DIFFUSION AND ADOPTION OF THE CHORKOR SMOKER IN TEMA U COMPOUND

by

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ABSTRACT

BUADI, DONUS KOFI. Diffusion and Adoption of the Chorkor Smoker in Tema U Compound.

The main objective of the research is to study the processes in the introduction of the Chorkor smoker and to determine the factors which the fishsmokers consider in the adoption of the Chorkor smoker.

Qualitative research methodology was used for the study. The main data gathering device was individual interview using an interview guide. Data were collected from the individual fishmokers and the extension agents. The data were coded and analyzed.

The results are: (1) the influence of the larger community is an important factor influencing the adoption of the Chorkor smoker. They are deterrents to adoption. (2) the source from which fishsmokers seek information about innovations and the extent to which they seek information are important factors which influenced the innovativeness of the extension-aided adopters (3) information provided by change agents and/or opinion leaders are either lost or given different meanings/interpretations by clientele (4) the meetings and demonstrations helped the fishsmokers to develop

favourable attitude towards the Chorkor smoker (5) groups offer an effective medium for the introduction and acceptance of innovations (6) the size of a fishsmoker's enterprise is an important factor in the adoption of the Chorkor smoker (7) the age and education of respondents are not important factors influencing innovativeness of those who obtained extension assistance, (8) age is not an important factor influencing the adoption of the Chorkor smoker by the three groups namely adopters who had extension contact, adopters who did not benefit from extension contact and non-adopters (9) the two attributes, savings on fuelwood and fast rate of fish smoking, are the most important attributes which favoured the adoption of the Chorkor smoker.

The following recomendations were also provide to assist change agents (1) extension agents must endeavour to know the fish smoker in her social context (2) education should be carried out to allay the fears of fishsmokers and (3) extension should target large scale fishsmokers when introducing the Chorkor smoker into a new community.

DEDICATION

This dissertation is dedicated to

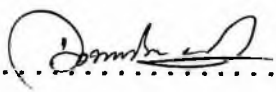
My wife, Mrs. Juliana Buadi,

My Children, Dela, Worla, and Kafui

and to my parents.

DECLARATION

I hereby declare that, except for references to other people's work which have been duly cited, this thesis is the result of my own investigation and ingenuity.



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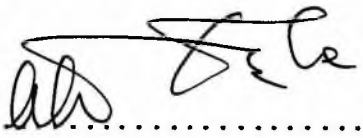

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CHAPTER I

INTRODUCTION

1.0 BACKGROUND

According to Ameh(1990) fish constitutes a major part of the animal protein intake in West Africa, ranging from 20% in Benin, to 70% in Ghana, Sierra Leone and Senegal.

It is an important source of animal protein in Ghana and, of all the animal protein sources it is the cheapest. It is also a source of iodine which could be used to control goitre (iodine deficiency disorder) now prevalent in Ghana.

Acquah(1988) emphasised that although Ghana has abundant marine and fresh water fishery resources most people are deprived of fish supply. He attributed this situation to post-harvest losses. Post-harvest losses account for the seasonal fish shortages, and high prices of fish.

In Ghana, poor fish handling and inadequate storage facilities have contributed to post-harvest losses. Cold storage facilities are inadequate. The few cold stores in the country are located in the big towns. In rural areas they are non-existent. Besides, the high fees for cold stores may deter small scale fish dealers. The scarcity of refrigerated vehicles and the poor road and transport network do not permit the efficient distribution of fresh and frozen fish.

There are other methods of reducing post-harvest losses in Ghana. These include drying, salting and smoking of fish. Fish smoking is a very widespread and important method of fish preservation in Ghana. The

government is therefore pushing smoking as the most acceptable method of fish preservation.

For a long time now, Ghana has depended on traditional fish smoking equipment. The traditional ovens are cylindrical and are of two types: the one made from clay mud, and the second of metal from old oil drums. Each oven has a stoke hole at the side for stoking and removing fuelwood. The fish is arranged in layers(usually 1-3 layers) on wire mesh or sticks, and each layer is separated from the other by sticks. The entire 'pile' is supported by iron rods spanning the top of the oven. Fish smoking on the traditional ovens is tedious, time and fuel-consuming. The traditional ovens are therefore inefficient.

The Chorkor smoker is an improvement on the traditional oven in terms of its larger capacity, lower fuel consumption and much less time and effort is involved in using it. It has been introduced to solve the problem of fishsmokers. It will also help to reduce post-harvest loses, so as to ensure the availability of fish throughout the year, keep fish prices within the reach of the citizens and ensure adequate and stable income for fishermen and fishsmokers.

The Chorkor smoker is an appropriate intermediate technology developed in 1970 at Chorkor in Accra by the Food Research Institute with assistance from FAO.

Brownell and Lopez (1985) listed the merits of the Chorkor smoker as follows:

1.No major adaptation or re-education is necessary since the system is in keeping with the fish smoking habits of West Africans

2.Low construction cost.

3.Long life and low maintenance cost if well protected

from the rain.

4.Large capacity - up to 240kg of wet fish can be smoked at a time.

5.High quality and uniformity of fish.

6.Easy to operate (much less time and effort involved)

7.No smoke in the eyes.

8.Greatly reduced consumption of fuel(6 -10 times less firewood than with the traditional ovens).

Having recognised the importance of the Chorkor smoker, the National Council for Women and Development has been instrumental in diffusing the Chorkor smoker so as to help fish smoking women.

1.1 PROBLEM STATEMENT

For many years, post-harvest losses of fish have been a source of concern for the government and people of Ghana. Policy-makers have been looking for ways to curb these losses.

The existing methods of fish preservation are largely traditional. The work involved in using the traditional ovens has been tedious, time-consuming and the quantity of fish that could be smoked at a time was small.

The Chorkor smoker has now been introduced to enhance fish preservation and to help solve some of the problems that fishsmokers encounter in their work.

Since 1987 the governments of Ghana and the Nertherlands have been sponsoring courses on artisanal fish processing and applied research at the University of Ghana Legon. The courses are handled jointly by the National Council for Women and Development and the University of Ghana. The participants are middle-

level agricultural extension agents drawn from English speaking Afican countries eg, Ghana, Nigeria, The Gambia, Uganda, Lesotho. The participants are trained from July- August in extension and technical aspects of fish processing with emphasis on the Chorkor smoker. They are therefore equipped to disseminate information on the Chorkor smoker in their respective countries.

The problem however is that the response to the Chorkor smoker by potential adopters in Ghana is poor. Practical research is needed to understand the fishsmokers - what factors have influenced some to adopt the Chorkor smoker readily while others have not.

1.2 RESEARCH QUESTIONS

The study was designed to seek answers to four major research questions:

1. Did the introduction of the Chorkor smoker to the Tema U Compound conform to the stages and processes predicted/prescribed by adoption/diffusion theories?
2. Does the socio-cultural environment of the Tema U Compound influence the adoption and diffusion of the Chorkor smoker as an innovation?
3. Do the characteristics of the potential adopters of the Chorkor smoker in Tema U Compound influence the adoption of the innovation?
4. Do the attributes of the Chorkor smoker as an innovation influence its adoption?

1.3 PURPOSE AND OBJECTIVES

The overall purpose of this study is to find out how the diffusion of the Chorkor smoker was undertaken at Tema U compund and to determine the important factors that influenced the adoption of the Chorkor smoker.

The specific objectives of the study are listed as follows:

1. To identify the various stages in the diffusion, adoption of the Chorkor smoker.
2. To investigate how contacts were made by the extension agent with the community members.
3. To describe the sources of information that the fishsmokers used in making their decision about the Chorkor smoker.
4. To provide a description of the methods employed in the diffusion process.
5. To identify the social system within which the fishsmokers operate.
6. To identify and describe the various factors which influenced the acceptance or rejection of the Chorkor smoker.
7. To identify and describe the attributes of the innovation as considered by the fishsmokers.

1.4 NEED FOR THE STUDY

The data on diffusion /adoption of innovations in Ghana is grossly inadequate. One contribution of this research will be to add to the material already collected on the diffusion of innovations in Ghana.

Secondly in view of the farmers' poor response to

innovations, and the numerous factors and their inter-relationships in the adoption process there is a need to obtain views from farmers and extension agents and also gain further insights into the problem of adoption and diffusion.

This will help researchers to develop appropriate technologies for potential users. Extension agents would also know the right strategies to use in the diffusion of innovations like the Chorkor smoker.

1.5 ORGANISATION OF THE REPORT

The report is organised under the following major headings: Chapter one deals with the introduction; chapter two reviews related literature; chapter three is on methodology; chapter four relates the results of the study. The results are discussed in chapter five and the conclusions and recommendations are presented in chapter six.

CHAPTER II

LITERATURE REVIEW

2.0 INTRODUCTION

The purpose of this chapter is to review the literature relating to the research questions posed for this study. The chapter will treat the three main research questions identified for the study in chapter one. The first section will deal with stages/processes undertaken by the extension agents in the introduction of innovation. The second section will focus on the socio-cultural environment into which the Chorkor smoker was introduced. The third section will examine the factors that contribute to the adoption or non-adoption of innovation.

2.1 Processes/Stages in the Introduction of Innovation

The process of introduction or diffusion consists of a set of stages that are linked. The extension agents and potential adopters may go through some or all of these stages. Extension agents will however use methods and strategies that will enhance the diffusion and adoption of innovations.

Rogers(1962:13) defined diffusion as the "process by which innovations spread". The diffusion process is the spread of a new idea from its source of invention to its ultimate user. Different actors are involved in the process of diffusion.

Research ⇒ Extension ⇒ Adopter

The extension agent is an important link between research and the adopter. The basic roles of extension agents include education and communication. The success of an extension agent depends on his ability to educate the clients, communicate information, and the ability to select appropriate methods and processes of introduction. One of the methods of creating awareness of an innovation in a community is through an opinion leader. It is the role of the extension agent to select some of the target group members to act as innovators and opinion leaders.

Extension Teaching Methods

The extension method used in teaching potential adopters affects their adoption decisions, whether to adopt or reject a particular innovation. The extension agent uses various methods and techniques of imparting knowledge and a change in the attitudes and behaviour of the learners. The educational methods commonly used by extension include individual, group and mass methods (Maunder, 1972:). It is the task of extension agents to choose the methods that will be most effective in achieving the educational objectives or in stimulating social change. The extension agent may contact and persuade an individual or a group to adopt an innovation. Groups usually consist of members with the same or similar objectives. According to Garforth(1982:54)

> ...groups offer a more effective learning environment through mutual reinforcement and group pressure against the rejection of new practices or ideas.

Groups influence individuals by the attitudes of their members and consequently the members want to conform to the group. There is also the general notion that influential people in a group exert influence on the rest of the group to accept social change once they themselves favour the change. Group meetings provide a forum for expressing views, for feedback response, and for clarification of issues relating to diffusion and adoption. Group methods are important in moving people from the interest stage to trial stage (Maunder, 1972:). Demonstrations constitute an important part of the teaching method. Potential adopters may be sceptical of the new innovation. They want to see how results are obtained before they can believe their value (Arensberg and Niehoff, 1971:93). In the absence of a trial or when results are not convincing, the individual is likely to reject the innovation.

Sources of Information

Potential adopters are likely to adopt innovations depending on the source from which they obtain information. They usually obtain information from different sources for their adoption decisions. Appropriate information is needed at each stage of the adoption process. Information which is detailed and specific to each particular individual and his situation

is necessary, particularly throughout the active decision making stage (that is the period between awareness and adoption). The appropriate information will help the potential adopter to take care of risks and uncertainties and also make the right decisions and then act. Where information is not relevant or appropriate or reliable, an individual may likely reject the innovation. According to Jones (1972:17).

> ... many inappropriate decision occur as a result of an incorrect or incomplete analysis of a problem, or of failing to seek adequate information (or due to an excess of often contradictory information) on possible innovative solutions..."

This state may be attributed to the characteristics of the potential adopters and also the extension gents. Opinion leaders may also interpret outside information on the basis of their opinions and experiences.
Although most adopters obtain more than one type of information through the same channel, most utilise multiple sources in the process of acceptance or rejection of techniques. Furthermore there is evidence that different sources of information are utilised for different types of practices (Wilkening 1950:).

The particular sources utilised will depend upon the way in which they are perceived by the individual seeking the information. The clients' perceptions of the extension agent also affect adoption. At the point of deciding whether to accept a new innovation or not, potential adopters depend on extension agents and on the experience and knowledge of other potential adopters. According to Yeracaris (1970:) the most significant

variable accounting for the acceptance of innovations is communication, which occurs through a network of relationships. A communication network consists of interconnected individuals who are linked by patterned flows of information. Networks can serve as important connections to information sources. As a set of individuals interact with each other, information is passed on about manythings including innovations. Networks are therefore important in the diffusion of innovations.

2.2 The Socio-cultural Environment

The socio-cultural environment in which an individual lives affect his decision, whether to adopt an innovation or reject it. The socio-cultural environment has been shown in the literature as an important factor in the diffusion and adoption of innovations. Katz et al (1963:) defined diffusion in sociological terms as the

> (1) Acceptance (2) over time (3) of some specific item - an idea or practice, by individuals, groups or other adopting units, linked (4) to specific channels communication (5) to a social structure (6) to a given system of values or culture.

Katz, et. al; (1963) further stated that the social structure constitutes a set of boundaries within which items diffuse.

Secondly, it described major channels of person-to-person communication through which diffusion flows. Thirdly, it has to do with the distribution and

differentiation of statuses and roles and the characteristic patterns of interaction among the occupants of varying positions. Hence people with different statuses and roles are found in a social system.

Leadership

There are usually leaders in every social system who through interaction influence their followers. Potential adopters are likely to accept an innovation which is favoured by their leaders. Leaders have specific roles to play in the social system. In rural areas they rule subjects by customs and traditions and the people tend to resist rapid change. The people may view the central government (and therefore its change agents) with suspicion. This poses a problem for extension. Consequently the central government must work through local leaders. According to Maunder (1972) extension should rely on institutional leaders and representatives of the various social layers to speed up the programme and its adoption. They serve as a point of contact between the extension agent and the potential adopters. The local leaders have authority, that is the right to influence others and they often legitimise the introduction of innovation.

Ends and objectives/values

The goals and values of individuals also determine the rate at which they adopt innovations. The changes which the members of social system expect to accomplish

through appropriate interaction is referred to as ends and objectives. These constitute an important value orientation. Values form a people's goals and influence the way they evaluate other people, experiences and objects. Values are acquired during early socialisation and depict what is right or wrong, important and unimportant, desirable or undesirable, good or bad. Himmelweit, et. al. (1958) established that even when class membership is held constant different value orientations characterise early and late adopters. Katz, et. al. (1963:) also noted that "attitudes, values and personality represent one of the major sets of variables that have been related to the acceptance of innovation". The rate of adoptionis low if the new idea conflicts with the value system of the community.

Attitudes

Social system members who have an unfavourable attitude towards change or towards extension agents will not readily adopt innovations introduced by such agents.

The attitudes of the members of a social system is also an important factor in the diffusion, adoption process (Katz et, al. 1963:249). Attitude is a permanent organization of an individual's beliefs that disposes one's action towards that object.

According to Rogers and Shoemaker (1971:110) there are at least two levels of attitudes: (1) a specific attitude toward the innovation, and (2) a general attitude toward the change. The first, attitude toward change consists essentially of a favourable or unfavourable belief in the usefulness of the new idea

for the individual. They further stated that a previous positive experience with the adoption of innovations creates a bank of generally favourable attitudes to change. On the contrary a negative experience from an innovation that is perceived as a failure leads to resistance to future new ideas.

Norms

Individuals may accept innovations which do not conflict with the norms of a social system and rejects those which conflict with the social system norms. The norms of a social system can be a barrier to change (Rogers and Shoemaker, 1971). Norms are established behaviour patterns for members of a given social system. Norms provide standards for behaviour. Norms influence the range of choices of goals and govern the selection and application of facilities to attain the goals. Mcdonnel (1973:27) stated that

> A progressive farmer may want to carry out some innovations, but if he violates or upsets the group norms in any way, or even if there is a suspicion that this may be so, that farmer will soon be brought to size!

Sanctions are applied to serve as deterrent to deviant behaviour.

Culture

Culture is important in diffusion and adoption. The culture of the members of the community may speed up diffusion and adoption or act as a barrier, as is

reported by Arensberg and Niehoff (1971:74) :

> Apart form access to new ideas there is a matter of cultural willingness to adopt. Some cultures have patterns which favour the borrowing of new ideas, while others attempt to rely on the existing system without getting anything from outside.

