No. 4

THE BASIC DESIGN STUDY REPORT ON THE PROJECT FOR CONSTRUCTING KILIMANJARO INDUSTRIAL DEVELOPMENT CENTRE (PHASE II) IN THE UNITED REPUBLIC OF TANZANIA

JULY, 1988

Japan International Cooperation Agency

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ON
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(PHASE II)
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PREFACE

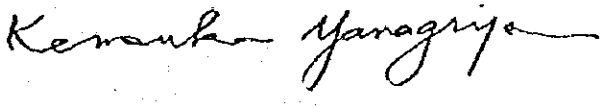
In response to the request of the Government of the United Republic of Tanzania, the Government of Japan has decided to conduct a basic design study on the Project for Constructing Kilimanjaro Industrial Development Centre (Phase II) and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Tanzania a study team headed by Dr. Minori Sano, Special Assistant to the Director of the Grant Aid Management Department, JICA from March 25 to April 17, 1988.

The team had discussions on the Project with the officials concerned of the Government of Tanzania and conducted a field survey in Kilimanjaro area. After the team returned to Japan, further studies were made, a draft report was prepared and, for the explanation and discussion of it, a mission headed by Mr. Toshio Okazaki, Deputy Manager of Technical Cooperation Division, Mining & Industrial Development Department, JICA was sent to Tanzania from June 24 to July 5, 1988. As a result, the present report has been prepared.

I hope that this report will serve for the development of the project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the United Republic of Tanzania for their close cooperation extended to the team.

