

FOOD WRAPPING PRACTICES AND THE  
REFUSE DISPOSAL PROBLEM IN A RURAL SETTING

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WAS ACCEPTED IN PARTIAL FULFILMENT  
OF THE REQUIREMENTS FOR THE  
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THE EFFECTIVE DATE OF THE AWARD IS

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FOOD WRAPPING PRACTICES AND THE REFUSE DISPOSAL PROBLEM  
IN A RURAL SETTING

By

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B.Sc. (Ibadan)

A Dissertation submitted in partial fulfilment of the  
requirements for the Degree of Master of Public Health  
(Health Education)

At the

African Regional Health Education Centre  
Department of Preventive and Social Medicine  
College of Medicine  
University of Ibadan  
Ibadan, Nigeria

JULY 1982

DEDICATION

Dedicated to the memory of my father,  
Pa. Adelokun Adebayo.

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ABSTRACT

It is the aim of this study to investigate the food wrapping methods of the people in Igbo-Ora (a developing rural area). It has been observed that often, the type of materials used in wrapping food determines the nature of refuse being generated. The food wrapping materials form a great bulk of the refuse.

The traditional method of food wrapping consists of wrapping the food in leaves. It is well documented in the literature that the bulk of refuse being generated in rural and urban areas consist mainly of leaves. This fact has contributed immensely to poor environmental sanitation, the consequence of which may include disease endemicity, occasional epidemics, and a contributing factor to flood and fire disasters.

In order to combat refuse disposal problem both local and state governments have been spending large sum of money, but with little or no positive effect. Furthermore, policy makers e.g. state governors and many authorities have made remarks about the refuse components, i.e. that leaves used for wrapping food constitute the major component of the refuse. Co-incidentally this study endeavours to investigate the opinions of the people on the different types of materials used to wrap food and their preferences in using them.

This study would be useful to Waste Disposal Boards, Plastic/  
Polyethylene manufacturing Industries and all organizations or  
individuals interested in better environmental sanitation in our  
communities.

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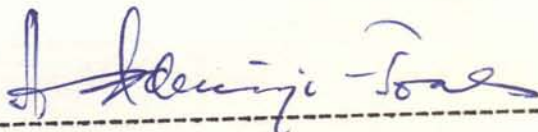
Finally, I give glory to the Almighty God for giving me the energy to complete this work.



CERTIFICATION

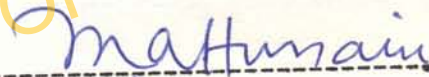
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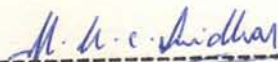
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## CHAPTER ONE

### INTRODUCTION

The problem of refuse disposal in many developing rural and urban areas is a matter of concern to many people and authorities. Increase in refuse generation emanates from increase in population, size of these areas, the habits and living conditions of the people including the traditional food wrapping practices which in some places, consists mainly of using leaves and gives rise to large quantities of refuse. In Nigeria, especially in the Yoruba-speaking areas, many of the local foods such as 'amala', 'lafun', 'eko', 'iyan' (pounded yam), 'eba', 'fufu', 'moinmoin' and 'ogi' are commonly wrapped in leaves and sold or kept until wanted in homes.

#### Handling and Preparation of Traditional food items:

'Amala' and 'Lafun' are popular staples in Western part of Nigeria. One is made from yam or plantains and the other from cassava. 'Amala' is yam flour which is prepared for selling/eating by boiling and stirring the flour in water until it is cooked and thickened. Individual portions are then shaped and wrapped in leaves. These 'balls' can then be bought for eating at food premises, taken home for consumption or if the 'amala' had been prepared at home, served at meal time or set aside for a person who is not immediately present. 'Lafun', made from cassava is treated in a similar way. Recently many food sellers wrap 'amala' in polyethylene.



'Eko': This food item is made from maize. The maize (corn) is first soaked in water for two or three days. It is then milled. The outer coat of the maize is separated and the starchy part is made into a paste which is called 'ogi'. When this paste is cooked and allowed to gel, it becomes 'eko'. Uncooked, it is sold as 'ogi' which can be made into hot pap. When it is made into 'eko', it is traditionally wrapped in leaves to cool, this gives it a characteristic shape and form. 'Eko' is rarely wrapped in polyethylene because in the semi-fluid state it is very hot and cannot be comfortably handled. But the leaves provide insulation and 'eko' makers acquire skill and speed in shaping a number of leaves, pouring in the fluid 'eko' and wrapping it before it becomes too difficult to handle. It is in this form that it is sold and usually, bought and taken home by individual buyers. In Igbo-Ora and other areas of Ibarapa Division, 'eko' is prepared by pouring the thick (cooked) semi-fluid 'ogi' into small calabashes lined with leaves which are then folded and left to cool. When solid, the 'eko' can be removed and sold in exactly the same way as before. 'Eko' made in this way is called 'kolobo'. This method lends itself easily to using the polyethylene film to contain the 'eko' as when the preparation solidifies it stiffens and can conveniently be handled.

'Iyan' (Pounded yam): is made from boiled yam. The yam is pounded while still very hot, adding water as required, into a smooth

and solid consistency in a mortar. Traditionally (when the pounding is considered enough), a quantity of the 'iyan' equal to a marketable portion is **shaped** into a ball and **wrapped** in leaves. This is then sold to be taken away, eaten as a serving in eating houses or disposed of appropriately. Some food sellers now use **polyethylene** to wrap 'iyan'.

'Eba' is made from 'gari' which is made from grated cassava. It is made by stirring the 'gari' in boiling water. In the process, the 'gari' becomes cooked and formed into a starchy mass. Individual portions are then shaped and wrapped in leaves. Polyethylene has also been found useful for wrapping 'eba' by some individuals. Like 'amala, 'lafun' and 'iyan', 'eba' can be bought from the foodseller and taken away or eaten at the food canteen, or if prepared at home, it can be eaten as a serving.

'Fufu' is made from fermented cassava. It is also cooked in boiling water and then wrapped in leaves in a similar fashion ready to be sold. The raw cassava substance may also be compressed, wrapped in leaves and sold to be cooked at homes.

'Moinmoin' is made from beans. The cold bean paste is mixed with such ingredients as pepper, onion, groundnut oil or red palm oil and salt. Individual portions are then wrapped in leaves and cooked by steaming. Only in 'moinmoin' are the leaves actually cooked with the food substance. As the leaves are only wrappers, they have to be

discarded and in like manner, contribute to refuse for which arrangements have to be made for collection and final disposal.

Leaves used in wrapping food constitute a large portion of the refuse in old town area of Ibadan and in Ibarapa Local community. (see tables 1:1 and 1:2). As the final disposal of refuse in most of our communities is so inefficient and haphazard, refuse is allowed to accumulate on streets, to block gutters and water ways, and generally constitute a nuisance. This creates many problems for many communities and because leaves contribute such a high percentage to the total volume of refuse, the question 'What could people use instead of leaves to wrap/contain their food?' comes to mind. Amongst the possible alternatives, paper, cloth, polyethylene or more solid containers, polyethylene seems the most logical and convenient choice. And although some of these materials are already being used, their use is not yet universally accepted.

A study done in the Western State of Nigeria (see page 26) suggests that the use of polyethylene wrap instead of leaves would reduce the amount of refuse generated in a community. One of the aims of this study therefore, is to find out what beliefs and opinions people have about the use of polyethylene for wrapping food. The study also endeavours to investigate the probable problems such as disposal method that may arise and to find ways to tackle such problems. Since some people have been using polyethylene to wrap food

in Igbo-Ora, the adoption pattern of the innovation in the community was also examined.

This study was originally planned to cover both rural and urban areas (i.e. Igbo-Ora and Ibadan) but because of certain constraints the study had to be limited to the rural area.

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## CHAPTER TWO

### NATURE AND EXTENT OF THE PROBLEM

Refuse disposal in most of our urban areas has been described as a major problem by many authorities and individuals. The case of Ibadan city in Oyo State is an example. Nearly every recent government has been and is still being faced with the problem of disposing of refuse to the extent that the problem has become a daily news item in the news media. Refuse is known to contribute to health, economic, social and other community problems. For instance, the government of Oyo State declared sometime ago that N100,000.00 was being spent monthly over one period and that equipment worth 1.7 million Naira had been purchased to dispose of the refuse generated in the city without any satisfactory outcome (Ige, 1982). Refuse disposal is also a potential problem in our rural communities. For example Igbo-Ora, a semi-urban town and a developing rural community may be faced with refuse problems in the future as the population increases.

#### Some Identified Problems Associated with Refuse Disposal:

(1) Occurrence of Diseases: Some communicable diseases, for example gastroenteritis, cholera, and typhoid fever are endemic in our urban and rural areas. Awosaga, et al (1975) conducted a study in Igbo-Ora and reported that both the retrospective and prospective studies of dysenteric diseases in children indicated that the highest

incidence was in Block 3 which is composed of Oke-Iserin I and Oke-Iserin II. They further observed that

... near the market place in this area, the people had a compound refuse-dump and that they all used a common excreta disposal method in the bush. Both reasons may account for the high incident in this block .... The prospective study has shown from data collected that dysenteric diseases contribute more to childhood morbidity than is usually anticipated.

Igbo-Ora had a population of about 37,354 (1963 census). Occasionally epidemics of diarrhoeal diseases like cholera have occurred, claiming many lives inspite of the huge sum of money that have been spent/ by the health authorities to combat the disease. About four hundred (400) deaths occur annually in Igbo-Ora, the majority of which is amongst children in the 0-4 year age range (Olayinka, 1970). This age group is particularly susceptible to environmental health deficiencies to which refuse contribute a significant share.

The hazards to health associated with refuse arise because

- a) some people dump refuse, mainly leaves, indiscriminately including faeces perfectly wrapped amongst the refuse;
- b) dumping ground soon becomes a breeding place for flies and other infective agents of diseases;
- c) the flies act as vehicles of transmission of diseases by contaminating food;
- d) filth and dirt with pathogenic organisms, are also washed from dumps into ground water sources such as streams, ponds and rivers;

e) water from these sources is taken by people who may consequently become ill. This is commonly observed in urban areas when tap water fails and in rural areas where there is no tap water at all.

\*Lawoyin (1978) described poor environmental sanitation, including indiscriminate dumping of refuse, as a cause of dysentery, and other kinds of gastrointestinal tract diseases. This was contained in his address during one of the activities organised by the Adeoyo State Hospital Authority in Ibadan to mark the 50th year anniversary of the hospital.

(2) Rat Infestation:

Rat is known to abound wherever there is refuse. In rural and urban communities, rats are not only found in refuse dumps they also abound in houses where baskets and other open containers are used for collecting refuse, as well as for storing food. The rat is known to play an important role in spoiling food. It eats up food, defaecates and urinates in food stuff such as yam flour 'gari' etc. It also acts as pest when it destroys crop plants by eating up the tuber e.g. yam and cassava tuber. The havoc done by rat causes a great loss to human beings. Though in Nigeria, these have not ever been measured in Naira and Kobo, in other countries, the loss has been estimated. For instance, in the United States alone, it is estimated that what rats eat plus

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\* Dr. V.L. Lawoyin is the current Chairman of the Oyo State Health Council.

what they destroy amount to more than \$2.5 billion (dollars) per year. (Brooks and Brooks, 1979). Rats also play important role in spreading some diseases. Disappearance of refuse from the close vicinity of people would reduce the prevalence of rats.

(3) Fire and Flood Disasters:

Fire is a common occurrence in places where refuse is being dumped indiscriminately. Several fire outbreaks in Ibadan have been attributed to indiscriminate dumping of refuse where spontaneous combustion is likely to occur. <sup>Carelessness</sup> with cigarette ends and lighted matches near refuse dumps also pose a fire hazard. The case of the Dugbe fire outbreak in December, 1978 in which goods worth millions of Naira were destroyed is still fresh in our memory. The cause of that fire incident was attributed to careless handling of fire around the vicinity of refuse which had been indiscriminately dumped in a part of the market.

It is also known that indiscriminate dumping of refuse into gutters and streams can block the flow of water and contribute to flooding. Obateru (1978) commented in his article:

... the average Ibadan resident, is an indiscriminate water polluter. He releases all sorts of litter and rubbish into the city's waterways. There is no stream let alone river, in Ibadan that has not received more than its share of the debris of the city's civilization.

Two pathetic and unforgettable flood disasters in Ibadan in recent times, i.e. flood disaster of April 20, 1978 and August 31, 1980 which claimed many lives and destroyed much valuable properties are believed to have originated partly from blocked waterways.



(4) Traffic Obstruction:

Many roads in our urban areas (e.g. Ibadan and Lagos) have occasionally been rendered almost impassable because of refuse overflowing from dumps or refuse depots on to the roads. Large heaps of refuse adjacent to places, such as markets is a common sight and this has given rise to protest and action by certain community groups. The agitation was in protest against failure of a Municipal government to remove refuse from the dumping ground located within the market premises. Bakare (1978) commenting on such action in one of the local dailies wrote: "Most of the women, armed with shovels and baskets were removing the refuse and depositing it on the main road. This eventually, led to a 'terrible' traffic hold-up". The situation caused a lot of hardship to road users, workers and others within the area of the imbroglio and nearly resulted in a riot.

(5) Smell Nuisance:

This emanates from decomposing vegetable matter and the open burning of refuse. It causes irritation to the respiratory tract of people in the vicinity and even further away when there is a strong wind in their direction.

Daily news in papers, radio and television have commented to call attention to the menace of the refuse in urban communities. This menace has often been highlighted in speeches of government policy makers and others. Steps have been taken to reduce the problem of refuse disposal but the efforts made are not commensurate with the

increase in refuse generation rate which results from population increase. The increase is most marked in the old town area of Ibadan to where people migrate from the rural areas. The number of food sellers in the local area is increasing steadily as there is more demand for food. Food sellers wrap food in leaves, so also are the people in homes who preserve food for household members who may not be present at meal time. These factors have resulted in generation of refuse with very high leaf content and have rendered all efforts made by the local and state governments ineffective. It is also unfortunate that no authority has been able to obtain and sustain the people's participation/involvement in disposing of the refuse they (the people) generate. Active participation/involvement of the people in ridding their environment of refuse, particularly the food-wrap component would help minimise some of the problems associated with disposing of the refuse.

Past and present regimes in Oyo and Lagos States have tried to deal with the problem by buying refuse collecting vehicles, building refuse depots and so on, but the problem remains unsolved. This could be due to such problems as frequent vehicle breakdown arising from misuse and inadequate maintenance of the vehicles. W.H.O. Committee Report (1970) remarked:

... the lorries have to travel over previously deposited wastes, that have not been compacted to dump their loads at the top of the working face, they frequently get **stuck** particularly in wet season. This causes excessive wear

on clutches and tires and sometimes causes undue stress on the hoisting mechanisms on the lorries ... The collection vehicles are run until they breakdown. This results in high maintenance and repair costs and in a low availability for service.

There are not enough spareparts kept in stock ... and this results in repairs taking much longer to complete than should be necessary.

Collection vehicles are being over used because of the frequency of their trips from different dumping grounds or refuse depots to disposal sites arising from the size of the fleet (Number of vehicles available), the volume of refuse they have to deal with and possibly inefficient organization and management. Spare parts for the vehicles are not easily available and breakdown vehicles could not be put back into operation within a short period. A mass reduction in the amount of refuse being generated will reduce the frequency of trips to disposal sites thus reducing the wear and tear of the vehicles and increasing their life span and efficacy.

It is felt that recent food wrapping innovation in some rural and urban communities could reduce the existing and potential refuse problems in those communities.

#### Components of Refuse

A study carried out in Ibadan has shown that leaves used in wrapping food constitute the major component of refuse, especially in the old town area which is typical of the areas occupied by indigenous and low class people in most of our urban settings (Oluwande, 1974).

In most rural areas refuse disposal is not as yet an acute problem but this is not to say it may not constitute a problem in future, as the population grows. The study also revealed that leaves constitute a major component of refuse in a rural area as well (as Table 1.2 shows).

It has been shown that refuse disposal cause more acute problems in the old town and the middle class areas of Ibadan than in the Government Reservation Areas because refuse in the Government Reservation Areas contain less leaves and is therefore of less volume (Table 1:1).

Tables 1:1 and 1:2 below show the nature of refuse both in urban and rural areas. Analysis of these tables would further show the relevance of this study to the possible solution to the problem of refuse.

