon its completion.

The purpose of this collective move to the "new town" was to stabilize their production through proximity with associated large industries with respect to rationalizing the amount of orders received and to the introduction of sophisticated machinery and equipment.

The characteristics of this estate are the existence of many small and medium size industries supporting their associated large enterprises, and thus it became easier for them to obtain technical guidance through consultation from the larger industries in the estate.

Among the existing facilities for new enterprises in this estate are included a training center, food supply service center, clinics, maintenance centers, substations for joint use, water supply facilities, joint water purification facilities, civic hall, dormitories, etc..

Per-capita productivity increased by 15% during the period from 1966 through 1968

while increase in the rate of profit reached 37% for the same period for the reasons stated below.

- (1) Relationship with production lines of the large industries in the estate has been strengthened, and it is possible to easily work out forecasts on the supply of their products.
- (2) "Division of work" has been realized in the process of a collective move to the estate, thereby assuring a stable supply of high-quality products.
- (3) Co-ownership of designs
- (4) Joint purchase of raw materials and related tools
- (5) Joint sales of products and development of new brands of products

When considering the problem of establishing an industrial estate, it is essential that appropriate attention be paid to not only the infrastructures which will be commonly used by industries already established there but also to a harmonious combination of different industries as stated below.

- (1) Promotion of joint investments in processing facilities commonly used by the respective industries
- (2) Joint collection of technical know-how and information

#### 5.5 Necessary Comments

As for the Kafue Industrial Estate in Zambia, there are many advantages in establishing this industrial estate; an abundant potential of hydraulic power and industrial water, favorable condition of obtaining a large number of laborers through its proximity to Lusaka, etc..

In this connection, it is considered advisable to select the kinds of industries to be introduced into the estate according to programs reasonably to be drawn up. For this purpose, further studies on this matter should be carefully conducted on the basis of advice furnished by experienced experts.

## CHAPTER 6

### ON POSSIBILITY OF DEVELOPMENT WITH MINING AS CENTRAL INDUSTRY

## CHAPTER 6 ON POSSIBILITY OF DEVELOPMENT WITH MINING AS CENTRAL INDUSTRY

### 6.1 Industrial Development of Hitachi Area Pivoted on Nippon Mining Co., Ltd.

In discussing the potential for industrialization in Zambia, it must be pointed out that the development strategy adopted by INDECO and/or the Ministry of Trade and Industry has significance in itself but reviews should still be also made on the possibility of developing industries, taking avail of existing industries. It is impossible to understand industrial development in Zambia without giving attention to the existence of its mining industry. Accordingly, it is believed realistic to attempt to take another step for advancement, based upon the present prosperity brought about by the mining industry in Zambia. In fact, there are many cases showing the mining sector playing a leading role in developing industries in the world. As far as Japan is concerned, a typical example is to be found in the development of Hitachi, Ltd..

The following which deals with the process of industrial development in Hitachi are presented in order to understand more clearly the question of industrial development in Zambia.

The city of Hitachi, approximately 94 miles north of Tokyo is the cradle of the Nippon Mining Co., Ltd., which is typical of Japanese mining companies at present. The city has become a mining and industrial center where major factories of the present Hitachi, Ltd. are scattered.

Hitachi City with its population of 190 thousand relies mostly upon the Nippon Mining Co., Ltd. and Hitachi, Ltd. for its economic activities. The timing of full-scale development of the city is almost identical with that of development of mining companies in Zambia. Hitachi had been a deserted place before Fusanosuke Kuhara began the development of a mining industry on a large scale under the company's name of Hitachi Mine (predecessor of the present Nippon Mining Co., Ltd.).

Hitachi Mine was able to increase the amount of its copper production at a quick tempo, taking full advantage of favorable locational conditions, such as abundant ore reserves, easy access to raw materials and convenient transport conditions. This firm showed enthusiasm in constructing a big refinery at the initial stage so as to undertake consolidated treatment of copper and in realizing a mining company equipped with sophisticated machinery and instruments. During the course of such development, the firm built an electric power station and Tokyo Tsukudajima Workshop (which manufactured machinery for mines) in 1907 and repair shop of electrical equipment and appliances that were to become Hitachi Manufactory and this repair-shop commenced its operation in 1908. In 1909, a mine school was founded with the aim of training employees. In 1911, an electric refining factory started its operation, and upon establishment of a series of a sulfuric acid factory and new repair shop, full-scale production began. When Hitachi Mine came to change its name into "Kuhara Mining Co., Ltd." in 1912, Hitachi Mine had established a firm basis for the birth of the present Nippon Mining Co., Ltd.. The firm advanced very smoothly, and this can be obviously evinced by the remarkable increase in copper production. Hitachi Mine, which started with a production of 21 tons in 1905 recorded a production of more than 10 thousand tons of copper in 1913.