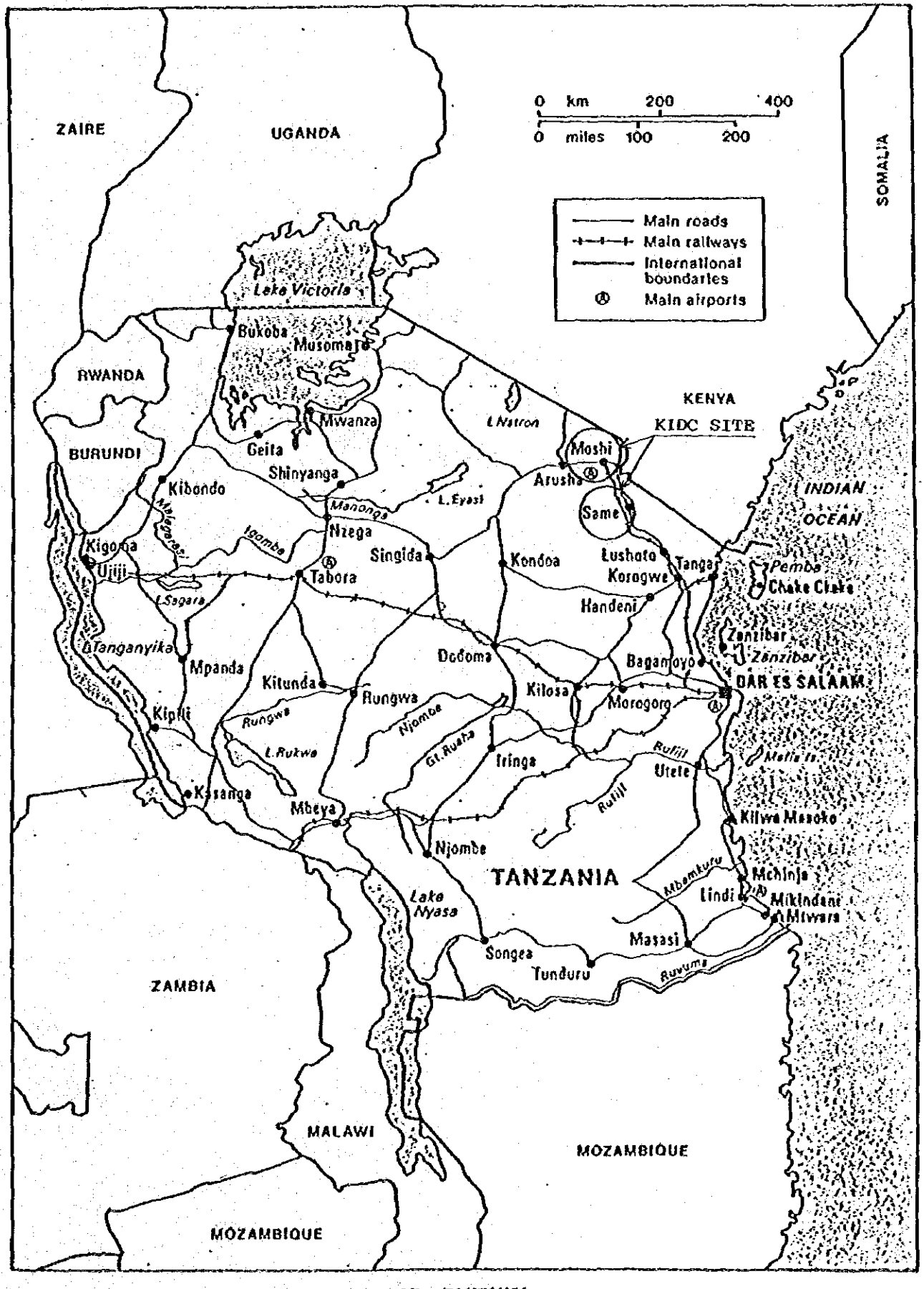
July, 1988



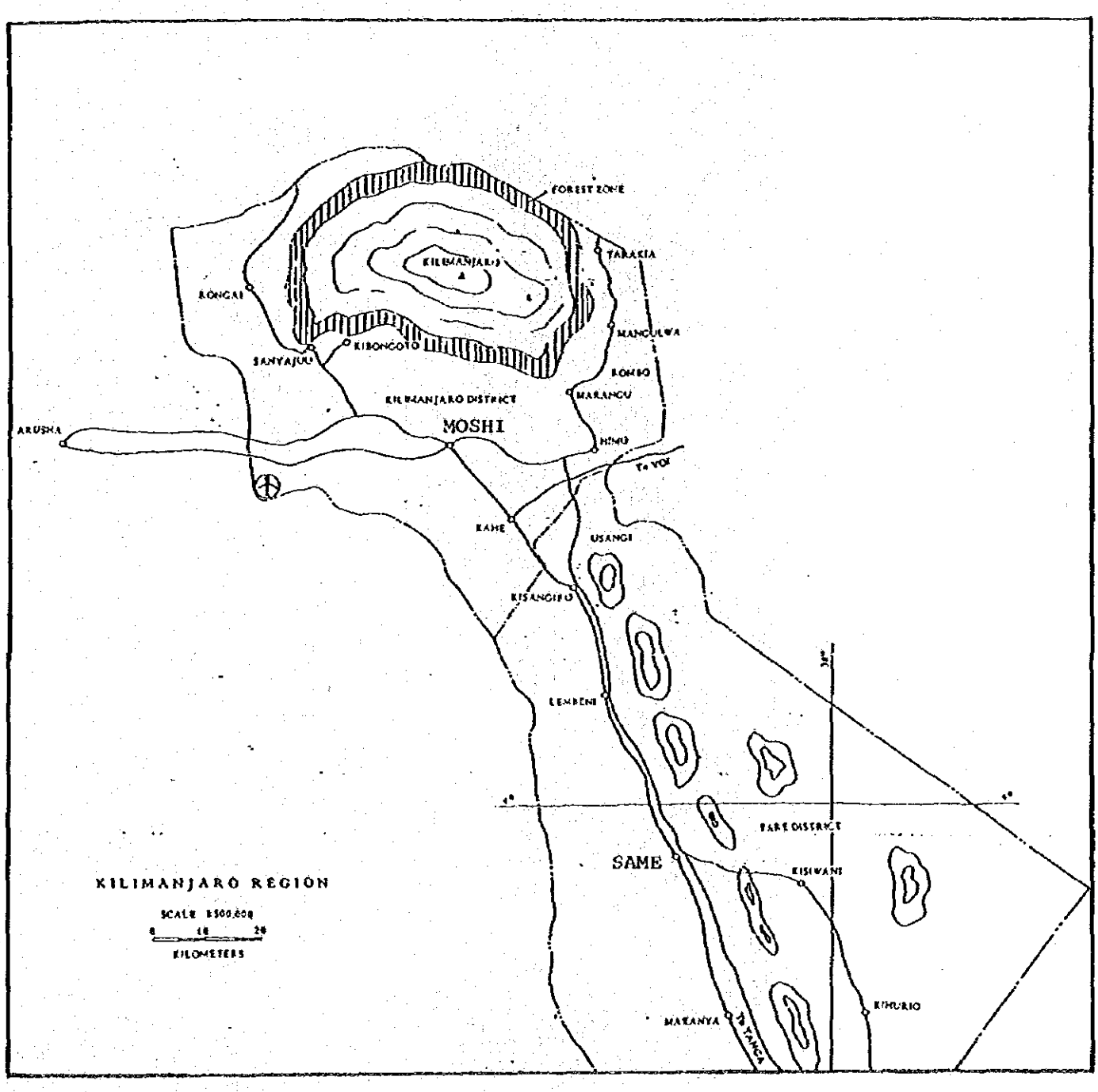
Kensuke Yanagiya
President
Japan International Cooperation Agency