Vine (1957:70) also identified ethnocentrism as a source of resistance to innovations:

> One of the most significant factors in resisting change is ethnocentrism. The people's pride in, and feeling of rightness about, their culture, customs, land and way of life have been built up through the ages. This feeling has been reinforced by all the institutions: the family,the church, the economic system, the government and the school.

When one sees one's way of life as superior to others, it influences the way one relates to people who hold a different view. It also influences the way one accepts and internalises information from people of a different orientation or culture. With reinforcement of such a position by various institutions, the people defend themselves against changes.

The larger community

The factors of the larger community may affect the rate of adoption of an innovation. Research studies have revealed that acceptance of innovations depends also on the factors of the larger community:

infrastructure, inputs, markets and credit. Byrnes (1978) indicated that the farmer in a developing country is confronted by an environment which includes potential economic constraints in the form of prices, market and infrastructure. Thus their ability to adopt innovations which require purchasing inputs will depend on existing price levels, marketing conditions, and the level of infrastructural development. Inadequate development of a country's infrastructure or markets makes it more difficult for potential adopters to obtain the inputs which they need to adopt the innovation. Commenting on the impact which inadequacies of inputs supply have on adoption Savale (1966:208) cited in Byrnes (1978:80) stated:

> The problem of supplies is of great importance in inducing (individuals) to accept new technology... Non-availability and inadequacy of supply and untimely nature of supplies did affect adoption to a considerable extent.

Williams (1968) cited in Byrnes (1978) identified inaccessibility to requisite facilities (no money, materials not available) as reasons for non-adoption of fertilisers in Nigeria. According to Byrnes (1978) the one single constraint to adoption of fertiliser usage or other innovations in agriculture production technology most frequently mentioned is lack of credit.

Maunder (1972) also hinted that people may view the central government, with suspicion because of the tax it exacts. It follows that change agents working for the central government may be viewed similarly.

2.3 Factors that contribute to the adoption or non-adoption of innovation

This section shall be considered under two sub-headings: individual characteristics, and innovation attributes.

2.3.1 Individual Characteristics

In various diffusion studies undertaken by Rogers (1961a), van den Ban (1957,1960, Lionberger and Coughenour (1957) Sheppard (1960), Bose (1961) individual characteristics have been found to influence adoption. These characteristics are age, economic status, education, size of enterprise and social status.

Age

The age of an individual influences innovativeness. Young people are generally more venturesome and receptive to change. They are wiling to accept risks. They are cosmopolite and so obtain information from outside their social system. The old people are conservative, localite and they feel insecure adopting innovations because the decisions they take do not affect them only but also the entire family. Rogers (1961a), Beal and Rogers (1960), van den Ban (1967) found younger age to be associated with innovativeness. Sheppard (1960) however found older age to be associated with innovativeness. The dominant and the general finding is that younger age is associated with innovativeness.

According to Barnette (1953) "the age levels would vary

with the kind of novelty, but the fact of an age differential would remain.

Economic Status

An idividual is likely to adopt an innovation if his income is high. The income or socio-economic status of an individual affects his adoption behaviour (Wilson and Gallup, 1955). Other researchers, Copp(1956), Lionberger and Coughenour (1957) supported the relationship between income and innovativeness.

The higher the income the higher the rate of adoption because such an individual can absorb risk. Potential adopters need money to by inputs and try the innovation. Poverty or low economic status is an important barrier to adoption.

Education

Education creates a favourable mental atmosphere for an individual to adopt an innovation. Educational attainment has been shown in the literature to have a positive relationship with adoption. Goldsen and Ralis (1957) cited in Byrnes (1978) found that literate villagers in Bang Chan, Thailand adopted a number of innovations earlier than illiterates. Van den Ban (1960) found that characteristics such as education, size of farm and networth were positively related to individual innovativeness. The relationship between education and innovativeness was also supported by researches carried out by Straus (1960), Coughenour (1960) and Sheppard (1960).

Illiterates are unable to read scientific and agricultural journals, and their comprehension of information relating to new ideas is quite low. Further, their ability to analyse information, take appropriate decisions, and deal with the problem of risk and uncertainty is lower than that of educated people.

Size of Enterprise

An individual's willingness to accept an innovation also depends on the size of enterprise. Those with small enterprises are less willing to try and less ready to accept innovations. Van den ban (1960) found size of enterprise to be positively related to innovativeness.

Social status

People with high social status are more likely to become aware of and adopt innovations earlier than those with low social status.

Social status is the position of an individual relative to others in a social system. In 402 studies in which empirical data were reported in support of a correlation between high social status and early adoption of an innovation, 275 such studies (68%) gave a positive relationship which 127 did not support the relationship (Rogers and Shoemaker, 1971). According to Aklilu (1976) cited in Byrnes (1978:169):

> Farmers with higher social status and social participation are often very influential at the village level. They are the people who are considered as the "opinion leaders".

Investigations carried out by Bose (1961) in ten Indian villages showed that those who adopted more improved practices belonged to the higher castes. But people with high social status may not always be the innovators especially if the innovation is not compatible with their norms.

Innovation attributes

Mosher (1966) identified new technologies or innovations as one of the requirements for modernising agriculture. The term "innovation" covers any thought, behaviour or thing which is perceived as new by an individual, group or culture to which it provides a new means towards achieving some recognised social end, or where it allows new social objectives to arise and become realised.

The way potential adopters perceive the attributes of an innovation affect their decision to adopt or reject that innovation. How an individual perceives an innovation may be quite different from how extension agents perceive the same innovation. Thus while an extension agent may see an innovation as a felt need, or as suitable for the individual's situation, or as a solution to the problems of the individual, the individual may however have a totally different view of the innovation. The individual may not adopt it because he does not see it as the best possible course of action. It is also to be deduced that since people's situations differ, the perception of one individual may differ from that of another. Wilkening, et. al; (1963:152) stated that the factors

> ... which affect adoption are related to the[individual's] perception of the consequences of adoption. These consequences may be perceived in the form of economic returns, production, quality of the product, ease of operations,timing of operations, maintenance of resources, or protection from losses or in the form of social or psychological factors.

An individual who does not perceive obvious advantages of the consequences/results of the new technology over what he is currently using will reject it.

Rogers (1975) cited in Byrnes (1978:1) argued that research on the adoption of innovations has had a "pro-innovation bias", that is, an assumption that the innovation is good and should be adopted by everyone. But it is increasingly recognised that the adoption of an innovation may not be the 'best course of action available' to an individual.

An innovation is a complex entity with many attributes. Each attribute can have a positive or a negative effect on the rate of adoption in a given population (Fliegel et al, 1968). Studies carried out by Fliegel and Kivlin (1966), Brandmer et al (1964), Fliegel and Kivlin (1962) indicated a relationship between innovation attributes (relative advantage, compatibility, trialability or divisibility, observability and complexity) and the rate of adoption. According to Rogers (1961b)

> Some new practices are relatively simple in nature, divisible for trial, and compatible with the farmers' past experiences; the result visible and possess a relative advantage over previous practices... These innovations were more readily adopted and their adoption periods were shorter.

Relative Advantage

An innovation is likely to be adopted by an individual if he perceives its relative advantage. Relative advantage refers to the degree to which an innovation is superior to the idea it supersedes. Rogers (1961a) stated that early adoption is favoured when an innovation posseses a relative advantage over previous practices.

Compatibility

Compatibility is another important attribute of innovations which favour adoption. It is the degree to which an individual perceives an innovation to be consistent with his felt needs, values, and past experiences. When an innovation can be identified with something familiar, it sets
the stage for the mental reaction of accepting or rejecting it. Barnett (1953:357) stated that:

> New things, ideas and behaviours are evaluated, not only with reference to

> intrinsic merits or demerits, but also by comparison with existing usages which can be measured on the same scale.

Studies carried out by Santopolo (1961), Yeracaris (1961), Jones (1972) show that compatibility is an important factor influencing the adoption of innovations.

Trialability or divisibility

A potential adopter may adopt an innovation if it is trialable or divisible. These terms refer to the degree to which an individual perceives that he can try an innovation on a limited scale on his own holding. There may however be intervening variables which may make it difficult for an individual to conduct a trial. Holden (1972) cited in Byrnes (1978) summarised many of these factors as: capital or credit, the establishment of a relationship with others in order to acquire the input, and the infrastructure.

While some innovations can be given a limited practical trial because they are divisible, others such as many mechanical items may have to be hired or borrowed from other users for effective trial. In the case of major fixed items of buildings and equipment such a trial on an individual's own holding is not possible although it is common for individuals tovisit shows, demonstrations, and the business concerns of earlier adopters to examine in detail innovations of this kind.

Kivlin (1960) found a correlation between divisibility

and the rate of adoption for 43 innovations that was not significant but in the expected direction.

Observability

An innovation is likely to be adopted if a potential adopter can observe the ability of the innovation to produce a profitable return. Observability refers to the extent to which a practice and its results can be readily seen. It is an important factor related to the adoption of innovations. To many potential adopters, "seeing is believing". Arensberg and Niehoff (1971:93) emphasised the importance of this issue in this statement:

> The villagers of the world, as well as the urban poor, are pragmatic people. Indeed they have had to become so to survive. Nevertheless, the solid core of pragmatism is scepticism. The very practical person has to see how results are obtained before he can believe their value. This is the basis for demonstration or the technique of showing in a pragmatic fashion the advantages of a new idea or practice. It is the most direct communication possible.

Jones (1972:39) stated that early adoption of an innovation is favoured "where it is highly visible and can be seen in use elsewhere". Rogers(1961a) also noted that when the results of new practices were visible they were more readily adopted.

Complexity

An innovation is likely to be rejected if it is complex. Complexity is the degree to which an innovation is perceived to be difficult to understand and use. Complex innovations appear risky to potential adopters since they require complex knowledge and skills to master them. They are therefore not readily adopted.

Graham (1956) observed differences in the adoption rates of Canasta and TV in the Upper and Lower classes of a sample of families in New Haven,Connecticut. He noted that the low rate of adoption of Canasta (12%) compared to TV (24%) in the lower class was because Canasta had complex procedures, was difficult to master, needed more detailed explanation, while TV was simple and only needed the ability to turn the knob.

In their study on attributes of innovation, Fliegel and Kivlin (1966) found that complexity did not have any effect on adoption. Kivlin (1960) also reported that the complexity of innovations was more highly related in a negative direction to their rate of adoption than any other characterstic of the innovation except relative advantage. Thus while complexity may hinder adoption in some cases its influence with other innovations may not be in the same direction.

Summary

A number of factors are brought out in the literature as factors that promote or hinder the diffusion and adoption of innovations. These include

sources of information, extension teaching methods, the socio-cultural environment, personal characteristics of potential adopters and the attributes of the innovation.

The role of the extension agent and opinion leaders are important in diffusion of innovations. The extension agent's role of communication and education helps to change the behaviour of potential adopters in the desired direction. Opinion leaders, apart from being sources of information, also have the ability to influence others to adopt innovations. Information itself is important in choice-making. Reliable and relevant information helps individuals to make the right decisions, whether to adopt or not to adopt a new technology. Consequently potential adopters may seek information from multiple sources.

The socio-cultural environment, consisting of the culture, norms, values, attitudes, leadership roles, and the larger community are also important factors in the diffusion and adoption of new technologies. Innovations that conflict with the culture, norms, values of the community are usually rejected. Unfavourable attitude of the community members towards the innovation, change/change agents may hinder adoption. Leaders can influence their subjects to adopt or reject new ideas. Various resources for adopting an innovation come from the larger community. The larger community can therefore enhance or hinder the diffusion and adoption of innovations.

Individual characteristics are also noted in the literature as factors that influence adoption. It is generally agreed that younger age, high economic status, high educational attainment, larger enterprise, high social status of individuals favour adoption while the

opposite act as obstacles to adoption.

The attributes of innovations also influence the diffusion and adoption of innovations. There is little disagreement in the literature that relative advantage, compatibility, divisibility, observability and simplicity of the innovations promote adoption.

The adoption or rejection of an innovation is therefore a complex phenomenon since many factors are involved in taking the final decision whether to adopt or not to adopt.

CHAPTER III

RESEARCH METHODOLOGY

3.0 Introduction

The purpose of this chapter is to describe the methodology used in carrying out the research project. It begins with a brief description of the study area. The next section describes the population and sample of study, followed by data gathering. Procedures used in the analysis of data will be indicated and finally limitations encountered will be presented.

3.1 RESEARCH DESIGN

Qualitative research methodology was the main design used in studying the phenomenon. This is appropriate for the following reasons. First, qualitative data provide rich descriptions and explanations of processes. Second, they are more likely to lead to serendipitous findings. Third, they help researchers go beyond initial preconceptions and framework. Lastly, the findings from qualitative studies have a quality of "undeniability", (Smith, 1978).

3.2 Study Area

The study was carried out in Tema U Compound. The area is about 29 kilometres East of Accra. It is close to Tema Fishing Habour and hence the inhabitants are

mainly engaged in fish-smoking.

The choice of Tema U Compound was basically influenced by the following factors:

1.Nearness to the University. This would make commuting easy and cheap since the study lacked financial support.

2.It is also a community in which the Chorkor smoker had recently been introduced, thus likely to present less extraneous influences eg. user fatigue.

3.3 Population and Sample of Study

The population used for the study comprised fishsmokers in Tema U Compound. A purposive sample of twenty-four fishsmokers in Tema U Compound was selected for the study. This consisted of (1) eleven fishsmokers who had extension contact and were given a free package by the extension agents. The twelfth fishsmoker was ill. (2) five fishsmokers who did not have extension contact/free package but on their own adopted the Chorkor smoker and (3) fishsmokers who did not have extension contact/free package and did not also adopt the Chorkor smoker. Two extension agents who introduced the Chorkor smoker into Tema U Compound were also included in the sample. One of them was from the National Council for Women and Development (NCWD) and the other from Food Research Institute, Accra.

3.4 Data Gathering

3.4.1 Instrumentation

The instrument used was an interview guide. The interview guide was developed after the initial visits to Akplabanya, Ayitepah and Tema U Compound to know the site, the context, the local response of the fishsmokers to the diffusion of the Chorkor smoker, and the problems associated with the diffusion and use of the Chorkor smoker. At Tema U Compound the researcher interviewed the adopters. The purpose was to find out what went on from the time extension agents made the initial contact with the community up to the time they adopted the Chorkor smoker and started using it.

Two fishsmokers who did not adopt the innovation were also interviewed to know why they did not adopt, and if they were then interested and why. Two women who on their own and by imitation adopted and constructed the oven were also interviewed to know what motivated them to adopt it. Another round of interviews was conducted based on the specific objectives of the study. The objective was to get clear and valid response with which to develop approriate interview guide.

The interview guide consisted of open-ended

questions or items to enable the researcher to collect a more detailed response and qualitative data. The questions were first reviewed by the researcher to ensure that they adequately covered the various dimensions of the phenomenon of study and elicited valid responses. The content validity of the research instrument was ascertained by an expert in extension in the Department of Agricultural extension, University of Ghana, Legon. The interview guide was divided into four parts. Part 1 was designed to collect information on the characteristics of the respondents such as age, education, size of enterprise and social status. Part 2 was intended to collect information on the attributes of the innovation eg, relative advantage, compatibility, observability while Part 3 was to elicit responses on the processes in the introduction of the Chorkor smoker eg, how the contact was made, extension teaching methods. Finally, Part 4 was designed to collect data on the socio-cultural environment eg, housing, ethnic groups, norms, social organisation, larger community (fears and constraints). Fear refers to the anticipation of another party (usually a more powerful one eg, the government) imposing its will on the fishsmokers. In this study constraints is defined as

any resource/input/facility/service, controlled by the larger community, which when lacking or inadequate or costly or difficult to obtain tends to hinder the adoption of the innovation.

3.4.2 Data Collection Technique

Interview appointments were booked with the initial adopters and the extension agents.

Each interview was conducted in the home of the respondent by the researcher himself. The respondents were assured of confidentiality of any information they volunteered. After interviewing two initial adopters, the researcher had a chat with his supervisor about the findings and the problem of eliciting the right responses.

The researcher had to re-word the questions and construct "probes". "Probes" are devices used to elicit the desired information. An additional five interviews of adopters were conducted and interview responses were again presented to the researchers's supervisor to read through. His comments were incorporated in further interviews. The interviewees were allowed to talk freely and provide answers the way they perceived them.

The respondents were allowed to express themselves freely. The data were read through and observer notes and comments were made to indicate missing data, observations made by the researcher, and areas which need further explanation or probe. Another round of interview was conducted with the sample of study to fill in missing data and to clarify information provided earlier and validate some responses.

