FARMERS' RESPONSE TO AGRICULTURAL INNOVATIONS

IN NDIVISI LOCATION BUNGOMA DISTRICT: THE CASE

OF LUKUSI AREA

BY

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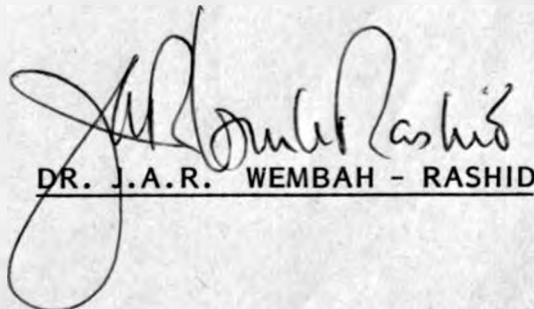
DECLARATION

This is my original work and has not been presented to any other University for the award of a degree.

MATHEWS GODFREY MUYEKHO

This work has been presented with my approval as a University Supervisor.

DR. J.A.R. WEMBAH - RASHID

TO MY LATE FATHER, FESTUS MUYEKHO

ACKNOWLEDGEMENTS

of the University of Nairobi for either, their keen interest in my work, or their good company - they constituted "a social recipe" for my existence at the University.

Mathews Godfrey Muyekho

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ABSTRACT

This study has been carried out in a community of small-scale mixed farmers. The concern is to explain the farmers' differential response to the diffusion of coffee into the community given that the area has a high potential for the production of this cash crop. While some farmers have adopted the crop, others have not. It was felt that there was need to identify the positive and negative aspects of the farmers' attitudes toward agricultural innovations such as coffee which is not indegeneous to the community under study.

It is hoped that the findings of this study will provide a contribution to theory formation on strategies and tactics of planned organizational change and may serve as useful information in formulating policy programmes for agricultural development. The data that are presented have been derived from the existing literature on the subject, author's personal face-to face interview of the respondents and participant - observation of the members of the community.

The findings show that factors related to the socio-economic characteristics of farmers (e.g. age and formal education) and situational factors (e.g availability of credit facilities and labour) are not crucial for farmers' receptivity to coffee. Rather it is the change agents who matter. The major explanatory factor is farmers' awareness of the need for such an innovation. That awareness can, on

the main, be cultivated by appropriate information from the agents of change. In other words there is need for greater agricultural extension services to enhance this awareness in farmers.

The work is presented in six chapters. The first chapter concentrates on some background information, the . problem of the study, objectives, and the rationale for the study. The second chapter is devoted to the literature review, theoretical frameworks and the generation of hypotheses. The third chapter is centred on the environmental setting of the study area, Ndivisi Location. The fourth chapter essentially deals with the methodology, while data presentation, analysis and interpretation form the core of the fifth chapter. Finally, conclusions and suggestions are presented in the last chapter.

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1.1   Background Information

Agriculture is a very important human activity.   In
rural areas, it is the main mode of livelihood, both as a
means for subsistence and cash income.   In Kenya, the
agricultural industry remains one of the major sources of
foreign exchange.

In this study, the author investigated ways by which
farmers in Ndivisi Location cope with the need to adopt
new farming techniques and practices.   Recent years have
witnessed a significant change in agricultural practices
in most parts of Kenya.   This change is a response to
government policy which urges farmers to improve their
agricultural practices and strategies.   However, not all
areas have responded instanteneously to this call.   Some
areas lag behind and continue with the traditional practices
which they consider or rather feel, best fulfil their needs.

In Ndivisi Location in general, and in Lukusi area in
particular, both attributes obtain.   Some farmers have
incorporated new practices into the traditional ones, some
have not.   However, most farmers have adopted a number of
innovations that pertain to food crop production.   A few cash
crops have found acceptance but not on a wider scale.

The study looked into innovations related to crop husbandry with special emphasis to the adoption or rejection of coffee growing by farmers. Coffee is not indigeneous to African farmers in Kenya. Its introduction dates back to the late nineteenth century when christian missionaries tried the crop on a small scale in the areas they settled, especially in central Kenya. Its adoption as a cash crop and subsequent developments during the first half of the twentieth century was dominated by European settlers.

In the Western Province of Kenya, coffee growing by African farmers was introduced between 1956 and 1963 following the general mobilisation of the African economy as part of government policy (Ogutu, 1975). Hitherto, the colonial government stressed the aim of African agriculture as merely getting sufficient food to maintain life (Department of Agriculture, 1945). It was believed that Africans in Kenya had not yet reached the level of education to enable them to successfully plan their agricultural economy. However, in 1954, the Swynnerton Plan changed this state of affairs. It recommended the intensification of African agriculture to African farmers to participate in agricultural planning and coordinated development in their communities. Upon this, fragmented plots were consolidated and title deeds issued to ensure security of farmers' tenure of land. Other facilities that were introduced and developed to meet the farmers' needs included the provision of technical assistance, marketing

facilities and accessibility to sources of agricultural
credit. To make use of these facilities, insistence was
placed upon sound cultural practices and that planting of
coffee should only be within appropriate ecological zones
of proved suitability. For the control of cash crops,
District Cash Crops Boards were to be established to ensure
the growing and development of relevant crops in their areas.
Cooperative societies were also to be formed thereafter
(Swynnerton, 1954: 8-15).

The recommendations of the Swynnerton Plan very
much encouraged farmers all over the country to take
agriculture seriously. More money flowed into the hands
of the African farmer. The establishment of the
Agricultural Betterment Fund Scheme assisted the farmers by
providing them with bonuses as an incentive to good farming.
Higher produce prices for all agricultural commodities
helped boost the income for rural communities.

