

A Comparative Study of Equipments Used in  
Commercial and Non-Commercial Food Services.

BY

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A THESIS SUBMITTED TO THE AVINASHILINGAM INSTITUTE FOR HOME SCIENCE  
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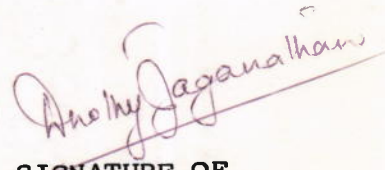
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## INTRODUCTION

## INTRODUCTION

Eating out is not only a firmly established custom but a daily necessity for millions of people even in developing countries like India. Changes in the condition of modern life have been reflected in the greatly increased number of eating places. The food service industry ranks fourth in size among all the industries of the nation. The millions of meals served each week in food service establishments accounts for over 20 per cent of the total amount spent for food (Pearson, 1981).

With the increase in urbanisation, industrialization and tourism, mass catering systems are becoming increasingly popular throughout the world in both industrialized and developing countries. They provide a convenient and economical means of catering for large numbers of people (Kaprio, 1983).

The requirements of people for eating outside their homes have thus changed from time to time, and given rise to the wide variety of institutions, which have tried to keep pace with the new demands (Sethi and Malhan, 1987).

The great technological explosion in the past few decades has advanced increased and improved the products nearly in all industries (Scriven and Stevens, 1989).

Traditionally in India, one of ways of respecting or honouring our guests, is to provide symptuous meal with elaborate menu. Our ceremonial functions and family gatherings are examples of this practice (Rao, 1992).

Tourism is one of the terms that has only recently gained importance. Travelling long distances by road, rail and air has become very common for reasons varying from National and International trade and co-operation in various fields to pleasure and education to Pilgrimages, shopping, business etc. This has led to the need for the provision of meals or snacks on trains, at bus stations air ports and soon (Sethi and Malhan, 1987 and Lattin, 1977).

Industrial catering covers the range of catering operations found serving industry. Included are factory and office canteens, cafeterias, snack bars mobile canteens and other quantity catering operations servicing, mining camps and oil rigs (Stewart and Hunwick, 1988).

Industrial food services are recently gaining more importance, since many industries realize that it is a good investment. The main intention is to provide wholesome and hot food to the employees which, in turn, results in increased productivity (Khan, 1987).

Many industries have realised that output is related to the welfare of the employees well, fed workers produced more and better work and because of this a great deal of money is spent in providing first class kitchens and dining rooms and in subsidising the meals (Kinton and Ceserani, 1984 and Iverson, 1989).

The kitchen is where food ideas are given shape colour and flavour (Hotel and food service Review, 1993).

Food service equipment is defined as "Machinery, appliances, equipment or supplies which are used in the stroage, preparation, or serving of food in commercial establishments, as differentiated from domestic use (West et al., 1977).

Catering equipment for food service establishment is basically not very different from that used for cooking and serving food at home except that, because of the volume of food cooked and served and the greater degree of handling required, it is constructed for greater quantity, durability, speed, efficiency and economy (Sethi and Malhan, 1987).

Economy refers to the amount of fuel in terms of electricity gas, coal, etc. Which an equipment may require for functioning. The operating costs of a piece of equipment is an important consideration in its selection (Sethi and Malhan, 1987).

To use of proper equipment in top condition is of primary importance in the production of good food (Graves and Peckham, 1987).

The type, amount and size of equipment will depend on the type of menu being provided. Not only should the equipment be suitably situated but the working height is very important to enable the equipment to be used without excess fatigue (Kinton, et al., 1992).

Because of the increased cost of labour there has been a considerable development in the use of vending machines; this is because their use does not require labour to serve, labour is only required to maintain and replenish the machines.

Around 40 per cent of energy is expended in preparing, cooking and serving food. The greatest proportion of this energy is used in the cooking equipment and much of it is wasted by excess use and poor utilisation (Kinton et al., 1992). Tips for energy saving is given in Appendix IB.

Properly cleaned and maintained food service equipment seldom breaks down. It has a longer useful life and uses less energy. Every equipment has to be continuously used to be kept in good working conditions (Minor and Cichy, 1984).

The present study is undertaken to compare the equipments used in commercial and non-commercial food services with the following objectives. To

- A. Study and compare the equipments used in commercial and non-commercial food services in relation to the number of personnel available.
- B. Study the impact of labour saving equipment in time consumption, and number of personnel handling the equipments.

REVIEW OF LITERATURE

## REVIEW OF LITERATURE

The review of literature pertaining to the study on "A COMPARITIVE STUDY OF EQUIPMENTS USED IN COMMERCIAL AND NON-COMMERCIAL FOOD SERVICES" includes the following aspects.

- A. History of the food service industry
- B. Commercial food services
- C. Non-commercial food services
- D. Types of food service equipment
- E. Transition of equipment from traditional to modern
- F. The future trends in catering.

### A. HISTORY OF THE FOOD SERVICE INDUSTRY

The food service industry is the business of preparing food for people to eat away from their homes (Palan and Stadler, 1986).

The food service industry has expanded rapidly in the past half century; especially in the last two decades, and ranks first in volume of sales among all retail outlets in the United States. A conservative estimate is that one of every four meals is planned, prepared and served outside the family home. The food service industry is broad in scope and varies from systems such as highly competitive and expensive restaurants and hotels to a multiplicity of fast

and less costly food outlets such as schools, universities and hospitals with conservative budgets (West et al., 1977).

Modern day restaurants and fast-food places developed from European road side inns. Those inns served travelers on horse-back or in carriages long before people had ever dreamed of automobiles (Palan and Stadler, 1986).

'Hotel' or 'Inn' is defined by British law as a place where a bonafide traveller can receive food and shelter, provided he is in a position to pay for it and is in a fit condition to be received (Andrews, 1980).

As European society progressed more roads were built and travel became easier so that there were many more travelers. In large cities, hotels developed and some of them set up dining rooms that in many cases became quite famous.

At the end of the 1800s when the young rail road industry had grown quickly the number of travelers increased dramatically. As people moved from rural towns to industrial cities, small inns and taverns made way for big hotels, which often became the centers of social life in the cities (Palan and Stadler, 1986).

The lead in hotel keeping was taken by the emerging nations of Europe especially Switzerland. It was in Europe that the birth of an organised hotel industry took place in the shape of chalets and small hotels which provided a variety of services and were mainly patronised by the aristocracy of the day.

The real growth of the modern hotel industry took place in the USA beginning with the opening of city hotel in New York in 1794. This was the first building specifically erected for hotel purposes. This eventually led to great competition between different cities and resulted in frenzied hotel building activity. Some of the finest hotels of the USA were built in this era, but the real boom in hotel building activity came in the twenties. This period also saw the beginning of chain operations under the guidance of E.M. Statler. It involved big investments, big profits and trained professionals to manage the business (Andrews, 1980).

The trend of eating outside one's home is on the increase during recent years due to a variety of reasons such as rapid urbanisation, increased industrialisation, changing life style and changes from traditional joint family system, increased number of working women, economical prosperity of the comparatively affluent group and increase in tourist potential (Bhat and Rao, 1992).

Public catering includes marriage parties, birthday celebrations, food distribution in temples and gurudwaras dietary departments in a hospital, feeding programmes like mid-day meal programmes, special nutrition programmes etc., industrial canteens, college cafeterias. Hotel, messes, road side dhabhas, mobile and stationary vendors, hotels, restaurants, railway canteens and in flight food service (Subbulakshmi, 1992).

A report compiled by the National Restaurant Association lists food service units under 2 major groupings.

1. Commercial or those establishments which are open to the public, are operated for profit and which may operate facilities and/or supply meal service on a regular basis for others.
2. Commercial (as employee feeding in schools, industrial and commercial organizations) educational, Government or Industrial Institutional organisations which run their own food service operations (West et al., 1977).

Today the food industry is changing rapidly. There will probably be an increase in both volume of food served and in the variety of food served.

We can predict that this increasing variety in food service operations will reach out even more to these markets.

Women who work.

Families with higher incomes and more leisure time.

People who eat out frequently, not just once or twice a week.

People who are increasingly accustomed to the fast food operation (Palan and Stadler, 1986).

#### B. COMMERCIAL FOOD SERVICES

Eating out is fun. Having meals away from home is a national pastime that aggressively rivals other special activities such as attending the theater, watching sports, games and other forms of recreation (NRA, 1985).

The commercial food service establishments that are open to the public, are operated for profit, and that may operate facilities and/or supply meal service on a regular basis for others. This type of feeding accounts for nearly 85 percentage of food service sales and included eating and drinking places (Khan, 1987).

It is no wonder that hotel keeping ranks high among the largest world wide industries (Lattin, et al., 1989).

Hotels offer overnight sleeping accommodation. Most hotels also offer breakfast, while a large number have restaurants and bars providing main meals and drinks to residents as well as to casual customers, that is people not staying at the hotel. Star hotels in India is given in Appendix V (Messenger, 1990).

Restaurants are public places where food is consumed by travelling public, business and professional men, tourists etc (Rao, 1992).

Restaurants are business organizations whose major purpose are to a) make a profit, b) to ensure continuance of the business by means of sustained sales (Eckstein, 1976).

Fast food service represents the fastest growing segment of the industry. For faster service these good services rely enormously on automation, on the other hand; since there is a need for faster service (Khan, 1987).

Expensive clubs in town or country providing facilities for recreation and relaxation with some sleeping accommodation, are run very much on the lines of a first class hotel.

Holiday camps generally consist of chalet-type accommodation and the amount of service varies. In some places cooking facilities are provided for the guests (Branson and Lennox, 1988).

Some consumers may even prefer buying food from the drive in and eating it at home. Take out food services are very handy for getting food at times when there is neither the incentive to cook at home nor to eat out (Khan, 1987).

The volume of meals served per day is given in Appendix IC. The hotel of today is a highly organised commercial unit, whether it is the small owner managed hotel or one of a large chain of hotels (White and Beckley, 1982).

#### C. NON COMMERCIAL FOOD SERVICES

With the increase in urbanization, industrialization and tourism, mass catering systems are becoming increasingly popular. Throughout the world in both industrialized and developing countries. They provide a convenient and economical means of catering for large numbers of people (Charles, 1983).

The non commercial sector of the industry includes catering in staffs, schools and colleges. The armed forces prisoners hospitals and other institutions. Until recently most were run by government agencies or local authorities on a non-profit making basis, sheltered from free market competition. Today however, the work is increasingly contracted out to independent catering companies which are not only in competition with others for the work, but also have to make a profit to survive (Messenger, 1990).

During the past two decades something of a revolution has taken place in this country. In one way it could broadly be called a minor industrial revolution has become an added attraction to recruitment and managements realising the advantages of better staff relations through well organised meal breaks, look astutely at the probability that industrial catering is of such importance to the people as a whole that it must be preserved as part of industry's service to the community (New, 1980).

Cafeterias and restaurants in plants and industries are increased enormously. Worker motivation is the primary reason for providing food service facilities to employees by business and industrial employees. These facilities primarily cater to the needs of the workers (Khan, 1987).

In many industrial plants the traditional cafeteria has been replaced by vending machines that largely provide calories and stimulates. This makes a greater variety of food possible, a menu is often prepared from the master menu (Eckstlin, 1976).

In some cases a 24 hour canteen service is necessary and it is usual to cater for the social activities of the workers. Not only are lunches provided for the manual workers but the clerical staff and managerial staff with in

many cases have their meals from the same kitchen. There is ample scope for both men and women and in this branch of the industry. There are more top jobs for women than in any other (Kinton and Ceserani, 1984).

A canteen provides a meeting place for all the work force and helps to promote a spirit of unit (Charles, 1983).

Employee food service often competes directly with commercial operations for its share of the market. If employees feel that the quality of the food is poor or the prices are too high, they will either bring food from home or go outside the work place for lunch. This has found employee cafeterias to remain abreast of current trends and to introduce such items as lighter meals and ethnic foods (Iverson, 1989).

#### D. TYPES OF FOOD SERVICE EQUIPMENTS

The kitchen is considered by many to be the heart of a food service firm (Minor and Cichy, 1984).

With an eye to efficiency, quality, increased production and savings in labour, a facility should be planned or redesigned, with a look to the right equipment (Eaton, 1980).

The term equipment in the food service industry means large machinery, tools and utensils used for food production. The kind of equipment in a food service operation depends on the type of food purchased (Palan and Stadler, 1986).

Equipment represents a fixed asset of a food service operation, which depreciates the moment it is purchased and installed, equipment selection requires careful planning and decision making. The selection factor is given in Appendix I (Khan, 1987).

Proper tools help improve the quality of work and make it easier to accomplish (Kotschever and Terrell, 1977).

The use of proper equipment in top condition is of primary importance in the production of good food. Standardized measuring equipment, a variety of knives, accurate scales and thermometers and well insulated ranges all contribute to good quality food (Graves and Packham, 1987).

The costs of buying and operating catering equipment are important elements in the final cost of a dish of food (Milson and Kirk, 1980).

Kitchen equipment may be divided in to three categories.

- A. Large equipment: - ranges, steamers, boiling pans, fish fryers, sinks, tables etc.
- B. Mechanical equipment - Peelers, mincers, mixers, refrigerators, dish washers etc.
- C. Utensils and small equipment - pots, pans, whisks, bowls, spoons etc., (Kinton and Ceserani, 1984).

Each piece of cookware has specific requirements for top energy savings (Avery, 1985).

**A. LARGE EQUIPMENT**

- 1. **Ranges:** The range is the most basic piece of equipment needed by practically every type of food service operation (Khan, 1987).
- 2. **Stoves:** The two main types of cooking stoves used in catering establishments are the solid top stove and the open or single burner stove (Stretch and Southgate, 1986).
- 3. **Convection Ovens:** Basically an oven is a heated chamber in which foods may be cooked at various temperatures (Khan, 1987).

4. **Micro Wave Oven:** The high speed fo heating possible with microwave has great utility for some special purposes (Kotschever and Terrell, 1977).
5. **Combination convection and microwave cooker:**  
This cooker combines forced air convection and microwave either of which can be used separately (Kinton and Ceserani, 1984).
6. **Steamers:** Steamers are very useful in food service operations because of their efficiency, cleanability and for the quality of food they produce (Khan, 1987).
7. **Boiling pans:** Many types are available in different metals and various sizes (Arora, 1987).
8. **Deep fat fryers:** The distinctive flavour and appearance of fried foods make deep fat fryers one of the most valuable pieces of equipment in many food service operations (Khan, 1987).
9. **Pressure Fryers:** Food is cooked in an air tight frying vat thus enabling food to be fried a lot faster and at a lower oil temperature (Kinton and Ceserani, 1984).

**10. Hot cupboards and Bain-maries:**

Hot cupboards are used for heating plates and serving dishes and for keeping food hot. Bain-maries in this case are open walls of water used for keeping foods hot and are available in many designs (Arora, 1987).

**11. Grills and Salamanders:** The Salamander, heated from above, probably causes more wastage of fuel than any other item of kitchen equipment (Arora, 1987).

**12. Contact Grills:** These, some times referred to as double sided or infra grills, have two heating surfaces arranged facing each other. These grills are electrically heated and cook food quickly (Kinston and Ceserani, 1984).

**13. Fry Plates, Griddle Plates:**

These are solid metal plates heated from below. They are used for cooking individual portions of meat, eggs, bacon etc (Arora, 1987).

**14. Sinks:**

Different materials are used for sinks according to the purpose for which they are intended.

- a. Heavy galvanised iron for heavy pot wash.
- b. Stainless steel for general purposes (Kinston and Ceserani, 1984).

**15. Tables:**

Large tables that receive heavy usage should be constructed of 12 to 14 gauge stainless steel, with channeling and bracing used as required for sturdiness (Kotschever and Terrell, 1977).

**B. MECHANICAL EQUIPMENT:**

If a piece of mechanical equipment can save time and physical effort and still produce a good and result then it should be considered for purchase or hire (Kinton and Ceserani, 1984).

**1. Potato Peeler:**

This is an important labour saving. The smallest are table or bench models, while the larger are floor types (Kotschever and Terrell, 1977).

**2. Refrigerators:**

Refrigerators are used primarily to store fresh foods and foods that stale or develop "off" flavours (Ehrenkranz and Inman, 1983).

**3. Food Mixer:**

This is an important labour saving, electrically operated piece of equipment used for many purposes (Arora, 1987).

