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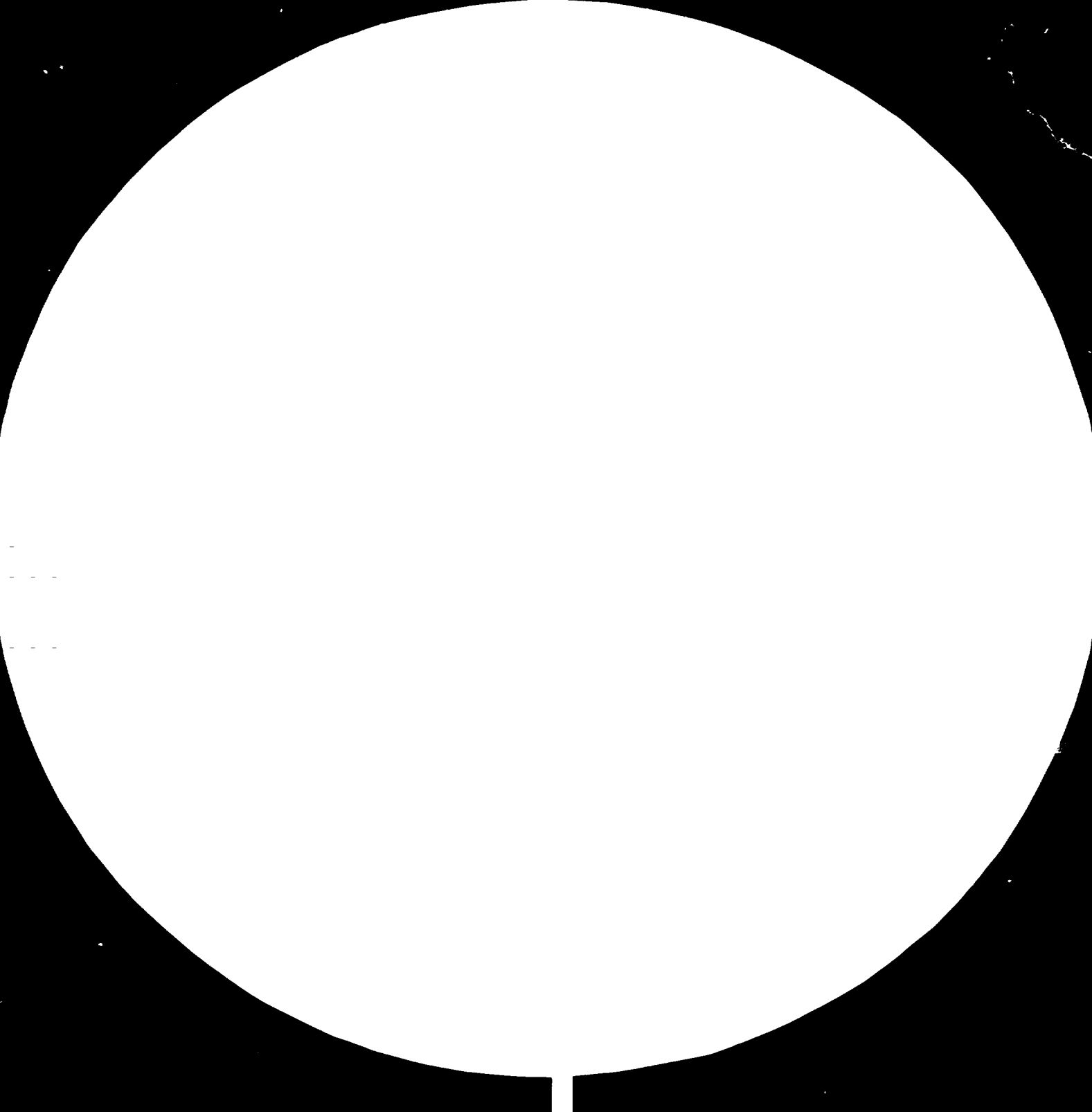
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MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

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DP/ID/SER.A/244  
21 March 1980  
English

RESTRICTED

DEVELOPMENT OF APPROPRIATE CERAMIC TECHNOLOGIES  
SI/URT/79/801  
UNITED REPUBLIC OF TANZANIA

(R) Technical report: Development of the pottery industry

Prepared for the Government of the United Republic of Tanzania  
by the United Nations Industrial Development Organization,  
acting as executing agency for the United Nations Development Programme

Based on the work of Svend. B. Johansen, expert in ceramic technology

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United Nations Industrial Development Organization  
Vienna

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### Explanatory notes

The following abbreviations of organizations are used in this report:

FAO      Food and Agriculture Organization of the United Nations  
SIDO      Small Industries Development Organization  
UNDP      United Nations Development Programme  
UNIDO      United Nations Industrial Development Organization