Previous data collected were discarded before getting the final instrument. This served as a pretest.

3.5 Managing the Data

3.5.1 Data analysis

Two major categories are described for the study. The first comprises those who adopted the Chorkor smoker as a result of the extension agents' activities and the second comprises those who did not receive any direct input from the extension agents. The adopters are categorised on the basis of the degree or extent to which an individual secures additional trays to the five originally owned. The number of trays is used because it is an index of the economic status of an individual. There is also a relationship between economic status and adoption. On the basis of this the following groups are identified in the first category.
Group 1. Individuals with a total of up to 10 trays (6 adopters)

Group 2. Individuals with a total of 11 - 20 trays (3 adopters)

Group 3. Individuals with a total of more than 20 trays (2 adopters)

For the second category, two groups of fishsmokers are identified. They are termed Group 4 and Group 5 as follows:

Group 4. Individuals who adopted the Chorkor smoker without assistance from the extension agents (5 fishsmokers).

Group 5. Individuals who at the time of the research had not adopted the Chorkor smoker (8 fishsmokers).

Groups 4 and 5 are included in the study to help compare and contrast the results with Groups 1 - 3 and to throw more light on the diffusion process with respect to the Chorkor smoker.

Data analysis was ongoing. The collected data were subjected to data reduction. Data reduction is part of data analysis, and it is "the process of selecting, focusing, simplifying, abstracting and transforming the 'raw' data that appear in written up field notes" (Miles and Huberman, 1984:21).

In order to assemble chunks of words (field notes) and reduce bulk into readily analyzable units, coding was done.

According to Miles and Huberman (1984:56):

> A code is an abbreviation or symbol applied to a segment of words - most often a sentence or paragraph of

> transcribed field notes - in order to classify the words. Codes are categories. ...They are retrieval and organising devices that allow the analyst to spot quickly, pull out, then cluster all the segments relating to the particular question, hypothesis, concept, or theme. Clustering sets the stage for analysis.

The coded data were tabulated and displayed in such a manner that relationships could be established by means of percentages.

The data for personal characteristics such as age, education and size of enterprise were subjected to chi-square analysis to find the relationship between the characteristics and adoption of the Chorkor smoker at P = 0.05.

3.6 Limitations

The sampling design may introduce some bias, since selection of the respondents is consciously or unconsciously influenced by human choice.

The fish-smoking women do not keep records. The data collected is based largely on the memory or recollections of the women and this may be subject to error.

Beneficiaries of this programme may not want to sound ungrateful through their expressed opinions. There may also be the fear of the price they may have to pay for volunteering answers. These attitudes are likely to affect the validity and reliability of the research.

According to Fox (1969) the validity of

participants' responses may be impaired by their desire to please the researcher or answer in a socially acceptable manner.

The responses of the participants to some questions were influenced by their experiences and biases, thereby introducing errors into the research. However, these would be minimised due to the repeated interviews which the researcher undertook with respondents.

Since this is a case study the results obtained are only applicable to this study on the Chorkor smoker in Tema U Compound. While some inference may be drawn from this study, further studies would be required before the findings could be generalised.

CHAPTER IV

RESULTS

4.0 INTRODUCTION

This chapter describes the results of investigations carried out at Tema U Compound to find out how the Chorkor smoker was introduced into the community and the factors that the fishsmokers considered in adopting or rejecting the innovation.

The results are presented here according to the objectives of the study. These are:

1. The socio-cultural environment into which the Chorkor smoker was introduced.
2. The processes/stages in the diffusion of the Chorkor smoker.
3. The sources of information.
4. The methods used by the extension agent to win the confidence of the community members and persuade them to adopt the smoker.
5. The individual characteristics eg. age, educational attainment, size of enterprise and factors limiting the expansion of enterprise and also social status.
6. The attributes of the Chorkor smoker which influenced its adoption (or rejection) by the fishsmokers.

The above factors are described here as the individual fishsmoker perceived them.

4.1 THE SOCIO-CULTURAL ENVIRONMENT

This section describes the features of the community in which the diffusion and adoption of the Chorkor smoker occurred.

The target community, Tema U Compound consists of people from different towns in Ghana. They migrated there to make a living in the fishing industry. Tema U Compound is not an isolated entity but part of a larger community. Larger community is defined here as people or groups of people living outside the geographic boundary of Tema U Compound. It may also be looked at as the immediate geographic areas outside Tema U Compound.

4.1.1 Housing

The fishsmokers in Tema U Compound live in wooden houses. The houses are built with wawa or plywood and the roofing material is either slate, plywood or roofing sheet.

One of the respondents in Group 2. explained that fishsmokers in need of land would have to contact the landowner with one bottle of schnapps, one bottle of Akpeteshie and ¢10.000 (formerly ¢5,000) . The landowner presents these items to the chief. The initial payment gives the prospective builder access to the land. She further said that after completing the house, the builder pays land rent (which was ¢2,000.00 in 1990) to the landowner.

The reasons given by the fishsmokers for putting up wooden houses include the following: the fear that the

landowners would take the block houses from them (one member of Group 1), poverty (one member of Group 4), to distinguish strangers from the indigenes) (one member of Group 4).

4.1.2 Ethnicity

Tema U Compound is not a homogenous community. The fishsmokers mentioned various ethnic groups which co-exist in the community. Majority of the respondents disclosed that the inhabitants of Tema U Compound are Anlos. Other tribes mentioned were Gas, Fantis, Adas, Hausas, Efutus, Frafra, Yoruba, Kabiri, Anehos. However, the Chorkor smoker was introduced to the Anlos, and all the adopters are Anlos.

4.1.3 Norm

Table 1 below shows the various norms in Tema U Compound. All the fishsmokers in the sample of study said that fishing is forbidden in the sea on Tuesdays. The reasons given are also indicated in Table 3 below. Table 4 illustrates the sanctions applied to enforce the norm.

Table 1: Distribution of respondents in Tema U Compound by stated norms in the community.

NORMS	No. of Respondents who stated norm (FREQUENCY/GP)						
Gp	1	2	3	4	5	Total	%
Fishing forbidden on Tuesdays	6	3	2	5	8	24	100
Laws regulating burial	0	1	0	0	0	1	4
Laws concerning fetishism	0	0	1	0	0	1	4
Laws against quarrelling	1	0	1	0	0	2	8
Laws against stealing	0	0	1	0	0	1	4

Source: Field Survey, 1991

Group 1:

All the respondents in Group 1 reported that fishing is forbidden in the sea on Tuesdays.(Table 1).

The reasons given by the fishsmokers (Table 2). for the ban on fishing on Tuesday included: it is a custom (three respondents), it is the day for worshipping the gods(one respondent). One member of the group did not give any reason.

As indicated in Table 3, only one fishsmoker in this group said that those who go a-fishing on Tuesdays are fined. One other respondent did not know the sanctions applied and the remaining three respondents did not indicate any sanctions.

Group 2:

All the respondents in this group (Table 1) above reported that fishing is forbidden on Tuesdays. One of them also stated that there are laws regulating burial.

The data in Table 2 reveal the reasons given for he ban on fishing on Tuesdays. Two of the fishsmokers indicated that Tuesday is a day for worshipping the gods. Two respondents also said it is a custom. One member of the group however pointed out that Tuesday is a day of rest.

As indicated in Table 3 only one respondent, said that sanctions are applied to enforce the norm. According to her:

> [Violaters] will pay a fine-kola, drinks and money. There was a time those at the harbour went to sea on Tuesday and so for some time, there was no fish until the gods were pacified at the harbour.

Group 3:

As illustrated in Table 1 above both respondents in the group disclosed that fishing is forbidden in the sea on Tuesdays. Other laws identified in the community were laws relating to fetishism (one respondent), quarrelling (one respondent), and stealing (one respondent).

Only one fishsmoker in Group 4 (Table 2 below) stated that fishing is banned on Tuesdays because it is a custom. The other member of the group did not give any reason why fishing is forbidden on Tuesdays.

One fishsmoker reported that offenders are

punished.(Table 3). One member of the group did not know the sanctions applied to enforce the norm.

Table 2: Distribution of respondents by the reasons given for not fishing on Tuesdays.

Reasons for not fishing on Tuesday	No. of respondents who mentioned reason (FREQUENCY/GP)						
Gp	1	2	3	4	5	Total	%
A day for worshipping sea gods/voodoo	1	2	0	0	4	7	29
It is a custom/law	3	2	1	4	2	12	50
It is a Ga festival day	0	0	0	1	0	1	4
Gas rest on Tuesday	0	1	0	0	0	1	4
Fishermen mend their nets	0	0	0	0	1	1	4
Don't know	0	0	0	0	1	1	4

Source: Field Survey, 1991

Table 3: Distribution of respondents by the sanctions known to be applied in the community to enforce the norm on fishing.

SANCTION	No. of respondents who know sanction (FREQUENCY/GP)						
	GP	1	2	3	4	5	Total %
Payment of a fine (eg. kola, money, hot drinks)	1	1	0	0	3	5	21
Offenders are arested/punished	0	0	1	0	2	3	13
Don't know	1	0	1	0	1	3	13

Source: Field Survey, 1991

Group 4:

All the five respondents in Group 4 reported that fishing is forbidden on Tuesdays.(Table 1).

Majority (four respondents) said that it is a custom while one fishsmoker said Tuesday is a Ga festival day.(Table 2 above).

None of those in Group 4 mentioned the sanctions that are applied to those who violate the norm.(Table 3).

Group 5:

All the eight respondents said that fishing is forbidden on Tuesday (Table 1).

The data in Table 2 above revealed a wide variety of reasons given by respondents in this group for the ban on fishing on Tuesdays. Two of the fishsmokers stated that it is a day for worshiping the sea gods while four said that it is a custom. One respondent also indicated that the fishermen mend their nets on Tuesdays. One fishsmoker however did not know why fishermen do not go to sea on Tuesdays.

The majority of the fishsmokers indicated that sanctions are applied to enforce the norm. Three of them claimed that offenders are fined, two stated that offenders are arrested. One of the respondents did not know the nature of sanctions applied. The remaining members of the group did not state the sanctions that are applied in the community.

4.1.4 Social Organisation

The data in Tables 5 and 6 below reveal the various societies and their objectives in Tema U Compound.

Group 1:

The members of this group named the various ethnic groups in Tema U compound and their chiefs. Three fishsmokers mentioned the Anlo chief and three mentioned the Ga chief. Other chiefs - Fanti, Ada, Hausa, Frafra and sea chiefs were named by a minority of the respondents.

The data in Table 4 show the different social groups in the community while Table 5 presents the

objectives of these social groups. Two respondents in group 1 made reference to the Devi societies. They said that the objective of the Devi societies is to convey deceased members to their hometowns for burial.

One of the respondents also mentioned the Anlo Union. She said that the Anlo Union was formed before the 31st December Women's Movement. She disclosed that its objective is to help the members when they are in difficulty.

Three respondents pointed out the existence of the Fishsmokers' Society. One of them reported that it has a membership of 200 women. According to her the objective of the Fishsmokers' Society is to provide financial assistance to members in the event of death.

The 31st December Women's Movement (31 DWM) was also identified by two respondents as a social group in Tema U Compound. The leader of the DWM, identified by name, was said to be the one the extension agents looked for when they brought the innovation.

One of the respondents claimed that when the 31 DWM was formed in Tema U compound they were given cloth and wire mesh at controlled prices by the factories and they in turn sent fish to Gondar Barracks, SOS home, Asylum, Wire mesh factory, without demanding payment. She said that when the chairperson died in 1982, 31DMW became inactive because their new leader is not s dynamic as the former one.

The other respondent also stated that the Movement is now inactive and has somehow collapsed following the death of the former president.

Table 4: Distribution of respondents by social groupings known in the community.

SOCIETIES	No. of respondents who know of society (FREQUENCY/GP)						
GP	1	2	3	4	5	Total	%
Devi (Hometown) Socíeties	2	3	2	3	3	13	54
Ewe/Anlo Union	2	0	0	0	0	2	8
Fishsmokers' Society	3	0	0	5	5	13	54
Tema Mannhean Fish Society	1	1	1	0	0	3	13
Drumming Society	0	0	1	0	0	1	4
31 DWM	2	1	2	0	1	6	25
Don't know	0	1	0	0	1	2	8

Source: Field Survey, 1991

Table 5:Frequency distribution of respondents by their stated objectives of the Societies in the community.

SOCIETY/OBJECTIVES	No. of respondents who stated respective objectives (FREQUENCY/GP)					
	GP 1	2	3	4	5	Total
Devi Society						
To convey/bury members'/ parents' corpses/offer help	2	2	2	3	3	12
To Visit/help sick members	0	1	2	0	0	3
To develop their hometowns	0	0	2	0	0	2
Anlo/Ewe Union						
To convey/bury corpse and offer financial help	1	0	0	0	0	1
To assist members in time of trouble	1	0	0	0	0	1
Fishsmokers' Society						
To help members financially in the event of death	1	0	0	0	0	1
To unite for progress	0	0	0	0	1	1
To get help from the government	0	0	0	0	1	1
To publicise their vocation	0	0	0	0	1	1
Tema Mannhean Fish Society						
To unite the women and save money	0	1	0	0	0	1
Drumming Soicieties						
To carry corpse home	0	0	1	0	0	1
To drum when someone dies	0	0	1	0	0	1
31 DWM						
To help a member in the event of arrest	0	1	0	0	0	1
To grace national anniver-saries/to assist the govt.	0	3	0	0	0	3
To get needs from the govt.	0	0	1	0	0	1
To respect and obey the government	0	0	1	0	0	1

Source: Field Survey, 1991

Group 2:

As shown in Table 4, Group 2 mentioned the Anlo chief (one respondent), Ga chief (one respondent), chiefs of other ethnic groups (one respondent) as those ruling the community. One fishsmoker claimed that the role of the Anlo chief included settling quarrels that ensue between/among his subjects.

In Table 4 above all the fishsmokers in Group 2 mentioned Devi societies; one named Tema Mannhean Fish Society; one referred to the 31DWM and one fishsmoker did not know the societies in Tema U Compound.

One of the respondents said there were about eight Devi societies in the community and she specifically mentioned Tegbi Society We society and Agavedzi society. The respondent sums up the objectives of the Devi Societies as: "We come from different places and living in a strange land so when there is death, others will take you home that is the deceased or the father's corpse". Another member also stated that they visit and help sick members. (Table 6).

One respondent of Group 3 claimed that the Tema Mannhean Fish society has the aim of uniting the fishsmokers and saving money at the bank. (Table 6).

With respect to the 31 DWM, all the members of Group 3 stated that its objectives is to assist the government and grace national anniversaries; one also added that it aims at sending a deputation to the government whenever a member is suddenly arrested. She complained that for about three years now the Movement has been inactive; the members have lost interest and attendance at meetings is poor. She attributed this to the non-assistance from the 31DWM in Accra when a local

member dies.

Group 3:

Two respondents in Group 3 named the Anlo chief and one of them also named the Ga chief as the rulers of the community. One of them said the Anlo chief is responsible for arbitration. The other respondent stated that the Ga chief is responsible for anything concerning the town since the land belongs to the Gas. This differentiates the roles of the two chiefs overseeing the same community.

As presented in Table 4, both respondents in Group 3 mentioned the Devi Societies and 31 DWM, but only one disclosed the Tema Mannhean Fish Society and the Drumming Society.

With respect to the Devi societies both respondents stated the three objectives; to convey corpses of members home; to assist sick members, and to develop their hometowns. One respondent claimed that the Tema Mannhean Fish Society was formed after the adoption of the Chorkor smoker.

She said she became the automatic leader since the extension agent asked her to look for people to adopt the Chorkor smoker. This also stated the objectives of the Drumming Societies as: to drum when a member of the community dies and to carry corpses to their home towns. One of the respondents indicated that the objectives of the 31DWM include getting their needs from the government and respecting and obeying the government.

Group 4:

Two chiefs were identified by the members of Group 4 as the rulers of Tema U Compound. They were the Anlo chief (three respondents) and the Ga chief (two respondents).

With respect to the societies in the community (Table 4 above), majority (three) named the Devi Societies while all the fishsmokers in the group mentioned the Fishsmokers' Society.

As shown in Table 5 above, the respondents said that the Devi Societies convey corpses of members to their hometowns.

Group 5:

Majority (five) of the fishsmokers said that the inhabitants of Tema U Compound are ruled by the Anlo chief while three respondents claimed that authority is vested in the Ga chief. One of them also reported the presence of a sea-going local leader who informs the Anlo chief of events in the community.