World War I which broke out in the same year brought about a favorable influence upon the Japanese national economy. Thanks to this war, domestic and overseas markets were greatly expanded, hence the remarkable increase in the price of copper owing to increased demand caused Kuhara Mining Co., Ltd. to make an enormous profit that it had never before experienced. Enjoying this business prosperity, Kuhara moved away from his previous businesses centered on copper and commenced to develop many mines at home and abroad and then expanded his ventures so as to take over plantations in foreign countries.

This boom did not last for many years and then the great panic occurred immediately before the termination of World War I. The price of copper went on dropping. The pros-

perity due to his vari-sided management completely came to standstill and Kuhara was forced to retire.

It was Yoshisuke Ayukawa that made his début as successor to Kuhara. Ayukawa successfully established a holding company named "Nippon Sangyo" (Nissan) under which 18 companies including Nippon Mining Co., Ltd., Hitachi, Ltd., Nissan Motor Co., Ltd., Japan Chemicals Ltd., etc. were founded under his competent leadership. Thus, "Nissan" had 60 affiliated companies exclusive of the firms listed above and became a gigantic concern (Konzern).

It is noteworthy that the suspension of the import of raw materials fostered Hitachi Manufactory which had already grown up as an independent department of manufacturing machinery, and it was in 1920 that Hitachi Manufactory started as a joint-stock company under the name of Hitachi, Ltd.. During this new start Hitachi decided to take the direction of development to turn the Hitachi area into a large collective "Kombinat" to produce copper and manufacture electrical equipment. The following gives the details of the expansion of Nippon Mining Co., Ltd..

Firstly, attention should be placed upon relations between Nippon Mining Co., Ltd. and its department assigned to manufacture machinery, which developed into the present Hitachi, Ltd.. Since Hitachi Mine had been abiding by the principle of utilizing electric power as much as possible for operation of machinery for mines since its initial stage, there arose the necessity of repairing motors and transformers quite frequently. So, Hitachi Mine started to construct a full-scale factory in 1910 and came to manufacture such machinery in 1911. In this year, the firm received orders to manufacture 20 transformers. As that time, it was already expected that this repair shop would become an independent organization from Hitachi Mine sooner or later. In those days, the sphere of domestic markets for electrical equipment was narrow in our country and Japanese techniques were also not very far advanced. Accordingly, it was commonly considered that the import of necessary products was easier and more economical than their domestic production. The prime reason why Japanese machinery could make progress despite such



circumstances is that the halt of imported goods due to the outbreak of World War I accelerated the progress of the industry. When Hitachi, Ltd. became independent as a joint-stock company in 1920, it constructed a conductor manufacturing factory, Kaigan Works, and Taga Works, respectively to expand its business activities and hence came to have a large number of different affiliated companies in the fields of real estate, transport, industrial water, city gas, repair, etc.. Finally, the firm succeeded in assuring its stable status in the economy of the Hitachi area. Hundreds of small-scale subcontract factories assembled to produce parts and assemblies for machinery manufactured by the firm.