The following technical terms are used in this report:

blunger      A clay-washing tank used in the preparation of the basic clay mixture, or in making a slip

engobe      A coating of slip, white or coloured, applied to ceramic ware to improve the appearance

leather-hard      A stage in the production of pottery before the article is fully dried

periodic kiln      Or intermittent kiln, a batch type kiln in which wares are set, fired, cooled and then drawn

ring-coil      A simple method of pot making in which the clay is rolled into a 'rope' which is then coiled to form the walls of the vessel

sintering      The process of heating a compacted powder to a temperature sufficiently high for inter-crystallization to take place so that the fired body acquires strength

spalling      Cracking or splitting

### ABSTRACT

This project, "Development of appropriate ceramic technologies" (SI/URT/79/801), was carried out for the Government of the United Republic of Tanzania by an expert of the United Nations Industrial Development Organization (UNIDO) acting as executing agency for the United Nations Development Programme (UNDP). The project included three missions, the first of which, by an expert in ceramic technology, is described in this report. The expert's mission lasted from 2 January to 15 March 1980, of which the period 8 January to 11 March was spent in the United Republic of Tanzania.

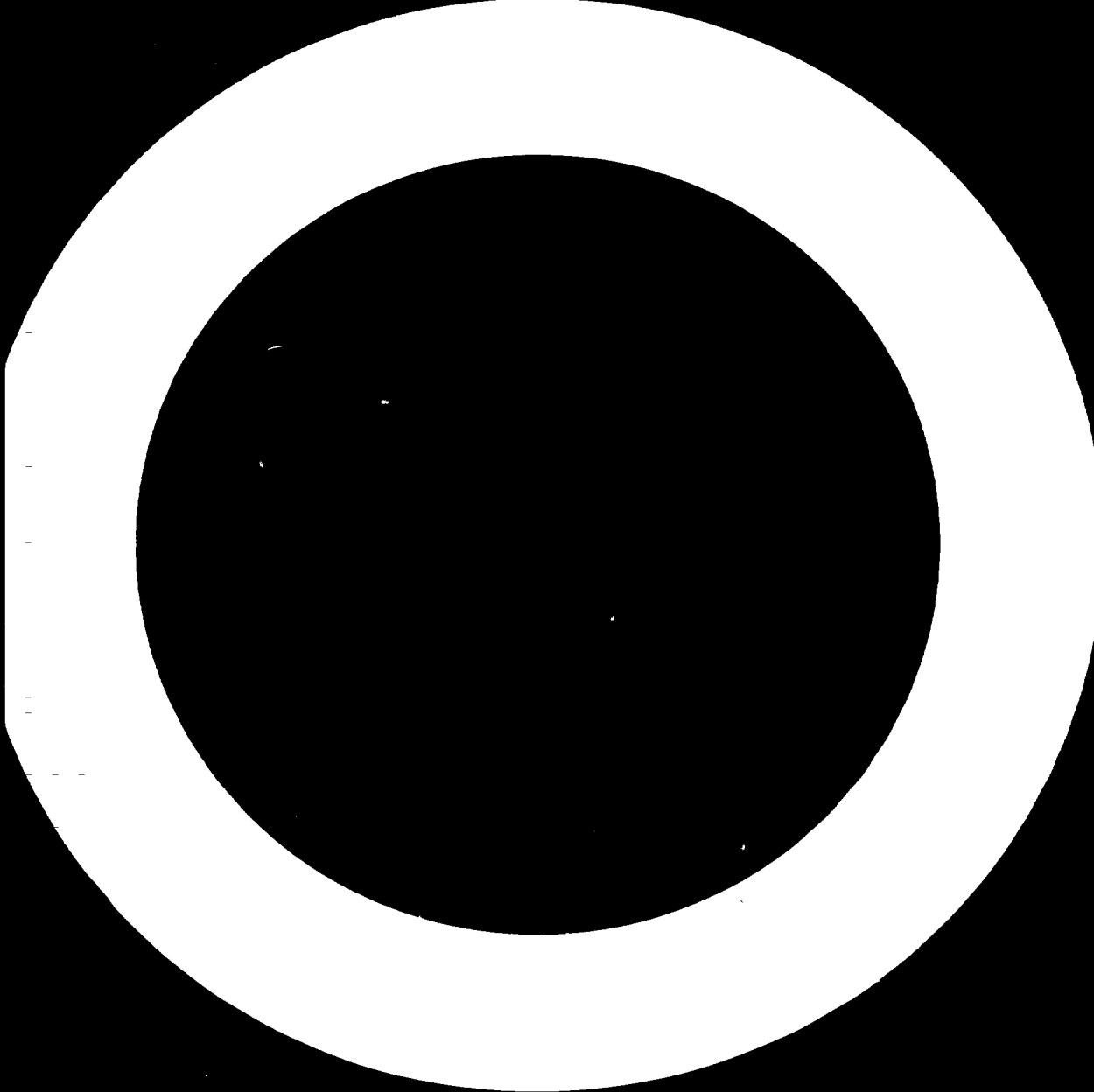
The purpose of the mission was to examine the existing state of the pottery industry in the country and to advise on its development.