LOCATION MAP

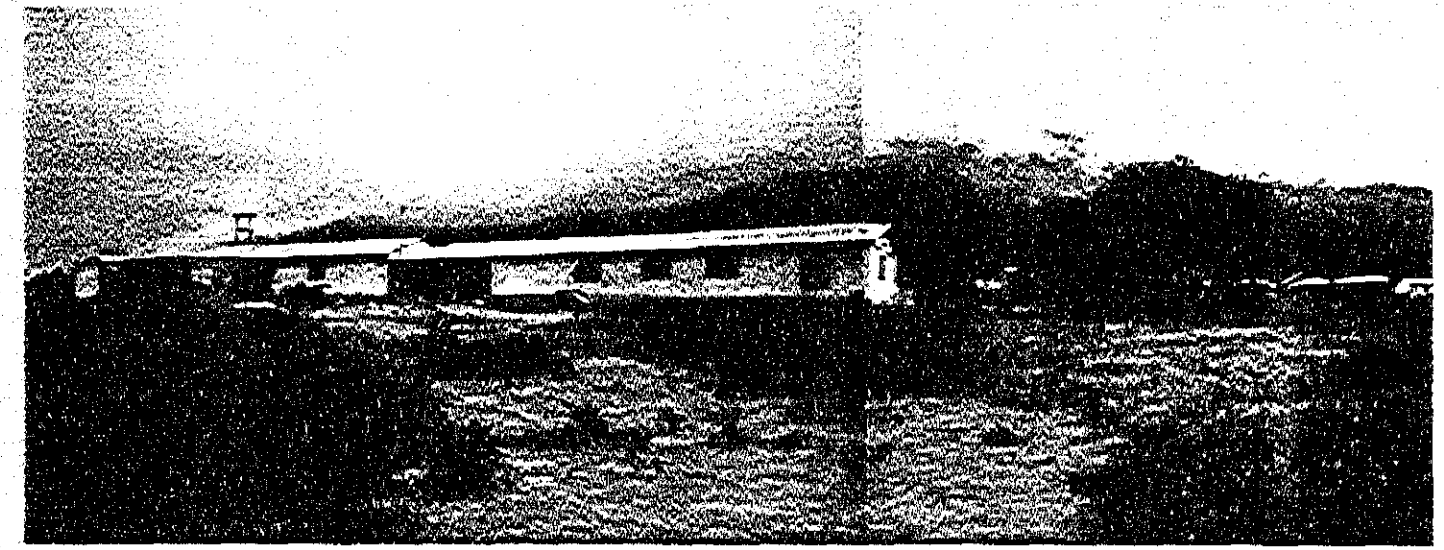
Tanzania



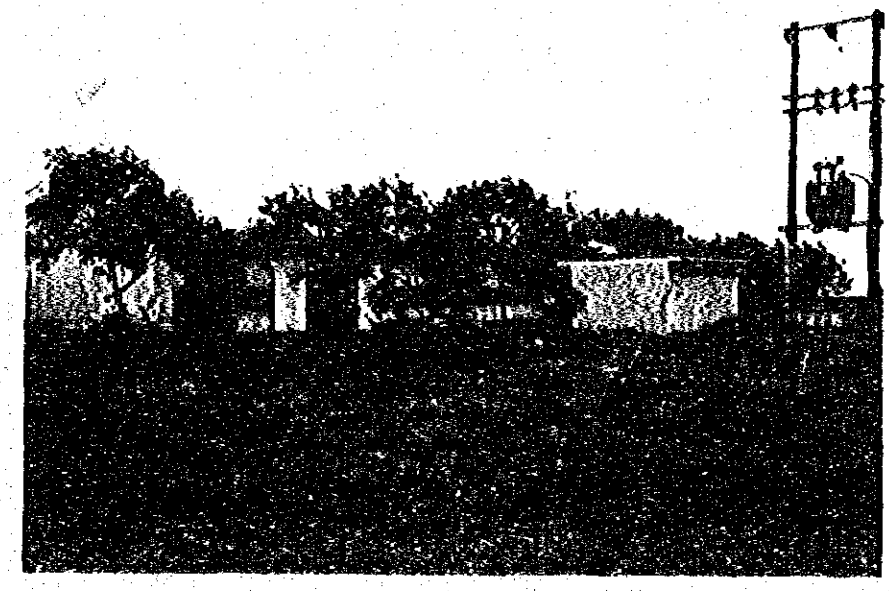
MAP OF TANZANIA



MAP OF KILIMANJARO REGION



KIDC Same Centre (viewed from the south side)



KIDC Moshi Centre's Machining Section
(viewed from the south-west side)

KIDC Moshi Centre's Foundry and Forging Section
(viewed from the south-east side)

SUMMARY

SUMMARY

he Kilimanjaro Industrial Development Centre (KIDC) Project (hereinafter eferred to as Project) has been carried out under the project-type echnical cooperation and grant aid for about ten years since 1978. The bjective of this technical cooperation is the development of medium and nall-scale industries in Kilimanjaro Region. During that period, echnologies in the fields of ceramics, machining, metalworking and riquette have been transferred and technologies thus transferred greatly ntribute to the development of human resources in the United Republic of nzania. Although this technical cooperation was to have been terminated March, 1988, the Kilimanjaro Regional Government have requested to the panese Government that basic technologies in the fields of ceramics, chining and metalworking continue to be transferred in the next stage, d the technical cooperation is extended for the next five years. At the me time, the Kilimanjaro Regional Government has also requested for the panese Government grant aid to expand equipment and facilities necessary r technical cooperation as mentioned above.

response to this request, an extension of the technical cooperation for e next five years starting from March, 1988 was agreed upon between the pan International Cooperation Agency (JICA) and the Kilimanjaro Regional vernment, and JICA has decided to conduct a basic design study for ipment and facilities necessary for the technical cooperation, and s dispatched the Basic Design Study Team to Tanzania from March 25 to ril 17, 1988.

study team has carried out the field investigation and also held scussions with the Tanzanian Government as well as the Kilimanjaro ional Government. Upon their return to Japan, the study team prepared s Basic Design Study Report in accordance with the results of the field estigation.

damental items of this Project are as follows:

1. Ceramics section

Location : Within the site of the existing Same Centre

Technologies to be transferred : Tableware and insulator

Equipment:

Tableware	Reinforcing the existing clay section
Insulator	Supplying equipment for forming, drying, firing and glazing sections
Investigation of raw materials	Supplying automobiles

Facilities:

Building for insulator	New building (10 m x 40 m)
Arrangement of on-site facilities	Relocating front gate
Water supply system	Boring well
Electrical system	Reinforcing existing electrical supply and distribution facilities

2. Machining and metalworking section

Location: Within the site of the existing Moshi Centre

Equipment:

Metalworking section	Supplying high frequency induction furnace (300 kg) and its associated equipment
Machining section	Supplying vertical lathe, universal milling machine, cylinder boring machine, etc.
Investigation of raw materials	Supplying automobiles
Design and Engineering section	Supplying drafting machines, etc.

Facilities:

Building for metalworking	Extension from existing building (15 m x 35 m) with 2 ton overhead travelling crane
Water supply system	Boring well
Electrical system	Reinforcing existing electrical and distribution facilities and supplying emergency electrical supply system
Design and engineering section	Modification of existing tool storage room to design room

The ceramics section for this Project will be provided in the existing Same Centre. Same District is located about 100 km southwest of Moshi City and along the Moshi-Dar es Salaam Road.

The existing Same Centre is constructed in a slope area near a mountain, 300 m north of the above road. The existing building is presently used for OJT activities related to tableware production, and a new building will be constructed on the spacious site on the south side of the existing building.

On the other hand, the existing Moshi Centre is located on the outskirts of Moshi City. Facilities for the machining and metalworking section for the Project will be provided within the above Moshi Centre. An additional building for the metalworking section will be newly constructed on the spacious flat site on the backside of the existing building for the metalworking section in order to effectively interconnect with the existing building.

The construction period is scheduled to be one year starting from the commencement to the completion of the works.

The executing agency of the Project in Kilimanjaro Region is the Kilimanjaro Regional Development Director's Office.

In five-year technical cooperation starting from March, 1988, about 160 persons are to participate in the OJT, and equipment and facilities will be operated and maintained as a part of OJT activities mainly by the Tanzanian counterpart personnel. Operation and maintenance budget to be allocated by the Tanzanian Government will be increased, because of the following reasons:

1) Electric charges will be increased, because the high frequency induction furnace is installed in the Moshi Centre and the size of the Same Centre is doubled.

2) Labour costs will be increased, because of the increase of personnel such as Tanzanian counterpart personnel, engineers, workers, etc.

The Project aims to improve and strengthen equipment and facilities necessary for the forthcoming project-type technical cooperation. In the technical cooperation carried out until March, 1988, basic technologies have been transferred through OJT activities, but of which scope was limited. If the Project is realized, basic technologies will be continuously transferred and applied technologies related to insulator, scrap materials recycling, etc. will be transferred, so that transfer of technologies related to factory management will be completed. Through technologies thus transferred, Tanzanian engineers would create a path for promotion of local industries, which is the main purpose of KIDC.