As presented in Table 4, majority(five) of the respondents mentioned the Fishsmokers' Society. The Devi Societies and the 31DWM were named by three respondents and one respondent respectively. One fishsmoker however did not know the societies existing in the community.

As shown in Table 5 above, three fishsmokers enumerated the objectives of the Devi societies as follows: to convey corpses home for burial and to give help (eg. contributing and buying coffin). One of them

said that those who do not contribute are buried at Tema U Compound when they die. One respondent said she is the president and founding member of the Tegbi society.

The interviewees in Group 5 further stated the objectives of the Fishsmokers' Society as follows: to unite for progress (one respondent); to obtain assistance from the government (one); and to publicise their vocation (one). Two members of the group criticised the leaders of the Fishsmokers' society for monopolising the benefits while another fishsmoker criticised them for not calling the members to a meeting to inform them about the new technology.

4.1.5 Larger Community

The factors of the larger community alluded to by the fishsmokers are described below. These are factors that influenced the diffusion and adoption of the Chorkor smoker.

Group 1:

As shown in Table 6 below, the six adopters in Group 1 mentioned fear and constraints as the areas in which they were influenced. Majority (three) mentioned fear of arrest by the government or fear of smoking fish for the government. Three respondents however indicated that they feared paying tax. With respect to fear, one respondent sums it up with a typical statement, as to why they feared to adopt the Chorkor smoker:

> "Because they said they will be arrested or asked to smoke fish for the government".

This is what another respondent also has to say to give an insight into why the people feared:

> In terms of tax it is not always that we work. But if you do not work this year the tax is recorded, and the following year they will add more tax even if you do not work. Then you will be called to report.

From these statements the fear of accumulated tax even when they are redundant is highlighted. She further said that they would not work for the government because they feared the government would be unable to provide sufficient wages to sustain them, their children and their parents.

Another respondent reported the fear of paying tax, the fear of being deceived by the government. She further said their suspicion (fear) was heightened by the fact that the innovation was given to them at no cost, which was something they had never heard of. She also disclosed that they were paying a tax of ¢2000.00 annually for the traditional ovens. She said she feared the authorities would impose tax on the Chorkor smoker as well.

Out of the six adopters, two complained of scarcity or inadequacy of fish. Majority (three) also complained of lack of funds. One respondent claimed she could not get wire mesh to buy.

The high cost of inputs also has a negative effect on the adopters. The specific items the fishsmokers claimed were expensive include fish (one respondent) and inputs for the construction of trays (two respondents).

Table 6: Distribution of respondents in Tema U Compound by factors of the larger community the respondents perceive to influence the adoption of the Chorkor smoker

FACTORS	No. of respondents who perceive the factor as influencing the adoption of the Chorkor smoker (FREQUENCY/GP)						
GP	1	2	3	4	5	Total	%
FEARS							
Fear of paying tax	3	2	1	0	1	7	29
Fear of arrest by the government	3	1	0	1	0	5	21
Fear of paying for the smoker	0	1	0	0	0	1	4
Fear of smoking fish for the government	3	3	2	1	1	10	42
Fear of being deceived etc. by the government	1	1	0	0	0	2	8
Fear of government change agents	0	0	0	0	1	1	4
Fear of being taken elsewhere to build the ovens for others	0	0	0	0	1	1	4
CONSTRAINTS							
Scarcity/Inadequacy of fish	2	1	0	0	3	6	25
Lack of funds	3	3	1	4	8	19	79
Difficulty of getting and transporting clay	0	1	0	1	1	3	13
Unavailability of wire mesh	1	0	0	0	0	1	4
High cost of fish	1	0	0	1	0	2	8
High cost of trays/nails/ wood/wire mesh	2	1	0	2	2	7	29
High cost of workmanship/ (splitting of wood/ carpenters' fees)	0	1	0	0	0	1	4
Non-availability of fish credit	0	0	0	1	0	1	4

Source: Field Survey, 1991

Group 2:

As illustrated in Table 6 , all the members of Group 2 reported that they were influenced by the fear of smoking fish for the government and by lack of funds. Other areas of fear mentioned included fear of paying tax (two respondents), fear of arrest (one), fear of paying for the smoker (one), fear of being deceived by the government (one).

With respect to constraints, one fishsmoker commented on the problem of getting fish and clay. She said that in the lean season one finds it difficult to get fish. She also hinted that the owner of the clay dump had put an embargo on the excavation of clay. One of the respondents stated that the cost of inputs for constructing the trays was high and another also complained about the high cost of workmanship as factors of the larger community which influenced them.

Group 3:

As shown in Table 6, fear and constraints were major factors of the larger community which influenced these fishsmokers. One of them mentioned the fear of paying tax; two indicated fears about smoking fish for the government; one cited lack of funds.

Group 4:

As indicated in Table 6, the factors of the larger community mentioned by Group 4 were mainly fears and

constraints. One respondent reported the fear of arrest by the government as a factor that militates against the adoption of the Chorkor smoker. Another fishsmoker also stated fear of smoking fish for the government as a factor that influenced adoption.

Majority (four) of the members of Group 4 complained of lack of money. One respondent also complained of the problem of digging and transporting clay from such a distance to their homes. Other constraints reported by the fishsmokers were high cost of fish (one respondent), high cost of inputs for tray construction (two), refusal of fishermen to give fish to them on credit (one respondent).

Group 5:

The data in Table 6 reveal the influence of the larger community on the adoption decision of fishsmokers in Group 5.

One respondent in Group 5 said that the women feared because it was rumoured that the ovens were to be built by government personnel. She further said that they also feared when they heard that the adopters would be taken elsewhere to build their ovens there. One fishsmoker said that the fear of adopting the oven was also based on the adopters being called upon to smoke fish for the government, while another reported the fear of paying tax.

A number of constraints were also reported by the fishsmokers. All the members of Group 5 mentioned lack of funds as a factor that influenced the adoption of the oven. Other constraints named were: fish scarcity

(three respondents), difficulty of getting clay (one), high cost of trays/inputs for building trays (two respondents).

4.1.6 Overview

Majority of the fishsmokers in Tema U Compound indicated that the inhabitants are Anlos.

All the groups and all the fishsmokers interviewed reported that fishing in the sea is forbidden on Tuesdays. Majority (50%) said that it is the custom. They did not mention any norm that would hinder the adoption of the Chorkor smoker.

In the area of social organisation, almost all the fishsmokers named the Anlo chief and the Ga chief as the main chiefs exercising authority over the inhabitants in Tema U Compound. Majority (54%) of the respondents mentioned the Devi Societies and they stated the objectives as follows: to convey corpses home and offer other help. This appears to be an important value orientation.

The respondents were influenced in their adoption decisions by fear and constraints. Almost all the groups mentioned fear of paying tax and fear of smoking fish for the government. The constraints influenced the respondents more than the fears. Almost all the respondents (79%) disclosed that lack of funds was a constraint.

4.2 Processes/Stages in the Introduction of the Chorkor Smoker

This section describes the various processes/stages in the introduction of the Chorkor smoker into Tema U Compound. The processes were carried out in stages through the collaborative effort of the extension agents, the contact person and members of Group 1,2 and 3. Only Groups 1 - 3 are considered here because they are the direct beneficiaries of extension contact.

4.2.1 Selection of site

The extension agent stated the criteria used in selecting Tema U Compound for the project. These criteria include:

1. The desire of the National Council on Women and Development (NCWD) to help women in fishsmoking.
2. Nearness to University of Ghana.
3. The excessive wastage of fuelwood by fishsmokers at Tema U Compound.

4.2.2 Making contacts with the target community

One of the extension agents said she went to the site to establish contact with the fishsmokers. She stated that attempts to see one of the leaders of the Fishsmokers' Association failed, but she later saw the President of the Fishsmokers' Society.

The extension agent said she introduced herself and the Chorkor smoker project to her. This is how she explained the purpose of the visit to the community:

> I told her of the fish-smoking project we are introducing and showed her photographs of other villages where the Chorkor smoker was introduced with the women and the Chorkor smoker in the photographs. I referred to those villages.

The extension agent said she told the President of the Fishsmokers' Society of her interest in working with a group and requested her to find her 10-12 people who smoke fish in the community. She gave reasons for her choice of ten people.

> I asked for ten people because ten is the co-operative regulation number. That is, if you want to start any co-operative group the regulation stipulates that you start with ten members, but we made allowance for two more persons.

The extension agent said she gave her guidelines (checklist) to help her in the selection of the ten or twelve fishsmokers. She was asked to select:

1. Large scale fishsmokers, that is those who will be more beneficial to them and they would not discontinue.
2. Full time fishsmokers.
3. Fishsmokers who are well distributed throughout the community so that others can see and learn from them.

The contact was successful because she co-operated with the extension agent and got her the twelve fishsmokers.

4.2.3 Overview

The processes/stages described in this section are:

1.Selection of site.
2.Extension agents making contact with the target community.

These processes/stages apply to only Groups 1 - 4.

The extension agent, stated that Tema U Compound was selected basically to help the fishsmoking women and to solve the problem of fuelwood wastage. The agent further stated that the selection of the site was also based on its nearness to University of Ghana where the course participants were residing.

The extension agent reported that she was taken to the house of the President of the Fishsmokers' Society. The extension agent said that she explained the project to her and asked her to get her 10-12 fishsmokers who were willing to accept the innovation. The President of the Fishsmokers Society went round to inform the fishsmokers and she got the 12 women.

4.3 SOURCES OF INFORMATION

4.3.1 Source of Awareness of Introduction of Chorkor smoker

Group 1:

All the adopters in Group 1 referred to extension-aided adopters as their source of awareness about the Chorkor smoker (Table 7). They further said that the President of the Fishsmokers' Society went from house to house informing people about the Chorkor smoker, or sent her children or messengers to inform the inhabitants about the introduction of the Chorkor

smoker. She herself admitted that she went to the homes of the inhabitants to inform them about the innovation.

Group 2:

All the members of group 2 named extension-aided adopters mainly the President of the Fishsmokers' Society as their source of awareness about the Chorkor smoker (Table 7). Two of them indicated that she sent her daughter to inform them. The third said she sent for her and told her about the innovation. One of the fishsmokers claimed the President explained that the government wanted the oven built for them because they were using too much fuel.

Group 3

As shown in Table 7 one member of Group 3 said an extension-aided adopter (their President) informed her about the Chorkor smoker. The other member of the Group stated that the extension agents informed her about the innovation. She further said that she became the contact person. she claimed that a member of the community, was the first to be contacted by the agents but she refused to accept the innovation and rather brought the agents to her.

One fishsmoker reported that the President told her the agents wanted people to adopt it; adding that the government brought it to help them because it uses less fuelwood and keeps smoke away from the eyes.

Table 7: Distribution of respondents in Tema U compound by source through which they got aware of the Chorkor smoker.

Source of awareness	No. of respondents indicating the source FREQUENCY						
Gp	1	2	3	4	5	Total	%
Extension agent	0	0	1	0	0	1	4
Extension-aided adopters	6	4	0	2	1	13	54
Observation (of other adopters/users)	0	0	0	1	5	6	25
Others (unnamed source)	0	0	0	2	2	4	17

Source: Field Survey, 1991

Group 4

As illustrated in Table 7 above, the members of Group 4 reported that they became aware of the Chorkor smoker through the following sources; unnamed sources (two of the respondents), extension-aided adopters (two respondents),observation (one respondent).

One of them pointed out that she became aware of the Chorkor smoker about six months after the completion of the project.

Group 5

As illustrated in Table 7 above the respondents reported that they became aware of the Chorkor smoker through the following sources: observation (5 respondents), extension-aided adopters (one), others (two).

4.3.2 Sources of Advice and Information

Group 1

Apart from receiving information about the innovation, the President of the Fishsmokers' Society was mentioned by five of the adopters in Group 1 as the one person from whom they sought information or advice on other matters. Two members of Group 1 said they depended on her because she was their leader. One other respondent however said that she believed her because of the way she presented the message and also she saw her as a source of her security.

One of the respondents said that after becoming aware of the innovation she made further inquiries from an Ada fishsmoker, who confirmed that the Chorkor smoker was good (Table 8).

Table 8: Distribution of respondents in Tema U Compound by sources from which they seek advice or information.

Source of advice/Information	No. of respondents who seek advice from the source FREQUENCY						
Gp	1	2	3	4	5	Total	%
President (Fishsmokers' Society)	5	0	0	0	1	6	25
Other extension-aided adopters	0	0	0	0	1	1	4
Ada fishsmoker	1	0	0	0	0	1	4
Unnamed sources	0	3	2	4	6	15	63

Source: Field Survey, 1991

Group 2

Three respondents in Group 2 did not indicate the names of the sources from which they sought advice and

information.

Group 3

The sources from which Group 3 sought advice and information was not disclosed.

Group 4

One respondent claimed that she sought advice from an extension-aided adopter (Table 8). She explained that she sought advice from her because they were good friends and age mates.

Group 5

As indicated in Table 8, one member each said that they sought advice and information from the President and other extension-aided adopters made further enquiries about the innovation.

4.3.3 Dissemination of Externally Generated Information to the Community

Group 1

With regards to how they receive information from outside the community, three respondents said that their leaders called meetings by means of the gong-gong; one stated that information was relayed by the gong-gong beater; one also mentioned community members as the source; one did not specify (Table 9).

Group 2

As indicated in Table 9, two respondents in this group stated that information coming from outside the community got to them at meetings summoned by the gong-gong beater. They further said that the information would first get to the Anlo chief or to Doris who then convened the meeting.

Group 3

With regards to information from outside the community (Table 9) one respondent in Group 3 pointed out that the chief usually requested the gong-gong beater to summon a meeting. Another indicated that the gong-gong beater relayed the information.

Table 9: Distribution of respondents according to stated means by which information from source external to the community is disseminated/received.

Means of receiving information from outside the community	No. of respondents who stated the means (FREQUENCY/GP)						
Gp	1	2	3	4	5	Total	%
Gong-gong beater summons a meeting	3	2	1	0	0	6	25
Gong-gong beater relays information	1	0	1	5	7	14	58
Other community members (Grapevine)	1	0	0	0	0	1	4
Did not specify	1	0	0	0	0	1	4

Source: Field Survey, 1991

Group 4

As indicated in Table 9, all of those interviewed in Group 4 intimated that the gong-gong beater relayed information from outside the community to the community members.

Group 5

With regards to dissemination of information from external sources to the members of the community, (Table 10) majority (seven) of the respondents in Group 5 said the gong-gong beater was responsible for relaying the message.

4.3.4 Dissemination of Information within the Community

Group 1

Three of the members of Group 1 also mentioned that the gong-gong beater normally relayed information from the community to them. With respect to the transmission of information from the society/group to its members, two said that the President informed them at meetings. Another said the organiser of their society went round members to inform them. One respondent however did not volunteer any response (Table 10).

Group 2

With regard to information from the group (Table 10), two of the members said that the gong-gong beater relayed information to them.

One of the respondents said that the gong-gong was

not used to spread information about the Chorkor smoker. She explained that it was because only a limited number of beneficiaries was required and that should the gong-gong be used there would be over-subscription.

Table 10: Distribution of respondents according to stated means by which information from within the community is disseminated/received.

Means of receiving information from within the community	No. of respondents who stated the means (FREQUENCY/GP)						
Gp	1	2	3	4	5	Total	%
Gong-gong beater relays information	3	2	2	4	5	16	67
Gong-gong beater summons a meeting	1	0	0	0	0	1	4
President/leader informs them at meetings	2	0	1	1	1	5	21
Message passed on by organiser	1	0	1	0	0	2	8
Message passed on by messengers	0	0	1	2	0	3	13
Letters	0	0	0	0	1	1	4
Other fishsmokers	0	0	1	0	0	1	4

Source: Field Survey, 1991

Group 3

As indicated in Table 10, a wide variety of means of disseminating information from the community was reported. The two members of the group stated that information from the community was disseminated by the leaders through the gong-gong. Other methods outlined included the organiser going from house to house (one respondent), messengers carry the message to the others (one), fishsmokers meetings (one).

Group 4

As shown in Table 10, majority (four) of the fishsmokers in Group 4 claimed that information from within the community and their leader was relayed to them by the gong-gong beater.

Two respondents however indicated that messengers passed on information from within the community to the members. One member of Group 4 said that meetings were usually called by the president to disseminate new information but the Chorkor smoker issue was not approached the same way.

Group 5

The fishsmokers also reported the means by which information from the group got to its members (Table 11). Majority (five) of the fishsmokers said that the gong-gong beater passed on the message to them.