The expert was attached to the Small Industries Development Organization (SIDO) and his report is based both on the findings of previous studies of the Ikombe and Usangi people and on personal findings gathered during visits to various areas of the country.

The expert concludes that a development of the pottery industry in the United Republic of Tanzania could be based on the Ikombe area where a population of more than 1,000 potters could be created in a few years time. Over the next 10 to 15 years, this could be increased to more than 2,000 highly qualified potters who could then be used to spread this development into other areas of the country.

The expert recommends the development of the use of large ceramic pots for local food storage to help combat food wastage. This would be the cheapest and most effective way of supplementing storage in centralized silos and would increase the market for ceramic pots.

Detailed recommendations are made to the Tanzanian Government and to SIDO for the implementation of these proposals.



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## INTRODUCTION

This project, "Development of appropriate ceramic technologies" (SI/URT/79/801), was carried out for the Government of the United Republic of Tanzania by an expert of the United Nations Industrial Development Organization (UNIDO), acting as executing agency for the United Nations Development Programme (UNDP). The project included three missions, the first of which, by an expert in ceramic technology, is described in this report. The expert's mission lasted from 2 January to 15 March, of which the period 8 January to 11 March was spent in the United Republic of Tanzania.

The expert was attached to the Small Industries Development Organization (SIDO) for the purpose of examining the existing state of the pottery industry and advising on its further development. The specific tasks to be carried out are given in the Job Description in annex I. The duration of the mission was only half that originally planned (five months) so that some of the original project objectives (such as the analysis of local clays and the collection of market data) could not be carried out in the limited time and had to be left to a later stage. A second expert in ceramic design, Mr. Auke Koopmans, was on mission in the United Republic of Tanzania from January to April 1980 and will submit his own report on design, complementary to this one.

### Project background

The Small Industries Development Organization (SIDO) was established in November 1973 to promote and provide services to small industries in the United Republic of Tanzania. It is therefore a relatively young organization with a wide range of activities. In establishing itself, SIDO has had many difficulties to overcome. One of the remaining problems is the lack of transport facilities for its Regional Officers. Nevertheless, under its present dynamic leadership, SIDO has been able to set up an organizational network with headquarters in Dar es Salaam and regional offices in 20 regions. It is also involved in setting up industrial estates in all the 20 regions of the country. Several of these are now close to completion.

SIDO is responsible for small industries in the ceramics field and has always been aware of the potential for expansion and job creation within this industry.

Consequently, SIDC has established training-cum-production centres in Mbeya, Ikombe, Usangi, Kisarawe and Singisi with the assistance of local experts and of Indian ceramics experts supplied under a special agreement between the Tanzanian Government and the Indian Government, the experts being partly paid by the United Nations. These experts have now completed almost four years of their five-year assignment.

In addition, there have been several Danish volunteers assigned to the ceramic centres of SIDO, and parallel to these activities, there have been several independent missions by Hungarian, Italian, Japanese, Norwegian, Swedish, and Yugoslavian ceramics experts.

All these experts had different attitudes to the development of a ceramics industry, agreeing only on the introduction of expensive high-level technology. In addition the training-cum-production centres, based on low-cost technology, were not giving any of the expected practical results. This, and the amount of conflicting advice previously received, caused SIDO to request technical assistance from UNIDO for the development in the ceramics industry of a technology appropriate to existing local skills and resources.

The expert has been guided in his work by the following general principles:

- (a) That any development plan should be based on a clear awareness of what is possible in any given situation;
- (b) That any development must be designed to work within existing structures of society rather than imposing disruptive strains on them;
- (c) That any plan for the ceramics industry should also seek simultaneously to provide a solution to the problem of the substantial wastage of food through lack of local storage facilities. Development of ceramic pots as food storage vessels would be both feasible and economic.