PREFACE

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ABBREVIATIONS

A/C	Air Conditioner
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CE	Carbon Equivalent
Conc.	Concrete
C/P	Counterpart
CPM	Critical Path Method
CV	Cross-linked Polyethylene Insulated Vinyl Sheath Cable
D	Depth
DS	Disconnecting Switch
DSM	Dar es Salaam
E	Earthing
ELR	Earth Leakage Relay
FRP	Fibre-reinforced Plastic
GDP	Gross Domestic Products
H	Height
HVAC	Heating, Ventilation and Air Conditioning
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standards
KADC	Kilimanjaro Agricultural Development Centre
KIDC	Kilimanjaro Industrial Development Centre
LA	Lightning Arrester
LBS	Line Breaker Switch
NVTC	National Vacational Training Centre
OJT	On the Job Training
P	Phase
PVC	Polyvinyl Chloride
Q'ty	Quantity
RC	Regional Commissioner
R/D	Record of Discussions
RDD	Regional Development Director
RH	Relative Humidity
RPO	Regional Planning Officer
SIDO	Small Industrial Development Organization

t	Ton
TANESCO	Tanzania Electric Supply Co., Ltd.
TEMDO	Tanzania Engineering and Manufacturing Design Organization
Temp	Temperature
Tr	Transformer
TSh	Tanzanian Shilling
TTC	Tanzania Tourist Corporation
VCB	Vacuum Circuit Breaker
W	Width
WH	Watt-hour

CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION

The United Republic of Tanzania (hereinafter referred to as Tanzania) has developed and promoted its own form of socialism since its independence in 1964. However, at the present time Tanzania relies on imports for its industrial products such as vehicles and machinery, and industrial development still remains one of the most important concerns for the Tanzanian Government and the nation.

Since 1978 the Kilimanjaro Industrial Development Centre (KIDC) Project has been implemented in Kilimanjaro Region with the assistance of the Japanese Government. The Project aims at transferring technologies to develop the local industries in Kilimanjaro Region. Although this technical cooperation was to have been terminated in March, 1988, it is considered necessary to continue the basic technology transfer and develop applied technologies.

Based on the above, in 1988 an extension of the technical cooperation for the next five years was agreed upon between the Japan International Cooperation Agency and the Kilimanjaro Regional Government and the R/D was signed by both parties in February, 1988.

The request for Japanese Government grant aid from the Tanzanian Regional Government covers the expansion of equipment and facilities for the ceramics, machining and metalworking sections needed for KIDC technical cooperation. The Japanese Government decided to conduct a basic design study on this Project and dispatched the Basic Design Study Team (refer to APPENDIX II) headed by Dr. Minori Sano, special assistant to the director of the Grant Aid Management Department, Japan International Cooperation Agency, to Tanzania from March 25 to April 17, 1988.

The purpose of this study is to examine the suitability of the Project and its expected effects. The request from the Tanzanian Government includes the supply of machinery and equipment and the construction of buildings for the ceramics, machining and metalworking sections.

The study team has carried out the following surveys and studies:

- Reconnaissance for raw materials (ceramics)
- Field survey on the candidate sites
- Investigation of the present conditions at KIDC
- Investigation of local industries, related training centres, and the present condition of construction industry

The study team also held discussions with the Tanzanian Government as well as the Kilimanjaro Regional Government to confirm the background and purpose of the Project. The Minutes of Discussions are attached as APPENDIX I.

Upon their return from Tanzania, the study team prepared "The Basic Design Study Report on The Project for Constructing Kilimanjaro Industrial Development Centre (Phase II) in the United Republic of Tanzania" consisting the following:

- Suitability of the fields in which technologies will be transferred
- Relationship between KIDC and local industries
- Relationship between KIDC and the existing training centres
- Contents and scope of cooperation

CHAPTER 2

BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2-1 Present Condition of Industry in the United Republic of Tanzania and Kilimanjaro Region

Wage employment by sector is shown in APPENDIX V. In 1986, about 8% of economically active persons were in wage employment. The majority of the population works in subsistence farming. Since 1982, employment in governmental authorities and manufacturing has slowed down. Consequently short-term employment (up to three months) has increased. On the other hand, agricultural wage employment and employment in services show growth in a range.

Between 1973 and 1978, real GDP showed 5.2% of annual growth rate in average. This was almost as same as the average of sub-Saharan countries. After the second oil shock, real GDP fell by 0.8% between 1980 and 1983. Real GDP per capita fell by 8% between 1978 and 1982. The percentage of subsistence production in GDP has increased recently.

In the 1970s, many industrial projects were implemented and resulted in a 0.5% a year growth of manufacturing production between 1970 and 1982. The contribution of manufacturing to GDP has dropped, however, in the 1980s. Industrial output declined by 6.4% in 1985 due to low capacity utilization. The decline in industrial output (refer to APPENDIX V) resulted from high import dependency which led to short falls in raw materials and spare parts. These situation recovered in a range with aids from foreign donors.

The oldest of the larger manufacturing enterprises were in the agricultural processing sector (cigarette manufacture, meat canning, brewing and cashewnut shelling). Import substitution production followed. Cement capacity grew fast. The National Development Corporation steel mill at Tanga has a 25,000 ton capacity for round bars, angles and flats. Other non-derivative industries include radio assembly, detergent, paper and tyre manufacturing. The first motor assembly plant (for trucks) started production in 1982, but plans for car and commercial vehicle assembly have been shelved.

The 1977-81 five-year plan and the basic industries strategy put heavy emphasis on developing the manufacturing sector. The principal objectives were to process all agricultural commodities, provide for basic consumer needs and launch new industries to use other Tanzanian resources - coal, iron ore, phosphates, pulp and paper. The Government has put an importance on seeking finance for a steel plant using Tanzania's ore. This is seen as central to its industrial strategy but external assistance has not been forthcoming. Other priorities included more balanced industrial development at centres other than Dar es Salaam, Tanga, Arusha and Mwanza.

The 1981-86 five-year plan paid greater attention on agriculture. Most of the previously proposed industrial projects have now been shelved, and industrial policy in practice is targeted to raising output, particularly in the agro-industrial sector.