The fishsmokers also stated the following means of disseminating information from the group to the members: meetings (one respondent), through letters to other societies (one). One of them however pointed out that in the case of the Chorkor smoker the President of the Fishsmokers' Society did not use the gong-gong to call them to a meeting as was usually the case. She stated that they would all have heard about the Chorkor smoker if this method had been used.

4.3.5 Overview

Majority (54%) of the fishsmokers indicaed that

they became aware of the Chorkor smoker through the extension-aided adopters. All the groups except Group 5 named the President of the Fishsmokers' Society as their source of awareness about the Chorkor smoker. Group 5 became aware of the oven mainly through observation.

The President was also mentioned as the major source from which they seek advice/information. All the groups indicated that information from within the community was relayed to them by the gong-gong beater.

There were also differences between what the fishsmokers claimed the extension agent told them and what their President, the opinion leader told them. Furthermore, differences were also noted in the statements fishsmokers claimed the opinion leader made.

4.4 EXTENSION TEACHING METHODS

The extension agent said she told the President of the Fishsmokers' Society that she works with groups and that she wanted 12 people. The agent said they encouraged the 12 women to form a group; which they did.

The extension agent also claimed she talked to them about the advantages of group formation, opening of bank account to enable them obtain credit, the advantages and disadvantages of the Chorkor smoker, management of the enterprise, processing, storage, sanitation and marketing. She said she went there on Tuesdays to establish the group. She hinted that her choice of Tuesday was because it is a day on which there is no fishing. The interviewees also said that they rest or bury the dead or market their fish on Tuesdays.

The agent disclosed that she held weekly meetings with the group and sometimes only seven, eight or ten of

them attended. According to the extension agent she used the group technique in teaching them.

The agent said that after she had formed the group, the women themselves called their own meetings for which she was sometimes present. The women chose the time suited to them. She intimated that initially the meetings were held in the morning but the meeting time changed to noon. The President of the Fishsmokers' Society organised the meetings.

Regarding the information provided at the meetings, the agent said she told them the following:

1.that they are bringing course participants to the community to learn and work.
2.that the Chorkor smoker uses less fuelwood.
3.that fuelwood is expensive.
4.deforestation problems and that in future they would not have enough fuelwood to smoke fish.
5.the embargo on fuelwood movement.
6.the law against the cutting of nim trees in the Greater Accra region.
7.cited the towns where the Chorkor smoker is used.

Two of the fishsmokers complained of comprehension problems. A fishsmoker in Group 1 said she did not understand the innovation early; two others in Group 4 and Group 5 also said they did not understand it.

4.4.1 Methods Used

The extension methods used as well as the information provided by the agent at the meetings are presented below.

Group 1:

One of the members of the group agreed with the extension agent with regard to the meeting day, Tuesday. Majority (four) of those in Group 1 said they held meetings with the extension agent(Table 11). One respondent said that meetings were held twice and another said they met six times. The remaining four did not confirm or dispute it.

The extension agent however reported that they had a series of meetings.

Table 11: Distribution of respondents who have adopted the Chorkor smoker by teaching methods they said extension agent used.

Teaching method	No. of respondents who mentioned the method (FREQUENCY/GP)				
	Gp 1	2	3	Total	%
Meetings	4	2	2	8	73
Demonstration	3	2	1	6	55

Source: Field Survey, 1991

Group 2:

As shown in Table 11, two respondents said that they held meetings.

Group 3

As indicated in Table 11 , the two respondents in Group 3 said that they held meetings. As to the number of times they met one of them said they met many times; the other said they met three or four times.

4.4.2 Information Provided by Extension Agent

Group 1

Those interviewed in Group 1 also narrated what the extension agent told them . Two of the respondents said the agent told them that she had come to introduce the Chorkor smoker and wanted twelve fishsmokers. One respondent each also stated what the agent told them as shown in Table 12.

Group 2

The members of Group 2 reported what the extension agent told them about the project (Table 13).

Majority (two) of those in Group 2 mentioned the introduction of the smoker into other communities and the government's intention to cut down on fuelwood usage. The respondents also reported many other statements made by the extension agent. Each of these statements was reported by one fishsmoker. They include: the motivation to help; the smoker is not from the government but from the whites; they want to give free assistance to them; the strides made by the Ada

fishsmokers; the fishsmokers would provide clay and the oven would be built for them; the adopters can use the old and new ovens and then make their choice; they provide adopters in other places with wire mesh and bowls at controlled price and the need to save at the bank in order to obtain credit.

The fishsmokers also indicated that they had the opportunity to ask questions and make requests from the extension agents.

One of the respondents in Group 2 also claimed that two or three of them went to their President's house and the agents also briefed them on the introduction of the innovation.

Table 12: Distribution of respondents by the type of information the respondents say was provided by the extension agent

Information	No. of respondents who stated the type of information (FREQUENCY/GP) Gp 1	2	3	Total
1.They have come to introduce the smoker and want 12 people.	2	0	0	2
2.They have introduced the Chorkor smoker into other towns.	1	2	1	4
3.Excessive use of fuelwood and the govt's intention to reduce it	0	2	0	2
4. They are here to help the women	0	1	0	1
5.The innovation is not from the govt. but from the white men.	0	1	0	1
6.Adopters at Akplabanya/Chorkor use less fuelwood and bagasse.	0	0	1	1
7.They are here to offer free help.	1	1	0	2
8.They want to reduce drudgery.	0	1	0	1
9.Ada people feared when the oven was introduced but they now have their own Co-op. T-shirts.	0	1	0	1
10.The women must bring clay and they'll build the ovens for them.	1	1	0	2
11.They'll build the ovens for them to compare with the old ones.	0	1	0	1
12.The women can use the old and new ovens and make their choice	0	1	0	1
13.They later helped adopters elsewhere with wire mesh/bowls at controlled price.	0	1	0	1
14.They must contribute money and save in order to get bank loans	0	1	0	1
15.The govt will not arrest or tax them/allayed our fears	1	0	1	2
16.The fishsmokers should unite and discuss their business.	1	0	0	1

Source: Field Survey, 1991

Group 3:

Table 12 illustrates what the fishsmokers claimed the agent told them. One of them said that the extension agent explained things to them, allayed their fears and encouraged them to adopt the Chorkor smoker. They claimed the extension agent also told them the following: the oven was built at Akplabanya and Chorkor and the people there liked it (one respondent) and they are using less fuelwood and bagasse than previously (one respondent).

4.4.3 Demonstration on Building and Proper use of the Chorkor smoker

This stage in the process of the introduction of the Chorkor smoker was subsequent to the group formation and group meetings.

The extension agent reported that she involved the fishsmokers in the construction of the Chorkor smoker to enable them know how to build it for themselves after the agents had ended their work in Tema U Compound.

The extension agent further explained why the demonstration was necessary:

> After building the oven, we demonstrated how to use the oven and the trays otherwise they will use plenty fuelwood and burn the fish and the trays.

The extension agent further said that they bought

fish which they smoked on both the traditional oven and the Chorkor smoker to enable the adopters compare the quantity of fuelwood used in each oven. The agent reported their finding as follows:

> They found that with the Chorkor smoker they used ¢800.00 of fuelwood and with the traditional oven they used ¢1,800.00 of fuelwood for 20 crates of fish.

She said that the women noticed that the Chorkor smoker used less fuelwood than the traditional oven. The agent indicated that the project provided wood, nail and wire mesh.

Group 1:

As shown in Table 11 , out of the six people interviewed in Group 1, three commented on the construction of the oven by the extension agents and their team. One of the fishsmokers said that the agents sent for them to come and see it built and how it was being built. Another member of the group pointed out that the team built the oven to a stage on the first day and returned three days later to continue it.

A respondent in Group 1 said that the agents called them to witness the mode of setting the fire and putting in the fuelwood so that in future they will not burn their fish.

Two of the respondents in the group said they learnt how to use the oven and how to put in the fuelwood.

> Two respondents said that the agents bought fish and smoked them on both the traditional oven and Chorkor smoker to show them the quantity of fuelwood each oven consumes. They both reported the low fuel consumption of the Chorkor smoker. One of them summed it up as follows, "We saw that the Chorkor smoker used less fuelwood".

Another respondent in Group 1 stated the results of the demonstration as follows:

> We saw how they put in the wood and the quality of the smoked fish and the rate of smoking and we like it.

The results of the demonstration were evident to the adopters themselves.

Group 2:

Two out of the three people in this group commented on the demonstration carried out by the extension agents.(Table 11).

The respondents in Group alleged that the agents and their team built the oven over a number of days. They said that the agents bought fish and smoked these on their President's oven to show them how to use the oven. One of them, described how it was used for the demonstration. "They put fire under the fish and covered with plywood to retain the heat and smoke."

Two respondents claimed that the agents smoked the fish for them to see and they liked the Chorkor smoker. One of them summed up the result of the demonstration:

When they smoked for us to see, I saw that is

why they buy Chorkor fish before ours in the market because theirs is not heavy.

A respondent in Group 2 said the agents called them together and gave them five trays and one plywood each.

Group 3:

The two people in Group 3 did not provide information on the demonstration. (Table 11).

4.4.4 Overview

All the groups which had extension assistance indicated that they held meetings to discuss the Chorkor smoker.

Majority of the points the extension agent claimed she highlighted at the meetings were not reported by any of the groups. A wide variety of statements were attributed by the fishsmokers to the extension agent yet one does not have any of these pieces of information mentioned by all the groups.

Majority (55%) of the fishsmokers claimed they benefitted from the demonstration. They either learnt how to build the oven, or how to use it or they were convinced of the superiority of the Chorkor smoker to the traditional oven.

4.5 Individual Characteristics

The characteristics of the individuals are described here as indicated by the individuals in each of the groups.

4.5.1 Age

The ages of the respondents stated here were based mainly on the information they provided. A few however were estimated.

Group 1:

Table 13 below shows the frequency distribution of the age of adopters in Group 1. The ages of the respondents vary widely, from a minimum of 30-39 years to a maximum of 60 years or more. The average age is 49 years.

As illustrated in Table 14 below, two of the respondents in Group 1 were 60 or more years old, two others were 40-49 years old and two were in the age range of 30-39 years. Majority (three) were below 50 years old.

Group 2:

Table 13 below shows that the majority (two of those) in Group 2 were below 50 years. One person each fell into of the age groups 30-39, 40-49 and 50-59 years.

Table 13: Distribution of respondents in Tema U Compound by age

Age yrs	Gp	No. of respondents in age group FREQUENCY 1	2	3	4	5	Total	%
30-39		2	1	1	0	2	6	25
40-49		2	1	0	1	4	8	33
50-59		0	1	0	4	1	6	25
60 or more		2	0	1	0	1	4	17

Source: Field Survey, 1991

Group 3:

As indicated in Table 13 above one of the respondents in Group 3 was 30-39 years old. The other member of the adopters in Group 3 was much older, being 60 or more years old.

Group 4:

The age distribution of the respondents in Group 4 is presented in Table 13. All the members of Group 4 were below 60 years old. One was 40-49 years old, and four were 50-59 years old.

Group 5:

Table 13 reveals that there is a wide variation in the ages of the respondents in Group 5. The youngest person was in the age range 30-39 years and the oldest was 60 or more years old.

Majority (six) were 49 years and below. Two of the

respondents were 50 years or more.

4.5.2 Education

Group 1:

The educational levels of the adopters in Group 1 are presented in Table 14 below.

Four of the adopters in Group 1 did not have any formal education, while two had formal education up to the Middle School. Majority of the members of Group 1 were unable to read or write.

Group 2:

The educational levels of the members of Group 2 are also indicated in Table 14.

Majority (two) of the respondents had formal education. Only one of those interviewed said she did not have any formal education.

Table 14: Distribution of the sample of study by educational level.

EDUCATION	No. of respondents in educational level category FREQUENCY						
Gp	1	2	3	4	5	Total	%
No formal education	4	1	1	5	7	18	75
Primary	0	1	0	0	1	2	8
Middle	2	1	1	0	0	4	17

Source: Field Survey, 1991

Group 3:

Table 14 shows the educational levels of members of Group 3. One of the respondents in this Group had no formal education, while the other member had formal education up to the Middle School level.

Group 4:

As indicated in Table 14, none of the respondents in Group 4 had formal education. The data reveal that Group 4 is entirely illiterate.

Group 5:

The level of education of the members of Group 5 is shown in Table 14.

Out of the eight women interviewed in this group, seven claimed they did not have any formal education.

However, one of the respondents was educated up to the primary school level.

4.5.3 Size of Enterprise:

The sizes of respondents' enterprises are presented in Tables 16, 17 and 18.

The main characteristics of the individuals considered in the adoption of the Chorkor smoker are age, education, size of enterprise and social status.

Three indices relating to size of enterprise were selected for the study. These are (1) quantity of fish smoked by the individuals during the peak fishing season, (2) the quantity of fish smoked in the lean season and (3) the number of traditional ovens owned by the individual.

Group 1

Information on the sizes of the respondents' enterprises was collected. A knowledge of the size of enterprise is relevant since the size of an enterprise is likely to affect a potential adopter's capability to adopt an innovation.

Table 15: Distribution of respondents in Tema U Compound by quantity of fish smoked during the peak fishing season (measured in crates).

Qty of fish smoked (crates/day)	No of respondents smoking fish FREQUENCY						
Gp.	1	2	3	4	5	Total	%
None	1	0	0	0	3	4	17
10 - 19	1	0	0	1	0	2	8
20 - 29	1	0	1	2	0	4	17
30 - 39	1	0	0	0	1	2	8
40 - 49	2	0	0	0	0	2	8
50 or more	0	3	1	2	1	7	29
Not available	0	0	0	0	3	3	13

Source: Field Survey, 1991

With respect to those interviewed in Group 1, one claimed she did not smoke fish during the peak fishing season as shown in Table 15. The respondent hinted that she was assisting her in-law to smoke fish. The quantity of fish actually smoked by members of Group 1 ranged from 10 - 19 crates per day to a maximum of 40 - 49 crates/day. Those who smoked from 10 - 19 crates/day to 40 - 49 crates/day of fish constituted five members of the population of Group 1.

In the lean season which coincided with the data collection , the quantities of fish smoked by women in Group 1 are presented in Table 16. Majority (four) reported smoking up to 10 - 19 crates of fish per day. One member of the group was not available to provide information relating to the quantity of fish she smoked during the lean season.

Table 16 Distribution of respondents in Tema U Compound by quantity of fish smoked in the lean season (measured in crates).

Quantity of fish smoked crates/day	No of respondents smoking fish FREQUENCY						
Gp.	1	2	3	4	5	Total	%
None	1	0	0	1	3	5	21
Less than 10	2	2	2	1	1	8	33
10 - 19	1	1	0	3	2	7	29
20 - 29	1	0	0	0	1	2	8
Not Available	1	0	0	0	1	2	8

Source: Field Survey, 1991

As indicated in Table 17 majority (four) of the adopters in Group 1 had less than seven traditional ovens prior to the introduction of the Chorkor smoker, while two claimed they had 7 - 9 traditional ovens. One of the respondents was concerned about the annual tax on the traditional ovens. She had this to say:

> We are paying annually for the traditional ovens. It is about ¢2000.00 per year currently. If they know about the Chorkor smoker they will ask us to pay for them as well.

Five of the members of Group 1 complained of lack of money to buy fish or construct more trays to expand the size of their enterprise. One of them claimed that they the adopters planned to contribute money and save at the bank in order to qualify for bank credit. She lamented that the savings had not taken off due to their inability to supply the bank with their constitution.

Table 17: Distribution of respondents in Tema U Compound by number of traditional ovens owned.

No. of Trad. Ovens	No. of respondents owning traditional ovens FREQUENCY Gp.1	2	3	4	5	Total	%
1 - 3	3	1	0	2	5	11	46
4 - 6	1	0	1	1	1	4	17
7 - 9	2	1	1	1	1	6	25
10 - 12	0	1	0	0	0	1	4
13 - 15	0	0	0	1	0	1	4
16 or more	0	0	0	0	1	1	4

Source: Field Survey, 1991

Group 2:

As shown in Table 15 above all the respondents in Group 2 smoked 50 or more crates of fish per day during the peak fishing season.

Table 16 reveals that the quantity of fish they smoked in the lean season was less than during the peak fishing season. The data in Table 16 show that two and one of the respondents smoked 1 - 9 crates/day and 10-19 crates/day respectively.

Variations in the number of traditional ovens owned by the adopters in Group 2 are noted in Table 17 above. One of them reported having as low as 1-3 traditional ovens while one also owned as many as 10-12 traditional ovens. The data in Table 17 also reveal that two of the adopters in Group 2 owned less than 10 traditional ovens.

