



**TOGETHER**  
*for a sustainable future*

## OCCASION

This publication has been made available to the public on the occasion of the 50<sup>th</sup> anniversary of the United Nations Industrial Development Organisation.



**TOGETHER**  
*for a sustainable future*

## DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

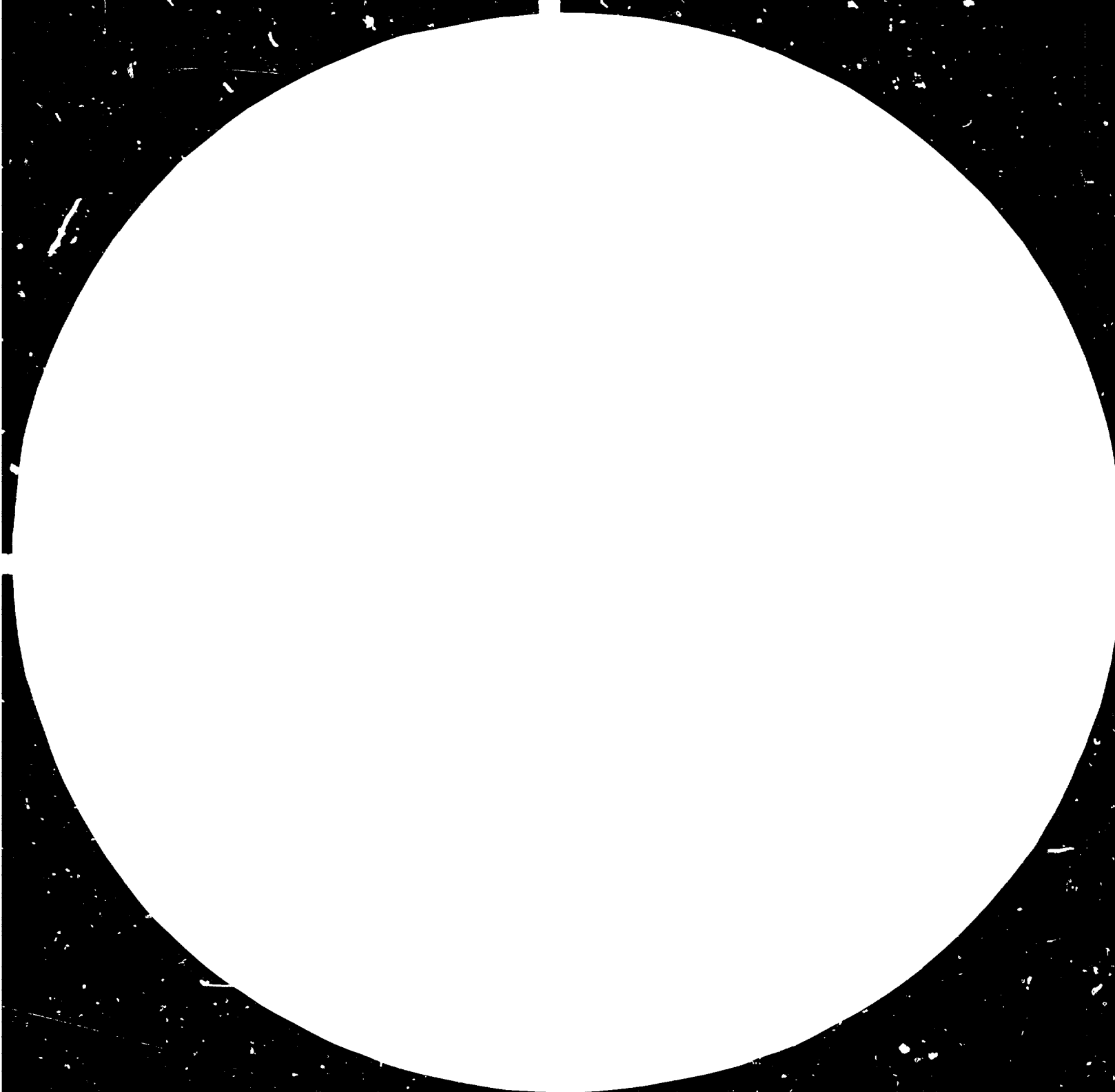
## FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

## CONTACT

Please contact [publications@unido.org](mailto:publications@unido.org) for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at [www.unido.org](http://www.unido.org)





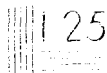
1.0

A resolution test chart featuring a central number '1.0'. To its left are five vertical lines of varying lengths, and to its right are five horizontal lines of varying lengths.