1.2   The Problem

Coffee growing was introduced into Bungoma District
sponteneously. Farmers were encouraged, through government
policy, to take up the crop. Ndivisi Location has a gently
slopping terrain with good fertile deep soil and more than
35 inches of rainfall per annum.   With moderate temperatures,
intensive agriculture is possible and both arabica and
robusta coffee can be grown.

With the foregoing attractive conditions that prevail
in Ndivisi Location, one would have expected all farmers
in the area to adopt coffee growing. However, this has not
been the case. For, from the 1960s when the crop was generally
adopted in the location, only a small proportion of farmers
cultivate it extensively and actively.

What are the circumstances that have led only a few
farmers to adopt and many not to adopt coffee cultivation?

1.3 Objectives of the Study

To identify, investigate and document for analysis:

1. Farmers who cultivate coffee actively and those
   who do not .
2. Farmers' attitudes towards agricultural innovations
   generally and those related to coffee in particular.
3. Mechanisms through which farmers have come to adopt
   the crop.

1.4 Rationale for the Study

1. Although many studies on agricultural innovations and
   how they can be adopted or otherwise have been
   conducted in Kenya, no such work was done in Ndivisi
   Location. This study, it is hoped, is a
   contribution towards that end. In this exercise
   another added contribution is in the field of theory
   formation, in this case that related to strategies
   and tactics of planned organizational change.

2.   At another level the study provides systematic and
        scholarly information which could be used by
        government and development agencies in the process of
        formulating policy and programmes for agricultural
        development, especially in encouraging the cultivation
        of coffee in the area of study. This is particularly
        important considering the place of coffee in Kenya's
        agricultural economy.

CHAPTER   2

2.1   Literature Review

In Ndivisi Location, a comprehensive study of general agricultural innovations was done by Misiko (1976) as part of a wider study of Bungoma district. Misiko wanted to identify the incentives perceived by farmers which lead them to adopt recommended practices related to hybrid maize production and the disincentives which lead other farmers not to adopt what was recommended. In his study, Misiko used the behavioral differential models after Lippit (1958) and Leagans (1963). He believes that there are many different theories that can be used to explain the behavioral change in farmers. In his model, Lippit postulates three kinds of forces in human behavioral change that may be associated with the adoption of innovations. Firstly, there is force that motivates people to change by creating dissatisfaction with the status quo and favourable judgement of potential future situation. Secondly, there are resistance forces that motivate people not to change. These two kinds of forces result from uncertainty of the unknown and inability to change. Finally, interference forces obstruct change without being directly related to it.

As for Leagans (1963:89) the behavioral differential model assumes that "changes that are important to people are those which help them meet their needs for biological, economic, social, aesthetic or moral well being".

Misiko argues that farmers would not resist adoption
of agricultural innovations if the incentives perceived by
them were strengthened while the disincentives perceived by
them were weakened or removed. He further contends that
farmers are aware of the need for improved agricultural
production and have a favourable mental set, but do not adopt
new recommended innovations largely because of the immediate
physical, economic, and biological environmental constraints.
He is of the opinion that knowledge about innovations and
achievement of the needed skills to use it is not enough.
Overt action as well as favourable physical conditions (e.g.
ready access to required production inputs) must also be
present. In effect, Misiko constructed a conceptual model
suggesting the main indicators of socio-economic (e.g. wealth
and operational capital), situational (e.g. availability of
production inputs), and communicational (e.g. change agents)
as primary influencers which relate on the eventual decision
making of a farmer. He emphasizes that depending on the needs
of the farmer, these factors create the overall conditions
constituting incentives and disincentives perceived by farmers
to be determinants of adoption or non adoption of agricultural
innovations.

From this stand point, he concludes that the greater
the amount of contact the farmers had with agricultural
extension agents, the more likely they adopted agricultural
practices and innovations. Farmers' social participation in
formal organizations was negatively related to their adoption

behaviour. He also argues that farmers who are better-off
economically in production resources are more receptive to
new technologies in agriculture. Misiko does not see the
distance of farms from input markets as an element of major
importance in explaining the variation in the adoption
behaviour. And, the socio-psychological variables i.e the
farmers' ability, self-commitment, expectation, opportunity,
goals and support, are seen as functions of the incentives
and disincentives in influencing their behaviour.

In this study, the validity of two of his conclusions
is questioned. The second conclusion that "farmers" social
participation in formal organizations is entatively related
to their adoption behaviour", needs further examination.
Formal organizations in this contect such institutions or
establishments as cooperative societies (e.g. the Kenya
Grain Growers' Cooperative Union; Coffee Farmers' Cooperative
societies); agricultural societies (e.g. the Agricultural
Society of Kenya); farmers' training centres and field
demonstrations. The impact of these formal organizations to
farmers is of the degree comparable to that of the extension
service offered by the Ministry of Agriculture. Most, if
not all, farmers' cooperative societies give guidance to
farmers on ways and means to improve crop production; they
also offer credit facilities to bonafide members who happen
to have 'shares' in them. A good example are the coffee
cooperative societies. Most of them are affiliated to coffee
pulping factories. These provide member framers with coffee

seedings which are raised in the nurseries within the factory premises. In addition they provide production inputs such as fertilizers, and pesticides, all these being considered as loans. In return, the factories act as markets in that they receive the harvests. Farmers' social participation in formal organizations is likely to enable them learn new ideas and techniques, which create some influence in their adoption behaviour or increased production.

The idea that the distance between farms and input markets is insignificant in explaining variations in the adoption behaviour, finds no support here. Most farmers in areas of small-scale production are served by input markets located at some far away distances. Market centres or towns may be situated away from the remote rural areas. Since most of these farmers are poor to afford expensive means for ferrying the inputs, they are likely to be affected in their efforts to engage in new farming activities. Added to this is the fact that most of these small-scale farmers compete with the well-to-do farmers. They need easy access to input markets. Where a small-scale farmer fails to get inputs in time he or she will opt to change his or her programme unlike the progressive and economically sound farmer who operates on a timetable and uses every possible means and alternatives to get inputs. The distance between the farms and input markets is an important factor as any other factor that necessitates agricultural production.