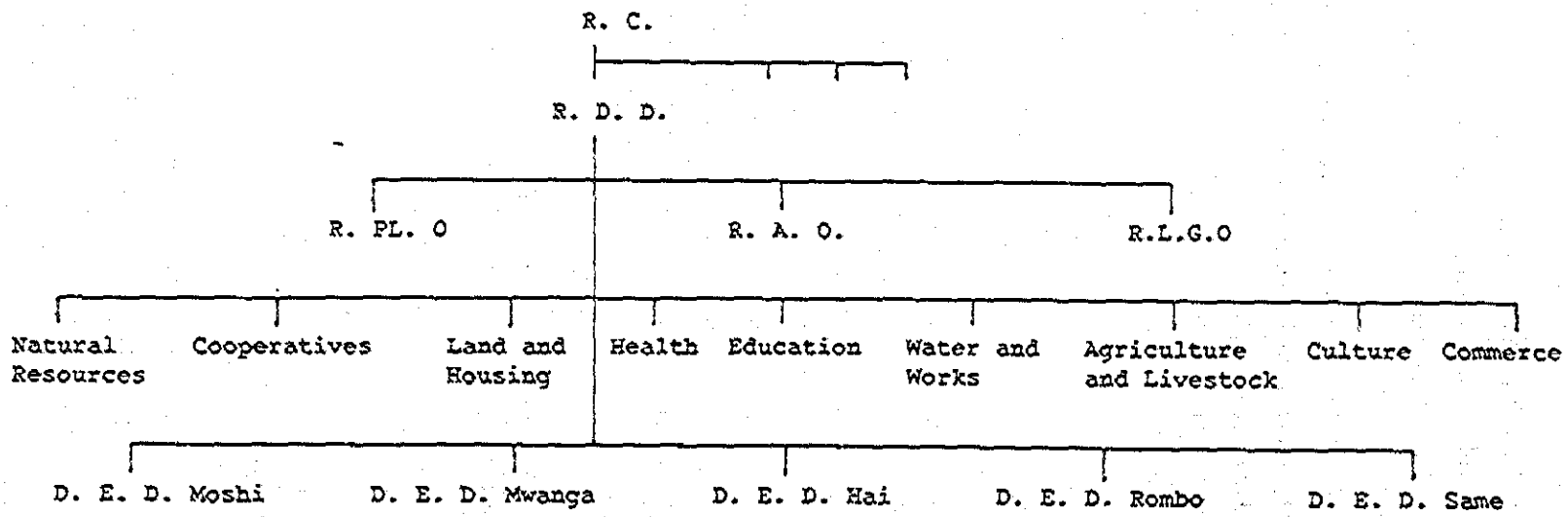
In 1983, production of manufacturing industries in Kilimanjaro Region achieved 4.8% of that in Tanzania and the production per capita was almost the same as average of Tanzania.

In Kilimanjaro Region, production share of manufacturing industries in 1985 was about 15% of the total production in the region as shown in APPENDIX V. The organization chart of the Kilimanjaro Regional Government is shown in Fig. 2-1.

This percentage was considerably higher compared with the average value 8% in Tanzania, which meant shares of other sectors such as services, etc. were smaller than that in other regions.

The organization chart of Kilimanjaro Regional Government is shown in Fig. 2-1, in which a Regional Development Director is responsible for industrializing in Kilimanjaro Region.

Fig. 2-1 Organization Chart of Kilimanjaro Regional Government



Note: R. C. = Regional Commissioner
R. D. D. = Regional Development Director
R. PL. O = Regional Planning Officer
R. A. O = Regional Administrative Officer
R. L. G. O = Regional Local Government Officer
D. E. D = District Executive Director

2-2 Outline of KIDC

Japan's technical cooperation which has been extended for the Integrated Development Plan of Kilimanjaro Region has a history of several ten years.

Former President Julius Nyerere of Tanzania requested the cooperation in the development of Kilimanjaro Region to the African Economic Mission dispatched by the Japanese Government in 1970. This request triggered a series of the technical cooperation including the above plan. In response to this request, the Japanese Government carried out two integrated development studies in Tanzania in 1971.

The principle in which each donor country extends a technical assistance to only one region in Tanzania has been established throughout the third 1977-81 five-year plan, and the Japanese Government decided to extend the technical cooperation to the Kilimanjaro Region. On this background, the Japanese Government conducted the study and prepared the plan for the integrated development of Kilimanjaro Region in 1977. In 1978 both Tanzania and Japan agreed to implement five projects including Kilimanjaro Industry Development Centre (hereinafter called KIDC) from among the above plan; the yen loan for the agricultural development in Lower Moshi area and Kilimanjaro Region Transmission System; and the grant aid of tractors to Lower Moshi, Kilimanjaro Agricultural Development Centre (hereinafter called KADC) and KIDC.

In September, 1978, the project-type technical cooperation as well as the grant aid for five years related to KIDC was agreed upon between the Japanese Government and Kilimanjaro Regional Government. In June, 1981, facilities and main equipment for the project-type technical cooperation (Phase I) were installed and handed over to the Tanzanian Government. Later in 1982 both countries agreed to extend the period for the project-type technical cooperation to 3.5 years. Subsequently, the follow-up cooperation was implemented during three years from 1986 to 1988. Considering that the above follow-up

cooperation was to have been terminated in March, 1988, R/D for the next five-year technical cooperation was signed in February, 1988. A Basic Design Study as part of grant aid for reinforcing facilities and equipment for the above five-year technical cooperation started in March, 1988, and it has been continuing up to the present time.

To distinguish a series of cooperation up to now from the next cooperation, the following definition is made:

Project-type technical cooperation from 1978 to March 1988 --- KIDC Phase I Technical Cooperation

Project-type technical cooperation for five years starting from March 1988 --- KIDC Phase II Technical Cooperation

Grant aid from 1979 to 1981 aimed at furnishing facilities and equipment for KIDC --- KIDC Phase I Grant

Grant aid from 1989 to 1990 aimed at supplying facilities and equipment for KIDC --- KIDC Phase II Grant

(hereinafter called the Project)

In KIDC Phase I Technical Cooperation, basic technologies in the fields of ceramics, briquette-making, forging, foundry and machining have been transferred to the Tanzanian counterpart personnel by Japanese experts.

The Technologies in the following items were transferred to the Tanzanian counterpart personnel, and actual activities done during the KIDC Phase I Technical Cooperation were as follows:

1) Machining (Moshi Centre)
   Items included mechanical parts (such as gears, pulleys, screws, cylinders, etc.), trially finished products (such as farm implements, oil jacks, volute pumps, etc.),

Actual activities included the acquisition of basic technologies related to machining, production and supply of parts which have been entrusted by other related centre.
Jigs and fixtures should be produced for effective use of machines and the quality and quantity of jobs necessary for OJT should be improved and increased.