1.1

A resolution test chart featuring a central number '1.1'. To its left are five vertical lines of varying lengths, and to its right are five horizontal lines of varying lengths.



1.25

A resolution test chart featuring a central number '1.25'. To its left are five vertical lines of varying lengths, and to its right are five horizontal lines of varying lengths.

1.4

1.6

RESTRICTED

MARCH 1982

English

11334

Egypt. FOOD CANNING DEVELOPMENT CENTRE.

DP/EGY/78/002

ARAB REPUBLIC OF EGYPT

Technical Report\*

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

Based on the work of Curtis J. Wilder  
Expert in Planning and Designing Food Testing Laboratories and Pilot Plants

United Nations Industrial Development Organization  
Vienna

---

\* This document has been reproduced without formal editing.

CONTENTS

1. SUMMARY..... Page 1

2. INTRODUCTION..... Page 1

3. FINDINGS AND RECOMMENDATIONS..... Page 2

APPENDICES

Table 1 - Space Requirements Page 8

Table 2 - Ground Floor Plan Page 9

Table 3 - First Floor Plan Page 10

Table 4 - Second Floor Plan Page 11

Table 5 - Ground Area Page 12

1. SUMMARY

The expert in planning and designing of food testing laboratories and pilot plants made an assessment of the existing facilities of the Food Canning Development Centre and made recommendations for future activities in the field of refrigeration, freezing, dehydration, etc. He reviewed the plans for the future facilities of the expanded Food Development Centre and discussed them with all the parties involved. The new Centre is expected to be equipped with various pilot plant equipment, laboratories, offices, lecture room, small kitchen, etc. The preliminary layout and size of space to be allocated for the different purposes was reviewed with the management of the Centre and the civil engineers responsible for the final civil engineering design. The new Centre is to be established with UNDP assistance and within a project which is being formulated.

2. INTRODUCTION

The main overall objective of the project Food Canning Development Centre was to establish facilities equipped with various laboratory and other equipment required for testing of tinfoil, tinfoil cans, other packaging materials, physical and chemical properties of raw materials for food canning as well as of finished canned products. In addition to other experts/consultants in food testing and quality control and food chemistry, food microbiology and production and quality control of tinfoil cans, the expert in planning and designing of food testing laboratories and pilot plants was engaged for a period of two weeks in January/February 1982. His main duties were to assess the existing food testing and quality control facilities for canned food products, tinfoil and tinfoil cans. He was to review the plans for future activities to be expanded to include refrigeration, freezing, dehydration and other technological processes. The expert was then to determine the future requirements in the laboratory and pilot plant facilities, main equipment and technical staff. Finally, he was expected to prepare a general layout for new laboratories and pilot plants to be established, and to discuss the necessary details with counterpart personnel. The project became operational in 1978 and ended at the beginning of 1982. The Centre's facilities are located within the food canning plant of the KAHA company located 25km outside Cairo.

### 3. FINDINGS AND RECOMMENDATIONS

After touring the KAHA factory and laboratories with Mrs. Zaneb, National Project Director and guided by Mr. Ebrahiem Gazal, Director General, the expert found the facilities basically adequate for the production of foods and cans. It should be mentioned that the cannery was not at full operation, handling only some re-packing and freezing, so that the Q.C. of these operations was not fully operating.

The laboratories seem to be equipped sufficiently for some testing and research work. The Q.C. laboratory for can making had a seam cross-section cutter with a projector to make the seam evaluation accurately. At the time of the experts visit, the staff were formulating a pineapple beverage and the expert assisted in its evaluation on two separate occasions. One of the samples (out of four) was quite good and acceptable by advanced standards. The research staff was also carrying out work in can seam evaluation, water analysis and waste grapefruit analysis for protein, carbohydrate, fat and minerals with an ultimate aim of animal feed. The staff seemed alert, friendly and interested in their work.

a) Future Activities to be expanded to include refrigeration, freezing, dehydration and other technological processes

Through discussions with several people at the Centre, the expert learned that many households in Egypt now have refrigerators with freezer storage and that this appliance is becoming quite common. This indicates that the local market for frozen foods, vegetables and juices will be growing. This is supported by the projections shown in the Project Document, indicating that the five year projection (1980-1985) in frozen foods will increase by 350%. Canned fruits and vegetables are projected to increase by 114% and dehydrated foods by 32%. It is suggested that the Centre should also emphasize food dehydration to a greater extent, including solar dehydration. It would be a potentially inexpensive process with the predominance of sunshine in Egypt and the low humidity would make packaging and storage less expensive than in many other areas of the world. The proposed new Food Development Centre with its varied laboratories should be in the position to meet the demands of the local food industry, and thus the needs of the industry should determine the selection of research projects and the Centre's activities.