Majority (two) of the adopters in Group 2 complained of the high cost of wood, nails, and carpenters' fees as factors militating against the growth of their enterprises. The rest (one member) of

the group did not consider the high cost as the constraining factor, but rather lack of money.

All the members of Group 3 claimed that they did not have sufficient money to buy either fresh fish or wire mesh or to build more trays to expand their business.

Group 3:

Reference to Table 15 shows that one of the adopters in Group 3 smoked 20 - 29 crates of fish per day, while one smoked 50 or more crates of fish per day during the peak fishing season.

The data in Table 16 above disclose that all the respondents in Group 3 smoked 1-9 crates of fish per day during the lean season. One of the members in Group 3 had 4-6 traditional ovens, while the other also owned 7-9 traditional ovens as shown in Table 17 above.

All the members of Group 3 reported lack of money as a hindrance to the expansion of their enterprise.

Group 4:

Out of the five people interviewed in Group 4, three reported smoking less than 30 crates of fish per day during the peak fishing season, while two smoked 50 or more crates during the same period as indicated in Table 15.

With respect to the quantity of fish they smoked during the lean season, Table 16 above shows that one of the respondents in Group 4 reported smoking less than 10 crates of fish per day, while the majority (three)

disclosed that they smoked 10-19 crates per day. One fishsmoker also stressed that the lean season is not a suitable period for smoking fish and so do not smoke fish in the lean season.

The number of traditional ovens owned by the individuals vary, as illustrated in Table 17. The number of traditional ovens they owned ranged from as low as 1-3 by two of the group members to as high as 13-15 by one of the group members. One of the fishsmokers in Group 5 also had 4-6 ovens, while another one had 7-9 ovens. Majority (four) of the respondents in Group 4 had less than 10 traditional ovens each.

Members of the Group 4 identified some factors which are restricting the size of their enterprise Three identified high cost of wood for trays, fuelwood and nails, while 80% identified lack of money to buy fish, wood and pay for the labour of masons/bricklayers and carpenters. One of the women in Group 4 noted that this indebtedness is a result of the high cost of fuelwood.

Another complained about the fishermen's unwillingness to sell fresh fish to her on credit. A member of Group 4 reported that lack of money for fish purchases affects them in two ways. One, they pay more for the same quantity of fish as those who have money. Two, they are unable to buy in bulk.

Group 5:

Data on the size of the fish-smoking enterprises of those in Group 5 are presented in Tables 15, 16 and 17 above.

As shown in Table 15 , three of the members of

Group 5 indicated that they did not smoke any fish during the last peak fishing season. Their reasons included financial constraints and the fact that they only recently settled in Tema U Compound. Out of the eight people interviewed in the group, only one reported smoking 30-39 crates of fish per day during the peak fishing season, and one also said she stopped smoking fish about four years ago due to ill-health but during that time she used to smoke 50 or more crates of fish. Three of those in Group 5 did not provide any figures; two of them were unwilling to do so.

Table 16 discloses the quantity of fish respondents in Group 5 claimed they smoked during the lean season. Out of the eight people interviewed in the group, three did not smoke fish during the lean season for financial reasons. Three smoked 1-19 crates of fish per day during the same period, while one smoked 20-29 crates of fish per day. One of the fishsmokers was not available to provide data on the quantity of fish she smoked in the lean season.

As illustrated in Table 17, majority (five) of the members of Group 5, had 1-3 traditional ovens. One fishsmoker had 4-6 ovens, while another had 7-9 ovens. The remaining fishsmoker also had 16 or more traditional ovens but she claimed they were all spoilt.

All the eight members of Group 5 complained of lack of money as a constraining factor in increasing the size of their enterprise. Seven out of the eight fish smokers claimed that they did not have money to build the Chorkor smoker and/or pay for various inputs (eg. nail and wire mesh which are fixed costs and also fish and fuelwood which are operating costs and the labour of the carpenter. Two respondents complained of the high

operating cost of inputs like wire mesh, fuelwood and the high fixed cost of wood for trays. One of them claimed that because of the expenditure involved in transporting the fresh and smoked fish and in paying taxes, they were left with little profit for expanding their enterprise.

4.5.4 Social Status

Group 1:

Majority (five) of the women interviewed in Group 1 admitted that they held no formal position in the community. One of them however explained why she did not hold any formal position in Tema U Compound: "Because... it is money they consider in giving position". One respondent in the group however said she was the Assistant secretary of the Fishsmokers' Society and 31st December Women's Movement as well as Tema Mannhean Fish Society.

Group 2:

Out of the three people in this group, one of them had been made a church worker in the Zion Church. The remaining two people held no formal position in the town. One of them however claimed that she was asked to assist the chief, but had not yet accepted it because she was not a good public speaker.

Group 3:

Out of the two people in Group 3, one of them claims to be the President of 31 DWM, President of the Fishsmokers' Society and Tema Mannhean Fish Society as well as Assistant to the chief. The other woman however did not have any formal position conferred on her.

Group 4:

All the fishsmokers in this group claimed they did not hold any formal positions in the community.

Group 5:

The data reveal that majority (seven) of those in Group 5 did not hold any formal positions in the community. Only one member of the group claimed to be the `Kingmaker' as well as Vice-President and founding member of Tegbi Society.

When the characteristics were subjected to statistical analysis the chi-square contigency coefficients indicated (1) a moderately high association between adopter and non-adopter categories and size of enterprise (quantity of fish smoked during the peak season). The coefficient was 0.56 and the association was significant. $\chi^2 = 0.56$, df = 1, P = 0.05. (2) a moderately high association between age of respondents and the three groups namely adopters who had extension contact, adopters who did not have extension contact and non-adopters. The coefficient was 0.59 and the association was significant. $\chi^2 = 0.59$, df = 2, P = 0.05

(3) a moderately high association between size of enterprise (number of ovens owned and the quantity of fish smoked during the peak season) and the three groups as above the coefficients were 0.61 and 0.65 respectively and the associations were significant. χ^2 = 0.61 and 0.65 respectively, df = 2, P = 0.05.

4.5.5 Overview

The personal characteristics of the fishsmokers are represented by age, education, size of enterprise and social status. These characteristics differ for individual fishsmokers as well as the groups.

The average age for Group 1 was 49 years. Group 2 reported an average age of 43 years. Group 3 also reported an average age of 50 years. The average ages for Groups 4 and 5 were 53 and 46 years, respectively.

The fishsmokers also differed in their educational attainment. Majority, 75% of the sample population of 24, did not have any formal education. Out of those who had formal education, 8% had primary education and 17% had middle school education. There was a wide variation in the average number of years spent by the groups in schooling. While Group 1 spent an average of 3 years in school, Group 2 spent 4 years. Group 3 reported an average of 5 years of schooling. No Group 4 fishsmoker had formal education. Group 5 however had an average of one year of schooling. Group 3 was the most educated group. Group 4 was basically illiterate yet they adopted the Chorkor smoker. Group 5 was only slightly different from Group 4 in years of schooling but the members did not adopt the Chorkor smoker.

The size of the operations varied considerably in

terms of the quantities of fish smoked by the fishsmokers in the peak fishing season and lean season. More fish was smoked in the peak fishing season than in the lean season. During the peak fishing season Group 1 reported smoking an average of 23 crates/day; Group 2 smoked an average of 100 crates/day based on the figures provided by the respondents; Group 3 smoked an average of 40 crates/day; and Group 4 and 5, 33 and 26 crates of fresh fish per day respectively. Group 2 is distinctly different from the other groups with respect to the average amount of fish smoked in the peak fishing season. Groups 2, 3, smoked more fish than Group 1 and also owned more trays.

In the lean season, Group 1 smoked an average of 8 crates/day; Group 2, 7 crates/day; Group 3, 8 crates/day, compared with 8 and 6 crates/day for Groups 4 and 5, respectively. Group 5 smoked the least amount of fish.

The number of traditional ovens owned by the respondents also reflect their size of enterprise. The findings show that Group 1 had an average of 4 ovens; Groups 2 and 3 had 7 ovens each while Groups 4 and 5 owned 6 ovens each. Groups 2 - 5 are not distinctly different in terms of number of ovens owned. Group 1 owned the least number of traditional ovens.

All the groups of fishsmokers mentioned lack of funds as the factor limiting the expansion of their enterprise.

The only measure of social status in this study is the formal positions that the fishsmokers hold in Tema U Compound. On the basis of this measure four respondents held formal positions and twenty did not.

Those who held formal positions were from Groups 1, 2,

3 and 5. Two of them were presidents and assistant secretary respectively of three different societies namely Fishsmokers' Society, 31 DWM and Tema Mannhean Fish Society. The third was the vice-President of a Devi Society as well as a kingmaker while the fourth was a church worker.

4.6 INNOVATION ATTRIBUTES

4.6.1 Attributes of the Chorkor smoker which Influence Adoption Decisions

The innovation attributes considered by the fishsmokers in their adoption or non-adoption decisions are presented here as described by the members of the various groups.

Group 1:

As shown in Table 18 below all the members of Group 1 reported that the Chorkor smoker saved fuelwood. A typical statement to support this finding was made by respondent: "It uses less fuel than the traditional oven". Another respondent also had this to say about the Chorkor smoker: "No suffering in terms of buying much fuelwood. It uses less fuelwood".

One fishsmoker also said that the bagasse generated smoke faster in the Chorkor smoker than in the traditional oven.

One of the reasons given by a respondent for adopting the Chorkor smoker was that it smoked fish at a

faster rate than the traditional oven.

A member of Group 1 claimed that she adopted the Chorkor smoker because it did not bruise the fish. This was supported by the following statement: "the Chorkor smoker does not bruise the fish since the tray does not sit on it".

Two of the respondents considered drudgery in accepting the Chorkor smoker. One of them said that the Chorkor smoker saved them the problem of having to put sticks between the various layers of fish.

Two respondents from Group 1 also reported that the smoked fish from the Chorkor smoker was of a better quality than the one from the traditional oven. One of them had this to say: "The quality of the fish is appealing to the eye", and another also commented on the quality of fish from the Chorkor smoker: "It smokes fresh, that is the fish does not contract but swells."

Another important attribute considered by one fishsmoker in her adoption decision was the protection that the Chorkor smoker offered from the fire hazard. The respondent indicated that the trays protected the hands from the heat.

The high cost of wire mesh was reported by one adopter as a source of concern for potential adopters. The respondent further claimed that the locally made wire mesh has a short life span of about three months compared to the foreign ones which last for about a year. The frequent replacements are bound to increase the running cost.

Another area of concern mentioned by two of the fishsmokers was the damage caused by the rain. One of them said that the rain could wash away the mud used in

the construction of the Chorkor smoker and also tear up the polythene cover.

Table 18 Distribution of respondents by stated innovation attributes which influenced adoption decisions.

Innovation attribute	No. of respondents who mentioned the attribute (FREQUENCY/GP)						
	Gp 1	2	3	4	5	Total	%
Savings on Fuelwood	6	3	2	5	6	22	92
Fast production of smoke	1	0	0	0	0	1	4
Saves bagasse	0	0	1	0	0	1	4
Fast rate of fish smoking	2	2	2	3	2	11	46
Ease of use	0	1	1	0	1	3	13
Effective smoke utilization	0	0	0	0	1	1	4
No bruising of fish	2	1	0	2	0	5	.21
No smoke in the eye	0	1	0	1	0	2	8
No drudgery	2	2	0	1	0	5	21
Good quality smoked fish	2	2	1	1	1	7	29
Larger quantity of fish smoked at a time	0	0	0	1	0	1	4
Freedom from the heat of the oven	1	1	1	1	4	8	33
Compatibility	0	0	0	1	1	2	8
Cost	1	1	1	4	1	8	3
Rain damage	2	0	0	1	0	3	13

Source: Field Survey, 1991

Group 2:

The attributes of the Chorkor smoker which they claimed to perceive and which made them adopt the innovation are presented in Table 18 above.

All the adopters in Group 2 said that they adopted the Chorkor smoker because it used less fuelwood than the traditional oven.

Two respondents said they adopted the Chorkor smoker because it smoked the fresh fish at a faster rate

than the traditional oven.

Other attributes mentioned by the respondents are as follows: it is easier to use than the traditional oven (one respondent) it does not bruise the fish (one respondent), it keeps smoke away from entering the eyes (one respondent).

Majority (two) of those in Group 2 remarked that they adopted the Chorkor smoker because its use did not involve suffering and toil. This was supported by a typical statement made by the respondents:

> No suffering with the new oven because when we put the fish on it we can come and sit down.

Majority (two) of the adopters in Group 2 said they accepted the Chorkor smoker because the quality of smoked fish was better than the one produced by the traditional ovens.

Another attribute of the Chorkor smoker that one fishsmoker said she considered was the protection the Chorkor smoker offered from the heat of the oven. An apt description of the situation was "It does not burn our wood like the traditional oven".

One of the fishsmokers complained of the high cost of the innovation. She said that the cost involved in buying and splitting wood, purchasing nails, paying the carpenter was high. One of them said that she would not have adopted if it had not been free, since she was

poor.

Group 3

As shown in Table 18, the two fishsmokers in the group indicated that the Chorkor smoker saved fuelwood and also smoked fish at a faster rate than the traditional oven.

One fishsmoker mentioned that it consumed less bagasse, while another said that the Chorkor smoker was easier to use than the traditional oven. This was what the respondent, had to say: "You can easily change the positions of the trays".

The following attributes were also reported by the fishsmokers: good quality smoked fish (one respondent) and the high cost of the innovation (one respondent).

Group 4:

The distribution of the fishsmokers by the attributes they claimed influenced them to adopt the Chorkor smoker are summarised in Table 18 .

All the fishsmokers in Group 4 reported that the Chorkor smoker used less fuelwood than the traditional

oven. The extent to which the Chorkor smoker saved fuelwood is reflected in this statement:

> I realised that it uses less fuelwood than the traditional oven. For instance for five crates of fish we were using three bundles of firewood but now we are using one and a half bundles of firewood.

In support of this statement, another respondent also stated the effect of the high fuelwood consumption of the traditional oven:

> The traditional ovens used much fuel and this costs us much, but I don't think we could have got into so much debt if we had the Chorkor smoker.

Majority of the fishsmokers in Group 4 also mentioned that the Chorkor smoker smoked fish at a faster rate than the traditional oven (3 respondents) and the high cost of operating the Chorkor smoker (4 respondents). Specific areas where they claimed costs were high include operating costs like fuelwood, fish, while the fixed costs include wire mesh, wood and nails for tray-making.

Two of the fishsmokers reported that they adopted the Chorkor smoker because the fish smoked on it was free from bruises. This is how one of them explained the cause of the fish bruising:

> Formerly we were piling fish on the traditional oven and the wire mesh sits on the fish, bruising it.

Another respondent also gave the following explanation:

> When you arrange the fish, the wire mesh of the Chorkor smoker will not sit on the fish and bruise it.

Seven other attributes of the Chorkor smoker were mentioned by Group 4 and each was mentioned by one respondent. These attributes are as follows: it keeps away smoke from the eyes, relief from drudgery or much toiling, good quality smoked fish, larger quantity of fish smoked at a time protection from the heat of the oven, compatibility and rain damage. The respondent had this to say about the larger quantity of fish smoked at a time:

> The fish that six wires of the former oven hold can fit into two of the trays.

With respect to compatibility one respondent had this to say about the Chorkor smoker: "In our home town it is the type they are using (near Keta), but with one stoke-hole and shorter length".

Group 5:

Information was collected from Group 5 on the attributes of the Chorkor smoker they perceived to be good. The data are presented in Table 18.

Majority (six) of the fishsmokers said they were told that the Chorkor smoker uses less fuelwood than the traditional oven. One respondent quoted an adopter as follows: "Formerly we were using plenty fuelwood but now little. It's even promoting our business".

Two fishsmokers claimed they heard that the Chorkor

smoker smoked fish at a faster rate than the traditional oven.

A member of Group 5 also said that she did not anticipate difficulties in the use of the Chorkor smoker while another stated that she heard the Chorkor smoker uses the smoke more effectively than the traditional oven.

One fishsmoker said she was informed that the Chorkor smoker turned out smoked fish of good quality. The respondent had to say:

> ... because I like the quality of the smoked fish I enquired about the Chorkor smoker... When fish is smoked on the Chorkor smoker the fish is light and not heavy.

Four of the fishsmokers interviewed said they heard people saying the Chorkor smoker offered protection from the heat of the fire. One of the respondents mentioned a typical supportive statement she heard:

> The old wires did not have wood so they were burning our fingers.