#### Project activities

It became clear that it would not be possible to accomplish all the specific objectives of the project within the short time period of the mission, particularly as no written information was available on the existing pottery industry, on the performance of the training-cum-production centres, on analysis of local clays, or on local market conditions for clay products. It was therefore decided to adopt a more general approach, aiming to establish guidelines for the development of the rural pottery industry. Information for this approach was obtained in two ways:

(a) From published sources: an ethnographic study of the Ikombe pottery industry, the largest in the country, has been made by Dr. Sac Waane, <sup>1/</sup> and a thesis on pottery production and marketing among the Usangi Pare, the second largest pottery industry in the country, has been written by Mrs. Beatrice Omari of the University of Dar es Salaam. <sup>2/</sup> Permission to use the work of both these authors is gratefully acknowledged. Both studies provided valuable background material, but, as they were not concerned with the further development of the rural pottery industry, they had to be supplemented by personal findings;

(b) From a study trip to various areas of pottery making and to the training-cum-production centres of SIDO. This trip, taken with the design expert, Mr. Koopmans, lasted about three weeks and went to the Bagamoyo, Kisirawe, Mbeya, Ikombe, Arusha, Singisi, Moski, Usangi, Pare and Mwanza areas.

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1/ Sac Waane, Pottery-making Traditions of the Ikombe Kisi, Mbeya Region (Baessler-Archiv, Neue Folge, 1977), Band XXV.

2/ Beatrice Omari, Pottery Production and Marketing 1936-1975 (M.A. thesis, University of Dar es Salaam).

## I. FINDINGS

### A. The present state of the Tanzanian pottery industry

#### Moulding techniques

Three different methods of moulding are used by the existing potters

The most advanced moulding method is the one used by the Ikombe potters as they make use of a tournette, a primitive potter's wheel, combined with hand-moulding and the ring-coil method. The pots are first moulded half way up and then left on the tournette until a soft leather-hard stage is reached. Then the upper half is built up by the combined method. The pots are again left until a leather-hard stage is reached. Then the outside is scraped down to give a surprisingly even, thin wall. Then the engobe (a plastic white clay mixture) is applied to fill the holes and finally the surface is smoothed, using a maize-cob. Additionally, on some pots, a red clay engobe is used as decoration, applied in different patterns by the fingers. This method permits the production of pots up to a height of 120 cm. The admirable high level of skill acquired by the Ikombe potters is emphasized by the fact that no other potters in the world can make such thin-walled pots of this size on a potter's wheel with such speed.

The second method in importance is the one used by the Usangi potters. It is a pure ring-coil moulding technique where the potters start with a ring of clay on some banana leaves, hand-moulding first the upper half of the pot. Then the pot is left to reach a soft leather-hard stage. Then the pot is turned upside down and, by the ring-coil method, the lower half of the pot is moulded, closing the bottom at the end of the moulding process. The pot is then left to acquire a leather-hard finish. When reached, the pot is scraped both inside and outside until a more or less even thickness is obtained. Then the pot is polished with a smooth stone. No engobe and no decoration is applied to the pots. This method also permits production of fairly big pots (up to a height of 80-90 cm with a diameter of 60-70 cm) by the most skilled potters, who again have acquired an admirably high level of skill. However, the pots are not so symmetrical in form and not so thin-walled as the Ikombe pots.

The third method in importance is the one used by the potters in the Mwanza Region. It, too, is a ring-coil moulding technique where the whole pot is

moulded in one piece from the bottom upwards. The pot is left to reach a leather-hard stage and is then scraped and polished. Finally, the pot is given a very beautiful incised decoration in a herring-bone pattern. On this account, they might be considered the most beautiful pots in the United Republic of Tanzania, but the pots produced are small in size compared to those of Usangi and Ikombe and therefore are not so interesting for potential use as food-storage.

As difficulties were experienced in locating the potters, there may also be skilled potters in the Mwanza region who can make the bigger pots, but anyway the speed of moulding seems to be slower in this region.

The fourth method of moulding is being introduced at the training-cum-production centres of SIDO. At these centres, a potter's wheel of the Indian type is being introduced by the Indian experts, together with the European kick-wheel. In a short training time, these experts have been able to transfer part of their skill to the trainees, but it was observed that no trainees can yet produce even one of the smallest sizes of the Ikombe pot production.

This is not very surprising as the use of a potter's wheel requires a very high level of skill, and it would require a lifetime to acquire the skill to make the big Ikombe pots properly on a wheel at anything like the speed of the traditional potters. What is surprising is that the eminent skill of the Ikombe potter was overlooked when the training-cum-production centres were established.

In addition, the products being moulded at the training-cum-production centres are mainly flower pots, vases and ash trays, which are secondary in importance to the marketable, cheap, functional products of the existing pottery industry. For this reason, potters have been reluctant to receive the training offered by SIDO, and the expensive products of the production centres have had difficulty in finding a local market.

#### Drying and firing

In all areas visited, the pots were sun-dried before firing. In the Ikombe area, the pots are further dried by a small fire lighted beneath the pots turned upside down. This is a very important addition to the sun-drying

as a means of avoiding the spalling of the walls of the pots during firing. This additional drying should be introduced in the other areas where spalling of the walls is a noticeable defect.