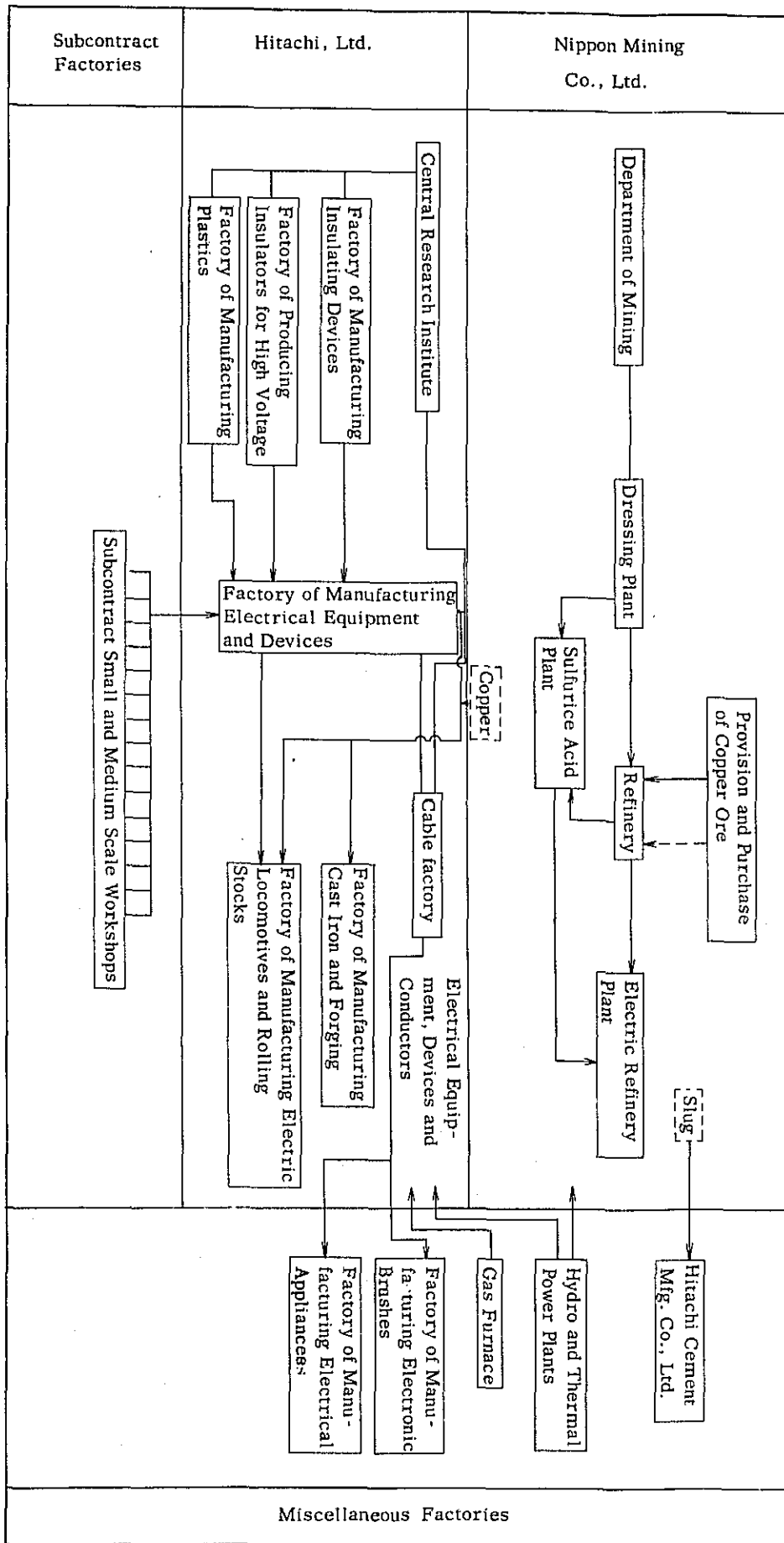
On the other hand, Tokyo Tsukudajima Workshop of Kuhara Mining Co., Ltd. was established with the aim of repairing and manufacturing machinery for mines owned by the latter firm. This workshop was engaged in the manufacture of machinery designed by Hitachi Mine of Kuhara Mining Co., Ltd. and came to gradually receive orders from the outside besides meeting demands from its organization. Thus, this workshop was developed as a manufacturer of mining machinery (a typical one manufactured by the workshop was a smelting furnace), centrifugal pump, pulunger pump, overhead travelling crane, etc. The workshop came to be amalgamated into the Hitachi Manufactory (Hitachi Seisakusho) in 1918. Hitachi Mine's expansion of its business into the field of electric power is as previously stated. Even after the completion of Nakasato Hydro Power Station in 1907, Hitachi Mine went on building many hydro power stations and upon completion of these power stations started to supply electric power to the public. A new company named "Hitachi Electric Power Co., Ltd." (This firm was absorbed into the present Tokyo Electric Power Co., Ltd. after the termination of World War II) was founded as an independent corporation in 1927. As of 1928, approx. 50% of electric power generated by the Hitachi Electric Power Co., Ltd. was consumed for its own use and the rest supplied to neighboring places.