Uchendu and Anthony (1975) aimed at assessing the prevailing agricultural situation, particularly the receptivity of the farming community to new techniques among the Gusii of Kisii District, Kenya. They noticed that the so-called 'progressive' farmers were characterized by management ability, access to resources of land, labour and capital; had had formal education coupled with experiences from the outside world progressive farmers are also seen to exhibit outstanding cultured trait which distinguishes them from their neighbours and are quite conducive to change. They are branded as "men of influence" who are very willing to "try something new" and were first adopters of technical innovations.

They also describe Gusii farmers as characterized by young age, most of whom have had off-farm employment experiences. Thus "vicarious experiences acquired by farmers in various farm and non-farm occupations outside the district are a major conditioning factor in Gusii receptivity to technical innovations in agriculture".

On the whole weare told that Gusii response to agricultural innovations represents a model of "cumulative" change rather than instant transformation. This is reflected in the sequence in which innovations have been introduced and adopted, and in the characteristics of individual innovations which tend to make them "self-spreading" e.g. the lower the risk involved in the innovation, the more acceptable it is.

Lastly, it is observed that a more efficient innovation
sequence has been followed in the highlands than in the
lowlands. This is due to an ecologically high potential
in the highlands. As such there is a high concentration of
the most viable cash crops, tea and pyrethrum. Another
motivating factor in the highlands is the presence of better
access roads. Farmers in the highlands are also more
responsive to technical change because they have better
economic opportunities. However, it was found that an
efficient market organization with urban contacts was needed
for major impact. This seems to tally with the observation
made by Garst (1972: 229) that the Gusii exhibited a ready
response to the profitability of innovations but price
decline or an uncertain market future had a noticeable
effect on the growth curves of adoption.

Garst had earlier on carried out research on Gusii
receptivity to new innovations. He found that there was a
strong positive relationship between the mean date of
adoption, the percentage of farmers adopting the innovation
and the intensity of use within the individual sampling
areas. He noticed that the first areas to adopt an
innovation also tend to be the ones with the highest percentage
of farmers who have adopted and where each farmer raises
more acres of the crop. He also noticed that with the
exception of hybrid maize all innovations exhibited almost
the same rate of adoption. The adoption rate of hybrid

maize was much more rapid than for the other innovations because it simply replaced an older crop and it would tend to have more uniformity of acreage per farm ebcause it is a food crop. Finally he observed that due to the limited division of labour both socially and spartially, each part of the study area was much like all other parts, i.e there was a little range in the size of the farms, size of families, and levels of income from one place to another.

Vail (1972) studied the process of agricultural innovations in Teso District, Uganda, by tracing its historical development . He observes that through the stimulus of forces exogeneous to Iteso culture, small-holder agriculture underwent profound changes. Males became committed to an agrarian way of life and assumed the dominant role in farm decision making; the traditional sharp division of labour was eliminated; and cotton production was universally adopted as a cash crop.

However, he also observes that two conditions necessary for sustained agricultural transformation were lacking, that is, the public and commercial sectors had no act to follow the diffusion of ploughing. Thus Iteso farmers did not anticulate a demand for new constraint-releasing innovations. Their predisposition was to respond to, rather than to create, innovation opportunities.

A third observation was with regard to government
strategies or programmes and innovation sequences. Vail
observes that the department of agriculture was not organized
to formulate or implement an integrated developmental
strategy. Planning and policy making were dominated by
expatriates with great faith in their own research findings
but reluctant to learn about farmers and their activities
in their fields. They even did not gather and systematically
apply second-hand insights about local farming problems
from the indegeneous extension field staff. The junior
extension staff were poorly trained and few in number. It
is only through regulation and haranguing by chiefs that
simple practices were adopted. It seems that reliance upon
this means, rather than agricultural education (formal or
informal) minimized Iteso's acquisition of or receptivity
to more complex modern farming knowledge necessary for
effective use of the sophisticated technology required for
further development.

A fourth observation by Vail reveals that the Iteso
themselves had little sense of the value of money or of
purchased goods; they were not income maximizers. What
was important for interpreting Iteso farming patterns was
that there was little perceived opportunity to become wealthy
or more important in the local community through venturesome
farming. Iteso did not utilize education or accumulated
wealth to go into commercial enterprise. Prestige was directly
linked to farming in only one way, that is, a man was considered

generous and could cultivate respect if he could provide visitors to his house with food and Millet beer.

It seems that, for a traditional community to change its farming practices and to improve performance, there is need for change agents to make an assessment of the appropriate strategies to employ. These strategies or tactics range from the more coercive (e.g. haranguing of farmers by administrative authorities) to the normative ones (e.g. farmer participation) (Jones, 1965: 192-200) Hence the role of a change agent with appropriate strategies is very important.