**4. Vertical high speed cutter mixer:**

This is an extremely fast, versatile labour saving machine which can deal with a great amount of the repetitive, time consuming work required in some kitchen operations (Kinston and Ceserani, 1984).

**5. Food Slicer and Choppers:**

Food slicers obtainable are both manually and electrically operated (Arora, 1987).

**6. Chopper (Hand or electric)**

Food choppers or grinders may operate as an attachment on another motor driven piece of equipment (Kotschever and Terrell, 1977).

**7. Water boiling appliances for tea and coffee making:**

There are two main types of boilers.

**Bulk Boilers:**

Used mainly where large quantities of boiling water are required for a given time.

**Automatic Boilers:**

These boilers have automatic water supplies and can give freshly boiled water at intervals.

**Pressure Boilers:**

This is the type that operates may still sets, consisting of steam heating milk boilers and pressure boilers providing boiling water (Arora, 1987).

**9. Dishwashers:**

Are the biggest time savers in any modern kitchen. Models built in convertible or portable; they may be top or front loading (Sunset Magazine, 1976).

**10. Waste disposer:**

Equipment that grinds and flushes pulverized food waste in to the sewage system with water (Palan and Stadler, 1986).

**C. UTENSILS AND SMALL EQUIPMENTS:****1. Frying Pans:**

Equipment that is filled with fat and used for frying food (Palan and Stadler, 1986).

**2. Colander:**

It is used to drain products and wash vegetables or fruits. It comes in different sizes (Khan, 1987).

**3. Knives:**

Most frequently used knife for slicing, dicing, chopping and cutting (Khan, 1987).

**4. Sauce Pan:**

It is used for cooking small amount of food on range.

**5. Sauce Pot, Stock Pot:**

Cooking large amount of food on range.

**6. Double boiler: Bain marie pans:**

It is used for cooking food below boiling to prevent scorching, storing food.

**7. Steam table pans: (Counter, hotel pans):**

It is used for cooking and holding food for services (Palan and Stadler, 1986).

**8. Spoons:**

Spoons used for stirring, mixing, separation and serving (Khan, 1987).

So properly selected equipment should reduce the drudgery of routine jobs, make "messy" jobs more organised and improve the hygiene and sanitation standards of the working environment (Sethi and Malhan, 1987).

#### E. TRANSITION OF EQUIPMENT FROM TRADITIONAL TO MODERN

The development of speciality cooking equipment is one of the most striking features of food service today.

In old style kitchen planning, a kitchen which could encompass all the many variations of cooking method was provided. Today every item of equipment must learn its keep and the food theme clearly delineates the limited requirements to match the marketing aim (Glew, 1977).

The history of the development of the kitchen is fascinating and to look at pictures of Baronial Kitchen and banquets gives a glimpse of past glories (Kinton and Ceserani, 1984).

One of the oldest ways to cook is today's most efficient way to cook through steam cooking. Steam cooking is more practical today than ever before. Back in the 30's when thermostatically controlled (pressurized) steam cooking was introduced (SFSJ, 1975).

In early kitchens the equipment consisted of an open fire for cooking, which was generally placed on the floor, the fuel being coal, wood, sun dried cowdung cakes or balls lighted between two or three bricks on which the cooking vessel was placed. Over the years, the activities of catering establishments have become more and more

professional and the objectives have been constantly directed towards utilising equipment for maximum efficiency and at the same time maintaining a service that is clean and attractive to both worker and viewer (Sethi and Malhan, 1987).

The first electric cookers did not appear until the last decade of the 19th century, but the idea of using electricity for cooking was in the minds of eminent scientists many years earlier.

With the increasing availability and use of convenience foods and the new and sophisticated equipment on the market to day, the demand for 'equipment operators' could become greater than that for skilled cooks (White and Beckley, 1982).

Today's equipment is designed to save labour and therefore reduce labour cost. Location of equipment is also important for efficient operation (Palan and Stadler, 1986).

The future trends in catering equipment are expected to focus on mobility and multi use and the modular and compact, in smaller sizes with automatic controls. Designs would be aimed at saving labour and time while being simple and safe in their construction (Sethi and Malhan, 1987).

## F. THE FUTURE TRENDS IN CATERING

Today, catering institutions form the backbone of the tourist trade and are important foreign exchange earners.

It was soon realized that the consumer demanded a variety of choices in types of establishments when he ate out - a rapid service coffee shop, a snack bar, a cocktail lounge with a distinctive atmosphere, a speciality restaurant built on a theme (Lattin et al., 1977).

The twentieth century has brought sweeping changes in eating patterns and health. A hundred years ago, most people ate plenty of fibre from bread and potatoes, but they lacked an adequately varied diet. Diseases caused by a lack of vitamins and minerals were common. Today, the problems are different. Many people eat too much meat, dairy products and sugar, and too little fibre for good health. New methods of farming and food processing, food selling and storage have helped to alter what we eat (Kinton et al., 1992).

A trend which is to be commended is where the entire kitchen operation is on full view to the customer. This type of operation gives the customer the opportunity of seeing the kitchen preparation (Kinton and Ceserani, 1984).

In order to be able to respond to the trends apparant in the future, every caterer will need to view his operation with a professional eye (Sethi and Malhan, 1987).

The next few years will indeed witness a technological explosion with in the hotel industry. Just a few short year ago people lamented that the computer was simply too costly for the average hotel operation; its applications would be limited to the large chains, or else computer centres would have to be developed to serve a consortium of smaller operations. Technology, has rapidly removed the concern. Today we have available mini computers that handle a tremendous variety of tasks and are priced with in the budget of the vast majority of hotels and motor hotels (Lattin et al., 1979).

Growth of chain operation is not new to the hotel industry. Operation of several hotels by one organisation has been a common practice for over fifty years, but until recently the number of hotels under chain control represented a small minority of the total industry.

In future, about the year 2015. Even now scientists are describing what life will be like in that period. Computerised robots will perform many functions now handled by man: these robots will prepare food, wash dishes, do much of the cleaning around the hotels, weed and care for the gardens and perform several types of office work.

It seems that all the technical know-how and equipment exists today to build and operate a fine hotel under the sea. Equally as exciting is the possibility of building a completely temperature conditioned resort and grounds almost anywhere in the world. By the year 2015 these two developments will probably be old hat. Space travel however should still be unusual enough to serve as a status badge.

Although change and obsolescence have always been an integral part of the hospitality industry, hotelmen have never before faced the tremendous acceleration of change that has taken place in every aspect of life during the past few years.

Undoubtedly, the future holds many unforeseen challenges. No matter what they may be, it seems absolutely certain that the hotel industry will be there to meet them (Lattin, et al., 1977).

## METHODOLOGY

## METHODOLOGY

The methodology pertaining to "A COMPARITIVE STUDY OF EQUIPMENTS USED IN COMMERCIAL AND NON - COMMERCIAL FOOD SERVICES" consisted of the following aspects.

1. Selection of Area
2. Size of the sample
3. Tools for the study
4. Conducting the study
  - a. Formulation of the questionnaire
  - b. Administration of the questionnaire and eliciting information.

### 1. SELECTION OF AREA:

The Area selected for the study was Madras and Coimbatore, because they are the main cities in Tamil Nadu.

### 2. SIZE OF THE SAMPLE:

The size of the sample is selected on the basis of purposive sample.

In this type of sampling, items for the sample are selected deliberately by the researcher; his choice concerning the items remains supreme. (Kothari, 1985).

The Institutions selected for the study were two commercial and two Non - Commercial of which one commercial and one Non - Commercial each from Coimbatore and Madras. In Coimbatore the commercial institution was "Sree Annapoorna" while the non-commercial was the canteen of "Lakshmi Machine Works", and in Madras the commercial one was "The Sindoori Hotel", the Non-commercial was TVS-Lucas, Industrial canteen.

The institutions were selected for the study are

---

NAME OF THE INSTITUTION

---

SREE ANNAPOORNA

Non -A/c. Restaurant (R.S.Puram)	A
A/c. Restaurant (R.S.Puram)	A <sub>1</sub>
Central Kitchen (Mettupalayam Road)	A <sub>2</sub>

THE SINDOORI HOTEL

B

TVS-LUCAS

A

LAKSHMI MACHINE WORKS

Periyanayakanpalayam

B

Unit II (Kaniyur)

B<sub>1</sub>

Mtd (Arasur)

B<sub>2</sub>

---

Regarding the commercial institutions the investigator selected the three star hotels. The reason being the star hotels cater to more number of customers, and they use more equipments in their institution for production.

The non-commercial institutions were selected on the basis of meals served at subsidised rate, and large number of employees catered to.

### 3. TOOLS FOR THE STUDY:

A Questionnaire was formulated to elicit informations.

The questionnaire consists of a number of questions in a definite order or a form (or set of forms). (Wilkinson and Bhandarkoor 1984).

The information requested in the questionnaire includes the type of institution, Type of equipment used, number of equipments, amount invested in the particular equipment, number of personnel handling each equipment, turn over per day. The completed questionnaire were consolidated and tabulated.

#### **4. CONDUCTING THE STUDY:**

The study was conducted in the following manner.

##### **1. Formulation of the Questionnaire:**

The main objective of this study being "A comparative study of equipments used in commercial and Non - Commercial food services". So a specially designed questionnaire was developed to collect the information.

The questionnaire is given in Appendix - II.

##### **2. Administration of the questionnaire and eliciting information:**

Appointments were fixed with the managers of the institutions, so that maximum cooperation could be obtained from the managers of the canteen and industry.

The prestructured questionnaire was administered to the managers and information regarding the type of institution, number of equipments used in the institution, the amount invested in the particular equipment, number of personnel handling each equipment, turn over per day were elicited from them. The equipments are given in Plate I (A, B, C, D, E, F).

Interview has been defined as a systematic method by which a person enters more or less imaginatively in to the inner life of a comparative stranger (Rangaswamy, 1989).

The filled questionnaire was consolidated.

**PLATE 1**  
**EQUIPMENTS**



**A. IDLI COOKER**



**B. ICE CREAM MAKER**



**C. BAIN MARIE**



**D. VEGETABLE CUTTER**



**E. BOILERS**



**F. STEAM AIR DRYER**

## RESULTS AND DISCUSSION

## RESULTS AND DISCUSSION

The discussion of the results of the present study on "A COMPARITIVE STUDY OF EQUIPMENTS USED IN COMMERCIAL AND NON-COMMERCIAL FOOD SERVICES" is discussed below under the following headings

- A. Background information
- B. Equipment used in different areas
- C. Number of personnels handling each equipment
- D. Equipment purchasing

### A. BACKGROUND INFORMATION

The back ground information of the selected institution are given in Table I.

For the study four institutions were selected. Two commercial food service and the other two non-commercial food service institution, which were industrial canteen, run at subsidised rates.

The two commercial institutions selected were Sree Annapoorna, Coimbatore, which runs a chain of restaurants and the other Hotel Sindoori Madras. These two hotels were selected since they were three star hotels.

Where as the non-commercial institution selected were Lakshmi machine works, Coimbatore which has three units and the other TVS - Lucas Madras. The details regarding the institution are given in Table No I and illustrated in Figure I.

Sree Annapoorna is a large food service organization in Coimbatore. In Coimbatore City itself it has six outlets. For the convenience of the investigator only one unit was taken and this unit had three kitchens which is also shown in Table No I.

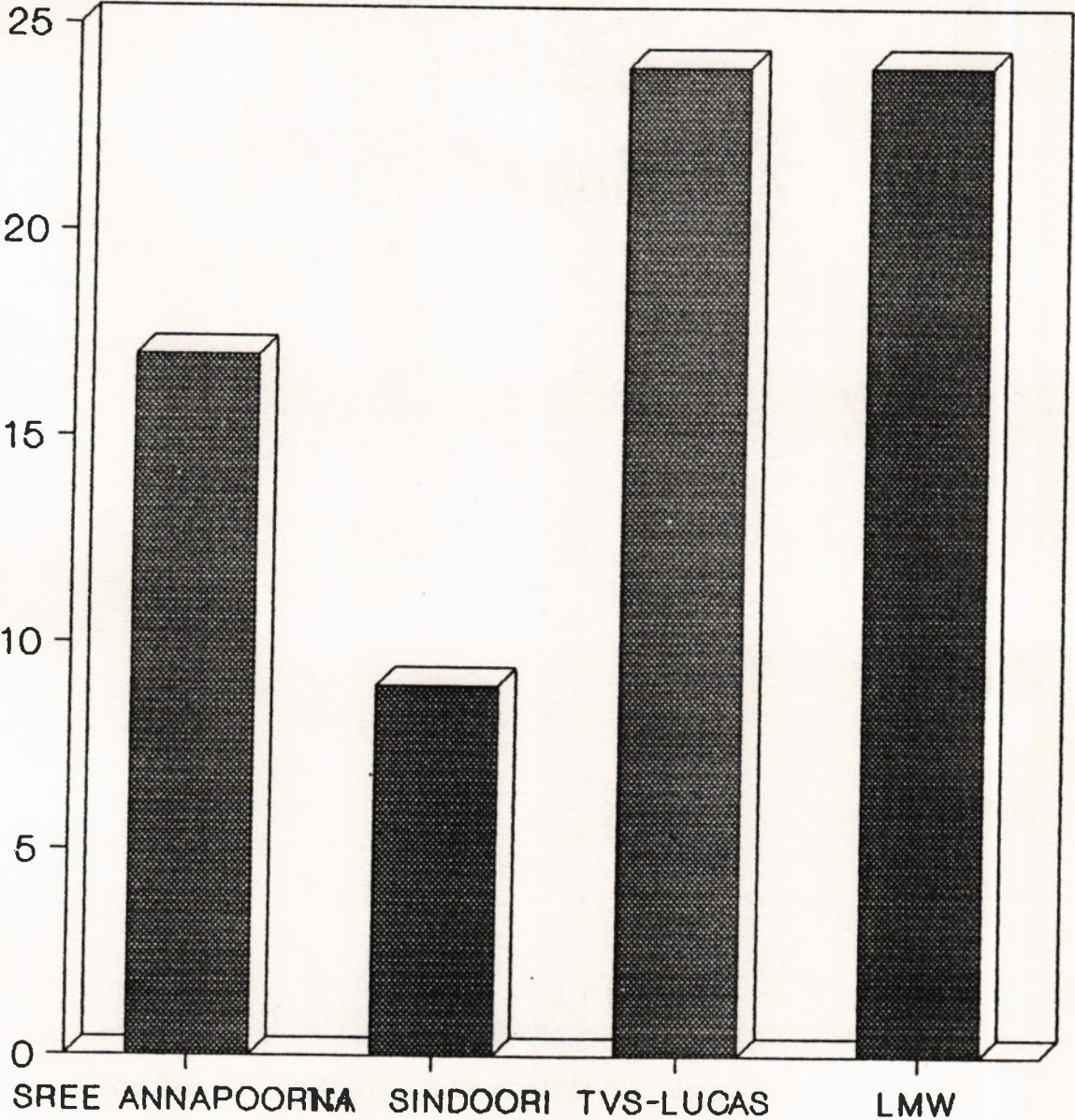
The Annapoorna restaurants selected caters to approximately 13,500 customers per day. The clientele catered are varied from all income groups and a corporate clientele. It has a centralized kitchen A2. From where the main items are prepared and sent to the various other restaurants. Where as at Hotel Sindoori it has no centralized kitchen there is only one restaurant. The present turnover of Sindoori Hotel is approximately 1,200 customers per day. It mainly caters to the high income and high middle income population and tourists from other countries.