TABLE 1:1

Composition of Refuse from 3 Social Class  
Areas of Ibadan

Component	Mean % by Weight		
	Government Reservation Area	Middle-Class Area	Old Town Area
Leaves	13.2	33.7	81.3
Paper	12.6	11.3	2.5
Garbage	65.3	41.6	8.2
Tin	4.6	6.2	3.5
Glass	2.1	2.5	0.0
Rag	1.6	3.4	4.3
Dust	0.6	1.3	0.2
Density	256kg/m <sup>3</sup> or 0.256kg/litre	280kg/m <sup>3</sup> or 0.280kg/litre	296kg/m <sup>3</sup> or 0.296kg/litre
Moisture Content	64.8%	61.4%	49.7%

Source: Oluwande, 1974

As has been noted in Table 1:1, leaves constitute the major portion of the refuse generated, especially in old town areas where the refuse problem is most acute. Replacement of leaves with polythylene, the qualities of which will be enumerated later could contribute to solving the problem of refuse in urban area as the other components of refuse in the old town area are infinitesimal. The quantities of other compo-

nents could be due to factors such as

- i) Very little paper is used, so the paper component is as low as 1.5% in old town area.
- ii) The garbage component is low compared with the other two social class areas: This could also be due to the fact that people in the old town area throw away less food as they do not have <sup>much</sup> more than enough to eat. The fact that the garbage content of refuse in both Government Reservation xxxx and Middle class areas is fairly high need not constitute a serious problem because:
  - (a) the garbage could be used in feeding animals and this of course should be encouraged;
  - (b) the bio-degradation rate of garbage is much higher than that of leaves.
- iii) The tin and glass component of refuse in the three social class areas is generally low. This is so because people do not discard tin much and glass materials. The little that are used are resold. Most bottles, used as liquid containers, are returnable commodities after the contents have been exhausted. This should be encouraged. Use of can, which is not returnable, as container for drinks should be discouraged.

iv) The dust component **is** also quite low and might be seen as not constituting problem.

From this discussion one could see that the use of polyethylene by some people in urban areas could be a right step towards reducing the refuse problem.

TABLE 1:2

Composition of Refuse from Ibarapa  
Division

Components	Mean % by weight	
	Ibarapa Staff House	Local Community
Leaves	28.1	49.9
Paper	8.1	0.7
Garbage	43.0	4.4
Tin	3.7	0.0
Glass	4.3	0.0
Rag	10.0	0.5
Dust & Ashes	10.0	0.5
Density	274kg/m <sup>3</sup> or 0.274kg/litre	271kg/m <sup>3</sup> or 0.271kg/litre
Moisture content	57.6%	43.1%

Source: Oluwande, 1974

The refuse component in the two social class areas in Ibarapa show almost the same pattern as that of the social class areas of Ibadan. Also recent weighing of refuse by the researcher from six houses selected from old town area of Ibadan and six from Igbo-Ora local community indicated mean % by weight of leaf component to be 80.7% and 40.8% respectively (Appendices 1A&1B). There is not much difference between the previous study by Oluwande (1974) who indicated that 81.3% of the refuse generated by residents in the old town area were leaves used for wrapping food. However, the slight drop in weight may be attributed to the use of polyethylene wrap as there were evidences of its use in five out of the six Ibadan houses. Polyethylene was found in the refuse containers of the five houses.

There is a remarkable drop in the weight of leaf component of refuse in Igbo-Ora local community. Oluwande (1974) indicated a mean % by weight of 49.9% for Igbo-Ora local community. In the present study, leaves contributed 40.8% of the mean weight of the refuse.

An interesting observation in Ibarapa is that some people are now using polyethylene to wrap food. The practice is found amongst food sellers as well as individuals at home. All houses selected for the weighing exercise have polyethylene wrap in their refuse containers (Appendix 1A). From this, I assume they had been using the polyethylene for sometime. This may account for the drop in weight



of leaf component of the refuse. An investigation carried out in this community (Igbo-Ora) will reveal an <sup>existing</sup> adoption pattern of polyethylene wrap use. This should provide a good basis for comparison if a similar study is carried out in an urban setting.

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CHAPTER THREE

LITERATURE REVIEW

Refuse and Methods of Refuse Disposal

Refuse is "waste from manufacturing or other establishments or any discarded matter" (Hoer and Osol, 1956). The nature of refuse differs a great deal from place to place. Kirk (1949) remarked:

The refuse of a typical community differs a good deal from that of one in a temperate climate, the principal difference being that there is much more organic matter to be handled in the tropics than there is elsewhere and much less ash and cinders. The refuse is therefore more bulky and attractive to flies. On account of the greater heat of the tropics it decomposes more rapidly and soon becomes offensive.

This remark is still true of the nature of refuse in most tropical communities. The major components of refuse generated in such countries are organic matter such as leaf and other vegetative material. The leaf, combined with some other organic substances when exposed to moisture and heat very soon begins to decompose, create the nuisance of offensive odour and provide ideal conditions for fly-breeding. Kirk states further that accumulation of refuse in towns encourages breeding of rats which could help in transmitting diseases e.g. salmonellosis and some other water-borne diseases; and from parasites that rats harbour, some arthropod-borne diseases

as well. The stagnation of water which is always associated with unorganized accumulation of refuse provide favourable conditions for mosquito breeding. Mosquitoes are vectors of malaria and other diseases <sup>such</sup> as yellow fever and filariasis (Lucas and Gilles, 1973). Flies also breed in refuse dumps and take part in the transmission of dysenteries and other gastro-intestinal diseases. Kirk also noted that accumulation of organic refuse may generate enough heat to start spontaneous fires, which in the presence of dry leaf, paper and other combustible materials may spread to involve adjacent houses posing a serious hazard to their occupants. Details about refuse and the menace of refuse have been dealt with under "The Nature and Extent of the problem" (see pp 6-18).

#### Methods of Refuse Disposal:

There are many methods of refuse disposal amongst which are controlled tipping, burning, composting, open dumping and incineration (Lucas and Gilles, ibid).

- (1) Controlled tipping (sanitary land fill) consists of tipping refuse in layers not more than six feet deep and then covering it on all sides exposed to the air with a layer of earth nine to twelve inches deep (Davies, 1977). According to Lucas et al, **this** method consists of depositing refuse in a planned controlled manner. The refuse is spread and compacted to reduce its volume, it is then covered with a layer of earth, which <sup>is</sup> in turn

compacted. This method is used in cities like Ibadan, to reclaim land which is valuable, but it is rarely used in rural areas. One major disadvantage of this method is that it requires about 0.75 to 1.5 acres per year, per 10,000 population which may amount to a large area of land/ (Ehlers and Steel, 1950). The method is satisfactory because it eliminates many of the health hazards associated with refuse and waste materials. Ashes (Maxcy, 1971) and inert material from burnt polyethylene can also be taken care of in this way.

- (2) Burning method is commonly used in both rural and urban areas. It consists of low-temperature burning of combustible components of refuse. In a number of instances, this method does not generate enough heat to destroy the refuse completely since the major component of refuse are garbage and leaves which have a high moisture content (see tables 1:1 and 1:2). The problem is compounded in wet seasons when wetness of the refuse is added to the moisture content. On the other hand, this method could be suitable, if properly used, for the disposal of polyethylene since it (polyethylene) oxidises at relatively lower temperature (Kirk-Othmer, 1967).
- (3) Open dumping is not considered a hygienic method of disposing of refuse. Although it is cheap and demands very little effort,

as has been indicated above, it creates in many ways, a health hazard to the community and detracts from any aesthetic value a locality may possess. It provides a breeding place for rats, flies, mosquitoes (Lucas et al op cit) and other pest; and often gives rise to very unpleasant odours. Burning of refuse is frequently associated with this method. Although this reduces the amount of refuse to a considerable degree, it may give rise to obnoxious fumes, and <sup>is a</sup> fire hazard, especially during the dry seasons if it is not properly sited in an isolated locality and/or efficiently supervised (Anderson, Morton and Green, 1978). This method, unfortunately cannot be recommended for the disposal of polyethylene for two important reasons. The polyethylene, being very light, half burnt scraps may be blown about by the wind, and by this method, burnt lumps cannot be collected for use in fire making (see p 86 ). Also the degradation rate of polyethylene is very slow.

- (4) Composting is a method suitable for the disposal of garbage and other organic materials in refuse. It involves controlling the natural decomposition of organic matter to the extent that the health hazards are completely removed, and it ensures an even and uniform decomposition of the material. It has the advantage that the end products can be used as fertilizer (Smolensky, 1977) for small kitchen gardens and garden allot-

ments. The amount of refuse that can be properly composted at a time is limited and because it will only handle organic matter is not by itself, an efficient municipal refuse disposal method.

(5) Incineration is the destruction of wastes by fire in an incinerator. There are various types of incinerators but certain features are common to all types in their design. These include the furnace, combustion chamber, chimney, charging apparatus and miscellaneous features (Ehler and Steel, Op Cit). In tropical rural areas, incinerators are built locally with mud and do not have all the features mentioned above. Incineration is an ideal method for disposal of refuse, including polyethylene, if the incinerator is properly designed and maintained.

Salvaging (i.e. separation of useful items such as bottles, tins, papers etc) is usually done in developed countries before the refuse is finally disposed. This is rarely done in tropical communities. Kirk (1949) wrote:

In most tropical towns there is not the same opportunity for the exercise of ingenuity where salvage is concerned because there is little of value which can be recovered from the refuse of the same or moderate sized tropical town.

Nowadays there are lots to be salvaged from refuse being generated in big towns like Ibadan and moderate-sized town like Igbo-Ora. Tins, glass etc. (See tables 1:1 and 1:2) can be salvaged for re-use.

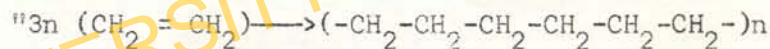
Polyethylene wrap that is now increasingly being used instead of leaves can also be salvaged for re-making polyethylene pellet and eventually new low-density polyethylene film. Depending on its composition, the salvaging could reduce amount of refuse to a remarkable extent.

Polyethylene and its attributes:

Dorian (1964) defines polyethylene as

a \*thermoplastic ethylene polymer, it is a valuable elastomer, with good electrical properties at H.F. (High Frequency) and has many uses in sheet form.

Polyethylene formation is an example of the process known as polymerization - that is joining of several small molecules to make a large molecule called a polymer. The chemical formula of polyethylene formed from ethylene can be represented with the equation:



Where n is about 300" (Holderness and Lambert, 1978).

Polyethylene can resist attack by chemicals (John and Osisioqu, 1976). This and the fact that it remains unchanged under various environmental conditions has a favourable implication for the use of polyethylene as food wrap.

Polyethylene is formed by heating ethene to above 100°C under a pressure of about 1000 atmosphere in the presence of a trace (about 0.01%) of oxygen. The resulting material is then processed into thin

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\* A classification for materials that can be made soft by the application of heat, and which harden upon cooling.

sheets. The polyethylene generally used as wrap, softens at around 120°C (Holderness and Lambert, 1978). Food commonly wrapped in polyethylene do not usually have such a high temperature.

Among the possible objections to using polyethylene for wrapping food is that it may contaminate the food, and may thereby have a carcinogenic effect. But as polyethylene is inert, the likelihood is not very great. This view is supported by considering the mechanism of oncogenesis of plastic material, polyethylene inclusive. Holland and Frei (1974) discussing the oncogenesis of implanted plastic material wrote:

During studies of an experimental model for hypertension involving plastic materials implanted subcutaneously in rodents, sarcoma formation was observed. Extensive studies show that the chemical nature of the implant was immaterial .... The necessary condition was the physical form, shape, and minimum size. The same material inserted as powder or smaller fragments failed to yield sarcoma.

If the plastic inserted as powder or smaller fragments failed to yield sarcoma (a malignant growth) plastic (i.e. polyethylene) used in wrapping food is most unlikely to cause cancer because it has neither the direct nor intimate contact with the tissue of the body as does the inserted powder or smaller fragments.

It has been reported that some countries have already adopted the use of polyethylene in solving their refuse problems with good effect, and, no adverse reports relating to the use of this material have so far come out. Example of such<sup>a</sup> place is Bangkok, Thailand



where polyethylene has replaced banana leaves for wrapping foods. (W.H.O. Committee Report, 1970). If a similar idea is adopted in our urban and rural areas, the amount of refuse being generated would be reduced remarkably. The report further states:

If polyethylene which is now manufactured in Nigeria did replace the use of leaves in Ibadan, the (residential) generation rate for the old town refuse could drop from 1.2 lb. to about 0.7 pounds per capita per day .

Although polyethylene is not bio-degradable, it can be easily melted by moderate heat and formed into lumps which being inflammable, can be used to start domestic fires. When used this way, the material burns giving off light smoke and ashes. There is no evidence that the light smoke given off when polyethylene is heated constitutes a health hazard. Kirk-Othmer (1967) wrote:

When heated in air or oxygen polyethylene oxidizes at lower temperatures, so do all hydrocarbons, and although the reaction is generally very slow at first, the induction period is followed by a substantially more rapid oxidation.

Heating of polyethylene in air is the most likely disposal method individuals could adopt. Kirk-Othmer further explained that:

Polyethylene begins to decompose slowly in vacuo or in an inert atmosphere at about 300°C and more quickly at higher temperature to give breakdown products consisting chiefly of lower-molecular weight hydrocarbons. Above 350°C gaseous products are evolved, butylene being the chief component; depolymerization to ethylene does not occur.

Butylene ( $C_4H_8$ ) is a raw material for making synthetic rubber. (Thorpe, 1946). This could be exploited by the rubber industries, which could

collect wastes of polyethylene and use it for making rubber (see page 94 for suggested method of collection).

### Social Change and Adoption of Innovation:

The adoption of polyethylene film as a food wrap (an innovation) to replace leaves is a form of social change. Social change is the process by which alteration in the structure and function of a social system occurs (Roger and Shoemaker, 1971). When a new method of doing certain things is invented, adopted and practised or a new behaviour is adopted within a community, a social change is said to have occurred. The adoption of a new food wrapping method can be considered social change. The process of change consists of three sequential steps i.e.

- 1) Invention: the new idea is developed and expressed
- 2) Diffusion: the new idea spreads and gain the attention of members of the community who adopt it.
- 3) Consequences: are the effects of such adoption.

Types of social change:

- 1) Immanent Change: This occurs when a social system members invent and develop a new idea with little or no influence of external source.
- 2) Contact change occurs when new idea is introduced to a social system from external source. This can take different forms i.e.
  - a) Direct contact change (Planned change). Change is effected by outsiders who, on their own or as represen-

tatives of change agencies, intentionally seek to introduce new ideas in order to achieve goals they have defined.

- b) Selective contact change: In this case, members of a social system are exposed to an innovation, usually spontaneously or accidentally. The adoption or rejection of such innovation is based on the perceived need of the people. Contact change often involves the activities of change agents and the client community. The change agents should work to improve their clients' capabilities and competence to analyse needs, and if this is emphasized, immanent and selective change may become easier. Furthermore, this could be achieved by effective communication which could also be attained when source and receiver are homophilous.

One of the most distinctive problems in the communication of innovations is that the source is usually quite heterophilous to the receiver. However, "Heterophilous individuals who have high empathy are in a social psychological sense, really homophilous" (Roger and Shoemaker, Op Cit.). The high empathy is an important attribute of a change agent. The homophily could be achieved by the change agent bringing himself to the level of his clients. He should know and

respect his clients' views and opinions and should be able to interact freely with them. In a nut-shell, he must possess an agreeable personality and <sup>in</sup> ~~be~~/Consonance with his clients'.

Social change occurs when innovations are adopted. The use of polyethylene wrap for local food by some people in some communities is an evidence of social change in food wrapping practice.

Roger et al., (1971) defined innovation as "an idea, practice or object perceived as new by an individual". They further explained that:

It matters little as far as human behaviour is concerned, whether or not an idea is "objectively" new as measured by the lapse of time since its first use or discovery. It is the perceived or subjective newness of the ideas for the individual that determines his reaction to it. If the idea seems new to the individual, it is an innovation.

consideration of the

The later part of this quotation is very relevant to the use of polyethylene wrap as a food wrapping innovation. The discovery of polyethylene wrap, especially, the low density polyethylene was made a long time ago. It has been in use in several developed countries. Other countries such as Thailand, Cameroon have also used polyethylene wrap. Its use in Nigeria is very recent, roughly as from 1974. Until 1982, the idea of using polyethylene wrap was not known to many people in Nigeria.

Adoption Process:

"The seeds of great discoveries are constantly floating around us but they only rest in minds well prepared to receive them"(Cannon, 1945). This adage simply summarises the process of adoption. New things/discoveries or ideas always abound in human beings' environment. Some may not be aware of the new things, some may be aware but may not give it any consideration at the material time, while some may try the new idea and may eventually accept or reject it.