Many researchers have identified major problems facing small-scale farmers in Africa as being rooted in the authorities responsible for providing extension services to farmers. Bhandari Lax (1973: 152) found that the problems that inhibit Kenyan farmers from rapid growth in agricultural production are "low numbers, poor education and insufficient trained extension workers". This same view is also shared by Leonard (1972a) who has done extensive research on extension service in Kenya generally but in Western Kenya in particular. He has been specially concerned with work performance of extension service and the structure of extension service in the Ministry of Agriculture. He has learned that extension staff tend to improve their effectiveness with one rebriefing every year on each of the important parts of the extension programme in their locale but its impact is relatively

small. Briefings are handled cheaply and simply through
lectures delivered by local Agricultural Assistants or
Divisional Assistant Agricultural officers at local out-
door meetings; or sometimes they only address their junior
staff at pay-day meetings. This poor organization is
seen to be at the root of poor performance of the junior
extension staff who are actually in contact with the
farmers, hence farmers do not get the really recommended
practices. Leonard also obsrves that the low level work
effort by extension workers results from dissatisfaction
with their employment situation. The persistence of
"European" and "African" types of positions in the Ministry
of Agriculture perpetuates barriers to responsibility and
promotion which injure morale. The junior staff complain
about their lack of promotion opportunities, hence miss
greater pay. They are also only harangued by their bosses
to work hard. In these circumstances then, there is a
counter-organization of junior staff and therefore effective
supervision of their work becomes extremely difficult.

Moris (1987: 208) sees that:

In Africa extension services offered by a Ministry
of agriculture tend to be highly bureaucratic in
structure and in their mode of field operation.

The most common characteristic is the steep vertical
hierarchy. The junior staff who work in such an organization
tend to think of themselves as government servants rather

than as former-advisers. In reality, contact staff are
supposed to serve farmers but they find that their most
important work relationships are vertical ones to super-
visors. In this manner the field agent gets rewarded,
disciplined or promoted by bureaucrats located higher in
the system. Moris highlights that in any organization,
the resources at the workers' command have a pronounced
effect in their morale and work productivity. Poor working
conditions are seen as the major cause of the low morale
in field assignments. It is also common in many African
countries for extension staff to see their role as the
giving of orders to farmers, an ideal based on the agent's
superior mastery of modern farming. Under such situations,
farmers are likely to resent whatever is being introduced
to them. It has also been found that majority of small-
holder farmers do not cope with the changing conditions
in farming practices due to extension bias by contact agents.
Leonard (1972b: 4) finds that extension attention is very
greatly skewed in favour of the more progressive and
wealthier farmers. This concentration on progressive farmers
is achieved at the expense of the non-innovative ones (1973a).

The findings of Mbithi similarly reflect the cause
of poor performance by extension workers as well as the
general extension bias, just as Leonard and Moris hold.
According to Mbithi (1972: 18):

The bureaucratic organizational nature of the
extension system where grass-root extension workers
are given deadlines minimizes the role of feedback,
continuous programme evaluation and a daptation, and
causes these extension workers to falsefy reports
and exaggerate meagre achievements.

This kind of behaviour stems from the relationship between
senior staff and the junior extension staff which is that
between the administrator and the administered. Due to this
strict formal relationship, the junior staff do not advise
farmers across a wide range of enterprises. These
extension agents are also not sufficiently trained to help
farmers adopt to the necessary technology at their disposal.
Added to this, most of them are not trained communication
strategies. By virtue of their training they have little
to do with the poor non-progressive farmer.

In terms of the general biases in extension service,
it follows that the spread of technical information is
directed to the educated farmers, academic audiences and
in a language least understood by even the contact extenison
staff.   This general trend leads to information that
is distorted, whose meaning makes no sense to the traditional
farmer. It is also observed that inputs are packaged in
units which are too large and in excess of the requirements
of the poorest small-scale farmers who own very small
plots. These farmers do not have the money nor the

acreage to use such large quantities. In this case research findings only meet the interests of large-scale farmers. Top farmers are favoured most in that change agents frequently visit them, neglecting the bottom farmers. As that is not enough, these top farmers are able to obtain loans and adopt innovations faster.

From the works cited in the literature, it follows that there are various forces that act upon the traditional small-scale farmers and these might explain their differential response to new agricultural innovations. Moris (1987: 205) has cited a case where small-holder farmers give wisdom to traditional practices in contrast to those contained in recommended technical packages because the latter happened to yield lower than the former. Again, if farm inputs are not supplied to agets or transported to remote areas in time, formers tend to turn to something else at their disposal. Most farmers are still embedded in the growing of food crops just to maintain their subsistence. This restricts their adoption of new technology, especially cash crops. Farmer education, travel, participation in field demonstrations and farm size are likely to determine farmers' adoption of new innovations. Most authors have suggested the availability of credit and market outlets as great incentives to farmers for the adoption of new technology (Vail, 1972; Mbithi, 1972; Swynnerton, 1954).

In view of the foregoing findings, it is true to say that there are many and different factors as well as theories that can explain the farmers' response to agricultural innovations. For example, the farmers' response may be a result of their attitudes towards, or their perception of, an innovation. The way farmers perceive an innovation various from locality to locality or from one individual to the other. people perceive situations differently. The forces underlying their differential perception, and there- fore their acceptance or rejection of an innovation are both internal and external. By internal forces is meant factors inherent in the farmers themselves which constitute their personal characteristics e.g. socio-economic rank. External forces on the other hand emanate from influences outside the farmers' personal characteristics e.g. institutional services. These elements tend to create and perpetuate unevenness among small-scale farmers (Uchendu, 1972: 23). In a nutshell, farmers' attitudes towards an innovation result from their differential perception of the innovation, hence giving it a positive response (adoption) or a negative response (rejection). Under the circumstances, a number of issues are here considered as factors which are likely to influence the farmers' response to an innovation:

(a) Socio-economic Factors

These refer to the farmers' characteristics, both social and economic. They include a farmers' age; formal

educational level; wealth and operational capital and the
size of farming land.

(b) Situational Factors

These refer to external factors that actually
necessitate production. They include the availability of
farm production inputs; the cost of farm production inputs;
the distance between input markets and the farms; the
availability of credit facilities; produce prices; and
the availability of a large labourforce.

(c) Information Factors

These refer to external factors that expose the
farmers to new ideas and practices (farmer educational
media). They include farmers' contacts with extension
service agents; social participation informal organizations;
use of mass media and contacts with neighbours.