In all areas the firing of the pots is by the open-fire method extensively used in developing countries.

Again, the Ikombe potters have perfected this method, using a thick bed of fuel below the pots and covering the pots carefully with grass during firing. Consequently, the Ikombe pots are higher and better fired than the pots of other areas, even though the firing time is only one hour. But, as we were not able to observe firings in the other areas, no comparative findings can be presented.

The training-cum-production centres of SIDO use thick-walled periodic kilns for firing the pots. This, of course, permits a higher firing temperature but at the expense of longer firing time (12 hours) and the use of much more fuel compared to the Ikombe method where no walled kiln at all is used. Therefore, the Ikombe pots can be fired very much cheaper than the products of the training-cum-production centres. This, too, explains the resistance of the potters to the introduction of a periodic kiln which cannot be considered as a good solution for this kind of porous ceramic product.

#### Preparation of the clay

In all the places visited, including the Ikombe area, the preparation of the clay mixture for moulding is defective, but the potters are not aware of this. Probably this is because pot-making is so traditional that no one thinks about changing the process as long as the pots are marketable.

At present, the plastic clay mixture contains sizeable pebbles which make the moulding difficult and leave holes in the pots during the scraping of the surface.

It was also noticed that the Usangi potters mixed dry clay with the wet clay by pounding the clay just before the moulding of the pots. This procedure does not develop a good plasticity and it leads to a very unhomogeneous clay mixture which creates internal tensions in the products during drying and firing and this leads to a weaker structure in the pots.

The Ikombe potters are more careful in soaking the clay with water and, consequently, body defects were not very pronounced in the stronger Ikombe pots.

In the Bagamoyo area, some pot-making units have failed because of too little plasticity in the clay mixture caused by too large an amount of sand in the local clays.

From the above facts it is clear that there is a need for a universal process for preparation of the plastic clay mixture for moulding. This universal process must be able to use most of the local clay in different areas of the country in order to ensure that the development of a local pottery industry can be easily extended into other regions of the country.

The proposal for such an universal process includes the following stages:

(a) Depending on the natural condition of the clay, prepare it for mixing with water; if it is dry, pound it and, if it is wet, cut it into thin slices by means of a piano wire;

(b) Stir the clay with water in a blunger until a thick clay slurry is obtained. Make use of sodium carbonate or sodium silicate, if not too expensive, to decrease the amount of water needed. Add sand in the blunger if the clay is too plastic;

(c) If the clay contains too much sand, let it settle in the blunger which is provided with a bottom pipe and some side pipes;

(d) Then tap the clay slurry from the side pipes, through a sieve with a 1.5 to 2.0 mm mesh, into tightly woven flour bags which act as filters in a primitive filter press. Clean the blunger for sand through the bottom pipe and repeat the process;

(e) Stack the flour bags with clay slurry in several layers, separated by pieces of wood. Add some additional weight, for example burnt bricks, on top of the last layer;

(f) Let the flour bags stay under pressure until no more water drains out through the bags;

(g) Spread the bags in the sun to dry until the right water content for moulding is obtained;

(h) Carry the bags with the clay to the potter's place and let the clay mature by keeping the bags humid.

Detailed drawings for the simple equipment needed will be presented in the report of Mr. Koopmans. The introduction of this universal process would improve the quality of clay mixtures for potting in all areas and would accord with the skills and resources of the local potters.

B. Considerations on future development

Plans for the future development of the pottery industry must take into account not only where assistance is most needed at present, but also whether development in a given area can be easily extended into other regions of the country.

The work of Dr. Waane and that of Mrs. Omari, mentioned earlier, permit an instructive comparison to be made between the Ikombe and Usangi potters.

Among the Usangi, it can be seen that:

- (a) The transport of raw material is already done by trucks;
- (b) The market is quite well organized through middlemen;
- (c) The transport of the finished products is done by trucks and transport is not a limiting factor on the increase of production;
- (d) The potters are producing pots as supplementary income to their husbands' income from other activities;
- (e) The production is seasonal and the potters stop production when the prices of pots are low;
- (f) Training in pot-making is available for any girl or woman, but the training is not organized throughout the village;
- (g) The potters are mostly from the lower marginal level of the society and they leave the profession when the need for cash money is fulfilled;
- (h) Pot making is not a prestigious activity and this gives the potters a certain feeling of inferiority which is not a good basis for a development programme.