Another respondent also narrated what she heard as follows:

> The trays have wood so your fingers will not be subjected to heat.

One fishsmoker admitted that the Chorkor smoker was similar to what was used in her home town. This is what she had to say about the Chorkor smoker:

> It is somethig we work with in our

> hometown You put fish on it and alter the positions as the smoking proceeds. We have a similar one to the Chorkor smoker but no partition. The stoke holes may be one or two ... I also saw it at Chorkor long ago.

One of the respondents complained of the high cost of inputs, particularly wire mesh, fuelwood and wood for trays. She explained the effect of the high cost: "I have not built the Chorkor smoker because wood is ¢1,200.00 and wire is expensive..."

4.6.2 Overview

The attributes of the innovation highlighted by each fishsmoker and used in making choices vary from person to person and from group to group.

In all 15 attributes of the innovation were named by the sample of study. The sample expressed concern about two of these attributes. They were the cost of the innovation and the innovation's proneness to rain damage.

The variable cost was discussed in relation to the adoption and continuous use of the Chorkor smoker. Two types of costs are identified: the fixed cost and the running or operating cost. The fixed cost refers to money required to buy or start using the innovation; the

running or operating cost is the money required to run or needed to keep using the innovation.

The only attributes that were mentioned by all the groups were savings on fuelwood (which is cost) and fast rate of fish smoking. Majority (92%) of respondents mentioned savings on fuelwood while 46% reported fast rate of fish smoking. The groups however differed in all the other attributes.

Groups 1 and 2 mentioned 9 attributes each, while Group 3 reported 7 attributes; Groups 4 and 5 named 11 and 8 attributes respectively. Four attributes, fast production of smoke, savings on bagasse, effective smoke utilisation and larger quantity of fish smoked at a time, were the least popular with the groups since four of the five groups did not mention them at all; they did not consider these attributes as important factors in the adoption of the Chorkor smoker.

CHAPTER V

DISCUSSION OF RESULTS

5.0 INTRODUCTION

The findings in the preceding chapter are presented to reveal what actually happened at Tema U Compound with regard to the diffusion/adoption of the Chorkor smoker.

The discussion of the results will be based on the socio-cultural environment into which the Chorkor smoker was introduced, the processes/stages in the diffusion of the Chorkor smoker, the sources of information, the methods used by the extension agent to win the confidence of the community members and persuade them to adopt the Chorkor smoker, the individual characteristics of the fishsmokers, and the attributes of the Chorkor smoker. The discussion will also seek to determine the relationship between these factors and the adoption of the technology.

5.1 The Socio-cultural Environment

The Chorkor smoker was not an innovation that conflicted with the norms of the social system. The community members were therefore free to adopt it. The Devi Societies and the Fish Smokers' society were the main social groupings in Tema U compound. It appears that the ends and objectives/values could be traced to the societies. They placed emphasis on their corpses being conveyed to their home towns and on getting funds for their business.

In descending order of importance, the fears expressed were: fear of smoking fish for the government, fear of paying tax and fear of arrest by the government. This could affect the attitude of the community members to the government, government change agents and the innovation.

Group 4 however decided to adopt the Chorkor smoker because: (1) the free package was an indication of the government's sincerity, and (2) the initial adopters were not smoking fish for the government after all.

The influence of the larger community was an obstacle to the adoption of the Chorkor smoker by Group 5. The fishsmokers did not explain why they feared the government and the government personnel. But the credibility of the extension agents and the government was at stake. Brynes (1978:180) in a study of innovativeness stated that:

> The credibility of information sources can significantly influence whether or not [individuals] decide to adopt an innovation.

Information sources here refer to the change agents and their employers, the government. Interventions by cosmopolite change agents is usually unwelcome by the target community, because the community members doubt the credibility of the change agents. Change agents from the target community are more acceptable to potential adopters because they are known to the local people and are part of their culture.

The larger community was important in the following ways: (1)The fishsmokers were suspicious of the

government and the change agents as well as their intentions. The fishsmokers therefore developed unfavourable attitude towards the government and the extension agents who came from Accra. Consequently the fishsmokers tended to ignore the innovation (2) The fishsmokers perceived that the problem of unavailability and scarcity of inputs might reduce the profitability of using the innovation. The effects that the larger community can have on the adoption of the Chorkor smoker are that they either hinder or delay the diffusion or adoption of the oven. It may be stated that with the passage of time some of the fears etc. are overcome and a favourable environment is created for adoption to occur. On the whole, Group 4 took less risk since the members have a precedent to follow; The large size of enterprise of Group 4 and the strong financial basis coupled with the impact of the innovation helped to explain the differences in the attitudes of Groups 4 and 5 towards the Chorkor smoker.

Generally, the larger community was an obstacle to the adoption of the innovation.

5.2 Processes and Stages in the Diffusion of the Chorkor Smoker in Tema U Compound

The introduction of the Chorkor smoker into Tema U Compound is not a one step affair. Rather it consisted of a series of stages: selection of the target community based on their felt needs, making initial contact with the community and teaching-learning processes.

The extension agent saw the need to use an opinion leader to create awareness of the Chorkor smoker in the

community. Aklilu (1976) cited in Byrnes (1978) confirmed that extension agents usually contact the target community through opinion leaders, as noted in this statement:

> (Opinion leaders) are almost always the first recipients of [information] regarding innovations since change agents attempt to reach their target population through them.

Awareness was important for the project to succeed. The extension agent used the opinion leader to pass round the information. The gong-gong which is the major means of disseminating information was not used. Consequently some of the fishsmokers became aware late or only became aware by observing the newly built ovens.

The extension agent made the fishsmokers see the need for adopting the oven eg the need to cut down on the oven's fuelwood consumption and thus save money. The fishsmokers became interested. They had a series of meetings with the extension agent and this together with the demonstration conducted helped the fishsmokers to evaluate the Chorkor smoker and then take a decision to adopt or not to adopt it.

As a result of the awareness and the knowledge acquired through the various stages, the attitude and behaviour of the fishsmnokers towards the innovation were favourable. The extension agent's approach helped to facilitate the diffusion of the Chorkor smoker in Tema U compound.

5.3 Sources of Information

Individuals seek information from various sources and this suggests a social network in the community and those that others associate with. The importance of this is that the adoption of an innovation by a member of the network will compel the others to acquire information and learn about it and then adopt it. This can speed up adoption. The social net-work can be exploited by change agents in the diffusion of innovations.

The President of the Fishsmokers' society and another fishsmoker were the major sources of information. According to Lionberger (1953:327):

> Persons who are more turned to as sources of information are naturally in a position to exercise greater influence and potential leadership in promoting technological change than others.

The results supportS Lionberger in that the President was the opinion leader and she also exercised much influence in promoting the change. She was also regarded as trustworthy. This result tallies with Lionberger's finding about the characteristics of those sought as sources of information. Lionberger said ``they were accorded higher prestige ratings than farmers who were not sought as personal sources of information'' (Lionberger 1953:327). The other fishsmoker was chosen as a source of information because ``she is a good friend and an age mate''. People tend to seek information and advice from those who are

homophilous with them. A member of Group 1 also sought advice or made further enquiries from an Ada fishsmoker in whose community the Chorkor smoker had earlier on been introduced. This member wanted to validate what was heard about the oven.

Rogers (1962) noted the situation in which individuals validate their opinions. Once formed, opinions about an innovation are reinforced by interaction with others. In the face of a high degree of uncertainty most individuals wish to validate their opinions with those of others. Personal influence helps to determine original opinions about an innovation at the awareness stage. The validation helps to reduce uncertainty. Uncertainty is defined as ``the degree to which a number of alternatives are perceived with respect to the occurrence of an event and the relative possibilities of these alternatives'' (Rogers 1983:XVII). Uncertainty also implies lack of predictability. The uncertainty and risk associated with the adoption of the Chorkor smoker revolved around government policy on tne fish smoking business and the durability of the Chorkor smoker. The fishsmokers were uncertain about the future prospects of their business.

The adopters from whom information was sought may be regarded as local opinion leaders and as low-resistance avenues through which information can be channelled to other fishsmokers. Lionberger (1955) found that "non-receptive" farmers (who opposed most farm innovations) readily sought information and advice from farmers who in turn were highly receptive to innovations. He concluded that:

> It is thus obvious that interpersonal sources provide low-resistance avenues for farm information which is not accepted when coming from the more discreet institutionalised agencies. (Lionberger 1955:32)

The results of this study agree with Lionberger's findings and this goes to emphasise the importance of information in adoption of innovations.

These personal sources are accessible, well-known and therefore regarded as trustworthy. The opinion leader was important as the source of information and advice to the community members. She was influential in bringing people from the awareness stage to the stage of adoption.

The results of the diffusion/adoption of the Chorkor smoker indicate the important role the opinion leaders played in the diffusion process. It is believed that opinion leaders have social control on the flow of information within and without the social system (Rogers, 1983).

In Tema U Compound the opinion leader transferred information to other fishsmokers and was also influential in getting people to accept the Chorkor smoker. The results of this study support Rogers (1983) who reported that opinion leaders lead in influencing others and their behaviour is important in determining the rate of adoption of innovations. The results also reveal that within and between the groups, different meanings and interpretations were given to the messages delivered by the extension agents. There was also loss of information given by the agents and the opinion leader to the followers.

Several factors help to explain the different accounts of the message and the loss of information.

First, the message perhaps was not clear and this made it difficult for the fishsmokers to understand and retain. One fishsmoker for instance complained of comprehension problems.

Second, the process of selectivity might have operated. People generally sift through information and choose/select the parts that are important to them. Consequently, some of the information goes unnoticed. Van den Ban and Hawkins (1988) pointed out that apart from loss of information selectivity also results in distortion of messages.

Third, the fishsmokers might have interpreted the message according to their past experience and knowledge. Individuals generally use past experience to guide their subsequent choices. The past experiences help them to determine possible consequences of their action and this could also explain the phenomenon of risk aversion by these fishsmokers. However, when messages are interpreted according to past experience and knowledge the actual meaning may be lost. Lionberger (1960) also supported the results of this study that messages are misinterpreted or lost by opinion leaders when he said:

> ... they are in a position to select what they transmit, to shade it with their own interpretations and to incorporate either positive or negative recommendations.

This is also true of other fishsmokers.

Fourth, the transmission of the message by those at

the meeting to those absent may result in distortions of the initial message. Copp et al (1958:154) stated that "A neighbouring farmer may colour his transmission of information with his personal evaluations". The different interpretations of the message and loss of information are likely to affect the rate of adoption and the subsequent innovativeness of the adopters. Inadequate and inaccurate information, loss of information, as well as inaccurate interpretation of information do not give potential adopters the level of confidence they need to react more favourably to the innovation. They rather slow down the rate of adoption.

Information sources as well as the information itself are therefore vital in the diffusion/adoption process. They influence the rate of adoption.

5.4 Extension Teaching Methods

In the diffusion of the Chorkor smoker, the extension agents used more than one extension teaching method (eg meetings, discussions, demonstration) and they also involve the various senses of the learners. (eg hearing, seeing).

The agents employed these approaches to enable the learners acquire more knowledge about the Chorkor smoker and the problem it is intended to solve. The knowledge helped to change the attitude and behaviour of the clientele and this favoured the adoption of the Chorkor smoker.

Demonstrations are important in persuading extension clientele to adopt new innovations. The literature says that potential adopters want to see how the results are obtained before they can believe their

value (Arensberg and Niehoff, 1971). In this study the extension-aided adopters learnt how to use the oven and also saw its performance. They were convinced of the merits of the Chorkor smoker; they noticed that the Chorkor smoker was superior to the traditional ovens currently being used.

Group influence at the meetings was also important in bringing the fishsmokers to the adoption stage. None of the initial 12 potential adopters rejected the innovation. According to Garforth (1982) groups offer a more effective learning environment and group pressure against the rejection of new practices or ideas. In the diffusion process of the oven in Tema U Compound the clientele listened, talked, posed questions and even observed how to build and use the oven. The group discussions also provided an atmosphere of free expression. The feedback helped to correct any misunderstanding and clarify issues relating to the Chorkor smoker.

Generally the more the fishsmokers participated in the teaching-learning process the more favourable their attitude to the Chorkor smoker. However their low level of participation in the building of the Chorkor smoker is likely to affect future diffusion of the technology in two ways:- (1) hired labour will have to be used, resulting in increased cost of building the oven, (2)

the likelihood that the ovens will not be built to specification is high.

5.5 Individual Characteristics

The results indicated that the association between adopter, non-adopter categories and age/education was not significant. χ^2 = 0.27 (for age) and 0.12 (for education), df = 1, P = 0.05. Several factors may account for this.

First, the opinion leader might have selected the fishsmokers on the basis of those she thougt she could work with. About a third of those selected for the project were related to the opinion leader and of varying backgrounds and characteristics. The sample selected therefore consisted of the old and young, educated and uneducated.

A second factor relevant to this discussion is the provision of a free innovation package by the extension agents. Innovations that are promised free of cost to clientele are likely to be adopted, since no direct financial cost is incurred in accepting them. Consequently, some fishsmokers may have decided to discard the traditional ovens and effectively utilise

the Chorkor smoker by building more trays; others may have decided to use both the traditional oven and the Chorkor smoker and invest more money into buying fresh fish.

There was a significant association between adopter, non-adopter categories and the size of enterprise (quantity of fish smoked during the peak season). $\chi^2 = 0.56$, df = 1, P = 0.05.

The larger size of enterprise favoured the adoption of the Chorkor smoker. The reasons given by Group 5 for non-adoption include lack of money to build the oven, buy complementary inputs and pay for the services of the carpenter. Market toll, oven tax, annual rent on the land they occupy and the cost of transporting fish were other areas of concern to Group 5. Of all the groups in the study, Group 5 smoked the least quantity of fish in the lean season. Their low economic status was a deterrent to adoption. Van den Ban and Hawkins (1988) and Copp(1956) say higher income is positively related to adoption.

Group 5 also complained about fish scarcity. The implications of this statement are (1) the group members are sometimes out of job and cannot therefore accumulate money for adoption; (2) the quantity of fish they get

cannot give them any appreciable income and (3) they are likely to make very little profit when fish is scarce as they may have to pay more for the same volume of fish. Whichever of these best explains the situation, fish scarcity is likely to make them financially worse off than in times of abundance. Consequently, they are unable to save enough to invest in the adoption.

Group 5 also mentioned the scarcity of clay as a constraint. Clay is perhaps the cheapest input for a group like this. The initial adopters got clay freely and easily, but later adopters were barred by the clay dump owner from excavating any more clay. The cost of using other materials will be relatively higher and non-affordable. If they use alternative materials, they must be sure they will get enough fish to smoke to recoup their money.

Group 5 fits into the category of laggards as described by Rogers (1962) though they do not have all the characteristics of laggards because the innovation was introduced to a group.

There was a significant association between size of enterprise and the three groups namely adopters who had extension contact, adopters who did not benefit from extension contact and non-adopters. χ^2 = 0.61 (for numbe-

of ovens owned) and 0.65 (for quantity of fish smoked during the peak season), df = 2, P = 0.05. Potential adopters with large enterprises are more ready to accept innovations. They have the resources to invest in the adoption. The extension-aided adopters accepted the innovation because of their relatively larger size of enterprise and therefore higher economic status. Several factors also influenced Group 4 to adopt the innovation.

First, they have more traditional ovens than Groups 1-3, an indication of their high financial status. Various researches by Copp(1956), Lionberger and Coughenour(1957) indicated that those with higher income have a higher rate of adopting innovations. The cost of the innovation did not deter them from adopting since they had the resources for adopting and running the oven.

Second, the attributes of the innovation influenced them to adopt the oven. Group 4 noted many more attributes of the innovation than Groups 1-3. These different attributes appeared to appeal to them since it satisfied their requirements. The more attributes an innovation has the greater the number of adopters.

Third, Group 4 decided to adopt the Chorkor smoker

when they realised that it was given free of cost to the initial adopters, an indication that the government has not come to "steal" (dupe) them. A fishsmoker also stated that the fears of smoking fish for the government deterred them but since nothing like that was happening, the members of Group 4 also decided to adopt the oven.

There was a significant association between the age of respondents and the three groups namely adopters who had extension contact, adopters who did not have extension contact and non-adopters. $\chi^2 = 0.59$, df = 2, P = 0.05. The younger group tended to accept the Chorkor smoker more readily than the older group. The non-adopters were not willing to take risk because of their age.