b) Future Requirements in Laboratory and Pilot Plant Facilities

Extensive discussions were held with the personnel of KAHA company, GOFI and UNDP during the preliminary meeting. It was suggested that the expert draw up preliminary plans to be further discussed at another meeting. The finished plans were presented for possible comments. In general, the plans were considered to be adequate although it was indicated that the following three things be specifically considered: waste disposal from laboratories, scheme of the pilot plant equipment location and plans for future expansion of the Centre. In the final plans all of these specific items have been given consideration.

The following people, besides the expert and Mrs. Zaneb attended the second meeting with GOFI to discuss the plans:

Mr. Khalifa	General Director of the group in GOFI who will plan the building
Mr. Louka	Specialist in design
Mr. Kamel	Building specifications
Mr. Fawzy	Air conditioning
Mr. Hazem	Electrical considerations
Mrs. Mahasen	Building design
Mr. Saad	Engineer of KAHA

The submitted general layout of the building for the Food Development Centre includes the following considerations:

The pilot plant should be one room with a concrete floor partially sloped to allow drainage from hosing down processing equipment and from normal wet operations. The room should be two floors in height to allow good ventilation for dust, steam, odors and other ventilation considerations. Furthermore, it must be high enough to contain equipment that might have an above normal room height i.e. distillation columns, vertical vacuum pans and others.

The pilot plant should contain piped equipment such as a sterilization retort, a spray dryer and a freezer. It should have enough storage space for mobile pieces of equipment such as a fruit pulper and a chopper to be moved on to the main processing area when needed.



As the pilot plant area is used for various operations involving all the forms of food preparation and processing for canning, freezing, drying, concentrating, etc. the plant should not be considered a "canning" or a "dehydration" pilot plant. It is a multiple use processing area for all foods and all preservation techniques. It is also an area of unit operation. It is suggested that no attempt should be made to set up a small scale continuous operation from raw product to finished package such as a continuous canning line.

The piped equipment is normally placed along a wall if access to the rear is not normally required, e.g. an air blast dehydrator, freezer, etc. Fixed equipment such as a commercial size seamer is usually located out in the room for access on all sides with overhead service lines.

The space allotments for the various functions of the Food Development Centre building were adapted as closely as possible to the specifications of Tables 1 and 2 received from UNIDO. However, the suggestion was made that a lecture room large enough for 100 people be included in the plans as well as two prayer rooms. This was done, increasing the total usable floor area by about 10%. The pilot plant was increased in size by about 15%. Additional space was allotted for a utility room (boiler, hot water, central ventilation, electrical panels, etc.), refrigeration and frozen storage rooms. The recommended placement of laboratories and offices by floor was also followed quite closely.

By placing the pilot plant as an attached, separate area, affords a unique way for future expansion. Another building could be attached to the pilot plant at right angles to the existing building, thus making a two wing complex both having access to the pilot plant. Land area planning should take this into consideration.

The final result of the meeting was the recommendation by the GOFI group to put the lecture room on the second floor as they found it impossible to build such a large room without posts on the ground floor and then put two more floors above it. Following this major shift in building design the group wanted to put most of the R and D laboratories on the ground floor in order to be near the pilot plant operation. This left the room arrangements by floors in a shamble.

At the final meeting it was agreed that the lecture room could be built on the ground floor, only it would be more expensive. The expert pointed out that the original plan was better as it was impractical to have visiting groups going up to the second floor. After some discussion, the experts original plan was adopted with some minor adjustments. The following are the adjustments made in the original plan:

#### Ground Floor

- (1) The canteen will be eliminated but a small kitchen will remain. This was done because the normal working day in Egypt starts at 7.30/8.00 am and continues until about 15.00 hours with no break for lunch.
- (2) The workshop-transport area will be moved across the pilot plant and put in the annex in place of the storage area as indicated in the original plan. In place of the workshop, two insulated rooms of about 25 m<sup>2</sup> one at frozen storage temperature and the other at refrigeration temperature will be built. There will be additional space for a storage area.
- (3) One third of the cleaning area presently located as one room on the first floor is to be equally divided between the three floors in order to establish a cleaning station on each floor

#### First Floor

- (1) A private toilet will be provided for the Director's office.
- (2) The conference room will be moved to the first floor.
- (3) The prayer rooms will be moved to the second floor.