TABLE I

## BACKGROUND INFORMATION

Institution Name	Type	Year of Inception	Working Hours/day	Number of Personnel	Number Catered to
1. Sree Annapoorna	Commercial				
Non A/c Restaurant (A)		1960			
A/c Restaurant (A1)		1982	17 hours	585	13,500
Central Kitchen (A2)		1985			
2. Hotel Sindoor(B)	Commercial	1987	9 hours	39	1,200
3. TVS-Lucas (A)	Non-Commercial	1979	24 hours	104	3,500
4. Lakshmi Machine Works Periyanaickenpalayam(B)	Non-Commercial	1981	24 hours	112	4,870
Unit II (Kaniyur) B1					
Mtd. (Arasur) B2		1990			

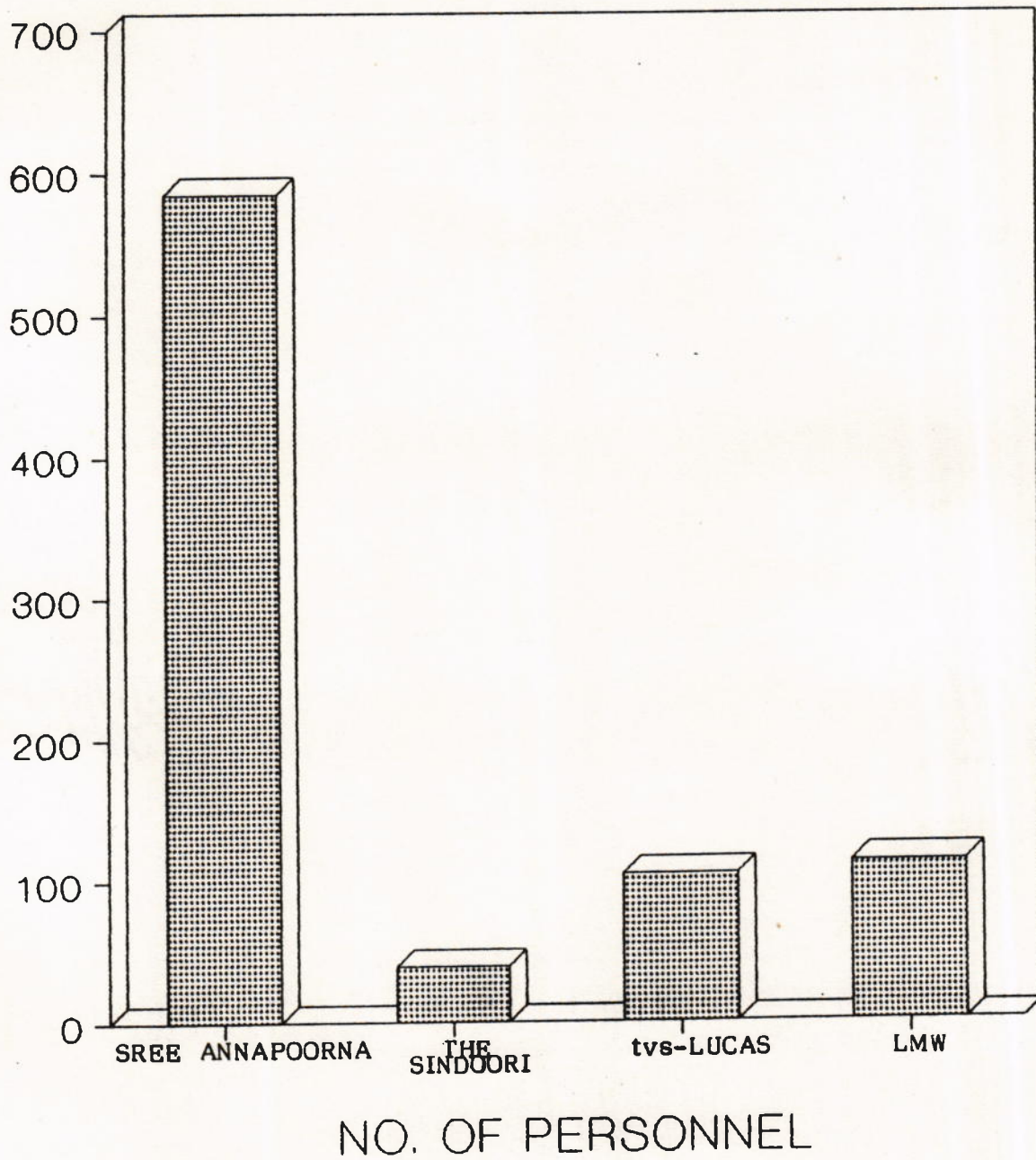
**BACKGROUND INFORMATION**



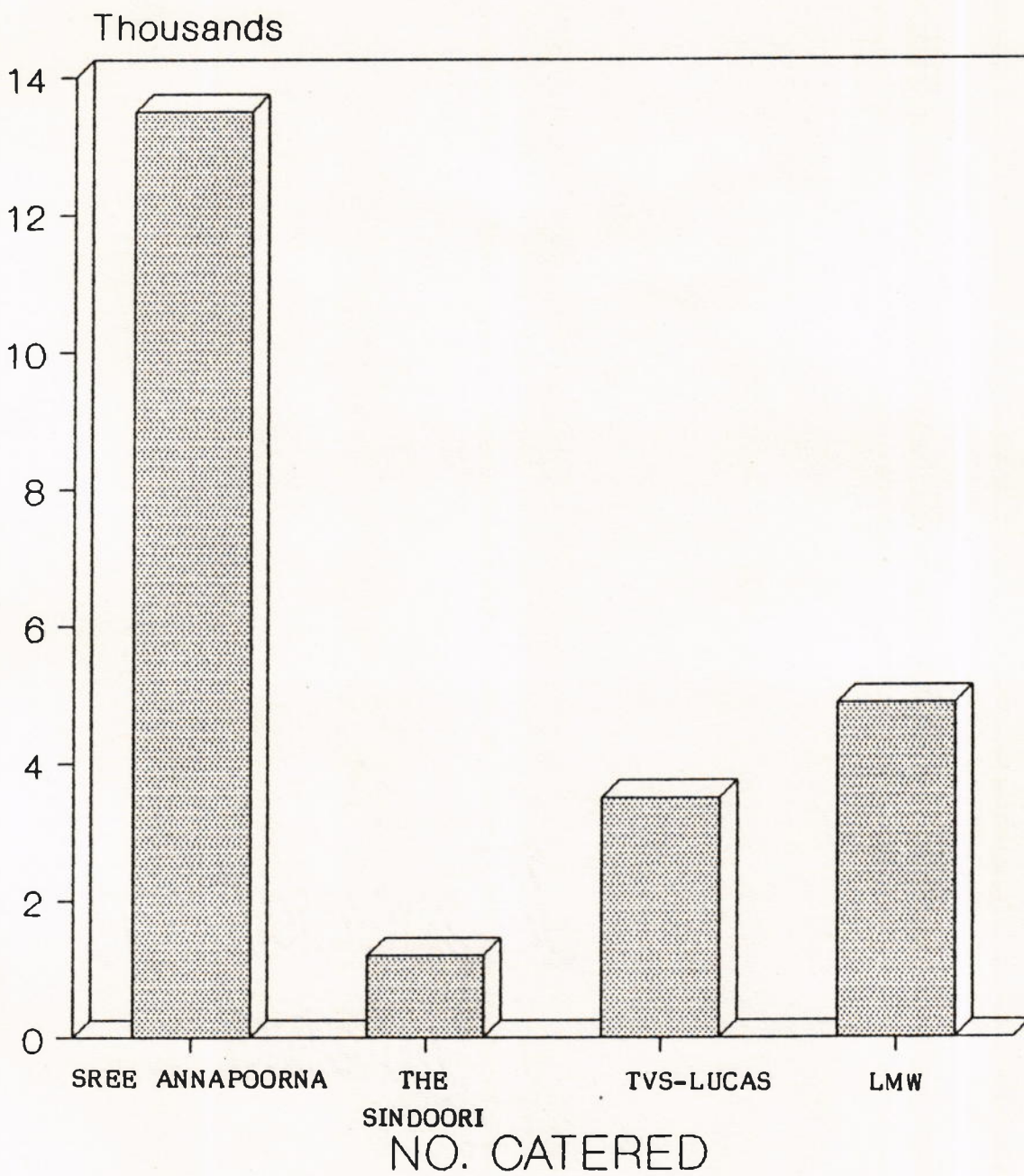
WORKING HOURS

FIGURE I

## BACKGROUND INFORMATION



## BACKGROUND INFORMATION



The Sree Annapoorna kitchen is well equipped with latest labour saving equipments, designed by the institution according to their needs. From the observation it is noticed that the kitchen of Sindoori also has a large number of equipments, most of the which are imported.

While coming to the non-commercial institution the TVS-Lucas canteen and LMW canteens, it was found that both the canteens work 24 hours. The workers come in shifts. The employees and canteen workers ratio is high at LMW when compared to TVS-Lucas. From the observation the investigator noticed that the canteen run by TVS-Lucas has more number of labour saving equipments and the kitchen is also well equipped. But in case of LMW, they have less number of equipments in their kitchen, but the number catered is much high. The clientele catered in both canteen were the employes, staffs and guest.

Based on the background information collected, the investigator went in to the details to findout the different types of the equipment available in each area. Depending upon the mode of operation they were classified as Electrical (E) and Non-Electrical (N.E).



With regard to the receiving area as seen from Table No. II. At Sree Annapoorna an electronic milk tester was used for checking the quality of milk. This electronic milk tester was used to test the fat content of the milk purchased and that the price of the milk at this institution was fixed depending upon the fat content of the milk, as a result of which the procurement price of milk varied every day. It was also observed that there was a weighing scale this was used to check the weight of the commodities as and when they arrive, where as at Hotel Sindoori there was no specific equipment in the receiving area to check the quality nor the quantity of the food item purchased. It was understood from the observation that the purchasing at Sree Annapoorna was from wholesalers and only bulk purchases, where as at Hotel Sindoori the purchasing was from retailers where the item were supplied in one Kg polythene bags, which did not require any weighing when the items arrived as indicated by the institution.

Regarding the non-commercial insitution, at the TVS-Lucas canteen, it was found that there was no equipment in the receiving area where as, at LMW a weighing scale and measuring vessele were used in the receiving area to check the quantity of commodities when purchased.

TABLE III

PRE-PREPARTION AREA

EQUIPMENT	CAPACITY	COMMERCIAL						NON-COMMERCIAL									
		A	A1	A2	B	B	B	A	B	B	B	B	B				
		E	N.E	E	N.E	E	N.E	E	N.E	E	N.E	E	N.E	E	N.E	E	N.E
1. Wet	15																
Grinder	litres	5															
	10 litres	2		12													
	5 litres	2															
	20 litres					7											
	3 litres																
	13 litres																
2. Cocount																	
scraper	-	2															
3. Mixer																	
4. Rice																	
Destoner																	
5. Potato																	
peeler																	
6. Steam air																	
dryer																	
7. Dough mixer																	
8. Coffee seeds																	
roaster																	
9. Coffee seeds																	
grinding																	
Machine																	

EQUIPMENT CAPACITY	COMMERCIAL				NON-COMMERCIAL			
	A	A1	A2	B	A	B	B1	B2
	E	N.E	E	N.E	E	N.E	E	N.E
10. Sugar grinding machine								
11. Flour grinding machine								
12. Rava roasting machine								
13. Vegetable cutting machine								
14. Egg beater								
15. Curd churner								
16. Vegetable slicer								
17. Dry grinder								
18. Bakery mixing machine								
19. Vegetable								

Table No III shows the different type of equipment used in the pre-preparation area and illustrated in Figure II. It was observed that at Sree Annapoorna a variety of equipment were used for food pre-preparation which could not be compared with Hotel Sindoori, as at this institution only grinders and dough mixer were found and rest of the activity such as chopping, peeling, slicing etc were done manually. When the workers were interviewed, it was noticed that the workers at Sree Annapoorna at both the institution were happy and that was the reason for the high turnover and consistent clientele. Where as at Hotel Sindoori the workers were not very happy. Since most of the activities involved manual labour.

Coming to the non-commercial institution, though the industrial canteen of LMW had three units, the equipment found was not sufficient, when compared with TVS, Lucas. At TVS Lucas, a plenty of equipment were available such as grinders, mechanically operated coconut scrapper, potato peeler, curd churner, vegetable slicer and cooker. Where as at LMW canteen the equipment found were used only wet grinder and vegetable cooker. When labour saving equipments are used in large scale catering the strain and monotony of the job is over come, and the workers work output is increased.

FIGURE II

# Equipment Used In The Pre-preparation Area

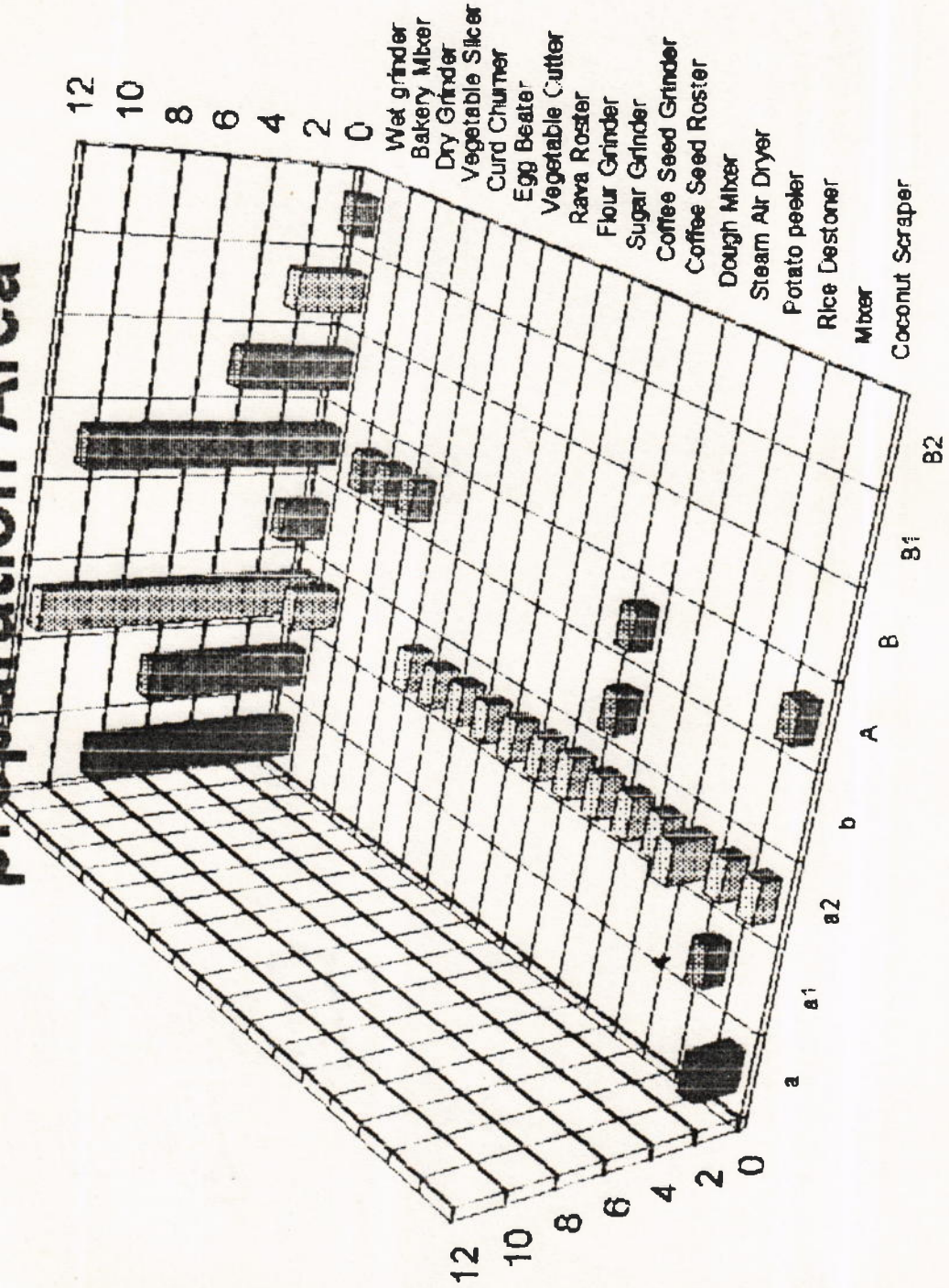


TABLE IV

PREPARATION AREA

Equipment	Capacity	Commercial						Non-Commercial							
		A	A1	A2	B	A	B	B1	B2						
		E	N.E	E	N.E.	E	N.E.	E	N.E.	E	N.E.	E	N.E.	E	N.E.
1. Rice Boilers	25 Kg	4		2		4		2		4		2		3	
	50 Kg			2											
2. Idli Cooker	240 idlies	2		1		2		1							
	700 idlies									1					
3. Fry pans	5 litres	6		5		7		5		4		4		4	
	10 litres	12				6									
	20 litres	2													
4. Dosa1 Tava	12 at a time	2		1				1							
5. Chappathi Tava	40 numbers	1		1				1		1					
6. Gas stove		8		2		10		2		5		2		3	
7. Steam Boiler	1.5 kilor			2				2		2		2			
8. Paratha Tava	15 at a time	1		1				1						1	
9. Ice Cream Maker	10 litre	2													
10. Fruit squeezer	2 litre													2	

Equipment	Capacity	Commercial						Non-Commercial						
		A	A1	A2	B	A	B	B1	B2					
11. Tandoor pot	-		1											
12. Polythene cover silver	-			1										
13. Bakery oven	16 KV			1		2								
14. Briyani Oven	14 KV			1										
15. Pressure vessele	250 litre					12								
16. Milk boiler					2		2	3						4
17. Koha vessele	80 litres					2								
18. Continental gas range	T.35								1					
19. South Indian range	T.35								1					
20. Chinese gas range	T.35								1					
21. Dosa Gas range	T.35								3					
22. Salamander	3 KW								1					
23. Hot water boiler	1.5 KW												1	
24. Bread slicer	2 KW												1	
25. Coffee machine														1

Equipment	Capacity	Commercial						Non-Commercial					
		A	A1	A2	B	B1	B2	A	B	B1	B2		
26. Micro wave oven	700 W	1											
27. Sambar cooker	500 litres					1							
28. Rasam Boiler	500 litres					1							
29. Cooking range						2							
30. Coffee vessele for prep.	50 litres					1							
31. Tea vessele for prep	50 litres					1							
32. Idli vessele	15 plates												
33. Rice vessele for prep.													
34. Rasam vessele for prep.													
35. Sambar vessele for prep.													
36. Electronic boiler													

Observation from table No iv show the different type of equipment - electrical and non - electrical available in the preparation area of the selected institution, and illustrated in Figure III. When compared, between the two commercial institution, it was noticed that at Sree Annapoorna maximum number of electrical equipments were used when compared with the preparation area of Hotel Sindoori, were the equipments used were mainly non - electrical as observed, in the table.