The adoption process consists of several stages. The stages postulated by a committee of rural sociologists in 1955 are as follows:

- (1) Awareness stage: This is also termed exposure. It is the stage at which the individual is exposed to the innovation but lacks complete information about it (Emery and Oeser, 1958). The primary function of this stage is to initiate the sequence of later stages that lead to eventual adoption or rejection of an innovation. The belief that awareness could be by accident has been criticised by Hassinger (1959). He argued that information about new ideas often does not create awareness. Even though the individual may be exposed to the information, the awareness is only created in the individual when he has a problem or a need that the innovation is likely to meet.
- (2) Interest stage: The individual becomes interested in the new

idea and seeks more information about it. Usually the individual favours the innovation, but he is yet to judge its value in terms of his own situation. The interest stage <sup>is</sup> composed of the cognitive aspect of behaviour (Lavidge and Steiner, 1961). The individual becomes more psychologically involved with the innovation at this stage than at the awareness stage.

- (3) Evaluation stage: At this stage mental calculation of the benefit to be derived ~~xxxx~~ from applying the new idea to his present and anticipated future situation is estimated. If the individual concludes that the advantage outweighs the disadvantage he then decides to try it. If he perceives <sup>that</sup> the disadvantage outweighs the advantage he would decide not to try it. A reinforcement effect is needed <sup>the</sup> at evaluation stage to convince the individual that he is likely to help himself by accepting the innovation. Mass communication has been found to be ineffective to provide reinforcement strong enough to convince the individual at the evaluation stage (Roger, 1962). A face-to-face interaction of the individual with a change agent would be more effective.
- (4) Trial stage: The individual uses the innovation on a small scale in order to determine its usefulness and relevance to his own situation. The advantages or otherwise observed at the trial stage will determine the adoption or rejection of the innovation. During the pretest of my instrument for data collection at Eruwa,

a housewife revealed to me that she had tried the use of polyethylene wrap for food and she was just deciding on whether to accept or reject the use of the wrap. The utility of polyethylene wrap in her own situation was seen as a disadvantage after trying it on two occasions. The food she wrapped in polyethylene used to get watery and too soft within twenty-four hours of wrapping. On the other hand, during the same exercise, another respondent revealed that food wrapped in polyethylene did not go bad for two days. In the first example the same thing could have happened to the food if wrapped in other materials. Since many factors could be responsible for food becoming soft within twenty-four hours e.g. if the food-stuff used is not of good quality, for instance, poor quality yam flour or if the food is not well cooked. One's experience about an innovation at the trial stage determines the adoption or rejection of the innovation. The first woman's experience may eventually end up in rejection of the food wrapping innovation whereas the second example may finally adopt the innovation.

- (5) Adoption or rejection stage: The innovation is either rejected or accepted by an individual depending on the perceived outcome at the trial stage.

These stages of adoption process have been criticized by some authorities for its simplicity. It was also highlighted that the adoption

distinctly process may not always include all the five stages as some may be skipped and the process short-circuited. For instance, Wilkening (1956) and Emery and Oeser (1958) postulated a three-stage adoption process. The fewer the stages of the adoption process the shorter the time lag for adoption to occur; and the better for the innovation. The adoption period (i.e. the time lag between awareness and adoption) depends on certain factors which could be inherent in the innovation itself or in the individuals.

#### Factors Influencing Adoption Rate:

##### Compatibility:

This is the degree to which an innovation is seen to be consistent with the existing values, past experiences, and needs of the receivers. A totally strange idea to a social system will not be adopted as rapidly as ~~xxx~~ one that is compatible. Compatibility is determined by socio-cultural values and beliefs, the consequence of ideas previously introduced and the clients' need for innovation. Clarifying the socio-cultural values, beliefs and clients' need about the food wrapping practice is an aspect of this study.

##### Complexity:

It is the degree to which an innovation is perceived as relatively difficult to understand and use. Innovation may be classified on a complexity - simplicity continuum. Kivlin (1960), Singh (1966a) and Petrini (1966a) carried out similar studies but



at different times and places and found that the complexity of farm innovations was more highly related in a negative direction to their rate of adoption. Certain food items like 'eba', and 'iyan' (pounded yam) are simple to wrap in polyethylene because they are nearly solid whereas wrapping other food items like 'eko' and 'moinmoin' (much more fluid) are a bit more complex hence these food items are rarely wrapped in polyethylene. Explanation and demonstration would facilitate the use of polyethylene for wrapping the food items.

#### Trialability:

Trialability is defined as a degree to which an innovation may be experimented with on a limited basis (Roger, et al., 1971). Studies conducted by Kivlin (1960), Singh (1966a) and Fliegel and others (1968) support the view that the trialability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. The use of polyethylene as a wrapping innovation can easily be tried on small scale. This advantage provides a promising future for the adoption of the food wrapping innovation.

#### Observability:

This is the degree to which the outcome of new ideas are visible to others. The observability of an innovation as perceived by members of a social system is positively related to its rate of adoption.

Hruschka and Rheinwald (1965) discovered that the more observable innovations diffused more widely than the less visible ones. Demonstra-

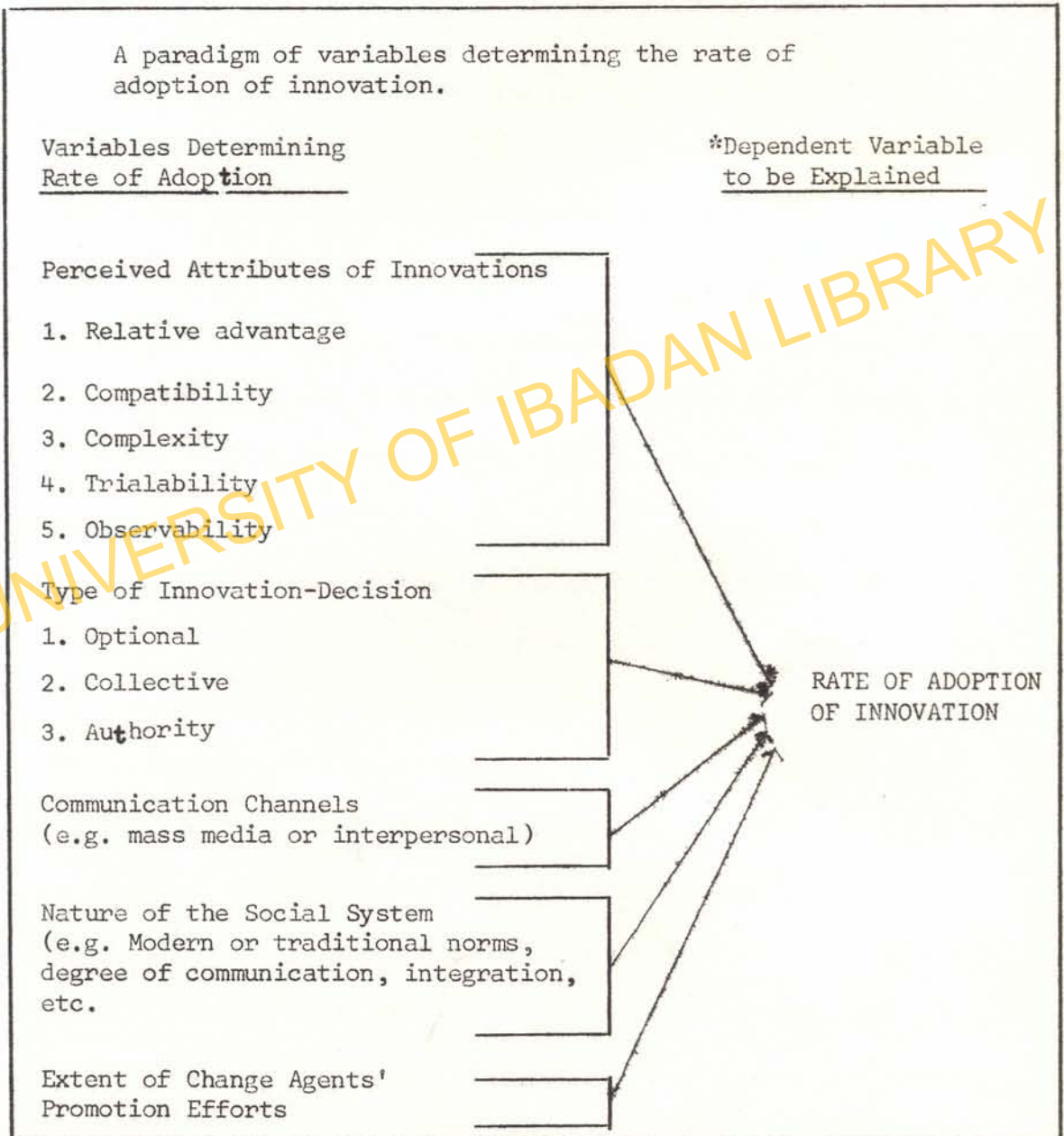
tions of a less observable innovation by change agents are an attempt to increase the observability of an innovation. However, <sup>the result of</sup> Hruschka and Rheinwald (1965) ~~XXXXXX~~ imply that some innovations do not lend themselves well to demonstrations thus making them less observable. The outcome of the food wrapping innovation is easily observable i.e. it is neater and at times cheaper than other food wrapping materials e.g. leaf. Furthermore, the wrapping of more complex food items like 'eko' can easily be demonstrated by trained change agents.

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FIGURE I:

Variables Determining Rate of Adoption

(Roger and Shoemaker, 1971)



\* e.g. Rate of adoption of innovation in a social system.

Other variables that affect adoption rate are:

Types of innovation-decisions: Innovation-decision process is "the mental process through which an individual (or group) passes from first knowledge of an innovation to a decision to adopt or reject and to confirmation of this decision" (Roger, et al., 1971).

An innovation requiring the decision of any authority will be adopted more rapidly because fewer number of people are involved in the decision-making process. The process may however be delayed in case of traditional authority.

Decision process is also rapid in optional innovation-decision whereas the process may be much delayed in case of collective decisions, where majority in the social system have to be convinced to accept the innovation.

The more persons involved in making an innovation-decision, the slower the rate of adoption. With this assumption it may be necessary to alter the unit of decision so that fewer individuals are involved in order to speed the rate of adoption.

Communication Channels: The choice of communication channel to speed adoption rate depends on the complexity of the innovation. A combination of two or more mass media may work very well while a single mass media e.g. radio may suffice with simple innovations like accepting vaccination. In highly complex type of innovation, combination of the mass media such as posters, radio, television etc. and contact with

change agents may be crucial for effective diffusion of the innovation. In a place like Igbo-Ora, diffusion of food wrapping innovation could be effected by direct contact of change agents with the people.

#### Extent of change agent's promotion efforts:

For a change agent to be effective, he/she must be highly empathetic. The change agents should probably first direct their efforts to opinion leaders because, Stone (1952) and Petrini (1966a) show that the greatest response to change agent effort occurs at about the point when opinion leaders are adopting the innovation.

#### Categorization of Innovation Adopters:

In any given social system the rate of adoption of innovation varies with individual within the same social system. Categorization is based on the time lag between awareness and adoption of the innovation by the individuals. In categorizing adopters, certain principles must be observed, i.e. the categorization should:

- 1) be exhaustive, or include all the respondents of the sample
- 2) be mutually exclusive, or exclude from any other category a respondent who appears in any one category
- 3) be derived from one classificatory principle

(Jahoda, 1951).

#### Categorization according to Roger and Shoemaker (1971)

- 1) Innovators: Persons in this category are venturesome and always eager to try new ideas. They are usually cosmopolites.
- 2) Early Adopters: They are local elites who usually command the

respect of their peers. They are the opinion leaders in most social systems and potential adopters look to early adopters for advice and information about innovations. The assistance of early adopters should be sought by change agents to facilitate diffusion of an innovation.

- 3) Early Majority: This category adopts innovation before the average member of a social system, often after some time of deliberation with their peers. Leadership seldom emerge from among early majority but they follow with deliberate willingness.
- 4) Late Majority: Are skeptical about new ideas and only adopt innovations just after the average member of a social system. The late majority only adopt new ideas as a result of economic necessity or increasing social pressure.
- 5) Laggards: These are traditionalist in outlook. They think in terms of what has been done in the past generation and are very resistant to change. By the time laggards finally adopt new ideas the innovators would have been using another more recent innovation. Roger et al., (1971) rightly put the attribute of laggard in nutshell by this statement:

"While most individuals in a social system are looking to the road of change ahead, the laggard has his attention fixed on the rear-view mirror".

### Generalizations on Adopter Categories Characteristics

These generalizations are gleaned from several studies carried out by researchers on innovation. The characteristics are summarised under the following headings:

- 1) Socio-economic status
- 2) Personality variables
- 3) Communication behaviour.

The early adopters have certain attributes which makes them favour innovations more than the late adopters. The attributes are compared as follows:

	Early Adopters	Late Adopters
<u>Socio-economic factor:</u>		
i) Age	No difference	No difference
ii) Education	More years of education More literate	Less year of or no formal education Less literate or illiterate
iii) Social Status	Higher	Lower
iv) Upward Social mobility	Greater degree	Lesser Degree
v) Economic orientation	More commercial	More subsistent

	Early Adopters	Late Adopters
<u>Personality Variables</u>		
vi) Empathy	Greater empathy	Less empathetic
vii) Dogmatism	Less tendency to be dogmatic	Higher tendency to be dogmatic
viii) Ability to deal with abstraction	Greater	Less
ix) Rationality	Greater	Less
x) Intelligence	Greater	Less
xi) Attitude toward change	More favourable	Less favourable.

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## CHAPTER FOUR

### THE STUDY

#### Purpose and Objectives of this study:

It has been observed, in both rural and urban areas, that people have been using polyethylene for wrapping food, especially solid food such as 'eba', 'amala', 'iyam' (pounded yam) and 'fufu'. Some individuals have expressed negative views while some have also expressed positive views about the use of polyethylene wrap for food. This research is an initial study which is to try to find out what are the beliefs, opinions and behavioural factors that the people have, and what practice(s) they have adopted which may enhance or militate against the adoption of polyethylene wrap in rural community.

Also the hygienic qualities of different food wraps (i.e., leaves and polyethylene) would be verified. This study will provide a basis or baseline for future studies.

#### Specific Objectives:

- (1) To examine the characteristics of the people in relation to certain generalizations about those who innovate (e.g. Association between educational status; age and adoption of innovation).
- (2) To investigate the pattern of utilization of different food-wrap materials.

- (3) To investigate how users of polyethylene dispose of their waste.
- (4) To investigate the eating habit of the rural population which may or may not favour preserving food by wrapping.
- (5) To identify source of information common to the rural population about the use of polyethylene wrap.
- (6) To determine if contamination of food occurs with leaves vis-a-vis polyethylene when used as food wrap.
- (7) To suggest an educational approach appropriate for the use and disposal of polyethylene wrap.

Hypotheses:

The following working hypotheses were formulated in order that the objectives of this study may be fulfilled. They are stated in the form of 'Null hypotheses' which are to be rejected or accepted.

- (1) That there is no association between educational status and preference for particular type of food wrap.
- (2) That there is no association between the age of a person and his/her preference for the use of polyethylene wrap.
- (3) That there is no association between contact with urban centres and acceptance of polyethylene wrap.

Definition of Terms as Used in this Study:

1. 'Educational Status' is defined in term of whether one is an illiterate or a literate.

2. 'Enumeration area' is the division of Igbo-Ora into smaller units for the purpose of census. Each of the units has a number referred to as enumeration number.
3. 'Food wraps' are materials e.g. leaves, polyethylene or paper that can be used for wrapping food.
4. 'House consumer' is a person who consumes food prepared by house users.
5. 'Household' consists of persons, including husband, wife and their relatives, children and househelps, who live together and eat from a common pot.
6. 'House user' is a person who uses wrap for food prepared for a household.
7. 'Ibarapa local community' is the part of Igbo-Ora occupied mainly by the indigenous members of the community.
8. 'Ibarapa staff house' is a house built or rented by the government agency for its employees.
9. 'Illiterate' is a respondent who did not attend any formal institution of learning including those who could read and write but without attending any school.
10. 'Important personality' is a person who is seen as being important in his/her community.
11. 'Literate' is a respondent who attended formal institution of learning (i.e. elementary to University and who is able to read and write.

12. 'Primary user' is a person who prepares food and applies the food wrap. In this study primary users are the food sellers and a person who prepares food for a household.
13. 'Professional user' is a food seller who uses food wraps for the food she sells.
14. 'Secondary user' is a person who eats the food wrapped in food wrap, i.e. customer of the food seller and house consumers.

#### Assumptions:

Some assumptions basic to pursuit of this study are:

- 1) Food wrapped in polyethylene is safe for human consumption.
- 2) Community members interviewed will give true information about their food wrapping method(s).
- 3) Refuse disposal is a major and potential problem in urban and developing rural areas respectively.