#### Second Floor

The second floor will remain as originally drawn including the adjustments mentioned above.

At the final meeting, relations with the architects were also discussed. The expert stressed that there will be compromises but that the basic room size allotments should be maintained within reason and that the architects should not be allowed to change rooms around without prior discussions with the Centre's Director. It was also mentioned that only when the plans of the laboratories as to position, shape and size have been decided, can the position of the laboratory benches be made. Concern was expressed as to why these specific details cannot be made immediately. The GOFI group also wanted everything in

specific detail before even attacking the first preliminary drawing as to room arrangement and room shape.

In addition, the expert was requested to assist with specific details concerning the utilities and furniture needed in each laboratory. The expert again pointed out that nothing specific could be done until the final plan size and shape of each room in the building had been completed, but general recommendations applying to most of the laboratories were discussed. The expert suggested that the Centre's Director should visit and study the Cairo University laboratory buildings as well as talk to the staff in order to obtain practical knowledge.

Each of the laboratories was discussed and tentative work benches were indicated with all the necessary utilities for each work area. As far as the kitchen is concerned, it was recommended that it have steam, hot and cold water, electricity, floor drain, gas, and one formica work bench. The lower walls of the kitchen would be of ceramic tiles.

The location of the Food Development Centre was also given a great deal of thought. Some argued that if it were built on land donated by KAHA it would then be dominated by the company. Alexandria was considered as a potential site for the Centre but after evaluating the positive and negative aspects, the drawbacks seem to preclude the possibility. The centre of commerce is undoubtedly Cairo and with the Centre in Alexandria, easy access to supplies, people, university, airport, etc. would be hampered. Moreover, the present staff at the Centre would be forced to move causing many inconveniences. After consideration of all the factors, it is the expert's conclusion that the Centre may be built next to KAHA cannery. The Centre would have the following advantages:

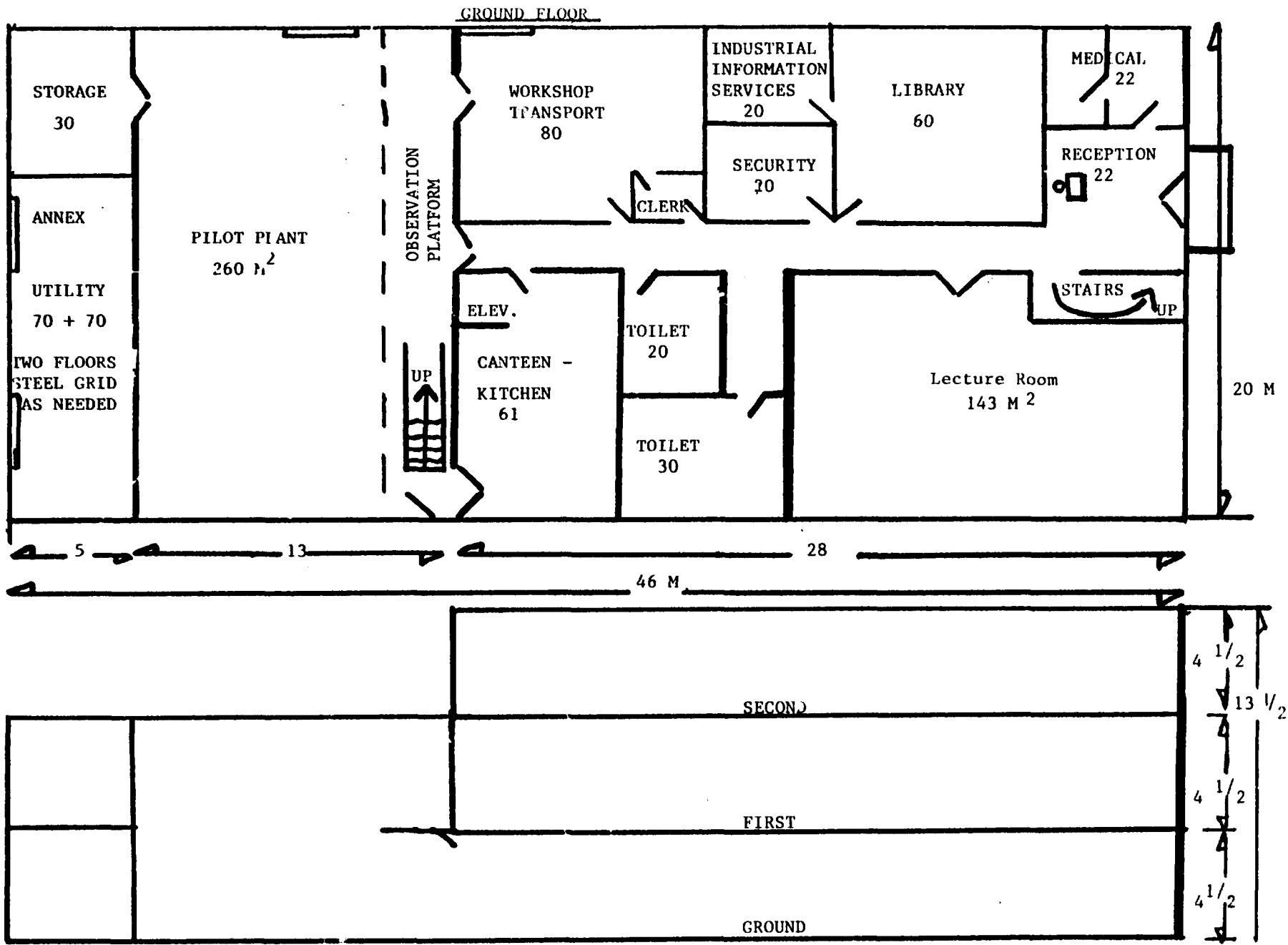
- (1) Free land donated by KAHA
- (2) Access to an active, operating cannery where possibly experimentation can be carried out. Samples of commercial products (both raw and processed) could be obtained for further experimentation.
- (3) Bus service available to the employees of the Centre.
- (4) Canteen service.