Whereas, among the Ikombe:

- (a) The pot-making activity is very prestigious for a female potter and is closely linked to her status as a woman (a woman unable to make pots is possibly unable to get married);
- (b) The potter comes from all levels of society;
- (c) Traditionally in this society, training in pot-making is obligatory from the age of seven years. Actually the whole area of Ikombe is one big training centre. Even in school, the girls are taught pot-making, and their training in all aspects of pot-making goes on during their lifetime. Already, at fifteen, the Ikombe girl is a qualified potter;
- (d) Pots are produced throughout the year;



(e) Pot-making is the predominant source of income in the Ikombe area;

(f) Transport of the pots out of the Ikombe area is a limiting factor on increase of production.

From this comparison, it can be seen that there are several factors which would make the Ikombe area a good point at which to concentrate development of the rural pottery industry but that the Ikombe could need assistance in solving the problem of transporting their finished products. The Ikombe potters are very conscious of this problem. The secretary of the village said that two thousand more pots a week could be produced and sold if transport to Ifungi Port were available.

The work of Dr. Waane also indicates that, in addition to the four hundred female potters at present active in the Ikombe area, there are likely to be six to eight hundred new qualified female potters coming along in the next 10 to 15 years who can only be usefully absorbed if the local pottery industry is expanded.

This area is also likely to have, because of population increase in relation to a limited amount of agricultural land, an under-employed male population of around a thousand persons who could, theoretically, be occupied in the pottery industry. However, as pot-making is exclusively a female activity, there would be very strong psychological barriers against men being involved in this work.

The expert sees a possible solution to this problem in a co-operative division of labour within the family in which the heavy work of excavation and preparation of the clay and the transport of products would come to be considered as the man's work, leaving the woman more time for the production of pots. In the development of the rural pottery industry, therefore, the universal process for the preparation of clay mixtures, described in the last section, should be introduced through the male population of Ikombe together with the solution to the transport problem.

All the above mentioned considerations, together with the high standard of skill achieved by the Ikombe potters, and the fact that their large ceramic pots would be ideal as food-storage containers, points to the desirability of basing an expansion of the rural pottery industry in the United Republic of Tanzania on Ikombe technology.

## II. CONCLUSIONS AND RECOMMENDATIONS

The recommendations presented in this report concentrate on the measures needed to ensure a rapid development of the Ikombe pottery industry. They are given at two levels, recommendations to various departments of the Government, and recommendations to SIDO. Each numbered recommendation is preceded by the conclusions and reasons leading to it.

### Recommendations to the Government

At present, the Small Industries Development Organization (SIDO) cannot fulfil the important role assigned to it because of inadequate support and resources.

1. The Government should provide SIDO with sufficient funds and means of transport to operate effectively.

In the Ikombe area, a great leap forward in development can be achieved with a small amount of economic and technical assistance. This assistance would not be a one-sided assistance to a small minority group, it would also be assistance to a larger part of the population for whom the cheap functional products of Ikombe could be of great value. Development in this area is also essential to solve the problems of over-population

2. The Prime Minister's Office should co-operate with SIDO in development of the Ikombe Pottery Industry and provide the necessary funds for such a development.

The Ikombe pot has been used as a symbol of Tanzanian culture and civilization, and Ikombe pottery is unique not only in this country but in the world. Therefore, this project could have great cultural significance. However, this development has to be carried out with knowledge and understanding of, and respect for, the Ikombe people, and with care not to disrupt their society.

3. The Ministry of Culture should also co-operate with SIDO in the development of the Ikombe pottery industry and in particular should arrange the transfer of Dr. Sac Waane, as an expert with an excellent inside knowledge of Ikombe society, from his present assignment at the Ministry of Culture to SIDO, to advise on the social and cultural aspects of this development.

There is currently a food wastage of 30-50 per cent in the United Republic of Tanzania. This could be reduced if a cheap and readily available form of food storage could be developed locally to supplement centralized storage in silos. The porous ceramic pot as a food-storage vessel is one of man's great discoveries or inventions. Because of its dual nature, closed and yet open, it protects the food against attack from all kinds of creatures but at the same time permits the food to breathe and to expel moisture content as though it was covered by a very fine, strong fly-net. The porous ceramic vessel is also ideal for liquid storage, again because of its dual nature which, like a wick, permits some of the liquid to seep to the surface where it is evaporated if exposed to the flow of air. As heat is taken from the content of the vessel by evaporation, the liquid is cooled down to the dew-point of air. In this way, the ceramic vessel can provide cool liquid for drinking even in remote areas. As well as being ideal for the storage of liquid and food, the ceramic vessel is the cheapest container in the country and can be produced one hundred per cent from local raw materials without even the fuel having to be imported. Such a ceramic food storage, one for each family, becomes an increasingly important and valuable solution the more remote the areas are and the more dispersed the population is. If the supremacy of the ceramic pot for food storage is consciously recognized by a larger part of the population, a great expansion of the market for ceramic pots can be foreseen. Pots suitable for food storage must be of a considerable size, from 75-100 cm in height with a diameter of 50-75 cm, so that they can contain up to 150 kilogrammes of rice, for example. Such pots can, at present, only be made by hand-moulding which requires a great deal of skill. The pots made by the Ikombe potters are unique in their suitability for this purpose. They could be improved by being a little stronger, having a standardized form for storage, and having a more appealing exterior. It should be emphasized that, if such an appropriate technology were developed in the United Republic of Tanzania, it could have far-reaching and valuable application in other countries of Africa and South America, especially in isolated areas with scattered populations. Recommendations have been made by the expert to UNIDO and UNDP on such possible future developments.