#### Description of the Study Area

This study was carried out in Igbo-Ora - one of the seven major towns of Ibarapa Division and the Headquarter of Ibarapa Central Local Government Area of Oyo State, Nigeria (see Map 1). It is a rural town with a population of 37,354 (1963 census). Estimated population by 1983 and 2000 AD are 61,205 and 93,131 respectively (using 1963 population i.e.  $37,354 \times 2.5\%$  growth rate per annum) (Dally, Filani and Richard, 1981). With the population estimate, there is a tendency

for refuse generation to increase with the population growth. There is every probability too that leaf component of the refuse would be much greater than other components if leaves are still being used for wrapping food. For instance, leaf component of refuse in old town area of Ibadan by the year 1970 was 80.7% <sup>M.H.O.</sup> (Report Committee, 1970) and by 1974, another study indicated an increase to 81.3% (Oluwande, 1974).

Location:

Igbo-Ora lies between longitude East 3 and 4 of Greenwich and Latitude 7 and 8.

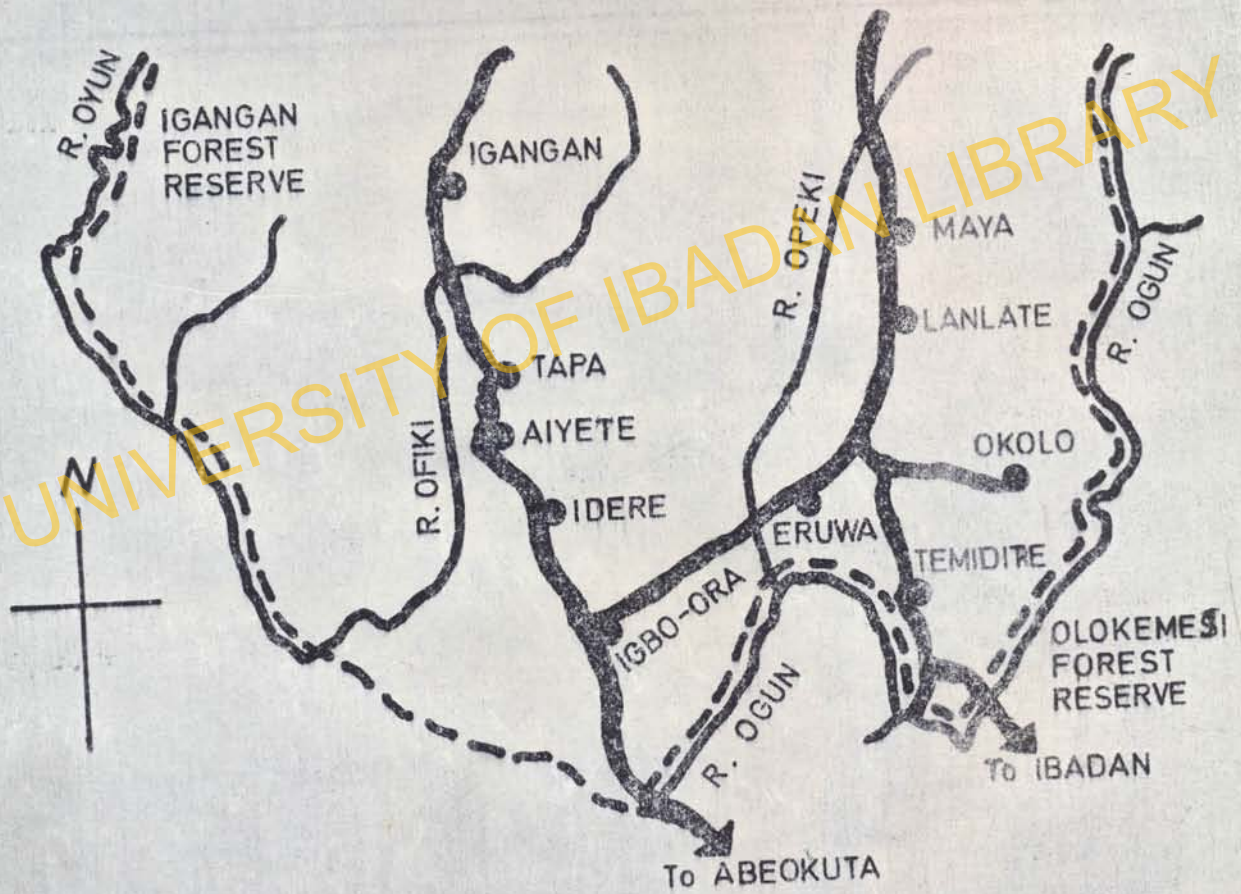
TABLE 2:1

Direction and distance (by road) of Igbo-Ora to other towns

Towns	Direction of Igbo-Ora from the town	Distance by road
Ibadan	North West West (NWW)	58 miles (92.8 km)
Eruwa	South West (SW)	13 miles (20.8 km)
Lagos	North (N)	80 miles (128 km)
Abeokuta	North North West (NNW)	20 miles (32 km)

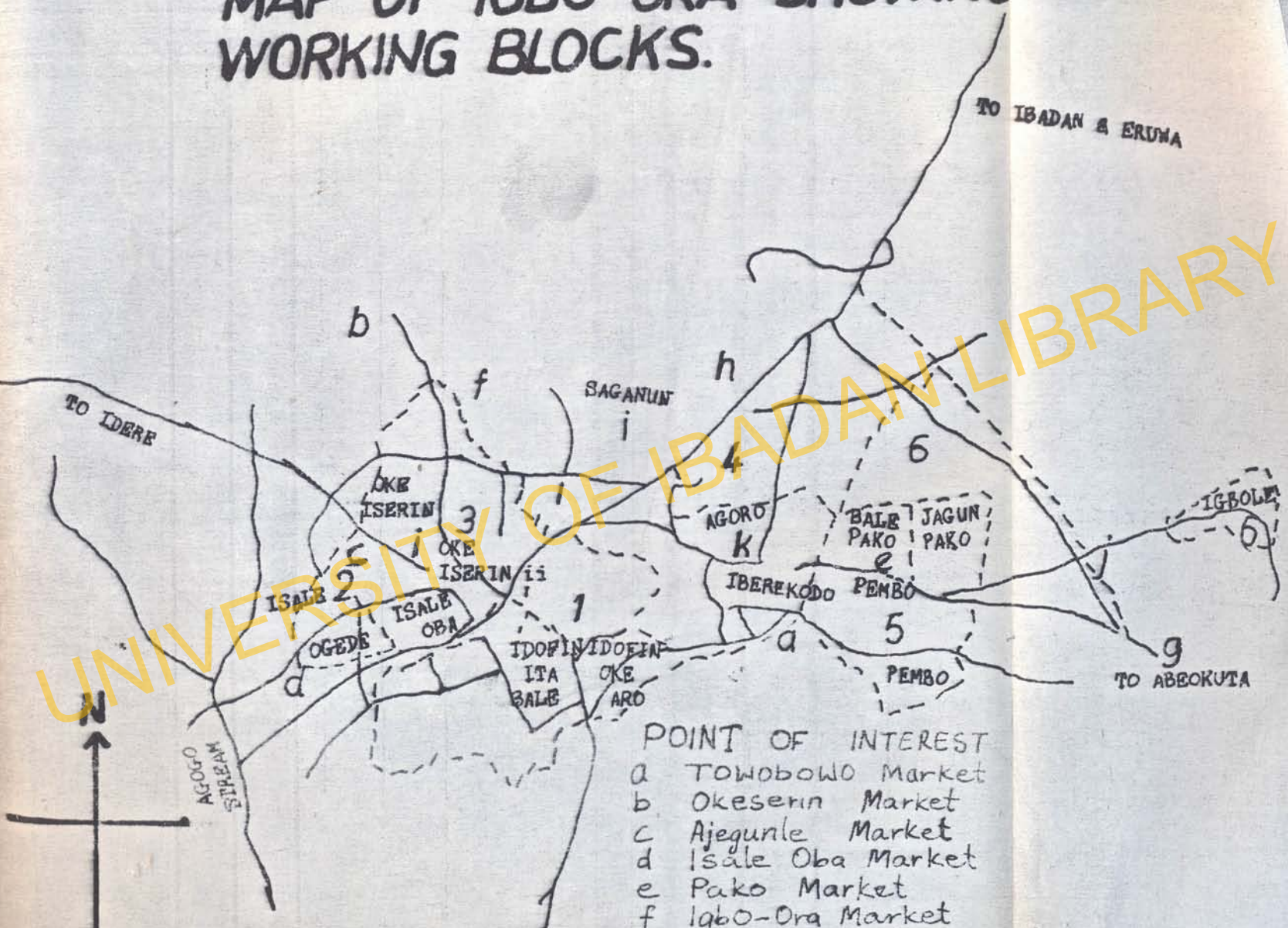
Igbo-Ora is divided into six areas referred to as Working blocks (see Map 2). Each block is further divided into enumeration areas. There are sixty-two enumeration areas on the whole. Each enumeration

AREA MAP OF IBARAPA DIVISION SHOWING IGBOORA OTHER TOWNS AND VILLAGES.



● TOWNS

# MAP OF IGBO-ORA SHOWING WORKING BLOCKS.



### POINT OF INTEREST

- a TOWOBOWO Market
- b Okesenin Market
- c Ajegunle Market
- d Isale Oba Market
- e Pako Market
- f Igbo-Ora Market
- g Igbo-Ora High School
- h Methodist High School
- i Igbo-Ora Maternity
- j Pako-Igbole Maternity.

area consists of compounds and houses.

The people of Igbo-Ora are mainly Oyo Yorubas. They share similar culture with their other Oyo Yoruba counterparts (except for some dialectical differences) in other Yoruba towns like Oyo, Ibadan, Iseyin, etc. They grow food crops such as maize, yam, cassava, melon and guinea-corn. From these food crops several local food are produced e.g. 'eko', 'amala', 'iyan' 'eba' etc. These food items are being prepared at homes and local food cantens, (Buka). There are many food sellers in Igbo-Ora now. This is in response to an increasing food demand as the town's population increases.

The vegetation is mainly Savana. However, there are 'Gedu' plantations and some trees also grow sporadically around.

The traditional food wrapping practice is to use leaves from some of these trees.

Igbo-Ora is enjoying health services provided ~~xxxx~~ by the the State government and the College of Medicine, University of Ibadan, Ibarapa Community Health Project. Igbo-Ora is the only town covered at present with home visiting in Ibarapa Central Local Government Area. The family visitors cover the blocks/enumeration areas. They improve personal and environmental health of the community through health education. They are under the supervision of a health sister. In addition to this, Igbo-Ora Rural Health Centre (part of Ibarapa Community Health Project) provides training opportunity in Health



Education and Environmental Health for Medical Students, Advanced Diploma in Health Education (ADHE) students, Community Health Officers (CHO) in training and Postgraduate Students in Public Health. These categories of health workers could be an asset as change agents in implementing the recommendations of this study if and when given the appropriate training. Aside from the rural health centre, there are other health care units providing maternity services, dispensaries (primary health care) and environmental health services. There are numerous primary and secondary schools in Igbo-Ora. Teachers in the schools and health workers such as Health Superintendents can also help in the dissemination of recommendation to school children and the general public respectively. As mentioned earlier, Igbo-Ora is the headquarter of Ibarapa Central. In the administrative set-up of the Local Government, there is a chairman who is the political head and the secretary. Other officials include the supervisory councillor for health whose duty is to see to the health services of the Local Government. He is responsible to the Chairman of the council. The local council is responsible for running the maternity centres and dispensaries. The council also has sanitary inspectors whose duties include provision of good environmental sanitation. They too can be of great help in educating members of the public.

Sample Selection and Survey Procedure:

Target population consists of people in the local community and staff

houses' of Igbo-Ora. It also includes food sellers, customers to food sellers, house users and house consumers.

Samples were selected from Igbo-Ora local community and staff houses. Food sellers in Igbo-Ora were covered and food sellers' customers were also interviewed.

Igbo-Ora is divided into sixty-two enumeration areas. Sixty out of these were selected by ballot. Two houses from each enumeration area were selected using the balloting method. Ballot was used to give chances to newly built houses that had not been given a number. One non-professional user and one house consumer were selected from each house. In houses where there were more than one house users and/or house consumers the first user and consumer came across were interviewed Food Sellers (Primary/Professional users); and customers (secondary users) found on the spot (i.e. customers buying food from the food seller or eating food in the canteen) were interviewed.

Prior to the commencement of interviewing, the researcher in company of one of the interviewers who is an indigene of Igbo-Ora drove and walked round the town to locate the food sellers in their shops. Food sellers and customers **at the shops were interviewed.**

#### Methods of Data Collection

(i) Observation: The materials people used in wrapping food and the disposal methods of the materials were observed. This provided

the researcher with an opportunity to compare the response to the interview schedule with what was observed in regard to the methods used in disposing materials (particularly polyethylene) used for wrapping food.

(ii) Interview Schedule: Semi-closed end interview schedule was used to collect information from respondents. The interview schedule was pretested at Eruwa which has similar demographic characteristics as Igbo-Ora. Eruwa is about 20 kilometers to Igbo-Ora. The interview was designed in such a way as to determine the variables that may be directly or indirectly associated with preference for a particular food wrapping material. The interview was conducted by the researcher and seven trained interviewers. The interviewers were trained and supervised by the researcher. The interviewers were primary school teachers with West African School Certificates (equivalent of General Certificate of Education, (GCE) Ordinary Level and Grade Two Teacher Training Certificates.

391 subjects were interviewed. Categories and numbers of respondents were as follows:

1) Food Sellers/Professional users	-	76
2) House-users	-	120
3) Food Sellers Customers	-	75
4) House consumers	-	120
		<hr/>
Total	-	391

The researcher cross-checked information collected by the interviewers by reinterviewing and comparing 12 selected interviewees, 2 from each block. Also each copy of the interview schedule was gone through. These steps were taken to ensure reliability of data collected. The interview was conducted between March 29 and April 8, 1982.

#### Methods of Analysis of Results:

The questions in the interview schedule (i.e. Appendix 2) with possible answers were coded and the response pattern analysed.

Methods of analysis include using 'frequency count' and cross tabulation of responses against age and education of the respondents. Chi-square test was applied to show whether the variables (i.e. age and education) have statistical significant effect on the pattern of response to preference for particular type of wrapping material.

Each of the questions in the interview schedule has possible answers (options) and each of the options were coded. There were columns for responses that were not available in the options to each question. These were referred to as 'others'. These 'others' were also coded for each question.

The open ended questions were classified and also coded.

Limitations of the Study:

1. The study could not be extended to cover the urban area because, of the little time available, the distance to be covered and the amount of money at my disposal.
2. At Igbo-Ora, where the study was conducted, there was no register of food sellers from which to draw a sample. The researcher only depended on locating food sellers by going about the town. Some of the food sellers prepare and sell the food in their own houses. Some might have been missed out since there was no effective way of locating all of them.
3. Most of the respondents could neither read nor write and their ages had to be estimated by the interviewers.

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## CHAPTER FIVE

### RESULTS

The results are in three parts i.e.

- 1) Result from observation of the subjects' food wrapping method and the environment of the study area (Igbo-Ora).
- 2) Findings from analysis of data collected by using interview schedule.
- 3) Laboratory results of leaf - washing experiment and coliform counts of the food wrapped in leaves and polyethylene film respectively.

#### Observation of Methods Used for Wrapping Food in the Client Community:

Observation by the researcher showed that people of Igbo-Ora were using leaves and polyethylene film for wrapping food. Leaves were being used more commonly in homes for wrapping food like 'amala', 'eba', and so on at Igbo-Ora. On the contrary, most of the food sellers were using polyethylene for wrapping foods like 'iyan' (pounded yam), 'amala' and 'eba'. 'Eko' was most rarely wrapped in polyethylene, leaves were mainly used. The procedure taken in wrapping 'eko' in leaves in Igbo-Ora has an interesting implication to the use of polyethylene for wrapping this food item. The process consists of arranging leaves in small calabashes (see p 2 ). This wrapping process favours the use of polyethylene wrap for 'eko'. This would be explained further later.

### Disposal Method of Wrapping Materials

Leaves, polyethylene film and other components of refuse were generally being dumped at the dumping grounds which were located at different quarters in the town. Some of the dumping grounds were located very near public places like markets and were found very close to houses. With the increase in the number of people using polyethylene wrap, the material was becoming a prominent component of the refuse dumped. This may pose a problem in the future if no step is taken to rid the environment of polyethylene waste. It should be remembered that biodegradation rate of polyethylene is very low (see p. 81).

### Findings from interviews held with Selected Subjects

The results are expressed as a percentage of the responses to each variable over the total number of respondents (391) except where otherwise stated.