2.2   Theoretical Orientations

Three theoretical frameworks have been adopted as
guiding bases for this study. These are the Adoption process
Model, the Linear Model and the Middle-class conservatism
model. All the three models were used in collecting both
quantitative and qualitative data.

2.2.1   The Adoption Process Model

This is a modification of a paradigm suggested by
Rogers (1962:305) which shows the adoption of an innovation
by indivi   's. The model contains three phases. These are
antecedents,   ocess and result.

The antecedence phase represents the conditions
present in a situation prior to the introduction of an
innovation. In the case of this study, the antecedents that
were considered were the three factors of socio-economic
status; the situational context; and informational factors.
In the second phase, the process of adoption of the innovation
takes place in stages; Firstly, farmers only become aware
of the innovation. They should of course show some interest
in the innovation. Awareness and interest are followed by
evaluation whereby the farmers assess the innovation say,
in terms of its advantages and disadvantages. What follows
is trial to see how the innovation performs. There is, thus,
perception of the characteristics of the innovation. Adoption
or non-adoption (rejection) of the innovation forms the third

and last phase and constitutes the result that is, the
farmers' response to the innovation which is either
positive (adoption) or negative (rejection).   It is assumed
that the farmers' response to the innovation is an outcome
of interacting antecedent factors.   The model is diagramati-
cally shown in figure 1.
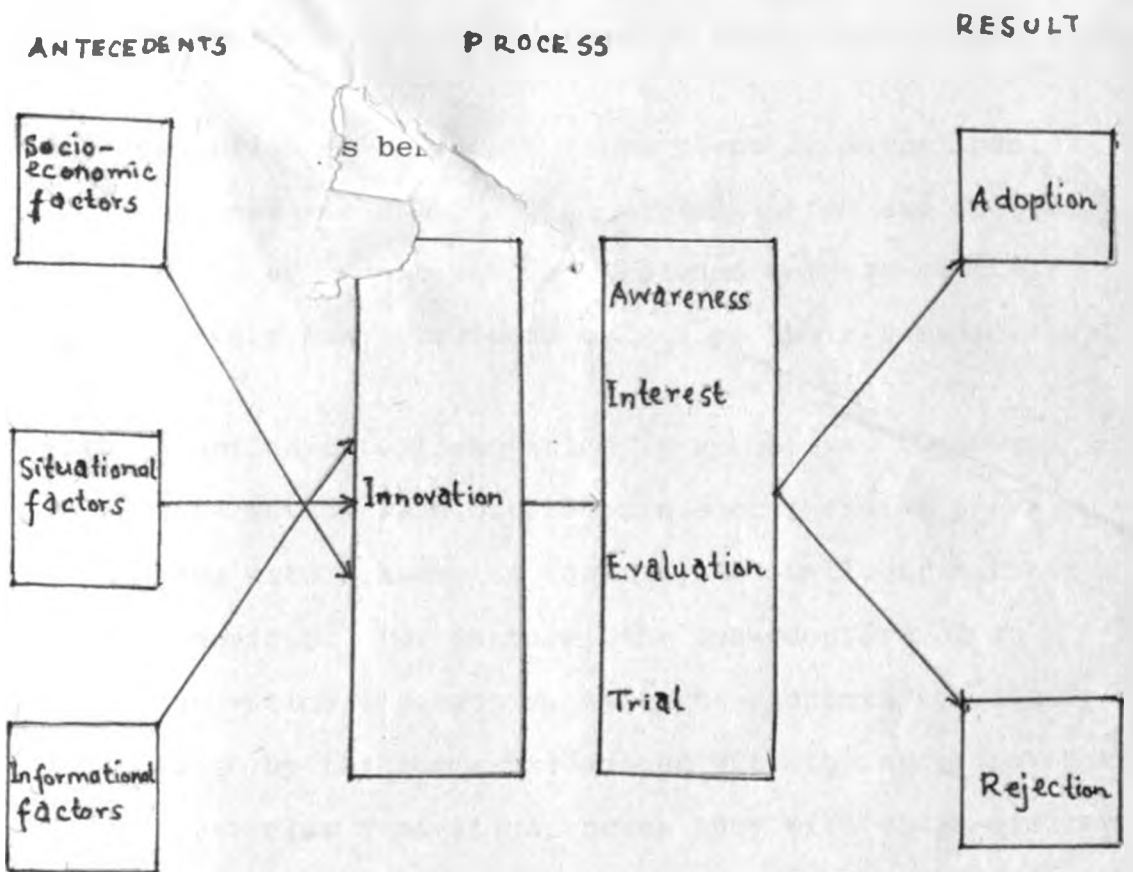
FIGURE 1:   A conceptual model of the Adoption Process.

        In addition to the model described above, the
adoption of an innovation can be conceptualized in terms
of the subjects' behaviour.   An explanation of the adoption
behaviour runs as follows:

(i)   adoption as an ultimate goal or end. In adopting an
        innovation, farmers seek to attain security. For
        example, farmers would turn to coffee growing simply
        because they want to increase their cash income. Their
        goal in this case is security, that is, the new crop
        becomes a kind of asset on which to rely should other
        means of generating income fail. Farmers become more
        secure because the sources of income are diversified.

(ii)   adoption as behaviour takes place in situations.
        Farmers are members of social system and frequency
        of interactions with enlightened members of their
        society has a profound effect on their behaviour.

(iii)   adoption of an innovation is normative. Farmers'
        interaction with others in a social system provide
        them with a sense of identity and influences their
        behaviour. For example, the non-adopters of an
        innovation itneracting with the adopters are likely
        to go by the norms associated with the adoption of that
        particular innovation, hence they will share similar
        with the adopters.