4. The Ministry of Agriculture should co-operate with SIDO in an impartial evaluation of small-scale food storage in ceramic pots, as a supplementary solution to food storage in central silos.

### Recommendations to SIDO

For all the reasons outlined in chapter I, the Ikombe area offers the best base for the development of the traditional pottery industry. Provided the problems of employing the male population and of transport and marketing of the pottery products can be overcome, consideration can then be given to increasing productivity and expanding the range of products. In less than 10 to 15 years, SIDO can create a highly-qualified population of more than 2,000 potters in the most economical way possible, since the project requires support and development of existing technologies and does not call for expensive training programmes. The transfer of this pottery industry to other parts of the country will take its natural course because of the overpopulation in Ikombe. Providing that a pot-making unit, consisting of husband, wife (wives) and children, remains cohesive, the more adventurous units can and will migrate to other areas without creating problems. If SIDO wants to speed up expansion into some part of the country, it has only to facilitate the new settlement and offer incentives to the more adventurous families in Ikombe whom SIDO will know from studies carried out. For the above mentioned reasons, the policy of introducing co-operatives and partnerships should, if possible, be avoided, as such forms of organization will make migration and the spreading of the industry very difficult.

5. SIDO should give high priority in the ceramics field to the development of the Ikombe pottery industry, based on the family unit.

If development is to be pursued in Ikombe with success, then the human situation of the Ikombe people and the dynamics of their society which lead to their present stage of superiority in pot-making must be studied. Then, with a proper understanding, and respect for, their society, the needed economic and technical assistance can be introduced in accordance with the forces of their society and not against them. A clear description of the status quo should be reached before any assistance is given. The presence of investigators in the area may be explained by saying that the aim is to help the Ikombe people solve their transport problem. Any further explanation should be avoided as it might influence the results of the investigation.

6. SIDO should turn its existing workshop in Ikombe into an office and guest-house for an investigation team, led by Dr. Sac Waane, to study Ikombe society and find appropriate solutions to the problems connected with the development project.

7. SIDO should collect all possible practical data related to the pottery industry of Ikombe, parallel to the above-mentioned investigation of the Ikombe society, including the following detailed steps:

(a) Make an aerial map of the Ikombe village, including the whole track to the market-place at Matema and also Itungi Port. This can be done in less than one day and it is very important for both studies and also for future reviews of development as this is closely related to the number of households;

(b) Collect all data about the present products of Ikombe, with drawings. Indicate, for each article, dimensions, volume and weight, the amount produced per day or per hour, the use for it, the market for it, and the price at Ikombe and give any comments supplied by the potters;

(c) Initiate a complete market study with indications of any present sizeable market and any future possible markets if transport to Itungi Port were provided;

(d) Record continuously wind direction, wind velocity and relative humidity at Ikombe.

(e) Map the clay mines which provide the white clay used as engobe, the brown clay used for the body and the red clay used for decoration. Bring samples of the clays to the Mbeya workshop for testing in the equipment designed by Mr. Koopmans and perform drying and firing tests. Try to make a rough estimate of the clay resources and determine the means and the time used for excavating and transporting 100 kilogrammes of each clay to the potters' place;

(f) Describe the processes and the time needed for the preparation of the clay mixtures;

(g) Describe the complete moulding process and the time taken for each of the products. Indicate by drawings the tools used and their dimensions;

(h) Describe the drying process and the time used for it and observe how the potters determine when the products are ready for firing. If possible, determine the water content left in the products at this stage;

(i) Make a sketch of the kiln bottom and indicate how the fuel, firewood, grass and leaves are arranged before the pots are set. Then go on sketching how the pots are set layer by layer. Finally, show when and how the fire is kindled and how the pots are covered by grass during the whole firing process. Note the time elapsed between each sketch and indicate the corresponding stage of the process. Give the potters' description of each stage and the importance they ascribe to it, especially noting the time elapsed from the start of the firing until the potters consider the pots fired. Give the potters' description of the end-point of firing. Then note how long the pots are allowed to cool before they are taken out from the kiln, giving again the potters' description and reasons. Then follow the potters' classification of the pots and note the reasons for the classification. Repeat the procedure for at least three consecutive firings. If they are not consistent in result, go on with more firings until the range of variations is approximately known;

(j) Determine the means available and the time needed for transporting the pots from the potters' place and out of Ikombe;

(k) Determine how much time the potters spend on selling their products.