The possibility that KAHA will dominate the thinking and project selection of the Centre can be overcome by strong leadership of the Centre Director. In addition, it was the KAHA Director who requested to include a lecture room for

meetings of all industry people in order to make it a true Centre, one of knowledge and information for all people of the food industry. A strong Centre Director should constantly promote and insist on access of the facilities for all concerned. Finally, the expert feels that the Food Development Centre should not be an isolated "Ivory Tower" but a viable, active facility with close proximity to an ongoing, commercial food factory.

TABLE 1

	<u>560 M<sup>2</sup></u> Ground Floor	<u>560 M<sup>2</sup></u> First Floor	<u>560 M<sup>2</sup></u> Second Floor	Pilot Plant	Utility Room
Library	60				
Lecture Room	142				
Medical	22				
Industrial Information					
Services	18				
Receptionist	18				
Security	20				
Workshop - Transport (80)					
Canteen (66)	146				
Toilets, Wardrobes (20) and (30)	50	50	50		
Hallways 3 (2 X 28)	56	56	56		
Stairways (2 X 12), Elevator (4)	28	28	28		
	<u>560 M<sup>2</sup></u>				
Office of the Director, Secretary, Legal Adviser, Public Relations, Training		106			
Research and Development		252			
Prayer Rooms (2)		36			
Cleaning		32			
		<u>560 M<sup>2</sup></u>			
Administration			129		
Statistics, Economics, Marketing			28		
Engineering Unit			120		
Technology Unit			14		
Technology Design			28		
Trouble-Shooting			28		
Inventory Purchases and Control			40		
Conference Room			50		
			<u>560 M<sup>2</sup></u>		
Pilot Plant				260 M <sup>2</sup>	
Utility Room (boiler, refrigeration, compressors, hot water, air compressor, air conditioning, electrical service, others and storage (40) in 2 (5 X 20)					140 M <sup>2</sup>
Storage					60