(iv)   adoption involves an expenditure of effort or
        motivation. In dividuals must exert energy to seek
        information about the new idea and try it ou before
        adopting it.

        The adoption process model is likely to give an
explanation as to why some farmers become motivated to adopt

a new crop while others do not. In other words, how do

traditional subsistence farmers become motivated or not

motivated to adopt market production of crops? What are

the incentives that motivated them to adopt coffee? What

are the disincentives that inhibit them from adopting the

crop? With the variables being measured and the data that

was obtained, the adoption process model has provided new

insights in the issue under discussion.

2.2.2 The Linear Model

Many studies support the idea that within any community,
the wealtheir individuals are likely to be the first or
principal adopters of new technology - e.g. Rogers (1971) and
Pelto (1973) among others. In line with this view, Berry
(1980) notes that farmers readiness to take advantage of new
income earning opportunities often depends on their assets
than on their attitudes. Based on this model, the correlation
coefficients are supposed to reveal a linear relationship
between two variables, an impression one gets from the
saying "the rich get richer and the poor get poorer (see
figure 2). This study tested the applicability of this
model to the farmers of Ndivisi Location.
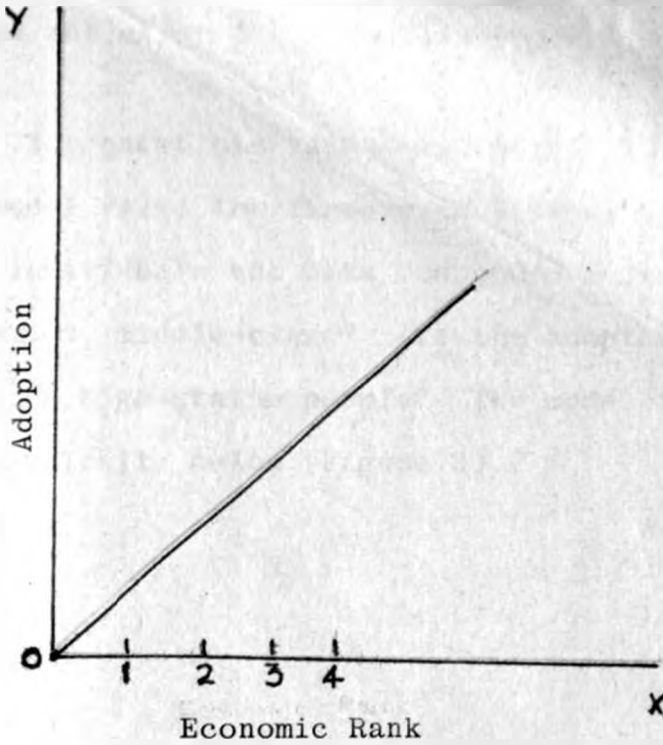
FIGURE 2: The Linear Model

2.2.3 The Middle-class Conservatism Model

This model is advanced by Homans (1961) on the basis
of evidence from socio-psychological experiments. It is
hypothesized that people of very low status and people of
very high status were likely to be innovators or adopters
of innovations. He argues that low-status individuals
are generally of low reputation and could therefore easily
adopt behaviour not in conformity with their groups. On
the other hand, upper-status people have a secure position
and have nothing to gain by conformity, and will also be
able to adopt behaviour not normal to the group. It the
follows that only the middle-class maintains close conformity
to traditional or group behaviour. This is aposition that

alleges the existence of middle-class conservatism.

The questions raised here are: to what extent is
this model valid for farmers in Ndivisi Location? are
those individuals who have responded negatively to coffee
production, middle-class? Are the adopters either low-
status or high-status people? The model is represented
diagramatically below (Figure 3).
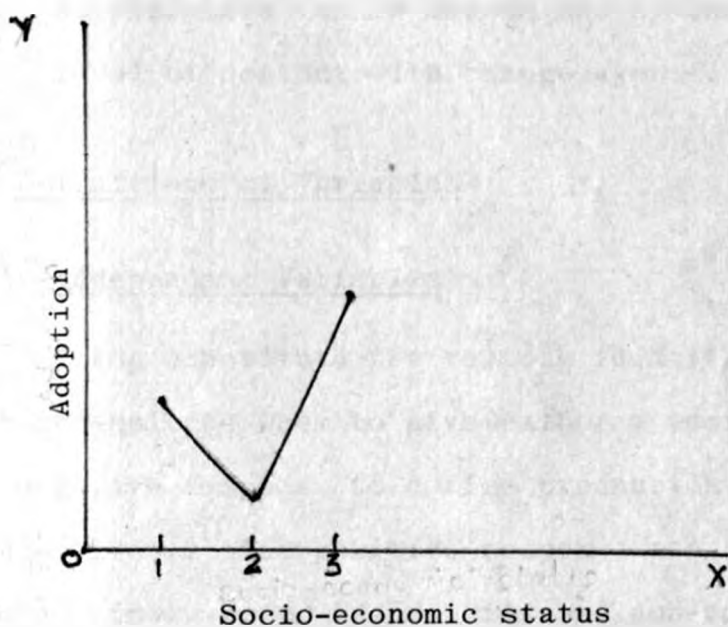
FIGURE 3: The Middle-class Conservatism Model.

2.3 Hypotheses

The literature reviewed and the models suggested
resulted into the formulation of the following hypotheses
as guidelines for data collection and intepreation:

1. Farmers' positive response to coffee growing is determined by a favourable socio-economic status at inception.

2. Farmers' negative response to coffee production is not influenced by situational factors.

3. Farmers' positive response to coffee growing in Ndivisi Location is determined by their degree or level of contact with change agents.