Regarding the equipment used in the preparation area of the two non - commercial institution. It was clearly observed that most of the equipment used in both the institution were non - electrical. No sophisticated labour saving electrical equipment were available in either of the non - commercial institution.

FIGURE III

# Preparation area

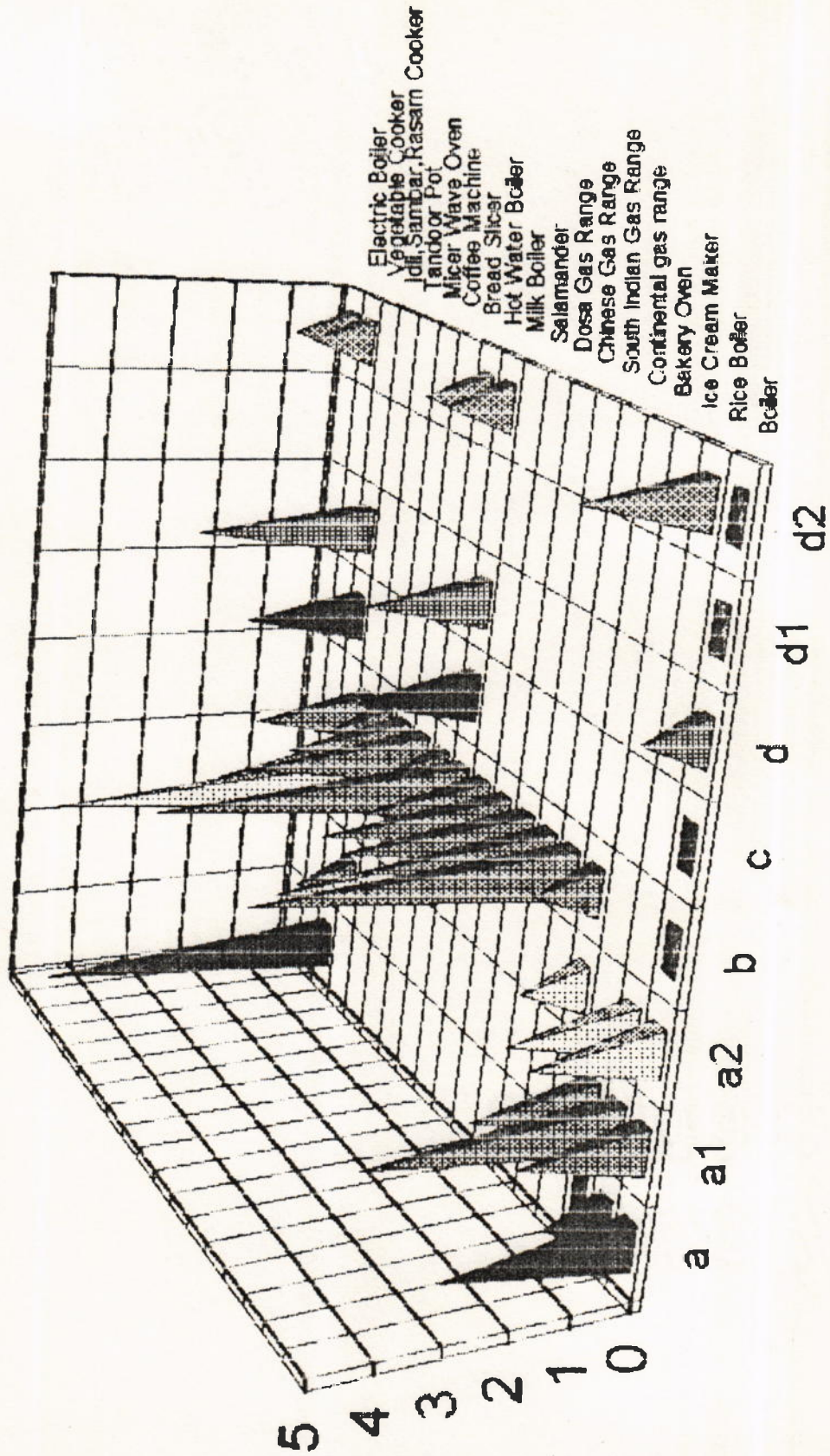


TABLE V

## SERVING AREA

Equipment	Capacity	Commercial						Non-Commercial							
		A	A1	A2	B	A	B	A	B	B1	B2				
		E	N.E.	E	N.E.	E	N.E.	E	N.E.	E	N.E.	E	N.E.	E	N.E.
1. Bain marie	6 Kw	2	3	3											
2. Big silver vessele	250	5	3	7	6	4	6	6	3	3	2				
3. Silver vessele for keeping rice	100 litre	15	3	2		6		2	2	2	2				
4. Troylleys		6	2	3	4	12	13	6	6	4					
5. Plates		1500	1800	2322	840	2000	1948	1000	500						
6. Curd cups		430	150	490	239	3500	625	600	1750						
7. Cuttories		234	135	528	321	1500	2980	300	500						
8. Tumblers		189	97	225	180	1240	1179	847	480						
9. Meal plates		252	58	147	220	2000	1594	849	720						
10. Sauce spoon		142	89	190	188	143	100	58	47						
11. Salt cup		98	42	54	49	323	227	80	38						
12. Rice cups		49	52	64	23	1120	1245	240	180						
13. Coffee tumblers		190	-	170	49	420	299	189	128						
14. Coffee cans		2	-	2	1	32	26	18	9						
15. Vadai serving vessele						5	3	2	2						
16. Rice vessele with cover		4	4	6	-	4	1	2	3						
17. Sambar and Rasam vessele		6	-	6	-	4	2	2	2						
18. Cups		240	180	490	221	1849	3685	1950	1750						
19. Cups (big size)		222	147	369	180	240	167	149	150						

Serving area is an important area in a Food service unit. This area has to be clean and well equipped. The axillary equipments such as plates, tumblers, teaspoon, cups and saucers and other minor equipment available for serving should be made adequate, so that no customer is made to wait when he come for his meals.

From the table No.V it is seen that axillary equipments needed in the Food service unit was sufficient enough for the number of clientele catered to everyday. To make the work easy for the workers in the unit, for serving and cleaning trolleys were available. It was observed that all the equipment in the serving area were only non - electrical equipments.



The different type of equipment available in the washing area are tabulated in Table No.VI. At all the institution washing is done manually. In Sree Annapoorna, they are using ordinary sinks at the washing area. Though washing is manually done, proper sterilization methods are adapted at Sree Annapoorna where a two way sink is used, where one has detergent and the other hot boiling water where the vessels are rinsed and sterilized. It was also noticed that at Hotel Sindoori a three way sink was used for cleaning the vessels.

Where as in TVS - Lucas a dishwasher was used for washing the plates, cups, saucers, tumbler, teaspoons and other miscellaneous equipments. This helps in saving time and labour and at the same time well sterilized. Where as in the LMW canteen all the items are manually cleaned as a result of which the number of personnels in the washing area is higher when compared to the other non commercial institution.

TABLE VII

STORAGE AREA

Equipment	Capacity	Commercial						Non-Commercial							
		A	A1	A2	B	B	B	A	B	B1	B2				
		E	N.E	E	N.E.	E	N.E.	E	N.E.	E	N.E.	E	N.E.	E	N.E.
1. Deep freezer	265 litre			3		1						1			1
2. Steel cupboard	800 litre								2						
3. Cooler	460 cups	1													
4. Hot case shelf	500 litre				1										
5. Water Storer	1000 litre				2										
6. Reach in cooler	500 litre								4						
7. Ice cream cabinet	8F									1					
8. Cabinet cold storage											2				
9. Walk in cooler	1 Ton				2							1			
10. Refrigerator	165 litre											1			1
11. Milk chilling plant	100 litre												1		
12. Wooden shelf														5	
13. Steel Almirah	-														1

While discussing the storage area of all the food service units selected, it was noticed that every unit had a refrigerator in the storage area and in Hotel Annapoorna there was a walk in cooler, were as in Sindoori Hotel there 4 walk in coolers were present which is seen in Table No. VII. This reason for four walk-in cooler in the storage area is unknown.

**TABLE VIII**  
**NUMBER OF PERSONS HANDLING EACH EQUIPMENT**  
**PRE-PREPARATION AREA**

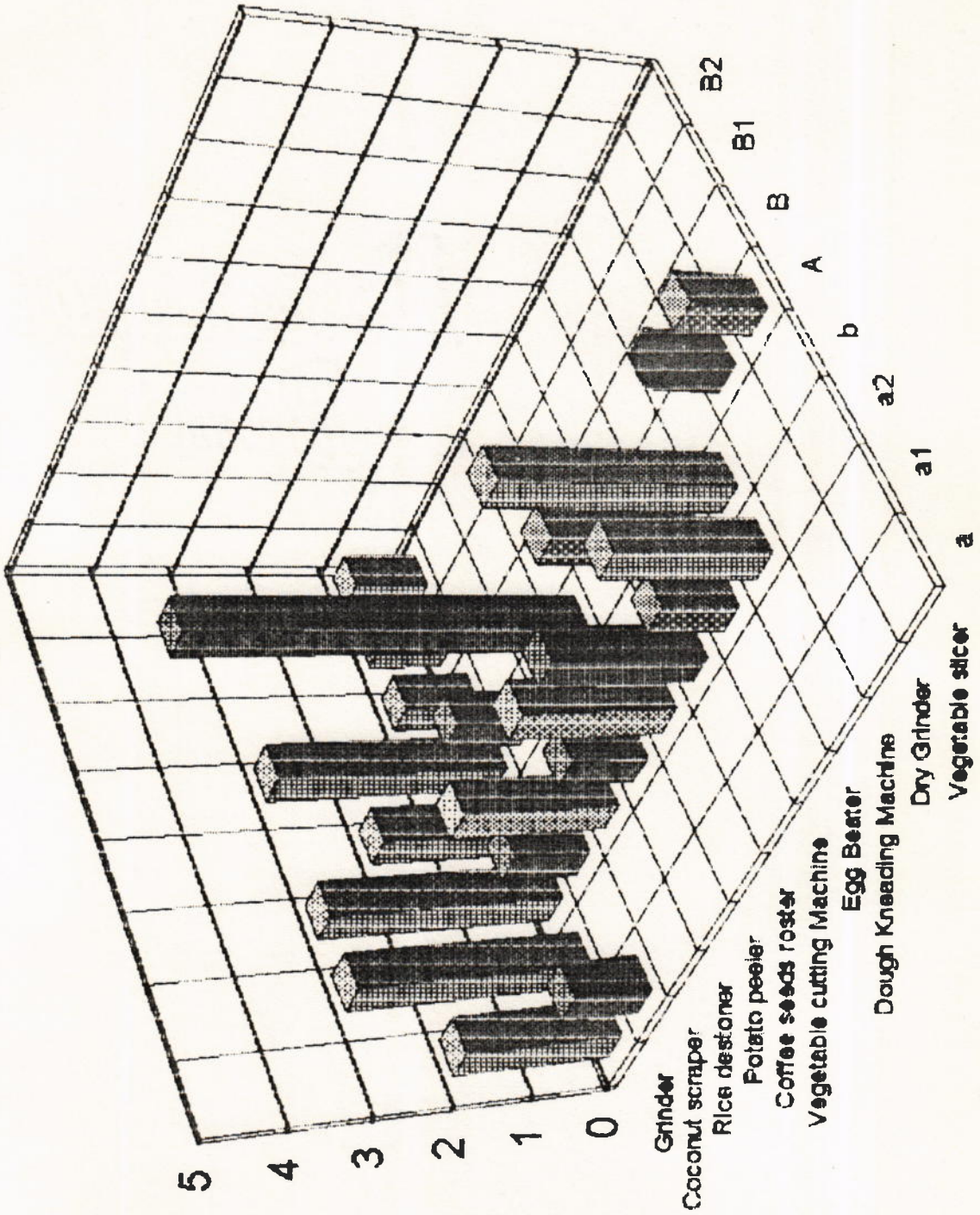
Equipment	Commercial				Non-Commercial			
	A	A1	A2	B	A	B	B1	B2
1. Grinder	2	3	3	2	3	1	1	1
2. Coconut scraper	1	-	1	-	1			
3. Rice Destoner			2					
4. Potato peeler			1	6				
5. Coffee seeds roaster			2					
6. Vegetable cutting machine			2					
7. Egg beater			1	2				
8. Dough kneading machine			2	3				
9. Dry Grinder					1			
10. Vegetable slicer					1			

From Table No. VIII gives us an idea of the number of workers handling the equipment in the pre-preparation area and illustrated in Figure IV.

FIGURE IV

Number Of Persons Handling Each Equipment

Pre-preparation Area



It is observed that the commercial food service units have a variety of equipments in the pre-preparation area. So they require more number of personnel.

Coming to the non-commercial institutions they did not have any specific sophisticated equipments in their units. So they need less number of personnels to handle each equipment.

TABLE IX

## PREPARATION AREA

Equipment	Commercial				Non-Commercial			
	A	A1	A2	B	A	B	B1	B2
1. Boiler	3	2	2			1		2
2. Rice boilers	1	4	2					2
3. Ice cream maker		2						
4. Bakery oven			1					
5. Gas range				11				
6. Dosa gas range				3				
7. Salamandar				2				
8. Milk boiler			2	5	2	2		1
9. Hot water boiler				1				

10. Bread slicer				3	
11. Coffee machine				2	
12. Micro wave oven				1	
13. Tandoor pot		1		2	
14. Idli, Sambar Rasam cooker	6	5		2	3
15. Vegetable cooker			2		1
16. Electric boiler			2		1

-----

It is observed that, Hotel Sindoori caters to both south Indian and North Indian dishes. Hence they need, more number of personnels to handle each equipment and prepare traditional recipes. As Sree Annapoorna cater to mainly South Indian dishes and a few north indian items the number of personnel working in the preparation area is less. But for the preparation of specialised items, such as sweets, they have trained cooks in that particular preparation. The details are shown in Table No. IX.

When compared to LMW, at TVS - Lucas has handling each equipments in much less. Because TVS - Lucas has more number of labour saving equipments in their kitchen.

**TABLE X**  
**SERVING AREA**

Equipment	Commercial				Non-Commercial			
	A	A1	A2	B	A	B	B1	B2
Bain marie	1	2	-	4	-	-	-	-

Regarding the serving area. The number of personnel handling the equipment is shown in the Table No.X.

Regarding the commercial institutions, Sree Annapoorna has more number of personnel to handle each equipments in their serving area. Because Hotel Annapoorna cater to more number of clientele. So they require more number of workers to operate the equipment.

While coming to the non-commercial institutions there is no labour saving devices in their serving area. From the table it is clear that the number of workers in this area are very limited.