TABLE 3:1

Categories of respondents to the use of  
Wrapping Materials

Category	Frequency	Percent
Food Seller	76	19.4
Persons preparing food for household	120	30.7
Food Sellers' customers	75	19.2
House consumer	120	30.7
TOTAL	391	100

(Refer to items 6(a) and (b) of Appendix 2)

TABLE 3:2

Sex Distribution of Respondents to the use of  
wrapping materials

Sex	Frequency	Percent
Male	153	39.1
Female	238	60.9
TOTAL	391	100

(Refer to item 6(c) of Appendix 2)



TABLE 3:3

Opinion of Respondents about the use of Polyethylene  
Wrap

Opinion	No.	%
Negative	10	2.6
Positive	349	89.3
Don't know	32	8.1
TOTAL	391	100

(Refer to item 13 of Appendix 2)

In Table 3:3, 349 (89.3%) of the respondents support the use of polyethylene for wrapping food. Only 10 (2.6%) had negative feelings while 32 (8.1%) could neither support nor reject the idea. 15 (4.1%) and 20 (5.1%) respondents claimed to have used polyethylene for wrapping 'eko' and 'moinmoin' respectively. This claim is quite interesting as the researcher had the feelings that these food items were never wrapped in polyethylene in Igbo-Ora before the study. Infact up to the time of writing this work, the researcher had not seen 'eko' or 'moinmoin' wrapped in polyethylene in Igbo-Ora. 1 (0.3%) respondent claimed to have used tin for cooking 'moinmoin'. (For further comment, see page 83).

TABLE 3:4

Distribution pattern of utilization of different materials  
for wrapping food, by the respondents

	Leaves		Polyethy- lene		Paper		Leaves & Polyethy- lene		Leaves & Paper		Polyethy- lene & Paper		Others*		Leaves & Others*		Paper & Others*		Not Specified*		T O T A L	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
'Akara'	45	11.5	24	6.1	3	0.8	11	2.8	2	0.5	0	0	1	0.3	0	0	0	0.3	304	77.7	391	100
'Amala'	45	11.5	173	44.2	0	0	114	29.2	0	0	0	0	1	0.3	1	0.3	1	0.3	56	14.3	391	100
'Eba'	53	13.6	144	36.8	0	0	103	26.3	0	0	0	0	1	0.3	0	0	1	0.3	89	22.8	391	100
'Eko'	116	29.7	16	4.1	0	0	9	2.3	0	0	0	0	2	0.5	0	0	1	0.3	247	63.2	391	100
'Fufu'	50	12.8	47	12.0	0	0	27	6.9	0	0	0	0	1	0.3	0	0	0	0	266	68.0	391	100
'Iyan'	58	14.8	82	21.0	0	0	47	12.0	0	0	0	0	4	1.0	0	0	0	0	200	51.2	391	100
'Moinmoin'	112	28.6	20	5.1	1	0.3	10	2.6	1	0.3	0	0	1	0.3	0	0	0	0	246	62.9	391	100
'Ogi'	53	13.6	24	6.1	1	0.3	17	4.3	0	0	0	0	1	0.3	0	0	0	0	295	75.4	391	100
Rice	16	4.1	9	2.3	0	0	4	1.0	1	0.3	0	0	8	2.0	0	0	0	0	353	90.3	391	100
Salt	39	10.0	19	4.9	1	0.3	16	4.1	0	0	0	0	11	2.8	0	0	0	0	305	78.0	391	100
***Others	5	1.3	3	0.8	1	0.3	2	0.5	0	0	0	0	1	0.3	0	0	0	0	379	96.9	391	100

\*'Others' for materials here consist mainly of using plates and pans for the food items, tin for 'moinmoin' and maize cob covering

\*\*'Not specified' indicates that the respondents did not prepare the particular food items by themselves, so they don't have to wrap the food. However, they could buy the food item from those who prepare them (i.e. food)

\*\*\* Other food items include 'robo' (fried melon paste), cheese, groundnut, mashed fried plantain and 'kenkey' - Chanaian food.

(Refer to Item 7 of Appendix 2)

TABLE 3:5

Broad sources of information for the respondents about polyethylene wrap.

Areas	No.	%
Study Area	30	7.7
Urban (e.g. Ibadan, Lagos Abeokuta)	326	83.4
Other Areas (i.e. Semi-Urban e.g. Eruwa)	4	1.0
Rural Area (e.g. Idere, Igangan, etc.)	5	1.3
Not specified	26	6.6
TOTAL	391	100

(Refer to item 11 of Appendix 2)

Urban area was the most common source of ideas about the use of polyethylene wrap.

TABLE 3:6

Specific Source of information for the respondents  
about polyethylene wrap

Source - Through:	No.	%
Discussion with relative who live outside Igbo-Ora	26	6.6
Discussion with friend	25	6.4
Important personality	6	1.5
During ceremony	193	49.4
Food seller	123	31.5
Others	18	4.6
TOTAL	391	100

(Refer to item 10 of Appendix 2)

In Table 3:6, 193 (49.4%) responses which constitute the largest group of respondents got the ideas of using polyethylene wrap from ceremonies they attended. This is closely followed by food sellers as source with 123 (31.5%). Only 6 (1.5%) got the idea through important personalities contrary to the generalisation that most people tend to accept innovation from important personalities in a community.

TABLE 3:7

Social aspect of eating behaviour (i.e. whether or not members of each family were always around at meal time

	No.	%
Always	19	4.9
Usually	37	9.5
Sometime	65	16.6
Rarely	187	47.8
No Response	83	21.2
TOTAL	391	100

(Refer to item 25 of Appendix 2)

Only 19 (4.9%) respondents claimed that all members of their family were always around during meal time. Other responses showed that the members of the families were not all always around at meal times. This eventually necessitated keeping the food **until** other members of the family xxxxxxxxxxxx were ready to eat. Table 3:8 shows the method of food preservation.

There were so many 'No response' because most of the food sellers' customers and some other respondents claimed not to live with their families. The same thing applies to Table 3:7.

TABLE 3:8

Methods of food preservation for the members of  
family not around

Methods of food preservation	No.	%
Wrapping food in leaves	70	17.9
Wrapping food in polyethylene	151	38.6
Putting food in place	86	22.0
No response	84	21.5
TOTAL	391	100

(Refer to item 26 of Appendix 2)

Calculation from Table 3:7 showed that 289 (73.9%) respondents indicated that members of their families were not always around at meal time. The implication of this was that the people have to preserve the food, and the method commonly used was to wrap it. In Table 3:8, 151 (38.6%) and 70 (17.9%) claimed to preserve their food by wrapping it in polyethylene and leaves respectively. In fact, those who wrapped their food constitute 221 (72%) of the respondents (i.e. 307) to this question (i.e. for members not around, how do you preserve their food for them?).

TABLE 3:9

Acceptability of the idea of using polyethylene wrap by respondents for other food items like 'eko'

Response	No.	%
Yes	342	87.5
No	34	8.7
Don't know	15	3.8
TOTAL	391	100

(Refer to item 7 column 9 of Appendix 2)

87.5% of the respondents would like to use polyethylene if shown how to use it, for wrapping food that were rarely wrapped in polyethylene because they thought it was not possible. Such food include 'eko' and 'moinmoin'.

8.7% would not support it while 3.8% were not sure whether they would accept the idea or not. Reasons given by those who would not support the idea of using polyethylene wrap for the food items mentioned above were as stated in Table 3:10.

TABLE 3:10

Distribution of reasons for not accepting the idea of using polyethylene for wrapping other food items (e.g.

'eko')

Reasons	No.	%
1. Impossible to use	8	2.0
2. It would melt	28	7.2
3. The food would not cook in it	1	0.3
4. It would not be good	2	0.5
5. It is not traditional	4	1.0
6. Not seen done yet	1	0.3
7. Could not give any reason	4	1.0
8. Didn't like to use it	1	0.3
TOTAL OVER 391	49	12.5

(Refer to item 7 column 10 of Appendix 2)

The percentages are based on total number of respondents (i.e. 391). Reasons 1, 2, 3 and 6 could still be classified as impossible, the number of which would then be 38 (i.e. 9.8%). So only 11 (2.8%) of the total respondents gave other reasons as stated in the Table above (i.e. Table 3:10).



TABLE 3:11

Distribution of respondents' preferred method of  
Polyethylene waste disposal

Disposal method	No.	%
Burning	86	22.0
Dumping ground	240	61.4
Melting in container to use it for making fire	2	0.5
Other methods	59	15.1
No response	4	1.0
TOTAL	391	100

(Refer to item 22 of Appendix 2)

240 (61.4%) respondents disposed polyethylene waste by dumping in dumping ground. 2 (0.5%) respondents claimed that they melt and use polyethylene scrap for making fire. This was very unusual and it was an interesting revelation.

TABLE 3:12

Distribution of frequency of visits to urban areas  
by the respondents

Frequency of visits to urban area	No.	%
Once a month	34	8.7
Twice a month	61	15.6
Thrice a month	19	4.9
Four times in a month	18	4.5
Five times in a month	2	0.5
More than five times in a month	6	1.5
Once a year	10	2.6
Twice a year	49	12.5
Thrice a year	23	5.9
Four times a year	15	3.8
Five times a year	4	1.0
<u>Subtotal</u>	241	61.6
Not applicable	150	38.4
<b>TOTAL</b>	<b>391</b>	<b>100</b>

(Refer to items 31 and 32 of Appendix 2)

In Table 3:12, a total of 241 (61.6%) respondents made journey to urban areas while 150 (38.4%) either <sup>journeyed</sup> / to rural areas or remained in Igbo-Ora. Also, 83.4% of respondents in Table 3:5 (p 60) said their

broad source of information was urban centres. This showed that most of the people had direct or indirect (i.e. through friends, relation and so on) contact with the urban centres.

TABLE 3:13

Distribution of perceived advantages of polyethylene wrap over leaves by the respondents

Perceived advantages	No.	%
More available than leaves	52	13.3
Cheaper than leaves	25	6.4
Its better hygienic condition over leaves	229	58.6
Its aesthetic value	19	4.9
Keeps food warm longer than leaf	45	11.5
Can be used on large scale for wrapping food during ceremony	9	2.3
Others	6	1.5
No response	6	1.5
TOTAL	391	100

(Refer to item 15 of Appendix 2)

TABLE 3:14

Distribution of perceived advantages of leaves  
over polyethylene wrap by the respondents

Perceived advantages	No.	%
Food wrapped in leaf is more tasteful	1	0.3
Leaves don't spoil food for about 2 days	9	2.3
Leaves are not transparent	54	13.8
Useful for wrapping food that cannot be wrapped in polyethylene e.g. 'eko' and 'moinmoin'	178	45.5
It is traditional	75	19.2
No advantage	74	18.9
TOTAL	391	100

(Refer to item 16 of Appendix 2)

Table 3:13 showed that 229 (58.6%) of the respondents considered polyethylene wrap to be better because it is neater and more hygienic to use than leaves. Also 45 (11.5%) indicated that polyethylene wrap keeps food warm longer than leaves. This could be seen as an advantage for preserving food that is preferred to be eaten hot or warm (e.g. 'amala' and pounded yam). This is important especially in community like Igbo-Ora where people are not always around to take their meal immediately after the food is prepared (see Table 3:7).

In Table 3:14, the largest group of respondents, 178 (45.5%) considered the advantage leaf has over polyethylene wrap to be its usefulness for wrapping food (e.g. 'eko') that could not be wrapped in polyethylene. The fact that 'eko' could be wrapped in polyethylene would eliminate this notion and probably lead to replacement of leaves with polyethylene wrap for the food items. After all, the majority of the respondents indicated that they would accept the use of polyethylene, if shown how to use it, for wrapping food like 'eko' (see Table 3:9).

The taste of food wrapped in leaves appeared not to be very important as only one respondent (0.3%) considered the taste of food wrapped in leaves to be important.

TABLE 3:15

Comparison of food wrap preferences with educational status

Educational Status	Food Wrap Materials			
		Leaves	Polyethylene	Other
Illiterate	263	42 (16%)	191 (72.6%)	30 (11.4%)
Literate	128	3 (2.3%)	96 (75%)	29 (22.6%)
TOTAL	391	45	287	59

$$X^2 = 21.152 \quad \text{d.f.} = 2 \quad P < 0.005$$

(Refer to items 6(f) and 13 of Appendix 2)

Table 3:15 shows that there was association between educational status and preference for particular type of food wrap, i.e. the literates were more likely to use polyethylene wrap than the illiterates. 'Null hypothesis' '1' is therefore rejected. Also this 'hypothesis' supports the generalization that early adopters are likely to be literates (see P. 40).

TABLE 3:16

Comparison of food wrap preference with age

Age	Food Wrap Materials			Total
	Leaves	Polyethylene	Other	
12 - 35	21 (9.2%)	166 (72.5%)	42 (18.3%)	229
36 and above	25 (15.4%)	121 (74.7%)	16 (9.9%)	162
TOTAL	46	287	58	391

$$X^2 = 7.805 \quad \text{d.f.} = 2 \quad P < 0.05$$

(Refer to items 6(d) and 13 of Appendix 2)

The significance test showed that there was association between age and preference for polyethylene wrap. Ages 36 years and above are more likely to accept the use of polyethylene than ages 12-35 years. The reason for this observation could be the fact that majority if not all, of the food sellers, preferred to use polyethylene wrap,

and most of them were above 35 years of age. Also respondents between ages 12 and 35 used other materials such as plates, and dishes more than ages 36 and above.

TABLE 3:17

Comparison of direct contact/No contact with urban centres and acceptance of polyethylene wrap

	Responses			Total
	Accepted	Didn't accept	Un-decided	
Direct contact with urban centres	248	52	5	305
No direct contact with urban centres	75	8	3	86
TOTAL	323	60	8	391

$X^2 = 4.026$  d.f. = 2,  $0.05 < P < 0.975$   $P > 0.05$

(Refer to items 13 and 31 of Appendix 2)

There is no association between contact/no contact with urban centres and acceptance of polyethylene wrap, therefore 'Null hypothesis' is accepted for hypothesis 3. The acceptance of polyethylene wrap by the respondents who did not have direct contact with urban centres could be due to the fact that there were local sources of ideas about the wrap as indicated in Table 3:6.

TABLE 3:18

Distribution of acceptance of polyethylene wrap  
by primary and secondary users

Categories		R e s p o n s e s		
		Accepted	Didn't accept	Undecided
Primary Users	196	164 (83.7%)	29 (14.8%)	3 (1.5%)
Secondary Users	195	158 (81%)	31 (15.9%)	6 (3.1%)
TOTAL	391	322	60	9

Refer to items 6(a) (b) and 13 of Appendix 2)

NB: The percentages are based on the number of respondents for each category.

83.7% and 81% of the primary and secondary users respectively accepted the use of polyethylene wrap. This indicates that there is agreement between the two categories and that probably accounts for the continuous use of the wrap by the primary users.



TABLE 3:19

Distribution of respondents' view about whether or not there was refuse disposal problem in Igbo-Ora

Responses	No.	%
Yes	132	33.8
No	217	55.5
Don't know	27	6.9
No response	15	3.8
TOTAL	391	100

(Refer to item 27 of Appendix 2)

TABLE 3:20

Distribution of respondents' opinion as to the type of food wrap that could ameliorate the refuse disposal problem

Responses	No.	%
Leaves	16	4.1
Polyethylene	82	21.0
Paper	0	0.0
Not using anything to wrap food	11	2.8
Others (i.e. using plates only)	279	71.4
No response	3	0.8
TOTAL	391	100

(Refer to item 28 of Appendix 2)

### Laboratory Test Results

Two types of investigations were conducted to verify the hygienic condition of different types of leaves and polyethylene wrap. The tests are:

- 1) Leaf and polyethylene washing tests
- 2) Food wrapping tests.

Total coliform and faecal coliform estimations were carried out for each test.

#### Leaf/polyethylene washing tests:

Different types of leaves and polyethylene wrap were subjected to laboratory tests. The tests indicated that the different types of leaves commonly used for wrapping food were contaminated by coliform organisms. Polyethylene wash showed the least amount of contamination with 30 total coliform count per gram of the polyethylene (Most Probable Number - M.P.N.) and no faecal coliform at all.

The degree of contamination <sup>the</sup> in case of leaves varied with the different types of leaves. Banana leaf showed the highest degree of contamination with <sup>a</sup> total coliform count of 180+ and faecal coliform of 5 per washings of 1gm. of banana leaf.

TABLE 4:1

The degree of contamination for the different wraps

Wrapping materials	Total coliform count per washing of 1gm of wrapping material	Faecal coliform count per washing of 1gm, of wrapping material
Banana leaf	180+	5
Cocoa leaf	180+	2
Gbodogi leaf (wash1)	160	2
Gbodogi leaf (wash 2)	40	1
Polyethylene wash	30	Nil

Also see Figure 2.