2) Foundry section (Moshi Centre)
Items included potter's wheels, oil expellers, pumps, cutting tools, stoves, surface plates, etc.
Actual activities included the acquisition of cast iron-related technology by use of 100kg and 300kg oil furnaces. Revenue earned through OJT activities in this section stands first among any other sections in centres.
Main products for this section are to change from cast irons to ductile cast irons. For this purpose, facilities and technology transfer are required.

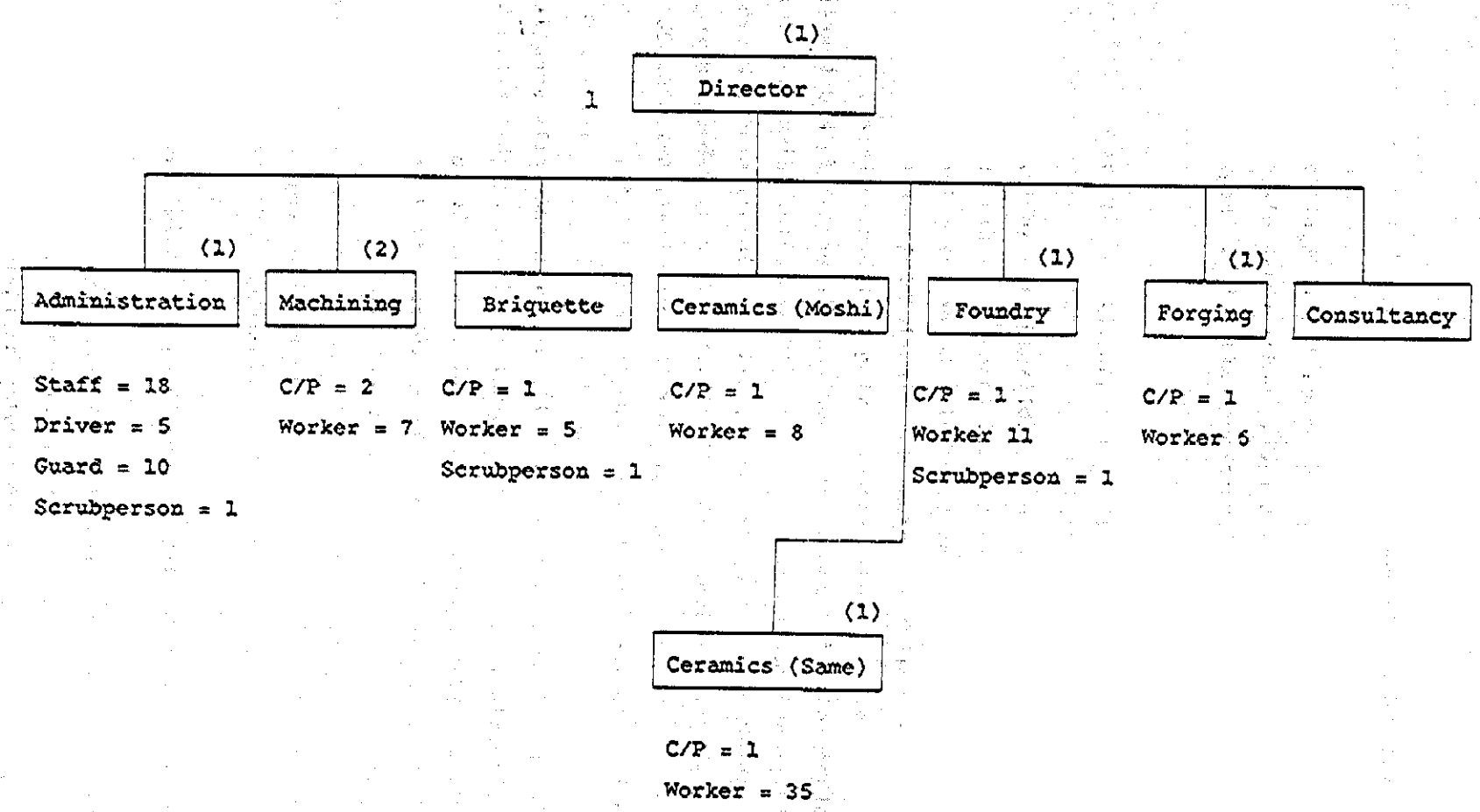
3) Forging section (Moshi Centre)
Items included hoes, sickles, hammers, chisels, nuts, various jigs and fixtures.
Actual activities included the acquisition of forging-related technology, production and supply of parts which have been entrusted by other related centre.
The quality and quantity of jobs necessary for OJT should be improved and increased.

4) Briquette section (Moshi Centre)
Items included briquette and transfer of briquette-producing technology was completed. The briquette is much in demand.

5) Ceramics section (Moshi and Same Centres)
Items included roof tiles and bricks at Moshi Center, and tablewares at Same Centre. Transfer of technology related to production of roof tiles and bricks has been completed.
In the Same Centre's tableware section, basic and some applied technologies as stoneware have been transferred. It is desirable that applied technologies to be transferred in order to increase the production items and improve their quality, by making use of favourable condition that raw materials are abundantly supplied near these centres.

Fig. 2-2 shows the organization chart of KIDC Phase I Technical Cooperation. KIDC is under the direct control of Regional Development Director (RDD) in Kilimanjaro Region.
KIDC is operated and maintained on the development and recurrent budgets allocated by Kilimanjaro Regional Government. Revenue earned through OJT activities is directly incorporated into the national treasury. Therefore, the development and recurrent budgets have no direct connection with such revenue.
The development and recurrent budgets in 1986/87 allocated to KIDC were 7,099,000 TSh (5,435,000 TSh for the development budget and 1,664,000 TSh for the recurrent budget), while the revenue earned through OJT activities in the same period was 2,154,000 TSh, which was equivalent to about 30% of the development and recurrent budgets.

Fig. 2-2 Organization Chart of KIDC (As of June 1987)



C/P = Counterpart personnel

( ) = Number of Japanese experts

Grand Total: 116

2-3 Outline of Related Development Projects

The Kilimanjaro Regional Government has no specific year program for the regional industrialization. Under these circumstances, there are a few organizations in and around Kilimanjaro Region which are related to KIDC.