TABLE XI

## WASHING AREA

Equipment	Commercial				Non-Commercial			
	A	A1	A2	B	A	B	B1	B2
1. Dish washer					6			
2. Floor cleaning machine					4			
3. Trolleys	4	2	6		4	2	1	1

As labour saving devices are installed to handle the soiled dishes the number of personnel employed in commercial hotels are less.

LMW not equipped with any labour saving devices a large number of personnel are required to handle the soiled dishes. This is seen in Table No.XI.

TABLE XII

## PERSONNEL - STORAGE AREA

Equipment	Commercial				Non-Commercial			
	A	A1	A2	B	A	B	B1	B2
1. Deep freezer		4		6				
2. Hot case shelf		3						
3. Ice cream cabinet				6				
4. Walk in cooler			2		2			
5. Milk chilling plant						2		
6. Refrigerator						1		

The different types of equipment used in the storage area and the number of personnel handling these equipment is shown in the Table No.XII.

Regarding the commercial restaurant in Hotel Sindoori, Deep freezer and ice cream cabinet are being used, where as in institution Sree Annapoorna we see only one walk in cooler. Where as in institution. Sree Annapoorna they have Deep freezer and Hot cases. Since the essential equipment such as walk in cooler and Deep freezer are in the storage area, the number of personnel working in this area are also

less. This is because the number of equipments in the storage area are only those which are really essential for the purpose of storing.

Whereas in the non-commercial institutions, we find that in one institution TVS-Lucas, there is a Deep freezer and in another Lakshmi Machine Works, there is a walk in cooler, and in institution Lakshmi Machine Works, there is a milk chilling plant and only a refrigerator. The milk chilling unit is used to keep the milk fresh as workers with industry come for their shift around the clock and they need milk all the time. From the table it is clear that the number of workers in this area are very limited and only one or two members to handle the equipment.

#### D. EQUIPMENT PURCHASING

Kitchen equipment is expensive. In order to justify the expense it is essential that maximum use is made of it. Which can only be achieved if all the equipment work efficiently and this depends on care and maintenance (Kinton and Ceserani, 1984).

The equipments which are being used in the food service industry are very sophisticated and it needs careful handling. These equipments are helpful in not only reducing the labour but also in reducing the time taken to carry out

each task, when the turn over is heavy. While purchasing the equipment care has to be taken so that we select the best and the right type of equipment for the particular industry and which will be regularly used. To find out the reason for purchasing the particular equipments, the investigator carefully interviewed, the person incharge for each unit, and elicited the information. Institutions organization chart is given in Appendix IV.

The reason given by all the food service industries were the same such as cost, frequency of use, menu, source of supply etc. From this it is understood that when we go in for a purchase of equipments every individuals thinks about the important factor, which will help us in the long run, as the industry expands in the future.

In Sree Annapoorna and TVS-Lucas the mode of purchasing the equipment through cash payment. But at Hotel Sindoori some of the equipments used are on rented basis and the rent is paid every forty fith day. But in Lakshmi Machine works the mode of buying the equipment is on credit basis. The equipment is delivered and once in fifteen days the payment is made on installment basis.

All equipment in the Food service until, have to be properly insulated and grounded. Because while using these equipments, the workers came in contact with water. If the

equipment is not grounded properly the worker may get electric shock which at times may also become fatal. To prevent such accidents arising from electric shock the investigator, was eager to check the details and it was found that in all institutions the equipments were placed in the right position and also properly grounded.

Inspection of the equipment is another important aspect in the maintenance of equipment. Buying the equipment may be easy, but maintenance becomes very difficult and one becomes very careless about it. All equipment purchased has to be properly inspected and inspection certificate issued before used and during are regularly. Equipment safety is given in Appendix IA.

It was found out that once in fifteen days the inspection done for all the equipments in the commercial food services. In TVS - Lucas once in fifteen days the regular service is being done for all the equipments is not done regularly. The equipment is inspected only if something goes wrong with the equipment. The investigator from her observation could find out that all the equipments in TVS - Lucas, was maintained in good condition, when compared to Lakshmi Machine Works, canteen.

From the observation, it was seen that in the commercial institutions the electric bills were paid

regularly, once in a month this expenses on electricity come along with the food expenses in the commercial institutions. Where as in the non-commercial institutions, the food service unit did not bothered about the payment of electric bills. Since the industry took care of the payment of the bill. The expenses was not included along with the food cost.

Regarding the use of the equipment, the worker handling the equipment is properly instructed and trained in the handling and know of the equipments. If there were any minor problems in the handling process, the workers themself sets in right, but if the problem is a serious one, immediately the supplier is informed about it and the problem is taken care of it immediately.

In Sree Annapoorna most of the equipments were designed by the institution itself. This designing is done depending upon the need of the institution and the number of customers catered to the layout design. Institution layouts is given in Appendix III. But Hotel Sindoori some of the equipments such as expresso, bread slicer, reach in freezer were imported. But the investigator felt that when equipments were imported and if a spare parts get repaired, replacement of the same may became a problem. Where as in the non-commercial institutions, the equipments were locally designed, with the help of the equipment manufacturer.

TABLE XIII

## MULTIPURPOSE EQUIPMENT

Institution Name	Yes	No
1. Sree Annapoorna		
2. Hotel Sindoori		
3. TVS-Lucas		
4. Lakshmi Machine Works		

As seen from the survey, all equipments are expensive. When equipments are purchased we have to think, whether they will serve multipurpose roles. With this in mind Sree Annapoorna have more number of multipurpose equipments for mixing, blending etc. This was also seen in Hotel Sindoori, Multipurpose equipments were used. Which are used for the purpose of grinding churning, blending, slicing, whipping, kneading and other allied activities. Where as in the industrial food services the TVS-Lucas and Lakshmi Machine Works canteens, no specific multipurpose equipments were seen expect for a grinder, which helped them in grinding the idli batter, and also for grinding the raw ingredient for vadi and bonda.

There is no special training was given to the personnels in both the commercial and non-commercial institutions. Only the operation of the equipment is shown to the workers and they master the same on experience.

TABLE XIV

PERIOD OF USE

Institution Name	Equipment	1 to 3 years	4 to 5 years	More than 5 years
1. Sree Annapoorna	All type of equipments			
2. Hotel Sindoori	Bread slicer Expresso Microwave oven Rest of the equipments			
3. TVS-Lucas	All type of equipments			
4. Lakshmi Machine Works	All type of equipments			

From the observation, it is seen that at sree Annapoorna all equipments available were used for more than five years. Where as in Hotel Sindoori except for the bread slicer, expresso coffee maker and micro wave oven were purchened with in three years and rest of the equipments are being used for more than seven years.

Where as in the industrial canteen studied the TVS-Lucas and Lakshmi Machine Works were using all types of equipments for more than five years, may be from the time of inception of the canteen.

**TABLE XV**  
**HAS THE INSTALLATION OF THE EQUIPMENT REDUCE THE**  
**NUMBER OF PERSONNEL**

Institution Name	Yes	No
1. Sree Annapoorna		
2. Hotel Sindoori		
3. TVS-Lucas		
4. Lakshmi Machine Works		

From observation it was noticed that in all the institution, both commercial and non-commercial, installation of particular equipment did not reduce the number of personnels. The equipment helped only to minimize the labour, and time but the number of personnel operating the equipment and working in these units were the same. This is seen from Table XV.

TABLE XVI

## PLACEMENT OF EQUIPMENT

Institution Name	Equipment	Utility Room	Non-Utility Room
1. Sree Annapoorna	Hot case shelf rest of the equipments		
2. Hotel Sindoori	All types of equipments		
3. TVS-Lucas	Curd churner Floor cleaning machine. Rest of the equipments		
4. Lakshmi Machine Works	Milk chilling plant Refrigerator Rest of the equipments		

It is noticed from Table No.XVI that all the equipment available in Sree Annapoorna are placed in the utility area except for the hot case cupboard. Which is in the non-utility room. In Hotel Sindoori all equipments are placed in the utility room. When equipments are placed in the utility room this helps the worker to carryout his work much easily and at the same time, it enable the traffic flow within the unit.

Where as in TVS-Lucas the curd churner and floor cleaning machines are placed in store room. This may be because the utility of the equipment may be rare when compared in the other equipments which are placed in the utility room. In Lakshmi Machine Works canteen, all types of equipments are placed in the utility room except for milk chilling plant (which needs a lot of space) and Refrigerator. These are placed in the still room.

TABLE XVII

## PRECAUTION TAKEN WHILE USING THE EQUIPMENT

Institution Name	Equipment	Use of Rubber overc	Rubber clove	Rubber shoes	None at all
1. Sree Annapoorna	All types of equipments				
2. Hotel Sindoori	All types of equipments				
3. TVS-Lucas	All types of equipments				
4. Lakshmi Machine Works	All types of equipments				

Precautions in using the equipment is an important requisite while handling equipment. It is noticed that no specific precaution were taken while using the equipments in both the commercial and non-commercial institutions. This is shown in Table XVII.

TABLE XVIII

## EQUIPMENT SERVICING

Institution Name	Equipment	Once in a Month	Once in a Year	Once in 5 Years	None at all
1. Sree Annapoorna	All types of equipments				
2. Hotel Sindoori	All types of equipments				
3. TVS-Lucas	All types of equipments				
4. Lakshmi Machine Works	All types of equipments				

If the equipment have to serve us for a long period of time, regular servicing is essential. It was noticed that in Hotel Sindoori regular servicing is being done once in five years for all types of equipment. But in Sree Annapoorna, TVS-Lucas and Lakshmi Machine Works the servicing is being done when there is some problem with the equipment. This is seen from Table XVIII.

## SUMMARY AND CONCLUSION

## SUMMARY AND CONCLUSION

'A comparative study of equipments used in commercial and non-commercial food services' was carried out to elicit the background information regarding the institution details, number of personnel handling each equipment, the amount invested in the particular equipment, turn over per day etc.

Two commercial and two non-commercial institutions were selected for the study. The commercial institutions selected were Sree Annapoorna in Coimbatore and Hotel Sindoori in Madras which were three star hotels.

The non-commercial institutions selected were Lakshmi Machine Works canteen, Coimbatore and the other was TVS-LUCAS Canteen, Madras. The non-commercial institutions selected caters to more than three thousand employees and the selection was done on the basis of meals supplied at subsidised rates.

The results of the present study are summarised below.

1. The commercial food service units are well equipped with latest labour saving equipments according to their need. Where as the non-commercial institutions do have a few labour saving devices which are most essential.

2. It is observed that Sree Annapoorna has different types of equipments in their receiving area compared to Hotel Sindoori. Where as the non-commercial institution, there was no specific equipments in the receiving area.
3. In the pre-preparation area of Sree Annapoorna there were a lot of equipments. Which were very essential. But at Hotel Sindoori there were very limited equipments where as at the non-commercial institutions TVS-Lucas used more equipments when compared to LMW in this particular area.
4. It was observed that at Sree Annapoorna used more electrical equipments when compared to Hotel Sindoori. The equipments used in the preparation area in both the non-commercial institutions were non-electrical.
5. Both commercial and non-commercial units were sufficiently equipped with axillary equipments in their serving areas such as plates, tumblers, tea spoons, cups and saucers, including furnitures.
6. Manual labour was employed in the cleaning of the vesseles in both commercial and one non-commercial institutions. At one non-commercial institution a dish washer was used.

7. The commercial and non-commercial units have a refrigerator in the storage area, which is the only equipment found.
8. Commercial food service units have more number of personnels working in the kitchen, because they are using more equipments and they caters to more number of clientele and also depending on the menu and the recipes prepared.
9. Factors considered in purchasing of the equipment were elicited from the authorities of the selected institutions. Recorded reasons were such as cost of the equipment, frequency of use, installation, maintenance cost, source of supply, fuel economy, work simplifying devices were considered in both the commercial and non-commercial institutions.
10. All equipments in the commercial and non-commercial units were properly installed and grounded.
11. Inspection of equipment is carried out regularly in both commercial and non-commercial food services.
12. In commercial food services the electric bills were taken care of along with the food cost, were as in the non-commercial units the electricity bills was paid along with the institution electricity bill.

13. Most of the food service units were using locally self designed equipments in their units as per their requirements.
14. The commercial food service units used more multipurpose equipments compared to non-commercial units.
15. In both commercial and non-commercial units the main aim was to minimize the labour, and as a result of which more labour saving equipments were available, which minimized on the labour and not the number of personnel operating the equipment.

#### RECOMMENDATION FOR FURTHER RESEARCH

1. The work efficiency of various equipments, both multipurpose and single purpose could be calculated.
2. The same study can be applied to hospitals and university canteens.

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APPENDIX

**APPENDIX I****SELECTION FACTOR**

Kitchen equipment is expensive so initial selection is important. When selecting equipment for the kitchen the essential factors to be taken in to consideration are:

1. Space available - The size and height of the equipment.
2. The cost - To purchase the equipment or lease.
3. Sub-floor - Sufficient strength in the floor to take the weight of the equipment.
4. Energy supply - Existing fuel supply able to take increased load.
5. Drainage/Water - Adequate and suitable facilities, meter costs.
6. Frequency of use - Will the menu make good use of equipment.

7. Load / Capacity - The equipment should be able to cook the quantities of food required by the normal menu.
8. Time available - The equipment should be able to cook the food in the time available.
9. Heat-up time - The length of time required to bring the equipment up to heat.
10. Ease of use - The equipment should be easy for the staff to handle and control efficiently.
11. Ease of maintenance - The equipment should be easy to clean and maintain.
12. Additional equipment - Is it necessary to use any additional equipment or attachments?
13. Extraction - Is it necessary to use an extraction system for fumes/steam.
14. Noise - Is the equipment likely to create an unacceptable noise level.

**15. Fuels**

- A large variety of catering equipment is available that may be operated by gas, electricity or solid fuel. The choice between the fuels is governed by the actual fuel supply being available and the estimated fuel consumption making any increase in fuel use possible.

**APPENDIX IA****EQUIPMENT SAFETY**

The following points need to be considered.

1. Adequate staff training is necessary before the equipment is used.
2. Staff should be tall enough to use the equipment as safety - grills are often high.
3. Waste food particles will burn easily and ignite if not removed.
4. Splashes of grease and fat may ignite if not cleaned away.
5. Drip trays and grill troughs need to be kept clean, to prevent fire.
6. Large trays will be heavy and hot, care is needed when removing them from the oven.
7. The tops of grills, salamanders, ovens and steamers have air vents which must be kept clear and clean.
8. The tops of equipment are often hot. Nothing must be placed on these surfaces.

9. Solid top ranges may be switched off but the heat will be retained for a considerable length of time.
10. Gas safety taps must always be switched off when equipment is not in use.
11. Drainage water taps may be hot and will splash when opened.
12. Electricity switches should be off when equipment is not in use.

**APPENDIX IB****TIPS FOR ENERGY SAVING**

1. Pre-heat equipment such as ovens, stoves, grills, fryers and hot cupboards for the minimum time. For example, when you need to pre-heat an oven, find out how long it takes to reach the correct temperature and switch on at the appropriate time, not hours in advance.
2. Turn equipment off when not being used. Do not leave on the oven or grill unnecessarily.
3. Use equipment to full capacity wherever possible. Not only should ovens and fast chillers/freezers be fully loaded when they are being used, but the next batch of food should be ready so the equipment is used more or less continuously while it is on.
4. Defrost refrigerators and freezers regularly. If ice is allowed to build up, much more electricity is needed to keep the right storage temperature.
5. Use appropriate sized pots and pans. Do not waste energy by leaving hobs and rings half covered. Boil vegetables in minimum amount of water and cover pots and pans to conserve the heat and preserve vitamins.

6. Close oven, refrigerator and freezer doors as quickly as possible plan your work so that you don't have to keep opening the oven, fridge or freezer. This result in a temperature change and more energy is required to return the equipment to the correct temperature.
7. Store hot food for the minimum possible time.
8. Use appropriate cooking methods, some ways of cooking are more energy efficient than others. For example, forced air convection ovens cook faster than general purpose ovens, heat up more quickly, can achieve the same results using lower temperatures and reduce weight loss by 10 to 25 percent.

Pressure steamers cook vegetables more quickly than plain boiling, and use relatively little energy.

## APPENDIX IC

## THE VOLUME OF MEALS SERVED PER DAY

In terms of kinds and numbers of food service establishments, and the volume of meals served, the National Restaurant Association gives the following listing.