Ideally, polyethylene washing test result should be negative because of its synthetic nature. The positive result must have been due to contamination from improper handling. Therefore proper way of handling the wrap should be an important aspect of health education.

#### Food Wrapping Test

This consists of investigating the degree of contamination of food wrapped in different materials. Total coliform and faecal coliform count tests were carried out. The result indicated contamination of the food (i.e. 'eko') wrapped in banana leaves while no coliform was found in 'eko' wrapped in polyethylene (Table 4.2).

Leaf Washing Test showing Total and Faecal Coliform Counts of Wrapping Materials i.e Gbodogi, Banana and Cocoa leaves and Polyethylene.

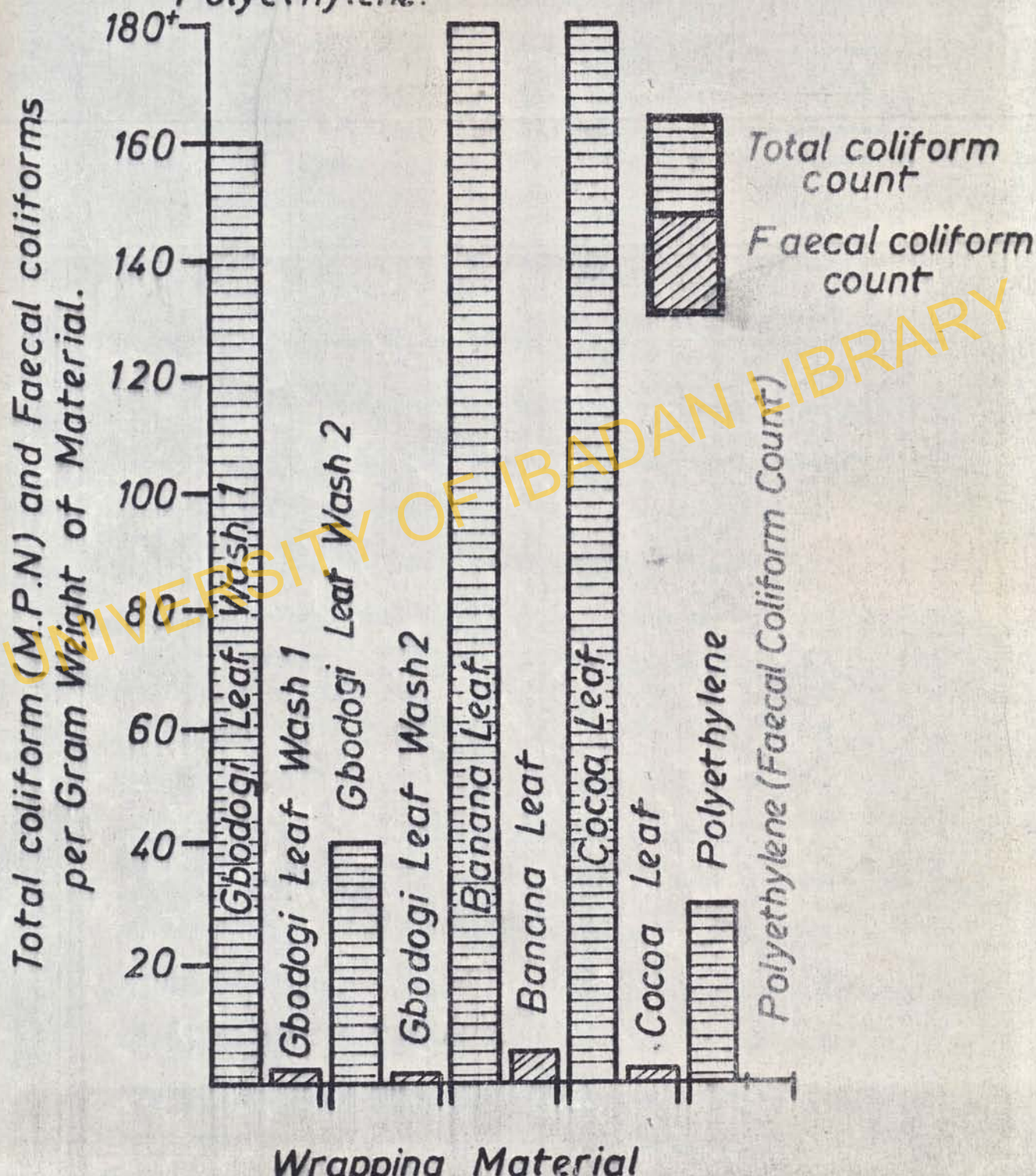


TABLE 4:2

Result of Food wrapping Test

Food and Wrapping Materials	Coliform count per gm. of 'eko' in different wraps	
	Total Coliform count	Faecal Coliform count
'Eko' in Banana leaf	21	7
'Eko' in Polyethylene wrap	Nil	Nil

Sterility was achieved with hot 'eko' (which later got cooled down) in polyethylene wrap. Sterility could not be achieved with the leaf because of the thickness and many 'sheets' of leaves that are used in wrapping the 'eko'. This fact protects bacteria that might be lodging at the corners of the leaves from the effect of the heat of the 'eko'. So when the 'eko' cools down the bacteria then start to grow on leaves and the food since there were nutrients and moisture (which are essential for the growth of bacteria) in both.

Implications of the findings to disease causation:

The presence of coliform bacteria, particularly faecal coliform is an indication that the leaves and food wrapped in them could be contaminated with pathogenic faeco-oral organisms, such as salmonella tyhi, cholera vibrio, virus of infective hepatitis, to mention a few. These organisms are capable of causing deadly diseases i.e. typhoid fever, cholera and infective hepatitis, respectively.

CHAPTER SIX

DISCUSSION AND IMPLICATIONS FOR HEALTH EDUCATION

The fact that this study was conducted in a rural area should not totally restrict the findings to rural community. In actual fact, there are 'rural areas' in urban settings, such as in Ibadan. Adeniyi-Jones\* (1982) commented thus:

The designation urban/rural cannot be based on geographical location alone but must reflect the quality of the environment in terms of sanitation, available facilities such as municipal water supplies and refuse disposal, town-planning and communications, as well as some social amenities.

Considering the situation of most urban areas in this context, one is convinced that certain parts of our urban areas can more accurately be designated rural than urban areas. Examples of this are old town area of Ibadan and some parts of Lagos where most of the facilities and conditions as stated above are lacking to varying degrees.

In view of the above comment, occasional references to urban areas are made in discussing the findings and their implications for health education.

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\*Personal discussion with Professor A. Adeniyi-Jones. Professor in the Department of Preventive and Social Medicine, College of Medicine, University of Ibadan. July 1982.

Comments on the use of Polyethylene, Leaves, Paper and Tin for Food:

Polyethylene Wrap:

My view about the use of polyethylene for wrapping food is a positive one. The questions that have however, agitated my mind so much were:

- 1) The safety of the food wrapped in polyethylene for human consumption. The question in my mind then was "is food wrapped in polyethylene safe for human consumption?"

Certain observations in regard to this have been made i.e.

- a) Many countries have been using polyethylene for wrapping food for a long time now and no adverse reports have been heard concerning the practice.
- b) Locally too, there has been no obvious adverse effect on people who eat food wrapped in polyethylene.
- c) Polyethylene products have become a common material in our communities. The products are being used daily by the people as containers, wraps etc. Therefore it is now almost impossible to exclude polyethylene (plastic materials inclusive) from man's day to day activities.

However, it has been alleged that food wrapped in polyethylene film may acquire carcinogenic properties (see p 25).

because of this I suggest that long-term studies should be carried out to confirm or refute this allegation.

- 2) Problem of bio-degradation of polyethylene: It is known that polyethylene degradation rate is much slower than that of leaf, because the bacteria responsible for breaking down organic matters are not very active on polyethylene\*. However, the problem of prolonged bio-degradation could be solved by the fact that polyethylene can be melted in simple metal container, the solid product of which can ~~xxx~~ still be used as fuel, especially when firewood or charcoal is being used for cooking. Also wastes of polyethylene film can be re-used to make pellets of low density polyethylene from which polyethylene film can be re-made\*\*.

Qualities of Polyethylene:

1. The amount required for wrapping a food item is not as large as that of leaves used for wrapping the same quantity, for example, three pieces of leaves were used in wrapping each of 412 gm. wt. and 416 gm. wt. of 'eko' whereas only one piece of polyethylene was needed for this same quantities\*\*\*.

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\*Personal discussion with Dr. Oderinde, A.O. (Lecturer, Department of Chemistry, University of Ibadan) May 1982.

\*\*Personal discussion with Mr. V.P. Vaswani (Technical Officer-in-Charge, Veepee Industry Ltd., Sango Ota, Ogun State). February 1982. Veepee Industry - manufacturers of polyethylene products.

\*\*\*Experiment conducted by the researcher.



2. It is lighter in weight and less voluminous. For instance, the weight of leaves and polyethylene used in wrapping 828 gms. of 'eko' (2 wraps of 10k worth each) weighed 83 gms. and 5 gms. respectively. Also the space occupied by the leaves and polyethylene wrap, for the same quantity of 'eko' was 2000cc and 100cc respectively\*.
3. It is easily destroyed by dry heat. Each household can use a simple metal container to melt it. The melted polyethylene (after it has become solidified) can be used for starting a fire by those who cook with firewood or charcoal in place of kerosine or palmut fibres (Tha).

#### The Leaves:

There are different types of leaves used for wrapping food. The type varies from place to place depending on the geographical conditions and vegetation of the area. For instance, the most common types in Ibarapa generally and Igbo-Ora in particular are 'gedu' and banana leaves. Igbo-Ora has a savanah type of vegetation. In Ibadan and some other places that are closer to forest areas, other types locally called 'ewe iran', 'gbodogi', cocoa and banana leaves are commonly used. Even though these leaves have been in use from time immemorial, it is not known that anybody has ever considered their merits

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\*Experiment conducted by the researcher.

and demerits as food wrap. Tests carried out have shown

that some hygienic disadvantages are associated with the leaves in common use (see pp.75-78). There are also some economic disadvantages as with scarcity, the cost of the leaves has been rising steadily. The demand being considerably greater than the supply.

In spite of widespread enquiries, I have been unable to find any evidence that steps are being taken or planned to ensure future supplier of any of the types of leaves commonly used. Because of this, it becomes desirable that alternative materials for wrapping food should be considered and sought for, as otherwise, people may be compelled to use materials, for example paper, which may also be dangerous to their health.

#### The Paper as Foodwrap

Some people now use paper to wrap food. This practice is most unsatisfactory as papers like old newspapers and others from very doubtful sources like cement paper may be very heavily contaminated, and cause gastro-intestinal upset or chemical poisoning. The practice should be discouraged.

#### Tin as food containers

Very small percentage of the respondents claimed to have used tin for cooking 'moinmoin' (see table 3:4). This may be due to the feeling that 'moinmoin' wrapped in leaves tastes better than when cooked

in tins. Also tin has many other disadvantages. It is clumsy to use, cannot be packed as compactly as food wrapped in less rigid material; the food has to be removed from the tin when it is sold; and had to be washed before it can be used again. Although because 'moinmoin' is steamed and this will take care of most pathogens, the food receives more direct handling thus increasing the opportunity for bacterial and other contamination. Because tin is reusable, it does not contribute to the refuse problem, but, on the other hand, should there be any noxious chemical substance in the tin, this may be transferred to the food substances and so constitute a danger to health.

Because of the impending scarcity of leaves and their potential for transmitting infection, the practice of wrapping food in leaves should cease and an alternative such as using polyethylene wraps adopted. To effect this change, health education activities should be planned.

#### The Process of Change:

One of the objectives of health education practice is to help people see the need for change and where the people themselves have seen the need for change it is the duty of the health educator to promote the healthful practices which the people might adopt to solve their problem. For instance, in response to questions 27 and 28 of the interview schedule (Tables 3:19 and 3:20), 132 (33.8%) of the 391 respondents indicated that there was refuse disposal problem in Igbo-Ora and 82 (21.0%) had the belief that using polyethylene would

ameliorate the problem. Though the number of those who responded this way is quite small the significance is that some people in the community, at least, realise that refuse constitute a problem in their environment. Furthermore, 229 (58.6%) of the respondents perceived it was more hygienic to use polyethylene rather than leaves. (See Table 3:13).

The statements above have established the fact that some members of the community (Igbo-Ora) had seen the need for a change in their method of food wrapping and already 349 (89.3%) had indicated positive opinion about polyethylene wrap (Table 3:3). This point could be seen as healthful behaviour towards solving present and potential problems refuse might pose. It is therefore the duty of the health educator to promote this healthful behaviour.

A principle of education (including general education) is to promote learning by teaching from known to the unknown/simple to complex.

This principle is relevant to the use of polyethylene wrap by the people. Already the people know they could use polyethylene wrap for food items like 'amala', pounded yam, 'eba' and 'fufu', but they hardly realised that it could also be used to wrap 'eko', and probably 'moinmoin' as well.

### Handling of Polyethylene wrap:

Result of the laboratory tests proved beyond doubt the view held by most of the respondents that polyethylene is more hygienic than leaves (See Tables 4:1 and 4:2). Polyethylene contained very few total coliform and no faecal coliform bacteria (the implication of this has been discussed). Normally polyethylene should not contain coliform bacteria at all, but in the process of handling, it might have become contaminated. Hence it is very important for food handlers using polyethylene, to observe simple rules of hygiene, such as keeping the wrap in clean and protected places, washing of the hand before handling the food and (polyethylene) wraps and to discontinue re-using polyethylene for wrapping food without some process of cleansing, for example by using milton solution or sterilizing by boiling for about five minutes.

### Disposal Method for Polyethylene Waste:

240 (61.4%) of the respondents dispose of their polyethylene waste by dumping it at the dumping ground (see Table 3:11). Because this could pose a problem because of slow rate of biodegradation the researcher has suggested the following alternative methods of disposing polyethylene waste:

- 1) Melting the waste in heated metal container. For example, the melted polyethylene later becomes solidified on cooling. The solid form could be used for making fire with firewood.

As it is difficult to remove solidified polyethylene from the metal after melting it, the inside of the container should be smeared with a small quantity of oil e.g. groundnut oil before the wrap is heated in it.

It is important that heating of the polyethylene is done in the open and never in an enclosed area. This precautionary step should be taken to avoid possibility of choking and to allow for proper oxidation of the heated polyethylene. This method could be useful to the individual users of polyethylene and infact it could serve as an incentive since this would reduce the amount spent on fuel such as kerosine, commonly used in starting the fire. It may also substitute palm nut fibre ('iha') which is now very scarce, especially in urban areas.

2) Re-cycling method: In this case, the wastes would be collected in large and thicker polyethylene bag such as refuse tin liners which should be made available for the individuals to buy at a cheap price. The bags filled with polyethylene waste could be dumped at a dumping centre that would easily be accessible to collectors who would return the waste to the factory for making pellets which would eventually be made into polyethylene film again.

At the initial stage mass education through the media and personal contact with change agents are necessary, to educate

the people about how to use the bag and the importance of separating other components of refuse from the polyethylene waste. On this point, emphasis must be laid on separation of sharp objects from the waste to be put inside the big polyethylene bag. Actually a bit of incentive could be introduced initially to encourage the people to take the necessary precaution in separating the materials. The incentive could take any form which should be decided on by the manufacturing company, and/or through negotiations with the community.

Health Education Approach to further the Change to Polyethylene:

The areas of focus should be

- 1) Better way of handling polyethylene wrap to prevent contamination
- 2) Emphasis on the hygienic advantage of polyethylene over leaves.
- 3) Possibility of reducing the menace of refuse from the community with the use of polyethylene.
- 4) Encouraging the users of polyethylene wrap to continue using it.
- 5) Introducing the use of polyethylene wrap for other food items like 'eko'.
- 6) Introducing the new method of disposing polyethylene waste.

Disposal of polyethylene waste by open dumping should be discouraged to prevent biodegradation problem.

To achieve these, effective communication should exist between change agents and the client community. The approach should include:

- 1) Training of the change agents in regard to the six cardinal points mentioned above: In Igbo-Ora, health sisters, Home Visitors, Students on posting for public health experience in rural area and those on internship, health superintendents and sanitary inspectors, community health nurses and other members of the community who might be interested could constitute the change agents. In urban centres similar group of people could also constitute the team of change agents. Each group should cover a specific area of the town.
- 2) Method of Communication: This should include face to face interaction between change agents and members of the community. This would provide forum for questions and clarifications of the aspects that are not clear to the clients or to the change agents themselves. Personal contact of the client with change agents have been known to be a useful method to achieve effective communication of ideas.
- 3) Demonstration: It is a well known method of teaching. It could be very effective when properly organised. Wrapping of food in polyethylene and the disposal method of polyethylene waste lend



themselves very much to demonstration.