FIRST FLOOR

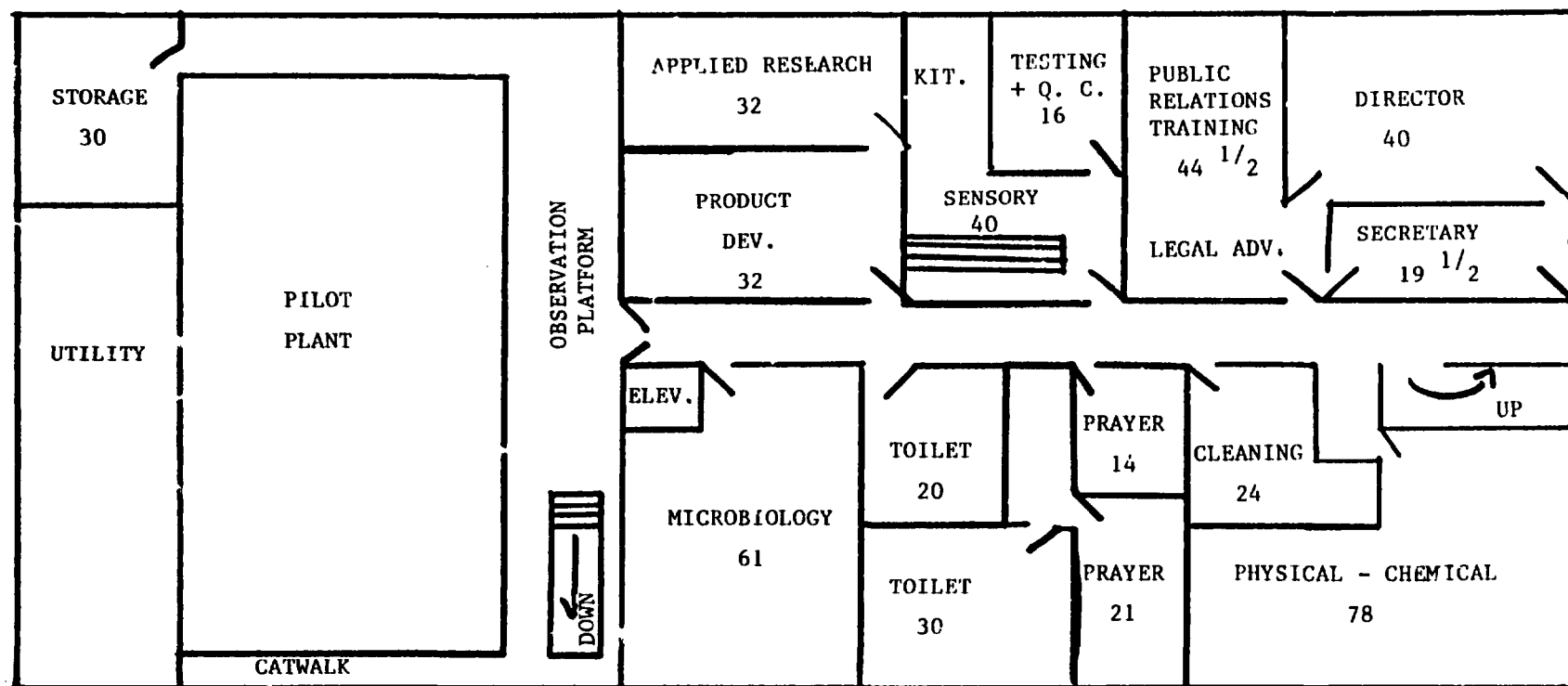
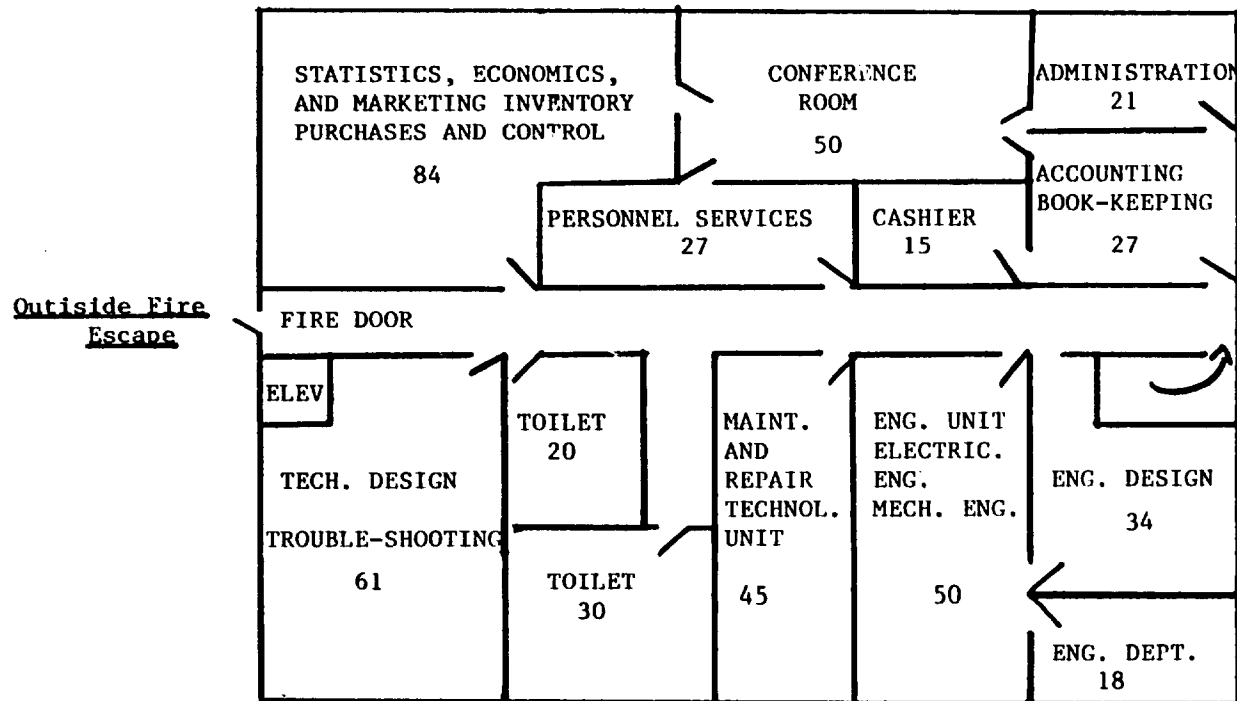