Relationship between Hitachi Mine and the chemical industry is relatively weak. The situation was considerably different from the background that Sumitomo Chemical Co.,

Ltd. was developed from Besshi Copper Mine in Japan. Since Japanese copper ores contain a great deal of sulfuric acid, there is a general trend of eliminating this chemical components from the ore in the Japanese chemical industry. Hitachi Mine started to produce sulfuric acid in 1911 and gave thought to the establishment of a chemical industry for a time. However, on account of a limited surplus of electric power, such an attempt did not become a reality until Nippon Mining Co., Ltd. proceeded from the management of a petroleum refinery industry to that of a petro-chemicals industry after World War II.

It is worthy of note that Hitachi expanded its businesses as far as a new share of petroleum production in addition to agriculture and forestry. Hitachi Mine came to have its affiliated companies producing titanium, zirconium, ferro-nickel, pure iron metallurgy, metal procession, etc. for a short time and undertook to run a coal industry which was separated after the end of World War II.

The flow chart given below shows the activities of "Kombinat" with Nippon Mining Co., Ltd. and Hitachi, Ltd. as the central "core" in the Hitachi area.



## 6.2 Re-Evaluation of Mining Industry as Leading Industry

Japan, which took her place along side the modern countries in the late 19th century, took a very positive attitude of seriously undertaking to develop mines. During the course of such development, the required equipment and facilities were modernized to a great extent, which led to the birth of the Japanese heavy industry. It must be reiterated that the mining industry is responsible for a supply of raw materials and has a nature of strong "priming powers" to arouse demand for electric power, transport machinery, mining machinery, etc., which will cause industrialization in a country.

It can be said that Hitachi Mine succeeded in developing a mining and industrial city. At its cradle stage, Hitachi Manufactory which had been only a workshop for mines owned by its mother organization looked for new outlets for its products. This small scale manufactory came to grow up into a large enterprise to carry out its business on a nation-

wide scale. When Hitachi Manufactory could manufacture motors, transformers, locomotives, electrical appliances, conductors and cables, insulating devices, computers, etc., a large number of small and medium size subcontracting enterprises to produce required parts and assemblies were born in neighboring places. On the other hand, such Hitachi's advancement promoted the build-up of affiliated and/or associated industries of electric power, city gas, service water, civil works, etc..

The team is well aware that Zambia surpasses our country with respect to copper production. It is the team's desire that the above information will be useful for facilitating an understanding of how many related industries can develop with the mining industry as a pivot.

To their great regret, the team could not understand the advancement process of industries connected with the mining industry in Zambia in complete detail. However, frankly speaking, Union Minière which is the predecessor of Gécomines in the Republic of Zaire undertook to establish various industries with the mining industry as a pivot. In comparison with the said firm, it appeared to the team that mining companies in Zambia were not necessarily serious in breeding their associated industrial companies. This fact indicates that Zambian mining companies do not entrust the treatment of demand involved in management of the mining industry with their associated companies but mostly with ordinary enterprises. Under these circumstances, many small scale dealers and sales agents of machinery, transport machinery and civil works, repair shops, factories of assemblies and parts, enterprises of metal processing and construction companies came to be born in Zambia. It can be mentioned that the present Zambian machinery and metal works industry is in a transitional stage from enterprises dealing mainly with the sales of products into the manufacturing industry. The Nippon Mining Co., Ltd. of Japan separated Hitachi, Ltd. from its sphere of control at its initial stage and fostered it into a comprehensive manufacturer of electrical equipment and machinery. Union Minière also established its affiliated companies which assumed influential status in the fields of electric

power, chemistry, food-stuff processing and civil works, but still keeps its workshop of manufacturing machinery within its organization. This firm has not yet opened its door for the demand for machinery to outsiders. In Zambia, mining companies were mostly absorbed in the management of their own mines and associated facilities instead of fostering their affiliated companies. The majority of the required machinery and materials including assemblies are imported from abroad. As seen from the above-mentioned descriptions, it is needless to say that there are many differences in the process and way of industrial development among Zambia, Zaire and Japan. Nevertheless, if consideration is given to the fact that the mining industry provides an impetus of development to the manufacturing industry, it will become a problem for Zambia in the future as to how she will expand her machinery and metal works industry, based on the progress of the existing dealers, repair shops of machinery and other devices, manufacturers of assemblies and parts, etc. within her territory.