2.4 Definitions of Variables

2.4.1 Independent Variables

These constitute the reasons identified by farmers which necessitate them to give either a positive response or a negative response to coffee production (incentives or disincentives). The positive response and the negative response simply refer to adoption and non-adoption of coffee growing respectively. Independent variables considered here are:

2.4.1.1 Socio-economic status

These are conceptualized as the farmers' characteristics which enable them to have possession of production resources. It is argued here and it is the authors' opinion that these characteristics are determinants of farmers' positive response to coffee production. These characteristics as stated in

the first hypothesis include:

(i)   Farmers' age: the old age farmers respond positively
        to coffee growing than the middle-age or young farmers.

(ii)   Formal educational level: farmers with a high formal
        educational level are likely to respond positively
        to coffee growing than those whose formal educational
        level is low.

(iii)   Wealth and operational capital: wealthy farmers
        will respond positively to coffee production than
        the poorer ones.

(iv)   Farm size: farmers with large pieces of land will
        respond positively to coffee production than those
        with small farms.

2.4.1.2 Situational Context

This variable is operationalized as external factors
or advantages that necessitate the farmers to exploit fully
their production resources. These factors are generally
important in the agricultural business. However, as viewed
in the present study, these are not important in determining
farmers' negative response to coffee growing. Situational
factors considered here are:

(i)   availability of farm production inputs

(ii)   cost of production inputs

(iii)   distance between input markets and the farms

(iv)   availability of credit facilities

(v)   availability of a   large labour force

(vi)   produce prices.

2.4.1.3 Information Factors

These are operationalized as the means by which the
innovation can be diffused to the farmers. They determine
the degree to which farmers respond to the innovation. It
is stated in the last hypothesis that these factors or
change agents determine farmers' positive response to coffee
growing.   They include farmers':

(i)   contacts with agricultural extension agents

(ii)   social participation in formal organizations e.g
        field demonstrations; trade fairs, or agricultural
        shows; cooperative societies and farmers seminars

(iii)   use of mass media,

(iv)   contacts with neighbours.

2.4.2 Dependent Variables

Adoption and non-adoption of coffee growing are
conceptualized as dependent variables. Adoption refers
to farmers positive response to the innovation constituting
acceptance and continued production of coffee by farmers,
non-adoption refers to farmers' negative response to coffee
production, that is, the crop is rejected.

CHAPTER 3

ENVIRONMENTAL SETTING OF NDIVISI LOCATION

Ndivisi Location is situated in Webuye Division of Bungoma District in the Western Province of Kenya. It lies in the eastern part of Bungoma District, bordered by Kimilili Location on the north, Naitiri Location in the east and Webuye and Bokoli Locations on the West. To the southern and south-eastern part of the location is the River Nzoia which forms an administrative boundary between Bungoma and Kakamega Districts. The location is roughly bound by rivers Nzoia and Kibisi; Chetambe (Webuye) Escapement; and the Webuye - Misikhu - Kitale road (maps 1,2 and 3). The total land area is 265 square kilometres.

3.1   Topography and soils

The land rises from 5000ft (1600M) from the south and south-east to 5400ft(1800m) in the north. It is underlain by granitic rock which forms the basement system. The soils in the location are of various types. They range from dark-red friable clays with deep humic top soil, to dark-brown sandy, and grey loams. These are well drained.

The location has a high density of drainage. It is characterized by the presence of numerous streams which are permanent. It is part of the Nzoia basin with its largest tributary, Kibisi.

2.2   Climate and Vegetation

Ndivisi Location is characterized by moderate
temperatures for it lies between the higher Mount Elgon
zone and the lowlying parts of central and Southern
Bungoma.   The mean maximum temperatures per year roughly
range from $26^{O}C$ to $30^{O}C$ while the mean minimum temperatures
per year range from $14^{O}C$ to $18^{O}C$.   High temperatures are
experienced between December and February.

The location receives moderate rainfall, both
relief and convectional.   Relief rain is influenced the
surrounding raised features-Mount Elgon, and the Nandi Hills.
Convectional rain is influenced by Lake Victoria.   Annual
rainfall follows a seasonal pattern ranging from 50 inches
(1270mm) to 60 inches (1524mm) per annum.   The location
thus gets adequate rainfall to support most agricultural
activities.   The long rains fall between March and August
while the short rains fall between September and December.

Natural vegetation in Ndivisi Location ranges from
bushland to woodland.   Much of the original vegetation is
depleted due to the influence of man's activities.   Around
Webuye Falls (Nabuyole) and along the Chetambe Escarpment
is a bushy grassland area, typical of the savannah.   In
most parts of the location the original trees have been
replaced by the exotic ones, eucalyptus, cypress and pine.

3.3   Demography

The dominant ethnic group is Luyia specifically
comprising the Bukusu and Tachoni. The location is fairly
densely populated and exhibits a high rate of population
growth. In 1976 Ndivisi Location had a total population
of 38,157 with a growth rate of 1.46 percent per annum.
With a total land area of 265 square - kilometres, its
population density was 144 persons per square kilometre
compared to 141 persons per square kilometre in 1969. In
1979 its total population was 41 741 with a density of 203
persons per square kilometre (Bungoma District Development
plan, 1979-1983: 10). This trend in population growth takes
the same pattern as that of Bungoma District as a whole. In
1979 the mean population density for Bungoma District was
112 persons per square kilometre, with a growth rate of 5.2
percent per annum, basing on the 1962 population. In 1979
the district had a population density of 164 persons per square
kilometre with a population growth rate of 3.85 percent per
annum (Kenya population census, 1979, vol.1,p.122).

3.4   Settlement and Land Use

With a fairly dense population, majority plots in
Ndivisi Location are small holdings. About 80 percent
of the total plots in the location consist of small
holdings less than 10 hectares (25 acres) each. In 1970
there were 999 small plots of less than 1.2 hectares

(3.5 acres) in Ndivisi Location (Bungoma District Development
Plan, 1979-1983). The number of small plots is directly
related to population densities, that is areas with the
highest population densities are the ones with many small
plots. The number of small plots is also directly related
to the soil patterns as well as the intensity of agricultural
activities, that is, areas with the most fertile soils are
the ones with very many small plots.