2-3-1 Small Industrial Development Organization (SIDO)

The Tanzanian Government established SIDO in 1973 through Act of Parliament No. 28. Main assistance comes from Sweden. The aim of this organization was to provide technical guidance, training, service, market research, coordination between the companies and governmental organizations, advice to the government, standardization and quality control for promoting and fostering small and medium-scale companies in Tanzania. Since 1982, sixteen centres were set up in Songea, Iringa, Kigoma, Lindi, Mbeya, Moshi, Sinyanga, Singida, tanga, Musoma, Sumbawanga, Tabora, Morogoro, Mwanza, Mtwara and Kagera. For these centres, 582,000,000 TSh was allocated from the national budget in 1982-1987.

The Moshi Centre, begun in 1978, produces and sells such items as malleable cast iron, vehicles parts, locks, coffee shears and pliers, plows, packaging materials, spectacle lenses, axes, hammers, and buffs, and sells stainless-steel knives which are ground.

The small and medium-scale companies under the control of SIDO receive favors in taxation and finance.

2-3-2 Tanzania Engineering and Manufacturing Design Organization (TEMDO)

The Tanzanian Government established TEMDO in 1980 through Parliament Act No. 23 and started its operation in 1982. The main objective of TEMDO is to develop designing and engineering capabilities. Its headquarters is located in Arusha, and main functions of the Organization are to 1) design machines, 2) develop prototypes, 3) design tools, dies and jigs, and 4) provide

training, technical advice, productivity and quality control advice, information, and OJT. The handled products are small pumps, maze-expellers, oil expellers, plumbing fixtures, etc.

The design and consulting fees that TEMDO will render to its clientele, as well as the national budget are allocated as the working expenses. This organization is not equipped with facilities for the development of prototypes and therefore relies on SIDO and KIDC. It places orders with KIDC for mainly foundry products.

2-3-3 Centre for Agricultural Mechanization and Rural Technology (CAMARTEC)

The aim of the centre is to improve the quality of rural life through development, adaptation and implementation of appropriate technologies in the fields of agricultural mechanization, water supply, building construction and sanitation, rural transport and energy.

The functions of the centre include:

a) To carry out applied research,
b) To develop and manufacture approved prototypes,
c) To perform tests on all types of machinery and equipment,
d) To conduct short-term training courses,
e) To offer consultancy services on the designing, testing and other technical aspects of agricultural mechanization, and
f) To act as the national link with other national and international institutions engaged in activities related to the functions of the centre.

CAMARTEC which officially started its operation in July 1982 is a merger of two separate Institutions; one formerly known as Tanzania Agricultural Machinery Testing Unit (TAMTU) and the other Arusha Appropriate Technology Project (AATP).

The centre is a parastatal organization under the Ministry of Industries. The running of the centre is directed by the Board of Directors under a Chairman appointed by the President of the United Republic of Tanzania. The day to day management of the centre is directed by the Director General also appointed by the President.

The centre is located in Arusha. It can presently handle farm implements, oil expellers, simple flour mills, tractor and truck parts, ox carts, handcarts, water tanks, hand pumps, well buckets, windmills, bio-gas holders, solar systems, cook stoves, etc. It also publishes booklets concerning the above products. Director at CAMARTEC places his hope on KIDC in the fields of bolts, nuts, and parts.

2-3-4 National Vocational Training Centre (NVTC)

These centres were established with the help of Sweden throughout the country, as training facilities mainly for the industries and handicrafts.

There is a training center for the foundry, forging and machining in Moshi. The centre aims at conducting vocational training (practical training 60%, learning 40%) and thus does not produce or do sales activities. It consists of 360 trainees, 60 Tanzanian trainers and 15 Swedish experts. The materials used in the centre are provided by Sweden on a grant basis. The trainees who accomplish a certain level of skills can be certified and some graduates actively work in various places of the country.

2-4 Details and Contents of Request

2-4-1 Contents of R/D for KIDC Phase II Technical Cooperation

The R/D for KIDC Phase II Technical Cooperation was agreed upon in February 1988 to provide a 5-year technical cooperation starting from March 13, 1988 and to carry out the following.

In order to develop and expand achievements of KIDC Phase I, Phase II aims to transfer the applied technologies including factory management through the following activities.

1) Machining and metalworking

- OJT in applied technologies in machining, foundry and forging
- Technical advices on production management, product planning and machinery design

2) Ceramic centre

- OJT in ceramics production
- Technical advices on tableware, insulator and gypsum
- Technical advices on production management and product planning

2-4-2 Request for Japanese Government Grant Aid for Requirement of KIDC Phase II

Considering that the KIDC Phase I Technical Cooperation ended in March 1988, the Request for Japanese Government Grant Aid for Requirements of KIDC Phase II Technical Cooperation was presented to the Japanese Government by the Kilimanjaro Regional Development Director through the Ministry of Finance of the United Republic of Tanzania in February 1987. A copy is attached to the appendix but its outline is as follows:

1) Ceramic Research and Development Centre (CRDC)

a) Location: To be located at KIDC tableware pilot plant site at Same.

b) Outline of the project
Utilization of big deposits of principal and subsidiary raw materials in this area which are of importance in ceramic activities in Kilimanjaro Region as well as outside Kilimanjaro.

c) Objective
- Development of designing capability
- Expansion of production range of tablewares
- Home production of low-voltage insulators
- Production of glazed walls and floor tiles
- Production of grinding stones
- New construction of gypsum pilot processing plant

d) Hardware
- Construction of two buildings for ceramics and gypsum
- A complete set of equipment and machinery such as glazing, firing kiln, testing equipment, gypsum moulds, gypsum mining, transportating vehicles, etc.

2) Repair and Maintenance Service Centre

a) Location: To be located at KIDC industrial area in Moshi.

b) Outline of the project
Establishment of a new project which will facilitate transfer of technology on a higher level.

c) Objective
- Development of designing capability
- Production of new machines, repair of agricultural machines and development of maintenance ability

d) Hardware

- Two building facilities: Factory and canteen
- Complete set of machines and tools such as hobbing, lathe and milling machines, furnaces, disc sanders, bandsaws, cutting machines, electroplating equipment, tools, etc.

3) Handicraft Centre

a) Location: To be located at KIDC industrial premises in Moshi.

b) Objective

- Woodworking, furniture manufacturing, bamboo crafts
- Focusing on artistic products in handicrafts
- Production of clay stove

c) Hardware

- One handicraft centre building
- Pilot plant equipment such as those for bamboo furniture production as well as for batique/tie and dye processing

In response to this request, JICA dispatched an implementation survey team for the technical cooperation of the project in July 1987, and implementing consultation team in January 1988 to study the background and suitability of the request and narrow down the fields requested. As a result, it was decided that the Handicraft Centre was not picked up as the Project.