TABLE 3

SECOND FLOOR



Outside Fire  
Escape



KAHA  
CANNERY

WORKSHOP

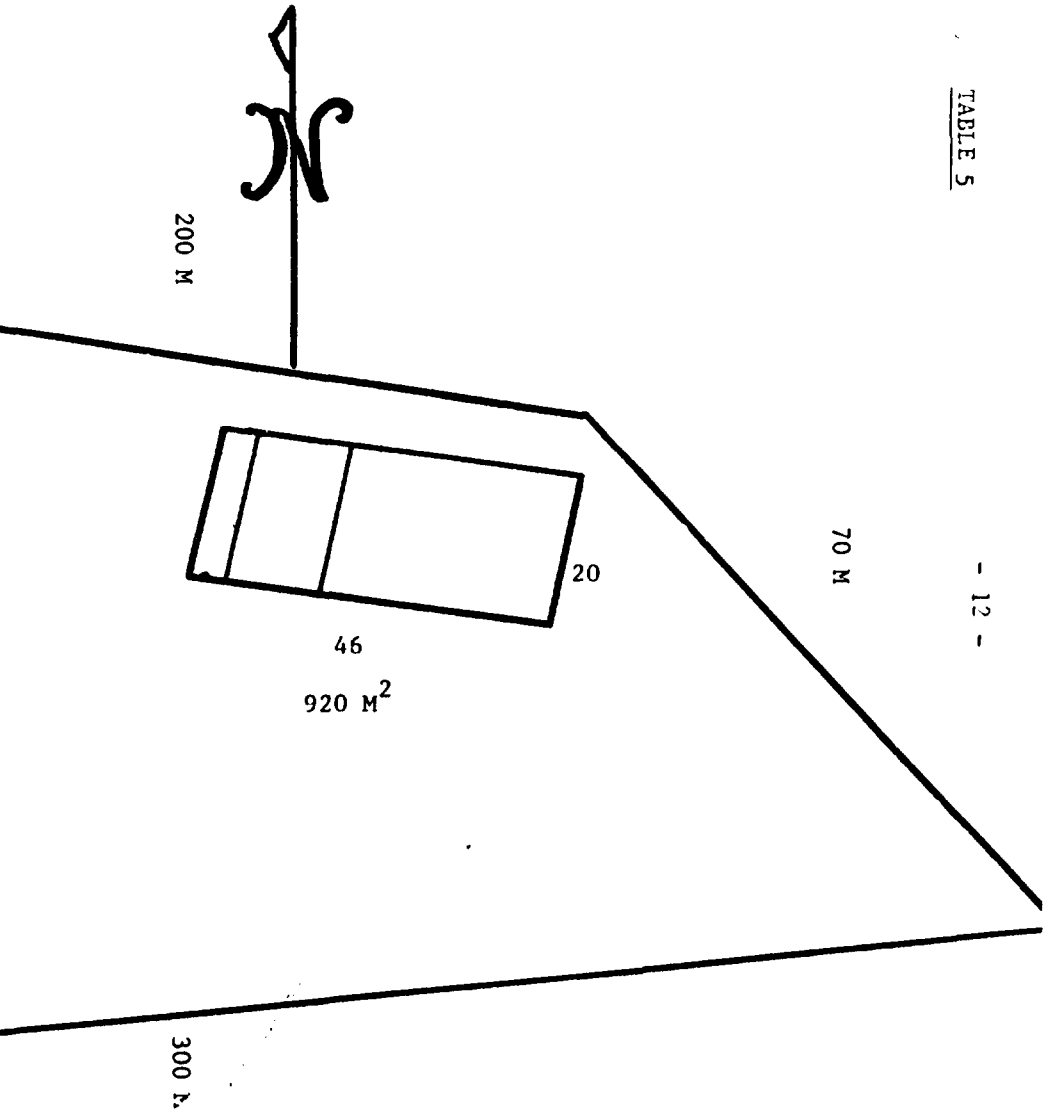