For the purpose of food wrapping, particularly 'eko', all that is required is to replace the leaves in the calabash used in wrapping 'eko', with polyethylene.

In places where small calabash is not being used (especially the urban areas) there is need for technological intervention by the polyethylene/plastic industries. Set of containers resembling the egg tray but with larger 'cups' that could take a measured quantity of 'eko' should be designed. Each 'cup' of the 'eko' tray would first be lined with polyethylene wrap before eko paste is poured in (See Figure 3). After the eko has cooled down, it could be removed from the cup with the polyethylene, wrapped and taken away by the individuals who buy the 'eko'. The 'eko' tray may be designed in form of shelves that could be disengaged from each other and re-set or re-assembled. The tray should be thick enough so that it could be carried on the head or designed in such a way that it would be carried by hand, because the people might want to hawk their goods about.

The Use of Mass Media: Radio, television and newspapers could be used to create awareness especially for the people in the 'rural area' of the urban settings. Plays, 'special messages' and other attractions on television and in radio programmes may catch the interest of the masses,

and may help to create awareness as to the use of polyethylene for wrapping different food items and the disposal methods.

The role of Musicians in educating the masses:

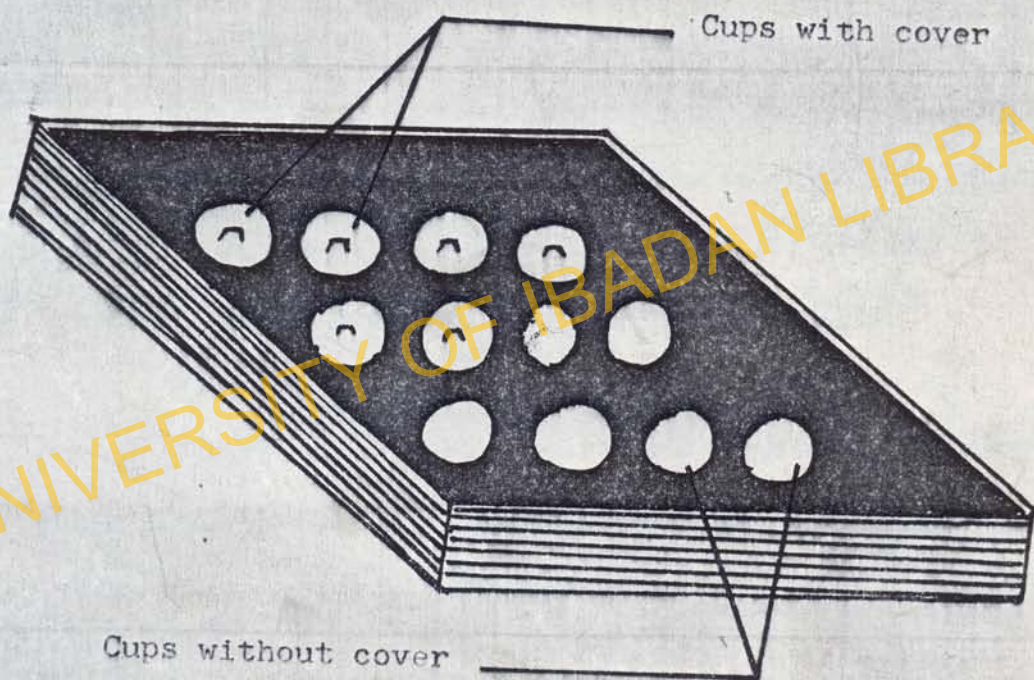
193 (49.4%) of the respondents claimed to have first knowledge about polyethylene wrap for food from ceremonies they attended. Therefore musicians could be encouraged to create awareness in people by setting the process of food wrapping and disposal methods of the wrap into music.

The general acceptance of polyethylene wrap in Igbo-Ora could be attributed to the fact that both categories of users accepted the use of polyethylene wrap for food. For instance, 164 (83.7%) of the 196 primary users accepted the use of polyethylene and 158 (81%) of the 195 secondary users interviewed accepted the wrap for food. (see Table 3:18). The acceptance on both sides must have been responsible for the continuous use of the wrap by the people.

In future, an education approach that would take cognizance of different categories of users or consumers of innovation in a community could be designed. This approach would ensure that the different categories are reached in order to promote the acceptance of the innovation.

Fig. 3

DIAGRAM OF THE SUGGESTED 'EKO' TRAY



N.B. All 'cups' must have covers.

Strategy to facilitate implementation of Education Approach:

- 1) Each organizational body charged with the responsibility of disposing the refuse should further consider the merits of polyethylene wrap in relation to the refuse disposal problem. Ibarapa Central Local Government Council and Ibadan Municipal Wastes Disposal Board are responsible for refuse disposal in Igbo-Ora and Ibadan respectively.
- 2) The organizational body and government agency should design health education programmes to facilitate the adoption and disposal of the polyethylene wrap. The programme may follow the pattern described under the "Health education approach".
- 3) Local human resources in Igbo-Ora, such as the Home Visitors, Health Sisters and Students on home visits who have direct contact with the people in their homes, could help in educating the people about the use and disposal method of polyethylene wrap. These contacts would provide opportunities for face-to-face interaction.
- 4) Both states and federal governments should encourage investment in polyethylene manufacturing industry and the industry must make provision for re-cycling plants so as to be able to handle returned waste of polyethylene.
- 5) The leaf sellers should be encouraged to go into polyethylene retail dealership. This is necessary to prevent them from having

the feelings of economic or financial insecurity which may generate agitation from the group, the consequence of which may retard the acceptance rate of polyethylene as wrap.

- 6) Individuals who should be registered by polyethylene/<sup>or rubber</sup> industries should be encouraged to collect and return polyethylene waste to the industries.

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## CHAPTER SEVEN

### SUMMARY AND CONCLUSION

Efforts have been made to identify the food wrapping practices of the people of Igbo-Ora, a semi-urban area. The implication of the choice of wrapping material for the refuse disposal problem and food hygiene is also considered. Three methods of data collection were adopted - observations, formal interviews and laboratory investigations. An interview schedule was administered to different categories of food wrap users, such as the food sellers, their customers, those who prepare food for households and those who consume the prepared food. A total of 391 people were interviewed.

- 1) The findings from observations and interviews showed that most of the respondents accepted the use of polyethylene for wrapping food. The study further revealed the pattern of utilization of different types of food wraps. Polyethylene wrap is used for food items like pounded yam, 'amala', 'eba', etc. while 'eko' and 'moinmoin' are rarely wrapped in polyethylene but mainly in leaves. The main reason for not using polyethylene for the 'eko' is that the respondents considered it impossible. This aspect has been recommended to be included in health education programmes for the people.

- 2) The advantages and disadvantages of using different wraps were also considered. Laboratory tests, using coliform and faecal coliform counts as indices, indicated that leaves are health-wise, more dangerous and unhygienic than polyethylene.
- 3) The respective weights of leaves and polyethylene used for wrapping the same quantity of food items were compared. The leaves were about 16 times heavier than polyethylene (see pp.81-82).
- 4) Methods for polyethylene waste disposal are suggested. They are likely to be safer and more preferable than the dumping method currently being used because of the associated incentives. These methods for polyethylene waste are recommended:
  - i) Melting and reusing it for making fire by the individuals and
  - ii) Salvaging and recycling.
- 5) Recommendations are made to refuse disposal agencies to set up an educational programme that would encourage the people to use polyethylene wrap for other foods like 'eko'.

I also recommended that a similar study be carried out in other urban areas as responses to different items on the interview schedule may be influenced by certain geographical and other factors in different places, as a response to certain items in Igbo-Ora may not be applicable to Ibadan.

I also suggest that long term studies be carried out on the alleged carcinogenic property of polyethylene when used as a food wrap.

With a change from using leaves to polyethylene wrap and acceptance of the disposal method for polyethylene waste, the quantity of refuse in the growing rural area (Igbo-Ora) would drastically drop to a quantity that could easily be managed by the local government. It is envisaged that the same would apply to urban centres.

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REFERENCES

1. Anderson, C.L., Morton, R.F. & Green, L.W. (1978) Community Health 3rd Ed. Saint Louis, The C.V. Mosby Company, p. 212.
2. Awosaga, S.O., Osinowo, T., Etefia, E.T., and Umeh, H.N.:  
"A Study of Dysenteric Diseases in Children below 10 years of age as seen at the Rural Health Centre, Igbo-Ora". Ibarapa Posting, University of Ibadan, Faculty of Medicine No. 60, August, 1975
3. Bakare, B.: "Market Women Angry" Nigerian Tribune, Ibadan. The African Newspapers of Nigeria Ltd., No. 8191 p. 16, May 5, 1978.
4. Bankole, T.O. and Ogunkoya, L. (1977) Introductory Organic Chemistry, Ibadan, Daystar Press. p. 196
5. Brooks, S.M. and Brooks, N.A. (1979): Turner's Personal and Community Health. 15th Ed. St. Louis, The C.V. Mosby Company, pp. 334-337
6. Cannon, W.B. (1945): The Way of an Investigator. New York, Norton.
7. Daly, M.T., Filani, M.O. and Richards, P. (1981): The Ibarapa Planning Atlas, Processes and Problems of Rural Development in Ibarapa Division, Oyo State of Nigeria. Technical Report No. 1, Department of Geography, University of Ibadan, Ibadan.
8. Davies, F.G. (1977) Clay's Handbook of Environmental Health 14th Ed. London, H.K. Lewis & Co. Ltd. p. 682.

9. Dorian, A.F. (1964) Elsevier's Dictionary of Industrial Chemistry. Vol.2, P.Z. Indexes. London, Elsevier Publishing Company.
10. Ehlers, V.M. and Steel, E.W. (1950): Municipal and Rural Sanitation. 4th ed New York, McGraw-Hill Book Company, Inc. pp. 138-158.
11. Emery, F.E. and Oeser, O.A. (1958) Information, Decision, and Action: A Study of the Psychological Determinants of Changes in Farming Techniques. New York, Cambridge
12. Hassinger, E. (1959) "Stages in the Adoption Process": Rural Sociology. 24: 52-53 - R.S.
13. Holderness, A. and Lambert, J.A. (1978) A New Certificate Chemistry. Ibadan, Heinemann Educational Books. p. 337
14. Hruschka, E. and Rheinwald, H. (1965) "The Effectiveness of German Pilot Farms", Sociologia Ruralis 5: 101-111
15. Ige, B. (Governor, Oyo State, Nigeria) An Interview on Nigerian Television Authority (NTA), Ibadan Programme - X-ray, July 3, 1982.
16. Jahoda, M. (1951) Research Method in Social Relations. New York, Holt, Rinehart and Winston, p. 264.
17. John, M.O. and Osiolu, I.U.W. (1976) A Concise School Certificate Organic Chemistry. p. 14
18. Kirk, J.B. (1949) A Manual of Practical Tropical Sanitation London. Bailliere, Tindall and Cox. pp. 257-266.

19. Kirk-Othmer, (1967) Encyclopaedia of Chemical Technology. 2nd Ed. Vol. 14, New York, Inter Science Publishers, a division of John Wiley and Sons, Inc.
20. Kivlin, J.E. (1960) "Characteristics of Farm Practices Associated with rate of Adoption". Rural Sociology University Park: Pennsylvania State University.
21. Lawoyin, V.L. "Observe Simple Rules of Hygienes: Public Told" Daily Sketch. Ibadan Sketch Publishing Company Ltd., No. 4447, May 8, 1978 p. 4.
22. Lavidge, R.J. and Stenier, G.A. (1961): A Model for Predicting Measurements of Advertising Effectiveness". Journal of Marketing. Vol. 25 pp. 59-62.
23. Lucas, A.O. and Gilles, H.M. (1973): A Short Textbook of Preventive Medicine for the Tropics. London, English University Press Ltd., pp. 278-280.
24. Maxcy, K.F. (1951) Rosenau Preventive Medicine and Hygiene. 7th ed. New York: Appleton-Century-Crofts, Inc. pp. 1283-1288.
25. Obateru, O. "Curbing the Menace of Ogunpa Flood": Daily Times, Lagos. Daily Times of Nigeria Ltd., No. 21, 857, p. 7. May 6, 1978.
26. Olayinka, A.I. (1970) Knowing Ibarapa Division. Biostatistics Unit Department of Preventive and Social Medicine, College of Medicine, University of Ibadan, Ibadan.

27. Oluwande, P.A. "Investigation into Certain Aspects of Refuse in Western State of Nigeria". Solid Waste Management (Formerly The Institute of Public Cleansing) Vol. LXIV (No. 1) p. 27, Jan. 1974.
28. Petrini, F. (1966a) "The Rate of Adoption of Selected Agricultural Innovations". Uppsala, Agricultural College of Sweden Report. 53 - R.S.
29. Roger, E.M. (1962) Diffusion of Innovation. New York, Free Press of Glencoe pp. 77-120.
30. Roger, E.M. and Shoemaker, F.F. (1971): Communication of Innovations: A Cross Cultural Approach, 2nd ed. New York The Free Press. A Division of Macmillan Publishing Company Inc.
31. Singh, R.N. (1966a) "Characteristics of Farm Innovations Associated with the rate of Adoption". Guelph Ontario Agricultural Extension Education Report, 14 ex.
32. Smolensky, J. (1977) Principles of Community Health, 4th ed. Philadelphia, W.B. Saunders Company, pp. 406-407.
33. Stone, J.T. (1952) "How County Agricultural Agents Teach". East Lansing, Michigan, Agricultural Extension Service, Mimeo Bul. RS.
34. Thorpe, J.F. and Whiteley, M.A. (1946): Thorpe's Dictionary of Applied Chemistry, 4th ed. London, Longmans, Green and Co. p. 177.

35. W.H.O. Committee Report (Federal Republic of Nigeria, Western State) 1970. Master Plans for Waste Disposal and Drainage. Immediate Measure Report Prepared for the W.H.O. as Executing Agency for the United Nation Development Programme. Ibadan, Maclaren International Limited in Association with Urwick, Currie and Partners Ltd.
36. Wilkening, E.A. (1956) "Roles of Communicating Agents in Technological Change in Agriculture". Social Forces 34: 361-367.

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B I B L I O G R A P H Y

1. Allport, G.W. (1933). Attitudes: A Handbook of Psychology. Worcester Mass, Clark University Press, pp. 798-844.
2. Ayeni, O. and Olayinka, A. (1964). Evaluation of Igbo-Ora Vital Statistics Registration System. Department of Preventive and Social Medicine, University of Ibadan, Ibadan.
3. Brieger, W.R. and Adeniyi, J.D. (1981): Urban Community Health Education in West Africa. P. 8.
4. Davey, T.H. and Wilson, T. (1974): Davey and Lightbody's Control of Disease in the Tropics. 4th ed. London, English Language Book Society. p. 340.
5. Davies, J.B.N. (1977): Community Health, Preventive Medicine and Social Services. 3rd edition, London; Bailliere Tindall.
6. Decision-makers Guide in Solid Waste Management, by Anderson, K. and Others (1976). Washington, D.C., U.S. Government Printing Office.
7. Fliegel, F.C. and Oliveira, F.C. (1968) "A Cross National Comparison of Farmers' Perceptions of Innovations as Related to Adoption Behaviour" Rural Sociology. 33: 437-449.
8. Freeman, R.B. (1970): Community Health Nursing Practice. Philadelphia, Saunders.

9. Green, L.W., Kreuter, M.W., Deeds, S.G. and Patridge, R.B. (1980): Health Education Planning: A diagnostic Approach. California, Mayfield Publishing Company.
10. Grupenhoff, B.L., and Shuster, K.A. (1971): Paper and Plastic Solid Waste Sacks: a Summary of available information. (Cincinnati) U.S. Environmental Protection Agency.
11. Hoerr, N.L. and Osol, A. (1956): Blakiston's New Gould Medical Dictionary. New York, McGraw-Hill Book Company Inco. p. 1028.
12. Kanfer, F.H. and Goldstein, A.P. eds. (1975): Helping People Change: New York, Pergman Press Inc.
13. Kiefer, I. (1949): Incentives for tire recycling and reuse: Environmental Protection Publication. SW-32c.1. Washington, U.S. Government Printing Office.
14. MacMahon, B. and Pugh, F.T. (1970): Epidemiology Principles and Methods. Boston, Little Brown and Company, 1970
15. Menakaya, T.C. and Floyd, B.N. eds. (1978): MacMillan Junior Atlas for Nigeria, Ibadan, MacMillan Nigeria Ltd.
16. Oluwande, P.A. (1971): Environmental Survey of Ibarapa Division 1964-71". Ibarapa Project Bulletin. University of Ibadan 6, 14-24.
17. Oskamp, S. (1977): Attitudes and Opinions. Englewood Cliffs, Prentice-Hall, Inc. 1977.
18. Ralph Stone and Company, Inc. (1972): "The Use of bags for Solid Waste Storage and collection". Environmental Protection Publication. SW-42d U.S. Environmental Protection Agency.