Majority of the respondents did not hold any formal position in the community. Only four held formal positions in the town and this included three adopters and one non-adopter. Even though Group 4 did not hold any formal position, yet they adopted the Chorkor smoker. Other factors like the attributes of the innovation and the size of their enterprises might have influenced them to adopt the Chorkor smoker.

5.6 Innovation Attributes

The results show that the attributes of the innovation constituted an important factor in the adoption of the Chorkor smoker. Group 4 noted more attributes of the Chorkor smoker than any other group in the study. To them, these attributes were compatible with their values, needs and past experiences. When potential adopters have many felt needs, they would adopt an innovation which would provide solutions to these felt needs. Innovations which have many attributes are beneficial and rewarding and have the potential of satisfying many adopters requirements.

The results also indicate that Group 4 skipped the trial stage. Since they are later adopters it is likely that they depended on the earlier adopters for the trial. They observed the oven and its usage by earlier adopters, learnt how to use it and also saw the results of its performance. Gross(1942), Ryan(1948) and Katz(1961) found that relatively earlier adopters may perceive divisibility/trial as more important than later adopters. The fact that later adopters skipped the trial stage confirms this finding. The advantagaes of skipping the trial stage include the following: (1) the

fishsmokers save money which they might otherwise have used for purchasing inputs for a trial, (2) the fishsmokers save time and avoid the additional work involved in conducting a trial, and (3) the adoption process is speeded up.

All the groups in the study consider two main attributes - savings on fuelwood and fast rate of fish smoking - as the most important attributes of the Chorkor smoker. These attributes favoured the adoption of the oven. Generally, owners of enterprises will want to reduce cost and maximise profit. The attribute, savings on fuelwood, will therefore enable the fishsmokers to reduce cost. It is expected that cost reduction will be translated into higher profit. Dalrymple (1975) quoted in Byrnes (1978) stated that the determining factor for the decision maker is profitability. The attribute, fast rate of fish smoking suggests that the rate of fish smoking on the traditional oven has been a source of concern to the fishsmokers. With the Chorkor smoker the fishsmokers can now save time and also increase production. This is particularly important during the major fishing season or during bumper harvests.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

6.0 INTRODUCTION

The study in Tema U Compound has shown that diffusion and adoption of the Chorkor smoker is a complex phenomenon, and under the influence of various factors.

This chapter shall comprise of conclusions and recommendations. The conclusions are derived from the study based on the analysis and interpretation of the data.

The conclusions are presented under the following headings:-

(1) The socio-cultural environment into which the Chorkor smoker was introduced.

(2) The processes/stages in the diffusion of the Chorkor smoker.

(3) The sources of information.

(4) The extension methods used by the extension agent.

(5) The individual characteristics.

(6) The attributes of the Chorkor smoker.

6.1 The Socio-Cultural Environment

The fishsmokers' responses to items on the socio-cultural environment reveal the following:

(1) The larger community is an important factor influencing the adoption of the Chorkor smoker.

The factors of the larger community described by

the clientele are basically of two types, fears and constraints. The questions that potential adopters are likely to ask are (1) what are the real motives and intentions of the change agents? (2) what are chances of getting needed inputs regularly, adequately and at affordable prices? The answers to these questions will influence the fishsmokers attitudes and behaviours towards the change agents and the innovation. Potential adopters need to protect themselves and their business. If the causes of these fears for instance are known to extension, a way can be found to reduce the level.

When inputs are lacking or when they are expensive, it is to be expected that the rate of adoption will be low. The constraints can sufficiently reduce the profitability of the innovation. The adopters will have problem maintaining the technology and this can eventually result in discontinuance. As a way of easing the constraints, extension can ensure that some of those complementary inputs are sold directly and cheaply to the fishsmokers through designated shops. The results have emphasised the importance of the larger community in choice making. It is important therefore that extension agents should not narrow fishsmokers perspectives to the smaller community.

6.2 Processes and Stages in the Diffusion of the Chorkor Smoker

The following conclusions on the processes/stages

in the diffusion of the Chorkor smoker in Tema U Compound were arrived at:

(1)Majority of respondents indicated that they benefitted from the meetings and demonstrations. It was concluded that the meetings and demonstrations helped the fishsmokers to develop a favourable attitude towards the Chorkor smoker.

The results of the demonstration convinced the fishsmokers of the merits of the Chorkor smoker. Erasmus (1961) showed that the visibility of an innovation is particularly important in affecting its rate of adoption in a less developed, preliterate society.

(2)All the fishsmokers selected to form a group through which the Chorkor smoker could be introduced into Tema U Compound accepted the new idea. None of them rejected the Chorkor smoker. It can be concluded that groups offer an effective 'medium' for the introduction and acceptance of innovations.

6.3 Sources of Information

On the basis of the responses given by the fishsmokers the following conclusions were arrived at:

(1)The sources from which fishsmokers seek information about innovations and the extent to which they seek information are important factors which influence the innovativeness of the extension-aided adopters.

Generally potential adopters seek information from different sources. The choice of source of information may be based on the trustworthiness, expertise or competence of the source (Byrnes 1978). A potential adopter is more likely to be confident in the

recommendations of a source with these qualities and adopt the innovation.

Information helps potential adopters particularly at the interest and evaluation stages of the adoption process. Information helps to avert risk and ensure that the right decisions are made.

The degree to which individuals seek information is also important. Sometimes, individuals obtain information and or advice from more than one person. This helps them to validate what they already know. By this they are able to judge the credibility of the extension workers. (2) Information provided by change agents and or opinion leaders are either lost or given different meanings/ interpretations by clientele.

Individuals differ in previous knowledge and experience, learning abilities etc. Loss of information and misinterpretation of information affect decision making, since individuals base their decisions on available facts. It is important that extension agents use instructional strategies that will help the clientele to be interested in learning and also understand the message being conveyed. This will help the individual to make the right choice. It must be emphasised that making the right choice does not necessarily mean adopting the innovation. A rejection may as well be the right choice for that particular fishsmoker.

6.4 Individual Characteristics

The following trends were revealed concerning the respondents' personal characteristics.

(1)The size of a fishsmoker's enterprise is an important

factor in the adoption of the Chorkor smoker.

The size of enterprise of fish smokers is significant in this study. The owners of large enterprises adopted the Chorkor smoker, while those with small enterprises did not. Small scale fishsmokers are sometimes considered in the diffusion, adoption research as laggards. They are slow in accepting new innovations. In some instances they may never adopt the technology at all. The size of the enterprise is an indication of the financial status of the owner. Small scale fishsmokers have less income than the large scale fishsmokers.

Byrnes (1978:66, 67) stated that the relationship between larger size of enterprise (higher income) and earlier adoption tends to be a function of any or all of the following factors: "ability to undertake risk, ability to purchase inputs, ability to deal in volume and thereby obtain a better price for inputs". The results show that those with higher income have the ability to undertake risks and to invest the additional resources in purchasing inputs.(2)The age and education of respondents are not important factors influencing the innovativeness of those who obtained extension assistance. The mode of selecting the adopters and the promise of a free innovation package accounted for this.

This second conclusion suggests that other factors have overriding influence on the innovativeness of the extension aided adopters. The mode of selection of the initial 12 was such that it excludes many other fishsmokers who could have been very innovative. The criteria of selection were not adhered to and the introduction of the Chorkor smoker was not made public through the use of gong-gong. The free innovation

package attracted individuals of different backgrounds. As a result the individual characteristics in this study are not important factors influencing their innovativeness. When these approaches - mode of selecting the adopters and provision of free innovation package - are omitted, a better understanding of the innovativeness of the fishsmokers may become apparent.

(3) Age is an important factor influencing the adoption of the Chorkor smoker by the three groups namely adopters who had extension contact, adopters who did not benefit from extension contact and non-adopters.

(4) The most important factor limiting the expansion of the fishsmokers' enterprise is unavailability of funds.

6.5 Innovation Attributes

When the fishsmokers' responses to the attributes of the innovation were analysed the following conclusions were arrived at. (1) The attributes, savings on fuelwood and fast rate of fishsmoking, are the most important attributes which favoured the adoption of the Chorkor smoker. Innovations which will help users to reduce running cost, save time in getting job done and increase production have a great chance of being adopted.

6.6 Recommendations

The recommendations here are derived from the results of the study, discussions, conclusions along with material found in the literature.

The following recommendations are proposed to help extension agents improve on the diffusion and adoption of the Chorkor smoker in similar or other communities:

1. Extension agents must endeavour to know the fishsmoker in her social context since this can influence her adoption decisions.
2. Education should be carried out to allay the fears of fishsmokers with respect to their fear of smoking fish for the government, fear of paying tax and fear of arrest by the government.
3. Extension should target fishsmokers with larger enterprises.

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APPENDIX 1

INTERVIEW GUIDE

Instructions and procedures for use of the Guide

1. Exchange setting.

2. Make reference to earlier visit and appointment agreed on.

3. Introduce yourself.

4. State the purpose of visit.

EXAMPLE: I am here to learn about the Chorkor smoker which was introduced into this community a few months back. Many things happened from the time the new idea was brought into this community up to the time you adopted/rejected it. I would like you to describe for me all that happened when the extension agent came to the community until the adoption or rejection of the Chorkor smoker and why you chose to adopt/reject the Chorkor smoker. I am also interested in getting some information about you yourself and this community.

5. Assure the farmer of confidentiality.

Fish smokers who adopted the Chorkor Smoker with Extension Assistance.

1. **INDIVIDUAL CHARACTERISTICS**

A. Age

B. Education

- Educational attainment of the adopter.

C. Size of enterprise.

- Quantity of fish smoked in the fishing season.
- Quantity oe fish smoked in the lean season
- Number of traditional ovens owned.

D. Social Status.

- Leadership positions

II. **ATTRIBUTES OF THE INNOVATION**

A. Why the choice of the Chorkor smoker.

B. Relative advantage.

- Capacity/Quality of smoked fish/Time and effort involved/Fuel consumption/Physical disturbance/cost/Durability.

C. Compatibility

- Similarity in mode of use.
- Ability to use it.
- Needs, values and past experience.

D. Trialability

- Resources for trial
- Availability of land and inputs for trial.
- Acquisition of "how-knowledge".

E. Observability

- Use of the smoker and the results

F. Complexity

- Anticipated difficulties in constructing it.
- Anticipated difficulties in understanding how to use it.

At the end of the interview, thank the fish smoker/interviewee and ask if you could contact her again in the future for another interview to clarify issues that may arise from the just-ended interview.

I. **PROCESSES OF INTRODUCTION**

A. **Contact**

1. Who were contacted by the extension agent?

2. Purpose.

3. Source of "awareness-knowledge" of the Chorkor smoker. (Members of household/Co-fish smokers, neighbours/friends/cosmopolite sources etc.

4. Characteristics of the sources.

B. **Stages through which potential adopters were taken by the extension agent.**

1. Describe what happened when the extension agent came into the community.

2. Subsequent events up to the completion of the programme.

3. Describe how the fish smokers were selected to adopt the innovation:

- who did the selection?

- criteria used.

- number selected.

Methods used by the extension agent in the diffusion process

1. Describe what the extension agent did during her visits.

- Meeting with individuals.

- Group meetings.

- Lectures, discussions etc.

- Demonstrations.

2. Message at each meeting.

3. Purpose/Objective.

II. **SOCIO-CULTURAL ENVIRONMENT (THE COMMUNITY)**

A. **Describe the social system as you see it:**

- Attitude to innovations, norms, roles, ends and objectives, leadership (authority).
- Housing.
- Ethnicity and leadership.
- Occupation.
- Norms.

B. **Sources of Information**

1. Available sources of information:
   - within the community.
   - Within the group/society.
   - outside the community.
2. What kind of information do you get and why?

C. **Group Formation/Social Groups**

1. Give a brief history of the group to which you belong.
2. Purpose of the group - Counsel/advice, education, Welfare, marketing, credit facilities etc.
3. Membership and position.
4. Names of the leaders and their roles.

D. **Existing groups**

1. Names of groups in the community.

2. Describe these groups.

3. Membership and position.

At the end of the interview, thank interviewee and ask if you could contact her again in the future for another interview to clarify issues that may arise from the just ended interview.

FISH SMOKERS WHO ADOPTED THE CHORKOR SMOKER ON THEIR OWN

I. **INDIVIDUAL CHARACTERISTICS**

A. Age

B. **Education**

Educational attainment of the adopter.

C. **Size of enterprise**.

- Quantity of fish smoked in the fishing season.
- Quantity of fish smoked in the lean season.
- Number of traditional ovens owned.

D. **Social status**:

- Leadership position/Family background.

II. **ATTRIBUTES OF THE INNOVATION**

A. Why the choice of the Chorkor smoker.

B. Relative advantage Capacity/Quality of smoked fish/Time and effort involved/Fuel Consumption / Physical disturbance / cost / durability.

C. Compatibility

- Similarity in mode of use.
- Availability of land and inputs for trial.
- Needs, values and past experience.

D. Trialability

- Resources for trial
- Availability of land and inputs for trial.
- Acquisition of "how-knowledge".

E. Observability

- Use of the smoker and the observed results.

F. Complexity

- Difficulties in constructing it.
- Difficulties in understanding how to use it.

III. SOCIAL-CULTURAL ENVIRONMENT (THE COMMUNITY)

A. Describe the social system as you see it

- Attitude to innovations, norms, roles, ends and objectives, leadership (authority).
- Housing
- Ethnicity and leadership
- Occupation
- Norms.

B. Sources of information

1. Sources of awareness. When?, How?, Why that source?

2. Available sources of information.

   - within the community

   - outside the community

   - within the society/group.

3. What kind of information do you get and why?

C. Group formation/Social Groups

1. Give a brief history of the group to which you belong.

2. Purpose of the group - Counsel/Advice, education, welfare, marketing, credit facilities etc.

3. Membership and position.

4. Names of the leaders and their roles.

D. Existing Groups

1. Names of groups in the community.

2. Describe these groups.

3. Membership and position.

At the end of the interview, thank interviewee and ask if you could contact her again in the future for another interview to clarify issues that may arise from the just-ended interview.

FISHSMOKERS WHO DID NOT ADOPT THE CHORKOR SMOKER

I. **INDIVIDUAL CHARACTERISTICS**

A. Age.

B. Education:

- Educational attainment.

C. Size of enterprise

- Quantity of fish smoked in the fishing season.
- Quantity of fish smoked in the lean season.
- Number of traditional ovens owned.

D. Social status:

- leadership position

II. ATTRIBUTES OF THE INNOVATION AS RELATED BY THE ADOPTERS

A. Describe what the adopters say about the innovation and give reasons for not adopting the oven.

B. Relative advantages

-Capacity/Quality of smoked fish/Time and effort involved / fuel consumption / physical disturbance / cost / durability

C. Compatibility

Similarity in mode of use.

Ability to use it.

Needs, values and past experience.

D. Trialability

Resources for trial.

Availability of land and inputs for trial.

Acquisition of "how-knowledge".

E. Observability

Use of the smoker and the observed results.

F. Complexity

Anticipated difficulties in constructing it.

Anticipated difficulties in understanding how to use it.

III. SOCIO-CULTURAL ENVIRONMENT (THE COMMUNITY)

A. Describe the social system as you see it.

- Attitude to innovations, norms, roles, ends and objectives, leadership (authority)
- Housing
- Ethnicity and leadership
- Occupation
- Norms.

B. Sources of information

1. Available sources of information
   - within the community
   - outside the community
   - within the group.
2. What kind of information do you get and why?
3. Source of information about the Chorkor smoker,

When? How? Why that source?

4. Reasons for rejecting the smoker.

- Fear/risk/uncertainty etc.

C. Group Formation/Social Groups

1. Give a brief history of the group to which you belong.

2. Purpose of the group:

- Counsel/Advice, education, welfare, marketing, credit facilities.

3. Membership and positions.

4. Names of the leaders and their roles.

D. Existing Groups

1. Names of groups in the community.

2. Describe these groups.

3. Membership and position.

At the end of the interview, thank the interviewee and ask if you could contact her again in the future for another interview to clarify issues that may arise from the just ended interview.

EXTENSION AGENTS

I. PROCESSES OF INTRODUCTION

A. Contact

1. Who did you contact in Tema U Compound?
2. Purpose
3. Guidelines for selecting potential adopters.

B. Stages through which extension agents took the potential adopters

1. Describes what happened when you went to Tema U compound.
2. Subsequent events up to the time of completing the programme.

Methods used by the extension agent in the diffusion process

1. Describe what you did during your visits
   - Meeting with individuals
   - Group meetings
   - Lectures, discussions etc.
   - Demonstrations.
2. Information provided at each meeting
3. Purpose/ objective