KINDS OF ESTABLISHMENT	PERCENT OF TOTAL MEALS SERVED
Restaurants, Cafeterias, Canteens, Lunch counters, refreshment stands	56.27
Industrial Restaurants	4.81
Hotels	7.98
Hospitals	4.28
Schools and Colleges, Clubs, Rail Roads, Steam ships, Airlines, Taverns and Bars, Drug stores, YMCA's and Camps, Department stores, Variety Stores, Candy and Confectionary stores, Cigar stores and stands, Motels and Tourist courts, Delicatessens, Bakery Product stores, News stands, Boarding houses, Religious institutions, Salvation Army, Penal institutions, Miscellaneous	26.66
	100.00

**APPENDIX II****AVINASHILINGAM DEEMED UNIVERSITY****COIMBATORE - 43****A COMPARATIVE STUDY OF EQUIPMENTS USED IN COMMERCIAL  
AND NON-COMMERCIAL FOOD SERVICES**

DATE:

1. NAME OF THE INVESTIGATOR :
2. NAME OF THE INTERVIEWEE :
3. DESIGNATION :
4. NAME OF THE INSTITUTION :
5. PLACE / ADDRESS :
6. TYPE OF INSTITUTION : COMMERCIAL / NON-COMMERCIAL
7. WORKING HOURS :
8. NUMBER OF PERSONNEL :
9. NUMBER CATERED TO :

10. EQUIPMENT USED IN THE INSTITUTION

AREAS	NAME OF THE EQUIPT	BRAND NAME	NUM- BER	CAPACITY	FREQUENCY OF USE	DURATION OF USE	COST OF THE EQUIPMENT	MAIN- TENANCE COST	SOURCE OF PURCHASE
-------	--------------------	------------	----------	----------	------------------	-----------------	-----------------------	--------------------	--------------------

i. PRE-  
PREPARA-  
TION AREA

ii. PREPARATION  
AREA

iii. SERVING  
AREA

iv. WASHING  
AREA

v. STORAGE  
AREA

11. NUMBER OF PERSONS HANDLING EACH EQUIPMENT

EQUIPMENTS	1	2	3	4	5	MORE THAN 5
------------	---	---	---	---	---	-------------

12. What are the considerations for purchasing a equipment for a organisation.

1. Cost
2. Frequency of use
3. Installation
4. Maintenance
5. Source of supply
6. Economy in fuel
7. Menu
8. Availability of Labour
9. Work simplifying device

13. Mode of buying the equipment  
a. Credit      b. Cash      c. Hire purchase
14. If on credit basis what is the frequency of payment  
a. Once in a month  
b. Once in 45 days  
c. Once in 6 months  
d. Annually.
15. Are electrical equipments properly grounded?  
Yes / No
16. Are electrical equipments inspected regularly by an electrician?  
Yes / No
17. If Yes, How often  
a. Once in 15 days  
b. Once in a month  
c. Once in 3 months  
d. Once in 6 months  
e. Annually
18. How often do you pay the electric bills?  
Monthly / Bimonthly
19. Are employees properly instructed in the operation of machine?  
Yes / NO

20. Where was the equipment designed?  
a. By the Institution    b. Local    c. Imported
21. Is it a multipurpose equipment?  
Yes / No
22. If yes for what purposes?  
a. Grinding  
b. Churning  
c. Blending  
d. Slicing  
e. Any other (specify)
23. Was there any special training to the personnel to operate the particular equipment?  
Yes / No
24. If yes who gives it  
a. Chef                      b. Food and beverage manager.
25. If so, what was the period of time?  
a. 15 days  
b. 1 mont  
c. 3 months  
d. 6 months



29. Where do you keep the equipment?

NAME OF THE EQUIPMENT	STORE ROOM	STILL ROOM	IN KITCHEN	IN UTILITY ROOM
-----------------------	------------	------------	------------	-----------------

-----

30. How often do you give equipments for servicing?

EQUIPMENTS	ONCE IN 15 DAYS	ONCE IN MONTH	ONCE A YEAR	ONCE IN 3 YEARS	ONCE IN 5 YEARS	NONE AT ALL
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31. What are the precautions taken while using equipment?

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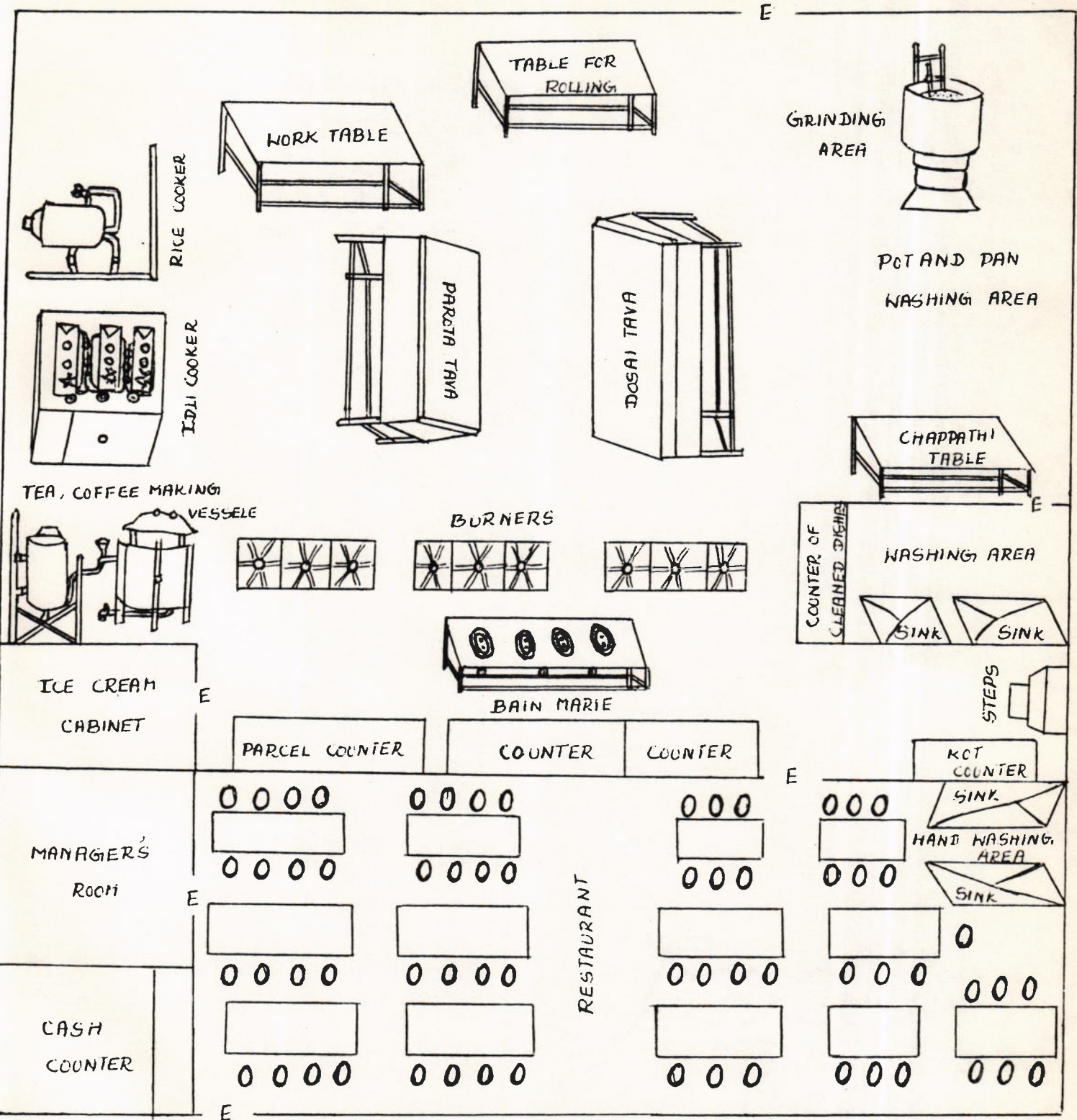
EQUIPMENTS	USE OF RUBBER OVER COATS	RUBBER CLOVES	RUBBER SHOES	NONE	AT ALL
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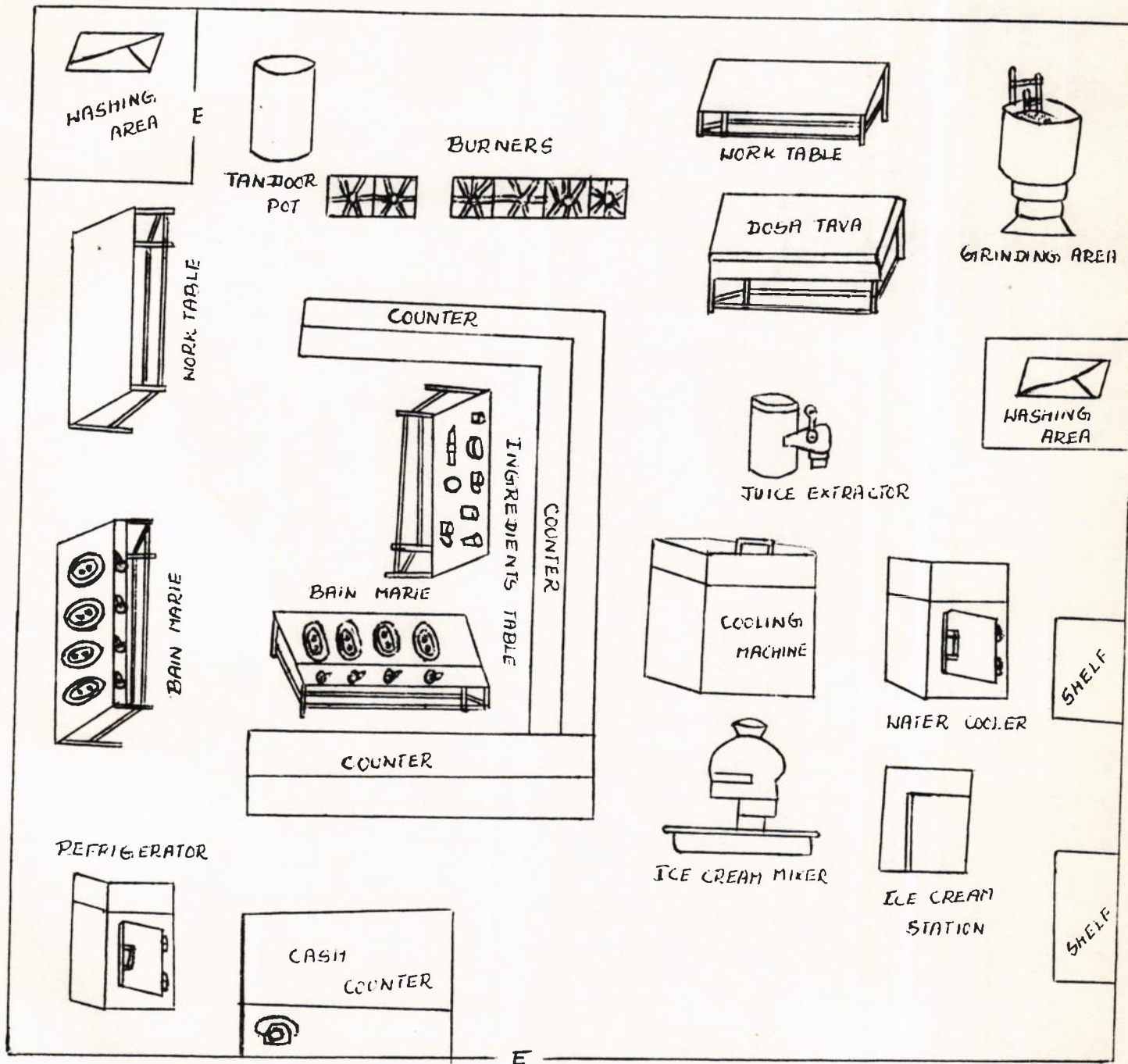
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APPENDIX III