CHAPTER 3

CONTENTS OF THE PROJECT

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3-1 Objectives and Contents

The objective of Phase II Grant is to provide the hardware required to implement the contents of Phase II Technical Cooperation as mentioned before. In this survey, the specifics of the grant aid required for Phase II that builds on the results of Phase I Technical Cooperation are formulated. In Phase I Technical Cooperation, basic technologies have been transferred and the results thereof have been positively evaluated. However, in some fields of basic technologies, the technology transfer of Phase I remains uncompleted and further efforts to transfer basic and applied technologies should continue in Phase II as well.

Another important objective is the establishment of an effective production flow system aiming at balanced revenues and expenditures, and to this end the Japanese experts advise and instruct their Tanzanian counterparts on factory management. In other words, in OJT related to business management, the Tanzanian counterpart personnel first investigate the demands and requirements of the regional communities. They then establish and demonstrate the flow system consisting of materials procurement → production → supply and receiving orders → repair service → delivery.

With such a viewpoint in mind, the present condition of KIDC and its surrounding area was investigated to determine the appropriate basic policy in each section of Phase II Grant.

3-2 Study of the Request

3-2-1 Insulator

In Phase I Technical Cooperation, OJT related to tableware was carried out at the KIDC Same Centre and the results were quite satisfactory. The Kilimanjaro Regional Government requested that applied technologies in the insulator to be transferred. Transfer of technologies in insulator for low voltage and communication uses would be considered with a view to the technologies presently being used at the Same Centre.

The quality of the materials being produced at the centre seems to be adequate for low voltage insulator use, as a result of visual observation. In the survey, a ceramics expert of the Basic Design Study Team produced a test piece using the above materials, collected a prototype insulator produced at the centre, and brought them back to Japan to conduct a water penetration test (JIS C 3801). The test piece showed satisfactory results. This means that low voltage insulators could be produced using the presently available raw materials if appropriate firing control is ensured.

The tableware-related technologies transferred in Phase I will be applied to insulator production. Engineers of the Tanzania Electric Supply Co., Ltd. (TANESCO) highly evaluated the insulator sample made at the Same Centre.

The low voltage insulators in Tanzania are much in demand as an import substitution product. Although most of the high voltage insulators in use are supplied by donor countries as a part of power transmission and distribution system projects, most low voltage insulators used in the low voltage distribution lines to private companies and households are also imported. Among low voltage insulators used in TANESCO are the types specified under JIS C 3845 and variations of it (for JIS C 3845, refer to APPENDIX XI.)

The ceramics expert of the Basic Design Study Team showed the KIDC sample to a chief transmission and distribution engineer of the TANESCO headquarters and asked him about future demand for it. As a result, the annual demand for low voltage insulators was estimated to be 100,000 pcs. The earliest possible supply of such insulators from KIDC is desirable.

There are a few ceramics factories in Morogoro and Arusha. The annual production of tableware and sanitaryware in Morogoro is 1,000 tons and 800 tons, respectively, but no insulator is presently being produced. In Arusha small ceramics factories produce insulators whose quality is low and the quantity of production is small. It is desirable that technologies in the field of low voltage insulator be transferred to develop local industries.

Additional machines such as jiggering, tapping and scrapping machines, potter's wheels, etc. would be required for the centre to start the transfer of technologies related to insulators for communications use. Therefore only the technologies related to low voltage insulator will be transferred in the first step of KIDC Phase II. The technologies related to high voltage insulator will be transferred in the future, because its production requires high quality materials and a higher level of technology.

A new building (10 m x 40 m) will be constructed to accommodate the forming, drying and firing sections for insulator. The existing clay section for tableware will be shared with the new clay section for insulator.

3-2-2 Tableware

Product quality is good and workers are well disciplined in the tableware section of the Same Centre as a result of Phase I Technical Cooperation. Further improvement of the basic technologies is desirable as basic technologies are also applicable to the insulator in Phase II. Additional equipment will be provided to strengthen the existing tableware forming section.

The traffic line in the clay, forming, drying and firing sections is inefficient but the existing processing lines will be partially improved and used. The existing building for the tableware section will be partially improved and used.

3-2-3 Gypsum

Gypsum is indispensable for the ceramics industry. Tanzania relies on imports to satisfy its large gypsum demand. Gypsum ore is reported to have been found in Nyumba Ya Nungu. The Basic Design Study Team conducted a field investigation of quarry sites for gypsum ore in an extensive area in Nyumba Ya Nungu. Although several gypsum ores were found in trial pits, a survey on the estimated amount of gypsum ore deposits is necessary. It was concluded that a gypsum processing pilot plant will be considered for future plans. Space for the gypsum processing plant will be arranged within the existing building.

3-2-4 Machining and Metalworking Sections

The purpose of machining and metalworking sections in KIDC Phase I was to give instruction in product development and repair technologies, conduct training courses, and to offer consulting services to small-scale companies.

Technology transfer in Phase I emphasized basic technologies, and the expected results were accomplished. However, the basic technologies included in Phase I do not cover all the needed fields. It is preferable that a series of technical cooperation activities be continued and that technologies transferred and acquired during the past seven years be further developed. In consideration of the cooperation between related organizations as mentioned in CHAPTER 2, it is important to strengthen the activities of the Moshi Centre in Phase II. Tanzania relies on imports for its vehicles, machinery, etc. Therefore, machinery repair and the production of spare parts are main industries in Kilimanjaro Region. Tanzania also relies on imports for its raw

materials (cast iron, ductile cast iron, cast steel, steel, etc.) to produce spare parts. An insufficient supply of these raw materials has led to a chronic shortage of spare parts. To cope with this situation, effective recycling of scrap materials is desirable. Twenty to thirty tons of scrap materials are left unused at each of the auto repair shops in Moshi. Thus, a high frequency induction furnace will be provided in Phase II to transfer complete production line technologies ranging from raw materials to delivery of products, and to promote local industries. The OJT in factory management planned in Phase II Technical Cooperation will come into reality in the course of constructing a scrap materials recycling system. In the machining section, some top priority machinery will be provided to supplement the existing machinery. Drafting machines, map cases, copying machines, etc. will be provided in the new engineering room of the existing building to develop engineering and design technologies.