30 M

135 M

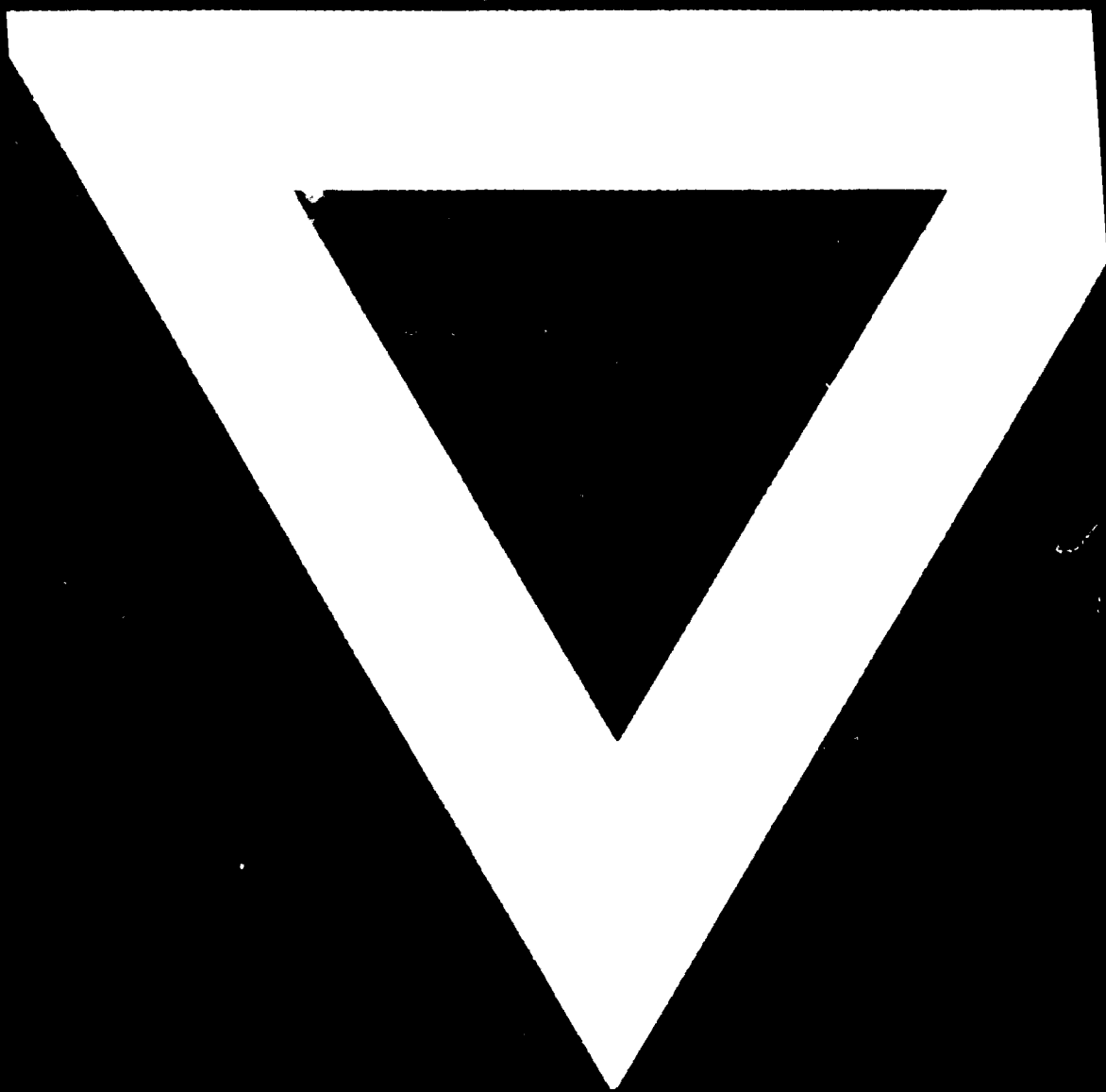


TABLE 5

- 12 -



C-970



2.10.19