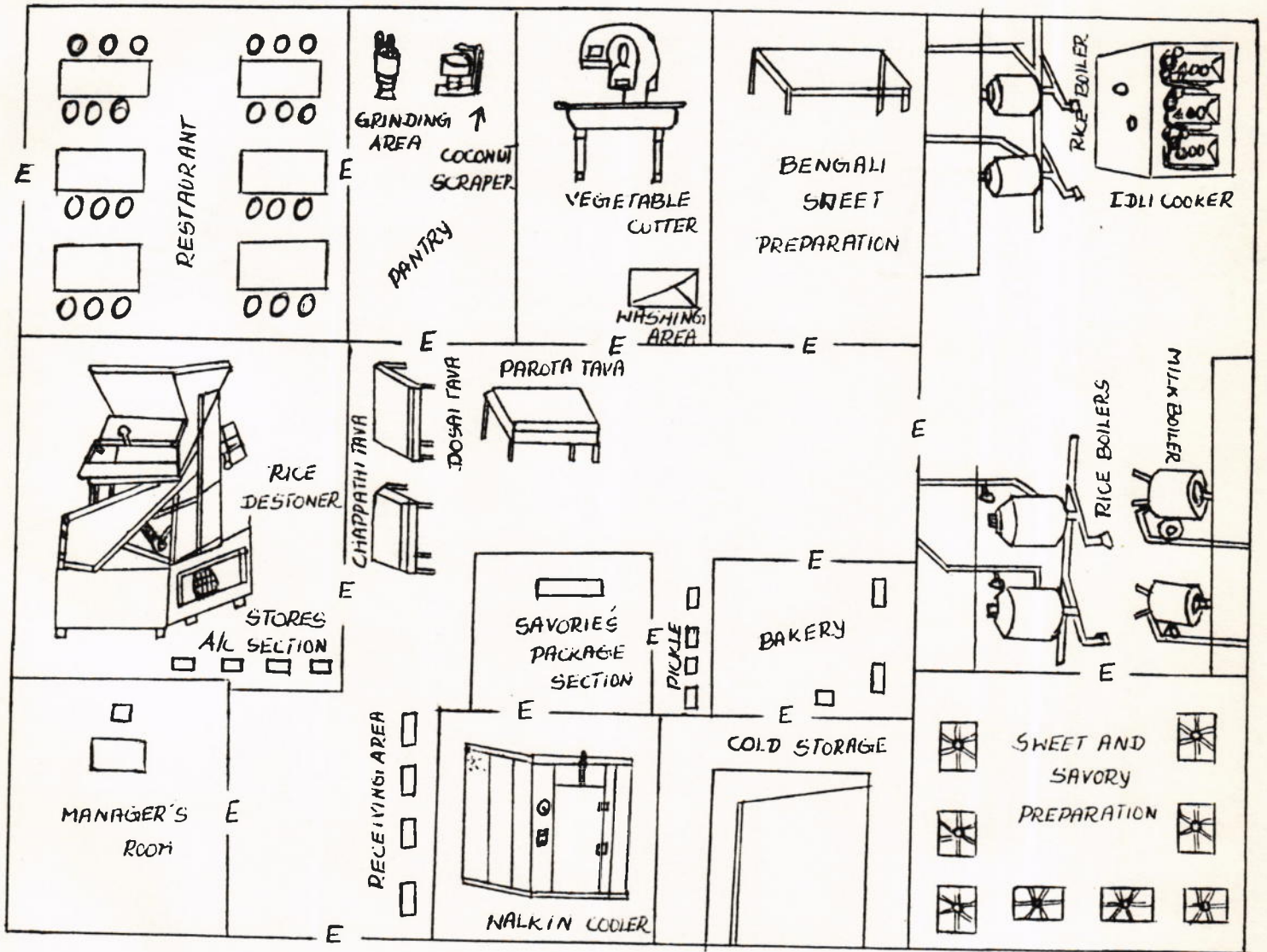
# LAYOUTS



# SREE ANNAPURNA NON A/C RESTAURANT.



# SREE ANNAPOORNA A/C RESTAURANT.



# SREE ANNAPOORNA CENTRAL KITCHEN

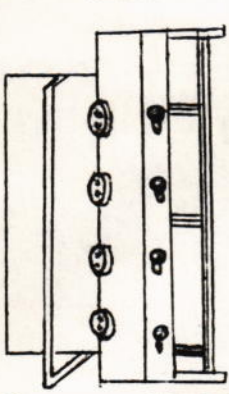
E



GRINDING AREA



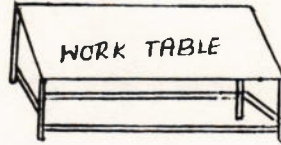
CHEF'S ROOM



SOUTH INDIAN GAS RANGE



BAIN MARIE



WORK TABLE



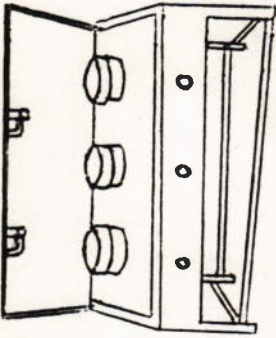
MEAT MINCER



WORK TABLE



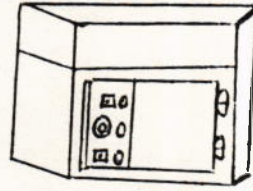
TANDOORI POT



CHINESE GAS RANGE



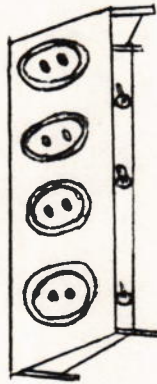
SALAMANDAR



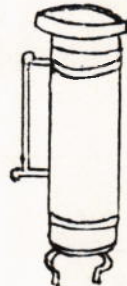
OVEN



REACH IN FREEZER



BAIN MARIE



HOT WATER BOILER



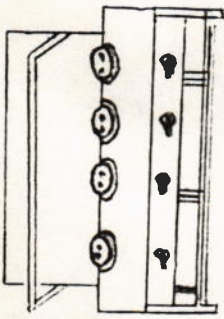
MILK BOILER



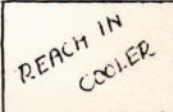
BREAD SLICER



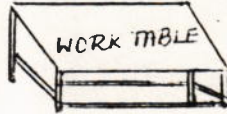
JUICE EXTRACTOR



CONTINENTAL GAS RANGE



REACH IN COOLER



WORK TABLE



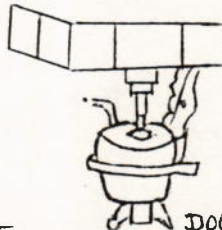
CABINET COLD STORAGE



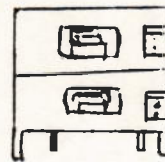
REACH IN COOLER



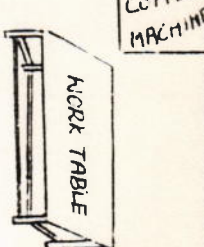
RECEPTION



DOUGH MIXER



DOUBLE DECKER



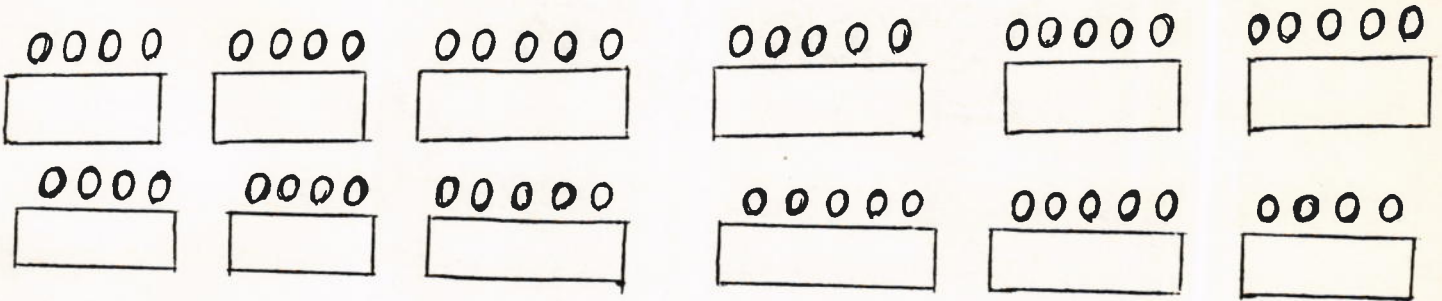
WORK TABLE

COFFEE MACHINE

E

# THE SINDOORI HOTEL

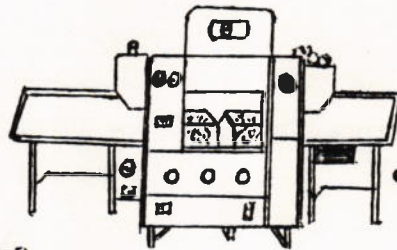
DINING AREA



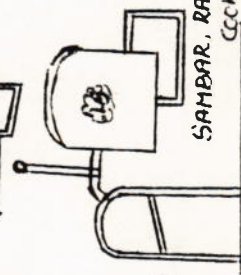
E

E

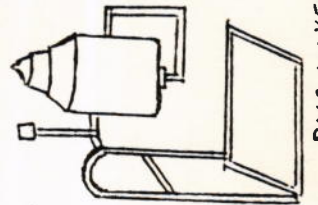
DISH WASHER



SAMBAR, RASAM  
COOKER

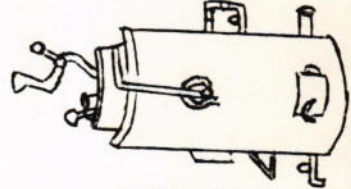


RICE COOKER

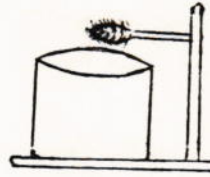


GENERATOR

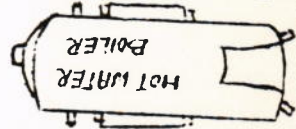
STEAM



COCONUT SCRAPER



GRINDING  
AREA

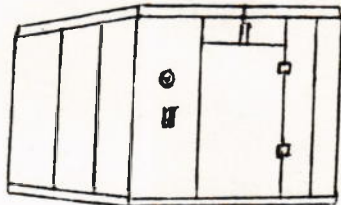


HOT WATER  
BOILER

DINING AREA

E

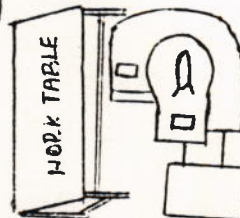
DRY STORAGE



WALK IN COOLER



POTATO PEELER

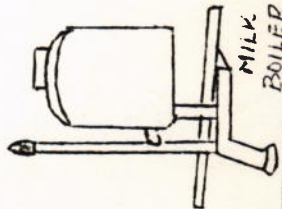
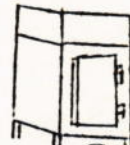