8. At the same time as the investigations in the Ikombe area, SIDO should:

(a) Fabricate the equipment for producing the clay mixtures designed by Mr. Koopmans and mentioned earlier in this report, and should test the use of the equipment in the Mbeya workshop to make sure that it works;

(b) Investigate alternative solutions to the transport of the products from Ikombe to Itungi Port. Investigate first the possibility of using a sailboat of the Katamaran type, with a big platform between the two bodies. The advantage of this type is that it is very stable on the sea and that it can go close to the sea-shore on shallow waters. It is also completely independent of the supply of petrol, which is a great advantage and would avoid many difficulties, especially in an isolated place like Ikombe. The use of a sail-boat too is more in accordance with local skills and traditions and would be the cheapest means of transport. If necessary, the Katamaran could also be supplied with small outboard motor in case of emergency. When the type of boat has been decided, the right size must be calculated in accordance with the market projections, a supplier found and a firm offer obtained. None of these solutions should be applied before a terminal report has been written and analyzed, but considerations about these solutions should appear in the terminal report.

9. Prepare a complete terminal report about all activities related to Ikombe with alternative solutions to the various problems. As this part of the project is estimated to last 8-9 months, it is strongly recommended that quarterly reports from the different activities should be written in order to keep to the time schedule and to correct the work plan if unforeseen problems

show up. The project should be kept under close observation and correction for at least one year, and this period extended if necessary.

10. After the period of the preliminary investigations, when the right solutions have been found to the problems of transport and of preparing the clay mixture, then both solutions should be put into practice simultaneously through the male population of Ikombe. If the solution to their transport problems, of which they are very aware, can be combined with the introduction of clay preparation, then the latter is less likely to meet with resistance. Since the taking-over of clay preparation and transport by the men would reduce the work-load of the women, support from the female potters for this project can probably be counted on.

Annex

JOB DESCRIPTION  
SI/URT/79/801/11-0/

POST TITLE           Expert in Ceramic Technology

DURATION             Two and a half months

DATE REQUIRED         As soon as possible

DUTY STATION         Dar-es Salaam, with travel within the country

DUTIES

The expert will be attached to the Small Industries Development Organization (SIDO) and will assist in building up existing skills in the ceramic industry and modernizing production in several small units spread throughout various regions of the country. The expert will specifically be expected to:

1. Make on-the-spot analysis of clays and their suitability for use in ceramics.
2. Analyse the current level of skills and make recommendations to units visited on how to improve the quality of production.
3. Collect market data on the national and regional consumption of ceramic wares.
4. Analyse existing ceramic technologies and suggest possible means of improvement.
5. Prepare a report, recommending locations of pottery units, raw-material sources, level of small-scale production, products to be produced, training requirements and future investments, which should be made to the Government.

The expert will also be expected to prepare a final report, setting out the findings of his mission and his recommendations to the Government on further action which might be taken.



QUALIFICATIONS

Ceramic engineer, or equivalent, with extensive experience in analysis of clays, production of ceramic wares with particular knowledge of building-up and modernizing production of small rural units.

LANGUAGE

English

BACKGROUND  
INFORMATION

The Government has committed itself to a programme of rural industrialization with heavy emphasis on small-scale production. One of the most traditional industries which has always been prevalent in the countryside is that of pottery and when the small industries institute, the Small Industries Development Organization (SIDO), began its operations in 1974, this sector was among the first to receive extensive assistance.

As a result of the severe foreign exchange crisis which characterized the period between 1973 and 1977 many impressive developments occurred in an effort to make the ceramics industry as self-reliant as possible. Among these were the development of a low-temperature glaze and the local production of fire bricks to withstand the high temperatures of salt glazing. In the process of this practical research, a talented cadre of local ceramicists has been developed to assist in SIDO's extension work to rural pottery units. Most of the research work is centred around SIDO's training-run-production centre in Mbeya and seminars are held yearly to exchange new findings and establish new goals.

As yet no large-scale ceramics factory has been established to cater for the domestic market in pottery. Several small units have come up in response to the local demand. The Government now wishes to build upon the existing skills and modernize production in several small units spread throughout various regions of the country where raw materials and markets allow. In defining the intermediate or appropriately scaled technology the Government has requested UNIDO to send an expert to advise them on how best to preserve what skills are already available and develop these to a point where commercial production of crockery is possible in a small scale unit.