19. Rokeach, M. (1970): Beliefs, Attitudes and Values: A Theory of Organization and Change. San Francisco, Jossey-Bass.
20. Ross, H.S. and Mico, P.R. (1980): Theory and Practice in Health Education, 1st ed., California, Mayfield Publishing Company pp. 100-119 and 181-187.
21. Rothman, J., Erlich, J.L. and Teresa, J.G. (1976): Promoting Innovation and Change in Organizations and Communities, New York, Wiley.
22. Spiegel, M.R. and Boxer, R.W. (1972): Theory and Problems of Statistics in SI Units. 1st ed. New York, Mc-Graw-Hill Book Company, pp. 201-216.
23. Stedman's Medical Dictionary, Unger, H.R. et al. (1975). Baltimore, The Williams and Wilkin's Company, p. 1290.
24. University of Ibadan, Faculty of Medicine, (1964): Ibarapa Project. Ibadan, University Press.
25. Young, M.A.C. (1968): "Review of Research and Studies Related to Health Education (1961-1966): Communication Methods and Materials". Health Education Monographs 25.
26. Zaltman, G., Kotler, P. and Kaufman, I., eds. (1972): Creating Social Change. New York, Hold, Rinehart and Winston.



Appendix 1A

Percentage by weight of leaf component of refuse  
in Igbo-Ora local community

Houses	Total Refuse Weight in Kg.	Leaf Component in Kg.	Other items in kg.	% by weight of leaf component
			P = Polyethylene Pa = Paper A = Ashes G = Garbage R = Rag D = Dust M = Milk tin	
1	2.27	1.36	0.91 (C&P)	59.9
2	1.82	0.45	1.37 (R,R&M)	24.7
3	0.68	0.45	0.23 (P,G&D)	66.2
4	3.18	0.91	2.27 (P,D&Pa)	28.6
5	1.59	0.23	1.36 (P&D)	14.5
6	2.27	1.14	1.13 (G,P&Pa)	50.2
			Mean % by Weight	40.7

NB: Refuse collected from each house for 24 hours

Appendix 1B

Percentage by weight of leaf component of refuse  
in old town area of Ibadan

Houses	Total Refuse weight in Kg.	Leaf component in Kg.	Other items in kg.	% by weight of leaf component
			P = Polyethylene Pa = Paper A = Ashes G = Garbage R = Rag D = Dust M = Milk Tin	
1	8.63	6.36	2.27 (P,M&D)	73.7
2	9.54	7.95	1.59 (P,Pa&A)	83.3
3	9.09	7.50	1.59 (P,R,M&Pa)	82.5
4	10.00	8.18	1.82 (Pa&P)	81.8
5	8.86	7.04	1.82 (Pa&G)	79.5
6	10.90	9.09	1.81 (G&P)	83.3
			Mean % by weight	80.7

NB: Refuse collected from each house for 24 hours

Appendix 2

Interview schedule on beliefs and opinions of people about food wrapping innovation. Circle (0)/Check (✓) or fill in as applicable.

---

For Researcher's use only

Research Area: -----

Serial No.: -----

---

1. House /Shop No. (Census)     /    /    /
2. House/Shop Name: -----
3. Area: Ibarapa Staff House/Local Community
4. Compound: -----
5. Town/Village: -----
6. Personal Data
  - (a) Primary consumer
    - (1 - Food seller
    - 2 - A person who prepares food for a household e.g. wife, house help (House user)
  - (b) Secondary consumer
    - (1 - Food seller's customer
    - 2 - A person who consumes food prepared for a household (House consumer)
  - (c) Sex
    - 1 - Male
    - 2 - Female
  - (d)     /    /     State exact age to the nearest year
  - (e) Marital status:
    - 1 - Married
    - 2 - Single
    - 3 - Divorced
    - 4 - Widowed

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(f) Level of education:

- 0 - Illiterate
- 1 - Adult Education
- 2 - Primary Education
- 3 - Secondary Modern School
- 4 - Secondary School
- 5 - Teacher Training
- 6 - Technical/Vocational
- 7 - University Education
- 8 - Arabic Education
- 9 - Other (specify) -----  
-----

(g) No. of years of formal education: Exact number of years spent at the last (highest) educational institution attended should be recorded     /    /    

(h) Occupation (Ise) 0 - Unemployed (Ainise lowo)

- 1 - Housewife (Iyawo ile)
- 2 - Trading (Owo sise)
- 3 - Civil servant (Osise ijoba)
- 4 - Employee in private sector  
(Osise ni ibi ise adani)
- 5 - Private business (self employed)  
(Ise adani)
- 6 - Food selling (Type of food to be specified)  
(Onje tita, Iru onje wo ni)  
-----  
-----
- 7 - Skilled worker/Artisan (Onise owo)
- 8 - Unskilled worker / Labourer (Alagbaje/  
Lebira)
- 9 - Farming (Agbe)
- 10.- Others: (specify) -----  
-----

- (1.) Ethnic group: (Eya)
- 1 - Yoruba
  - 2 - Ibo
  - 3 - Hausa
  - 4 - Fulani
  - 5 - Kanuri
  - 6 - Others (specify) -----

7. Here is a list of some of our common foods. Please tell me

1. if people wrap these foods
2. if they do what, what do they use for wrapping them
3. the type of food you yourself wrap
4. the materials you use in wrapping them
5. reason(s) for preference (see table)

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8. When did you first know about polyethylene wrap (in term of months or years) (O ti to igbawo ti e koko gbo nipa lilo ora lati fi pon nkan ri)

Month (Osu)     /    /     Year (Odun)     /    /    

9. If you have ever used polyethylene when did you first start using it

Month (Osu)     /    /     Year (Odun)     /    /    

10. How did you first come about the idea of using polyethylene wrap for food? Through:

(Bawo ni e ti se ko mo nipa wipe eniyan le lo ora lati fi pon onje? Nipa)

- 1 - a discussion with a relative who lives outside this town (titakuroso pelu eniyan mi kan ti o n gbe ni ilu okere)
- 2 - a discussion with a friend who travelled outside this town (Nipa titakuroso pelu ore mi kan ti o ti rinrin ajo lo si ilu okere ri)
- 3 - important personality in your area (Nipa se eniyan pataki kan ni agbegbe yin)
- 4 - during a ceremony that I attended (Nigbati mo lo si ibi ariya kan ni mo ti koko ri)
- 5 - a food seller (Lati odo eniti o nta onje)
- 6 - Others (specify) (Nipa ona miran - so ona na) -----  
-----

11. Where did you first hear about or see it, i.e. Place: Town/Village  
Write name of town/village -----

(Ilu wo ni e ti koko gbo nipa tabi ri ilo ora lati fi pon nkan: E daruko ilu na) -----

12. Why don't you wrap other food items in polyethylene, because (Kini idire ti eko fi npon awon onje yoku sinu ora? Nitoriwipe)

- 0 - I don't know how (Nko mo bi mo ti se le pon si inu ora)
- 1 - It's not possible (Ko sese)
- 2 - It is traditionally unacceptable (Ko ba asa ile wa mu)
- 3 - Other reasons (specify) (Idi pataki miran, E so) -----  
-----

13. What is your opinion about wrapping food in polyethylene (Kini iro yin nipa pipon onje si inu ora)

- 1 - Positive (Mo fara mo)
- 2 - Negative (Nko fara mo)
- 3 - Don't know (Nko ti e le so nkankan nipare)

14. If you have negative feelings to the use of polyethylene wrap for food, could the reason be due to:

(Ti e ko ba fara mo lilo ora lati fi ma pon onje, ki ni idi re):

- 1 - It's transparent (Nitoripe onje inu re ma nhan si ita)
- 2 - Inavailability of polyethylene wrap in your area (Nitoripe a ki nsaba ri ora ra ni adugbo wa)
- 3 - The fear that it might contain some dangerous chemicals (Nitoripe awon nkan ti o le se ijamba fun ara le wa ninu re)
- 4 - The belief that it is untraditional (Nitoripe ko ba asa ile wa mu)
- 5 - The belief that it is more costly than leave (Nitoripe owon ju ewe lo)
- 6 - The belief that food wrapped in polyethylene is not as tasteful and flavoury as the one wrapped in leaves. (Nitoripe onje ti a ba pon si inu ora ko ki ladun to eyi ti a pon si ewe)
- 7 - It spoils food. Make it becomes watery and too soft after keeping it for ----- days (O ma nje ki onje tete ro ti eniyan ba pon pamo fun ojo---)
- 8 - Others (specify) -----  
-----

15. What do you perceive as an advantage of using polyethylene wrap over leaves (Kini o nti eri gegebi anfani ti o wa ninu ki eniyan pon onje si inu ora ti ewe ko ni)

- 1.- It is more easily available than leaves (Owa ni arowoto ju ewe lo)
- 2 - It is cheaper than leaves (Ko won to ewe)
- 3 - Its better hygienic condition over leaves (O dara nitori imototo ti o ni ju ti ewe lo)



- 4 - Its aesthetic value (O dun wo, o si wuyi loju ju ewe lo)
  - 5 - It keeps food warm longer than leaf (Onje inu ora ki tete di tutu)
  - 6 - Can be used on large scale for wrapping food during ceremony (O dun lo ti eniyan ba nse sise nikan)
  - 7 - Can be stored for long period without getting spoilt (O se fi pamo fun Igba pipe laiye wipe yo ba je)
  - 8 - Others(specify) -----
- 

16. What do you perceive as an advantage of using leaves over polyethylene (Kini o nti eri wipe o je anfani ti o wa ninu ki eniyan pon onje si inu ewe ti ora ko ni)

- 1 - Food wrapped in leaf is more tasteful (Onje inu ewe ma ndun ju ti inu ora lo)
  - 2 - Does not make food become too soft for ----- days (Ko ki nje onje ro fun bi ojo melo kan)
  - 3 - Leaves are not transparent (Ewe ma nbo onje dafa. Eniyan ko ki nri onje na ni ita)
  - 4 - Useful for wrapping food that cannot be wrapped in polyethylene e.g. 'eko', 'moinmoin' (O se pon onje ti ko se pon sinu inu ora ba eko, moinmoin)
  - 5 - It is traditional (O ba asa ibi le wa mu)
  - 6 - No advantage (Ko si anfani kankan)
  - 7 - Others (specify) -----
- 

17. What do you perceive as disadvantage(s) of using leaf. (kini nkan ti e ri ti ko da nipa lilo ewe)

- 1 - it cannot be stored for long, for it gets dry and becomes useless (Ko se fi pamo nitori o ma ngbe, ko si ni se lomo)
- 2 - it is not easily available as polyethylene (Eniyan ki tete ri ra bi ora)
- 3 - it is not hygienic (O doti)
- 4 - it is more costly than leaf (Owon ju ewe lo)
- 5 - No disadvantage (Ko si ohun buruku kankan)
- 6 - Others (specify) -----

18. Have you accepted/continued using polyethylene wrap on permanent basis (Se eti gba lati ma lo ora fun pipon onje patapata niyen?)
- 1 - Yes (Beni)
  - 0 - No (Beko/kodaju)
  - 2 - Don't know (Nko mo)
19. If 'No' to item 19, why? \*(Ti idahun yin si ibere "18" ba je "beko", kini idi ti o fi je be)
- 1.- Supply of polyethylene wrap is not regular (E ki nri ora ra dede)
  - 2 - You are being criticised for using polyethylene wrap (Awon eniyan ko fara mo milo ora fun pipon onje)
  - 3 - You had a nasty experience about using polyethylene wrap (the experience should be stated)  
E ti ri iriri kan ti ko dun mo yin ninu nipa lilo ora,  
E so iru iriri yin na) \_\_\_\_\_  
\_\_\_\_\_
  - 4 - Others (specify) \_\_\_\_\_  
\_\_\_\_\_
20. \*How much polyethylene do you use in a week for wrapping food when you don't use leaf at all. (O ma nto bi ora elelo ti e nlo ni arin ose kan lati fi pon onje nigbati e o ba lo ewe rara)
- # : K Remark: \_\_\_\_\_
21. \*How much leaves do you use in a week for wrapping food when you don't use polyethylene at all. (O ma nto bi ewe elelo ti e nlo ni arin ose kan lati fi pon onje nigbati e o ba lo ora rara)
- # : K Remark: \_\_\_\_\_
22. How do you dispose of the polyethylene wrap? (Bawo o ni e ti se nda ora ti e ba ti lo nu?)
- 1 - burning (sisun nina)
  - 2 - dumping in dumping ground (Mo ma ndanu si akitan)
  - 3 - Melting it in a container and using the solid form for making fire. (Mo ma nyo ninu agolo gbigbona. Ti o ba si di lile pada tan, mo ma nfi da ina)
  - 4 - Others (specify) \_\_\_\_\_  
\_\_\_\_\_

\*To be estimated by Interviewer.

23. Do you envisage any problem by your method of disposal? (Nje ero wipe ona ti e ngba da ora na nu le da iyonu kankan sile)
- 1 - Yes (beni)
  - 2 - No (Beko/Kodaju)
  - 3 - Don't know (Nko mo)
24. If 'yes' to item, 23, can you specify the problem? (Ti o ba je wipe o le da iyonu kan sile, iru iyonu wo ni)
- 1 - Air pollution (Afefe bibaje)
  - 2 - Problem of bio-degradation (Koni tete jera)
  - 3 - Don't know (Nko mo)
  - 4 - Other (specify) -----  
-----
25. Is every member of your family always around at meal time to eat at the same time (Nje gbogbo awon eniyan ile yi ma ni anfani ati jeun ni asiko kanna?)
- 1 - Always (Nigbagbogbo)
  - 2 - Usually (Oma nsaba ri be)
  - 3 - Sometime (Nigbamiran)
  - 4 - Rarely (Ko wopo)
26. For members not around, how do you preserve their food for them? (Ti o ba se wipe awon miran ko ki nsi ni ile ni asiko ti o ba toju onje tan bawo ni e ti se npa onje won mo titi nwon o fi se tan lati jeun)
- 1 - Wrapping the food in leaves (Mo ma npon si inu ewe)
  - 2 - Wrapping the food in polyethylene (Mo ma npon si inu ora)
  - 3 - Putting it in plates and keeping it in cupboard (Mo ma nfi si inu abo/awo ma wa gbe si inu konbodu)
  - 4 - Other method (specify) -----  
-----

27 Do you think there is refuse disposal problem here? (Nje ile didanu je ohun isoro ni ilu yi)

- 1 - Yes (Beni)
- 0 - No (Beko/kodaju)
- 2 - Don't know (Nko mo)

28. If yes to item 27, which of the food wrapping materials can ameliorate the situation (Ti o ba je 'beni' ni idahun yin si ibere 27, iru ohun ipon onje wo ni o le mu isoro na diku)?

- 1 - Leaves (ewe)
- 2 - Polyethylene (Ora)
- 3 - Paper (iwe)
- 4 - Not using anything to wrap food (Ki ama lo nkankan lati fi pon onje)
- 5 - Others (specify) -----  
-----

29. Do you stay in this town permanently (Se ilu yi ni Ibugbe yingan?)

- 1 - Yes (Beni)
- 0 - No (Kodaju/Beko)
- 2 - Don't know (Nko le so)

30. Do you travel out of this town? (Nje e ma nrinrin ajo losi ilu miran?)

- 1 - Yes (Beni)
- 2 - No (Kodaju)

31. If 'yes' where? (Ti o ba je pe e ma nrinrin ajo ni bo ni e ma nsabalo? E daruko ilu na)

- 1 - -----
- 2 - -----
- 3 - -----

32. How often in a month/year do you make the journey (Bawo ni irinajo yin si ilu na se wapo si ni arin osu/odun kan)

- 1 - -----
- 2 - -----
- 3 - -----

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Interviewer's Name: -----

Date: -----

APPENDIX 3

Enumeration Area numbers in Each Block

Block I	Block II	Block III	Block IV	Block V	Block VI
0261	0262	0291	0341	0371	0392
0281	0263	0292	0342	0372	0401
0282	0264	0293	0343	0373	0402*
0283	0265	0294	0351	0374	0403
0284	0271	0295	0352	0381	0404
0285	0372	0301	0361	0382	0433
0411	0273	0302	0362	0391	0434
0412	0274	0303	0431	0393	0435
0421	0331	0304	0432	0394	8.E.A.
0422	0332	0311	9.E.A.	0395*	
10.E.A.	0333	0312		10.E.A.	
	0334	0313			
	12.E.A.	0321			
		13-E.A.			

\* - Not selected