WORK TABLE

VEGETABLE SLICER

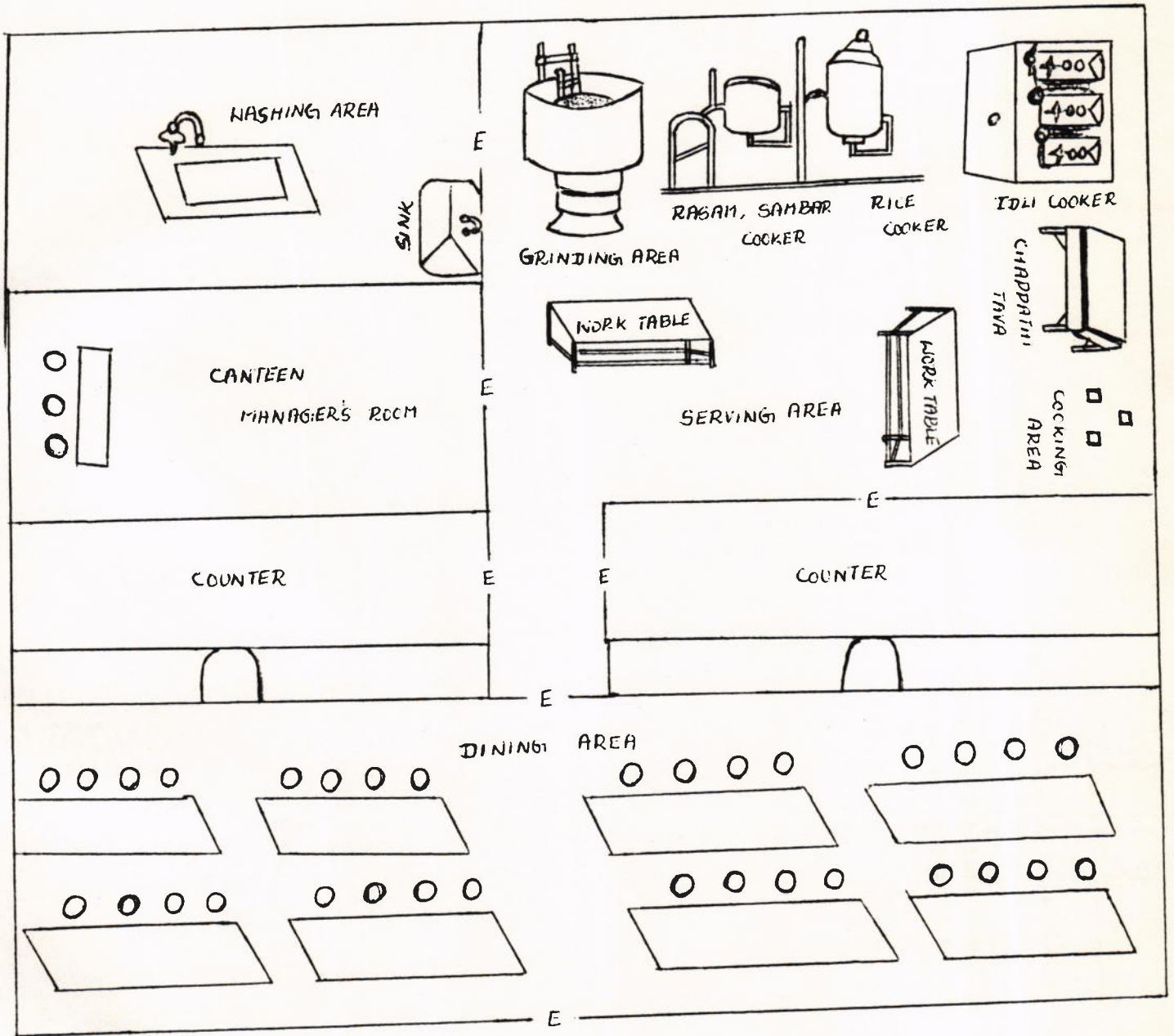
E

REFRIGERATOR



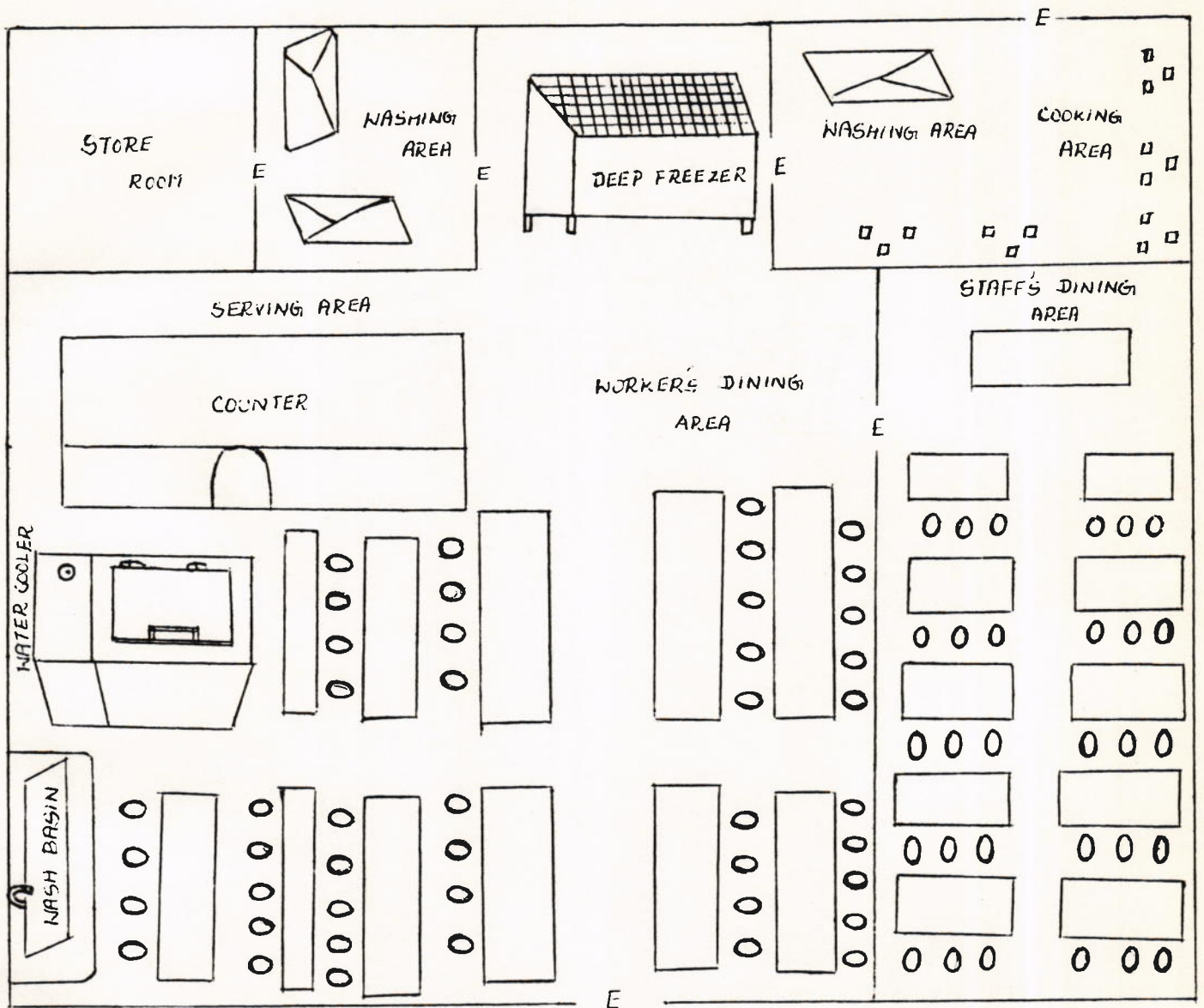
MILK  
BOILER

TVS\_LUCAS



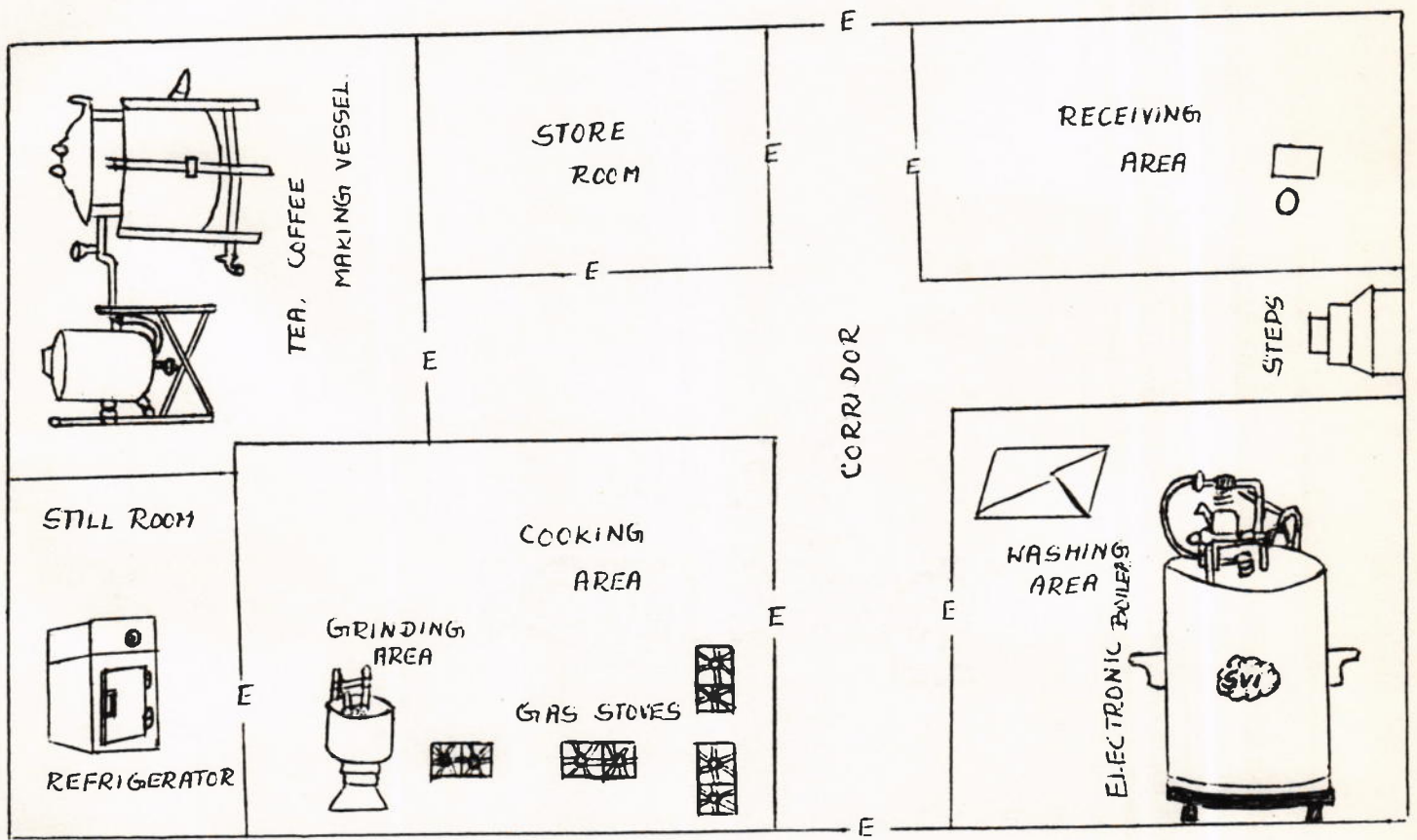
# LAKSHMI MACHINE WORKS

## UNIT - I



# LAKSHMI MACHINE WORKS

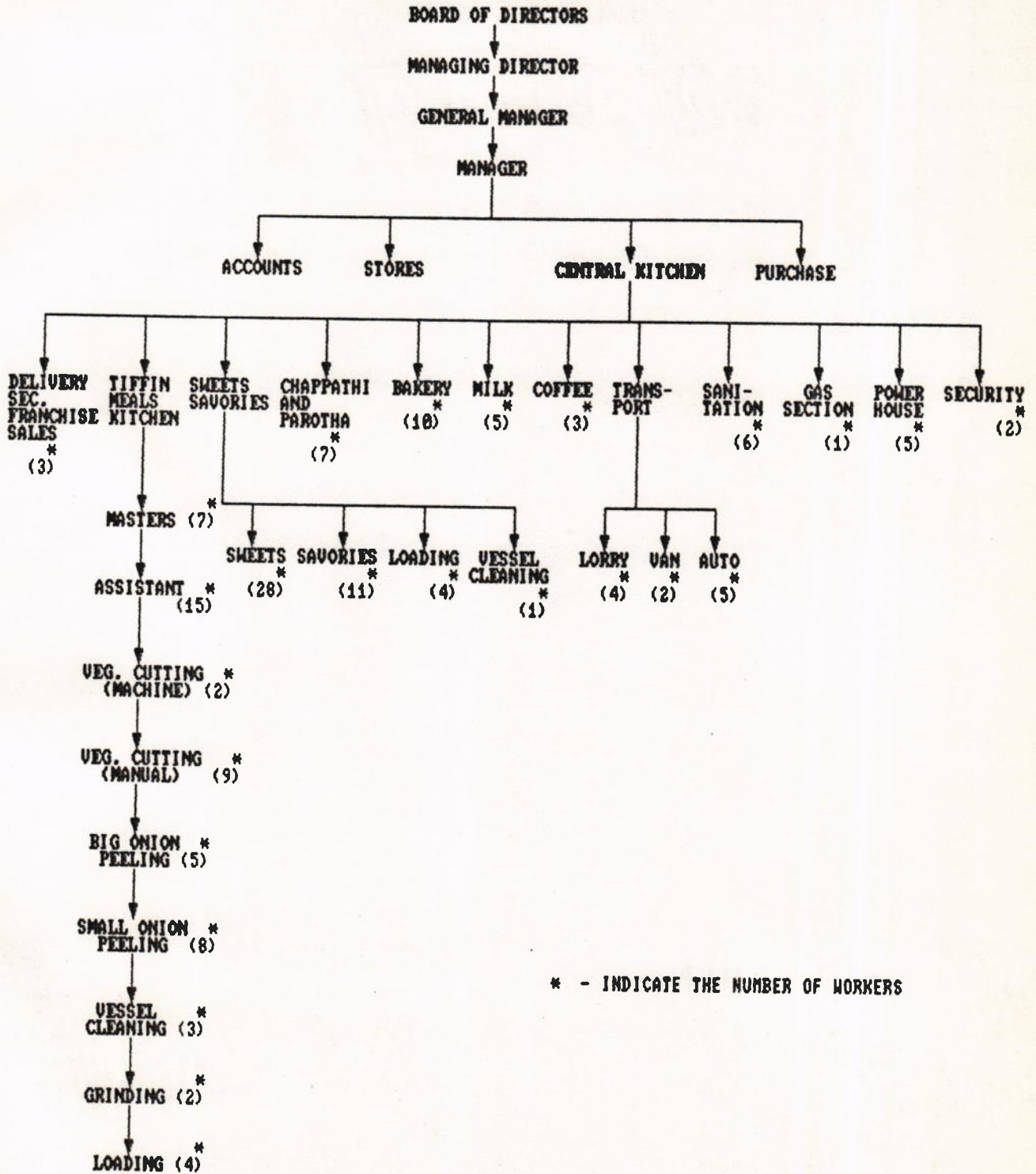
## UNIT II



# LAKSHMI MACHINE WORKS

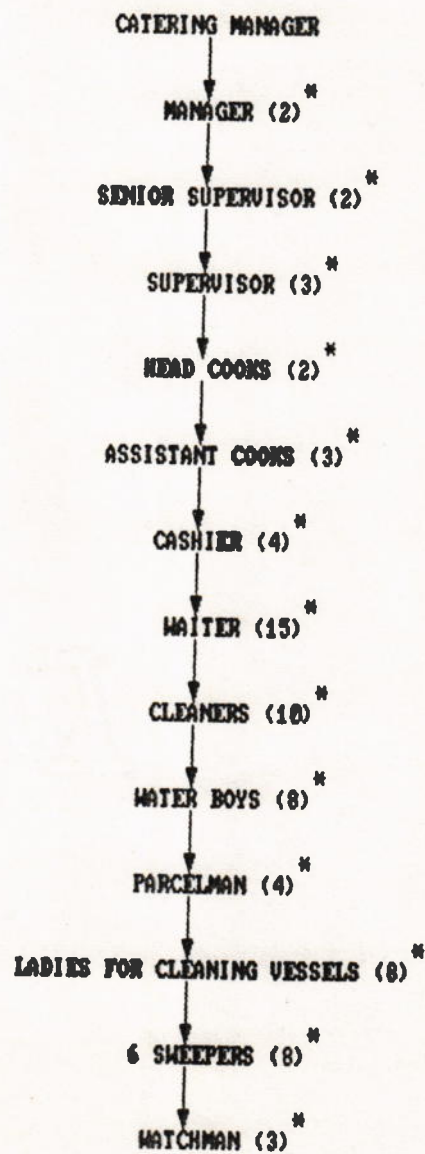
## MTD

**ORANIZATION CHART**  
**SREE ANNAPOORNA HOTELS**  
**CENTRAL KITCHEN**  
**SREE ANNAPOORNA**  
**METTUPALAYAM ROAD, COIMBATORE 641 043**



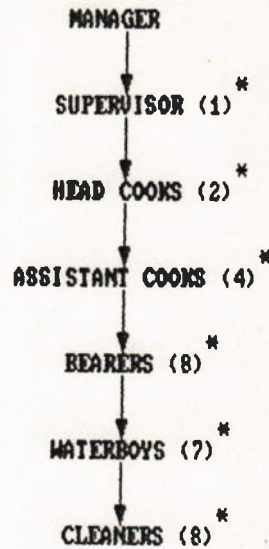
**SREE ANNAPOORNA  
NON-A/C. RESTAURANT**

75, AROKIASWAMY ROAD  
R.S.PURAM  
COIMBATORE - 641 002



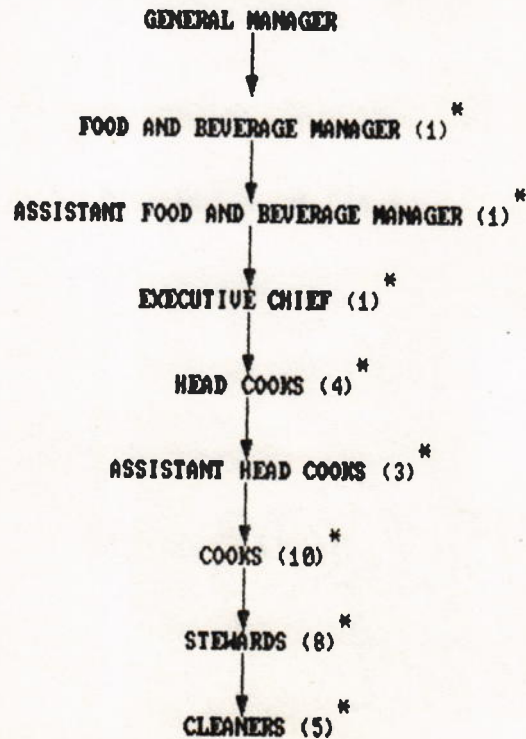
**SREE ANNAPOORNA  
A/C. RESTAURANT**

75, AROKIASWAMY ROAD  
R.S.PURAM  
COIMBATORE - 641 002

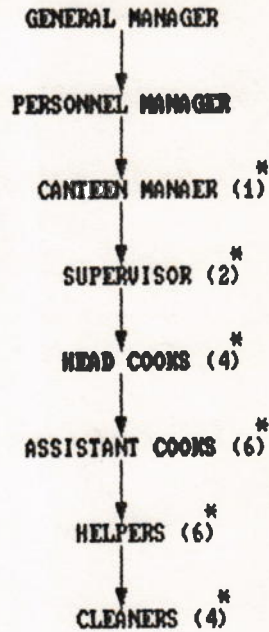


**THE SINDOORI HOTEL**

24, GREAMS LANE, GREAMS ROAD  
THOUSAND LIGHTS, MADRAS - 600 006

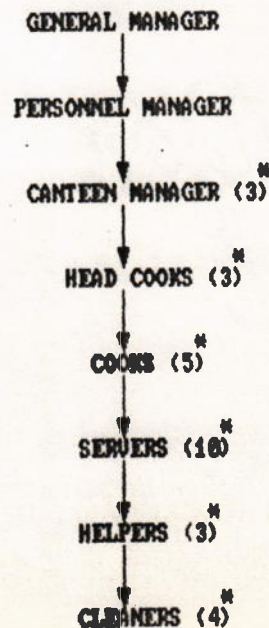


**TUS-LUCAS**  
**PADI**  
**MADRAS 600 050**



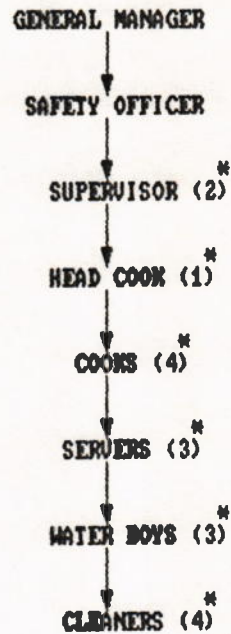
**LAKSHMI MACHINE WORKS**  
**UNIT - I**

**PERIYANAICKENPALAYAM**  
**COIMBATORE 641 020**



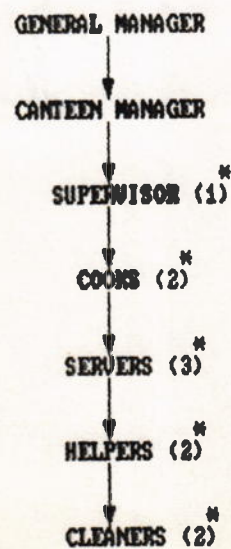
**LAKSHMI MACHINE WORKS  
UNIT - II**

**KANIYUR**



**LAKSHMI MACHINE WORKS  
UNIT - III**

**ARASUR**



## APPENDIX V

## STAR HOTELS IN INDIA

AGRA	Clarks Shuraj, Holiday inn, Jaiwal, Lauries, Mumtaz Ashok, Mughal Sheraton, Maurya Tourist Complex.
AHMEDABAD	Cama, Capital, Capri, Gokul, Karnavati Ashok, Meghdoot, Natraj, Paramount, Ritz.
ALLAHABAD	Royal
AMRITSAR	Almritsar International, Astoria, Blue Moon.
AURANGABAD	Ajanta, Ambassador, Amarpreet, Aurangabad Ashok, Nandanavan, Rama International.
BANGALORE	Ashoka, Bangalore International, Barton Court, Westend Harsha, Paivihar, Swiss Cottage.
BARODA	Express Hotel, Kaviraj, Utsav.
BHOPAL	Imperial Sabre.
BHUBANESHWAR	Prachi.
BIJAPUR	Ashok Travellers Lodge

BOMBAY	Ambassador, Taj Mahal, Oberoi Sheraton, Sun-n-Sand, Centaur, Fariyas, Nataraj, Ritz., President Welcome, Hotel Searock, Westend, etc.
CALCUTTA	Airport, Astor, Great Eastern, Hindustan International, Oberoi Grand, Park, Ritz Continental, Sinclairs.
CALICUT	Seaqueen, Alakapur Guest House.
CHANDIGARH	Oberoi Mountview, Pankaj, Samart.
COCHIN	Casino International, Malabar, Sealord, Woodlands.
COIMBATORE	Alankar, Guru, Minimex International.
COONOR	Ritz.
DARJEELING	Oberoi, Mount Everest.
DEHRADUN	Madhuban, Meddo's Grand, President.
DELHI	Siddhartha, Karishka, Ashoka, Alka, Akbar, Broadway, Gautam, Hans Pvt. Ltd., Claridges, Imperial, Janpath, Lodhi, Oberoi International, Oberoi Maidens, President, Qutab, Rajdoot, Ranjit, Sobti, Taj Mahal, Tourist, Vikram, Maurya Sheraton, Hyatt Regency, Samrat.

DHANBAD	Skylark.
GOA	Aroma Fort Aquada Beach Resort, Goa International, Kenis, Mandovi, Oberoi Bogmalo, Samart, Fidalgo, Welcome Hotel, Cidade-De-Goa.
GOPALPUR	Palm Beach.
GULMARG	Highland Park, Nedou's
GWALIOR	Gujri Mahal, Usha Kiran Place.
HYDERABAD	Welcome Hotel Banjara, Blue Moon, Nagarjune, Ritz, Rajshani, Parklane.
JAIPUR	Bissou, Clarks Amer, Imperial, Jaipur Ashoka, Jaipur Emerald, Rambagh Palace, Welcome Hotel Manshingh, York.
JAMMU	Jammu Ashok, Welcome Group Hotel Asia, Premier.
JORHAT	Paradise.
JULLUNDER	Skylark.
KHAJURAHO	Khajuraho Ashok.
KHANDALA	Khandala Hotel.

KULU	Oberoi Span, Kulu Valley Resort.
LADAKI	Highland, Indus, Noor Mahal.
LUCKNOW	Carlton, Clarks Avadh.
MADRAS	Chola, Connemara, Fisherman's Cove, Gokula, Imperial, Taj Coromondal, VGP Golden Beach Resort Ltd., Saveria, Madras International.
MADURAI	Hotel Apsara, Pandyan Hotel, Travellers Lodge.
MANALI	Travellers Lodge.
MAHABALIPURAM	Temple Bay.
MAHABALESWAR	Dia, Fredrick, May Fair, Regal.
MOUNT ABU	Hilton, Mount
MUSSORIE	Hakmans, Grand Savoy.
MYSORE	Kings Court, Lalitha Mahal Place, Rajendra Vilas, Imperial, Metropole.
NAGPUR	Midland.
OOTACAMUND	Fernhill palace, Dasaprakash, Savoy.
PATNA	Maurya Clarks, Patliputra Ashok.

PAHALGAM	Nataraj, Wood Stock, Pahalgam Hotel.
PUNE	Amir, Blue Diamond, Supreme, White Castle.
SIMLA	Holiday Home, Oberoi, Cecil, Oberoi Clark, Kwality.
SRINAGAR	Broadway, Oberoi Palace, International, Jehangir, Shiraz, President Lake View, Shen Shah.
KOTTAYAM	Anjali.
TRIVANDRUM	Amrita, Belair, Geeth, Raja Hotel, Kovalam Beach Resort.
UDAIPUR	Lake Palace, Laxmi Vilas Palace.
VARANASI	Clark's Pvt. Ltd. Varanasi.
VIJAYAWADA	Natraj.

SOURCE: TAMIL NADU TOURISM DEVELOPMENT CORPORATION