Within the district, Ndivisi Location is rated as
one of the zones with a high potential for agriculture
and intensive farming is practised to a reasonably high
degree. Agriculture is the mainstay of the locations economy.
Majority of the people are engaged in small-scale mixed
farming, growing both food, and cash crops, as well as keeping
livestock. The main food crops include maize, beans, finger
millet, sorghum, cassava, bananas, cowpeas, sweet potatoes,
yams and sim sim. Maize is the main staple food crop but it
is a cash crop as well. Beans are also a cash crop and
alternate with maize. The purely cash crops grown are
coffee, sunflower and sugarcane.

Livestock farming further establishes Ndivisi as a
farming location. The main livestock reared include cattle,
goats, sheep and poultry.

3.5   Coffee in Ndivisi Location:- An Overview

The diffusion of coffee into Ndivisi Location dates
back to the 1950s. What is presented in this section is
derived from discussions held with the Assistant Manager
of the Lukusi Coffee factory, and other sources.

In 1954 a coffee farmers' cooperative society was
established at Lukusi by a committee of voluntary farmers
from Ndivisi, Khalumuli, Muji and Makuselwa. This is the
time coffee was introduced into Bungoma District from Kisii
and Kakamega, following encouragement given by the Kenya
Planters' Cooperative Union (KPCU). In the period 1955/1956
coffee growing by farmers in Ndivisi began. This was
achieved through encouragement by the area chief in
organizing local meetings (barazas) thereby disseminating
the information to farmers. No coercive means were used
to involve the farmers. During this period, coffee seedlings
were obtained from other areas that had set up their own
nurseries, the major one being Chwele, some forty Kilometres
from Lukusi. The seedlings were not being given free of
charge. They were purchased at a certain amount depending
on the number required. Currently a coffee seedling costs
two shillings.

This major trend led to the establishment of a
coffee pulping plant. Parallel to this development was the
establishment of a coffee nursery from where farmers could
purchase the seedlings. The nursey and factory area occupy
land area of about five acres. The cooperative society offices

and the factory occupy the same premises and are affiliated
to the Bungoma branch of the Kenya National Farmers Union
(KNFU), located in Bungoma town.

As it was stated earlier on, no African farmers had
been allowed by the colonial authority to grow cash crops
but following the swynnerton Plan (1954) there was a general
mobilization of the African economy as part of government
policy.   Intensification in farm production accrued
from the incentives released by the swynnerton plan. As a
result there was an increase in the number of coffee farmers
in the years preceeding independence and those immediately
following independence.

In the period after independence, however, many parts
of Western Province experienced a general decline in agricultural
production and output of the average rural population.   In
other words, the period after independence experienced a
shift from dependence on farm produce; young men moved into
urban centres leaving behind the old folk and children who
could not work the land (Ogutu, 1975).

This view was also expressed by the respondents.
According to them the period following independence saw a
decline in the number of coffee farmers due to the low prices
that were being offered for the crop, a kilogram earned as
little as sixty cents. However, they offered no comparison

with other areas at the time which tended to experience
an increase in the number of coffee growers. Asked about
the present situation, the Lukusi farmers declared that
they are being paid less compared to areas like Mount Elgon,
Kisii and central Kenya where coffee farmers earn as much
as five shillings per kilogramme of coffee compared to
theirs which earns three shillings per kilogramme for the
best grade. They could not explain the cause of such a
difference. However, further investigation revealed that
the prices are determined by the quality of the produce
which is normally graded. If the crop is not properly
cared (e.g in adequate application of nutrients; poor weeding,
poor harvesting and poor storage) its quality is lowered,
hence fetching low prices. Another reason that was given
is that some farmers migrated into the newly created settlement
schemes that had formerly been occupied by the white settlers.

The cooperative movement and its nature of operation
contributed a lot to his trend of fluctuation in production.
According to Ogutu (1985) the operation of the cooperative
societies, charged with the marketing of the crop, were well
organized and maintained in the pre-independence period.
However, there arose what Ogutu regards as a "political fever
of independence" whereby there was a rapid increase in the
number of cooperatives, political agitation never allowed
them to function satisfactorily. Hence splinter societies
rose, the number of members of the existing ones dropped

and so was the decline in production output; the emergence
of poor administration and embezzlement of funds were also
witnessed.   According to the 1966 Cooperatives Commission,
the cooperative movement had become defunct.   In the late
1960s, however, farmers were encouraged to take up to coffee
growing, the number rising tremendously in the 1970s.   This
was a result of the new government's policy, contained in
the first Five Year Development, whose aim was to stabilize
the agricultural economy that had been unstable.   Table 1
shows figures for coffee production in tons for Bungoma,
Kakamega and Meru districts as well as the country's total
production in the period 1962-1966.   The table tries to show
how coffee production underwent fluctuations.   Note that
although Meru District (the district was the leading producer
in the whole country) and the country in general experience
these fluctuations, they exhibited a greater increase in
the recovery period compared to Western Province.

	1962/63	1963/64	1964/65	1965/66
Bungoma	589	638	366	433
Kakamega	29	113	89	140
Meru	2437	4278	3942	6230
Kenya(Total)	8701	15131	14542	25120

Table 1:   Coffee production in tons for the period 1962-66.
           (Source: Coffee Board of Kenya: Annual Report,
           1966, p.8)

The period 1966 to 1978 has been described as an "era of reform and revitalization." The 1966 Cooperatives Commission recommended a reorganizationof the whole cooperative movement, especially the cooperative societies. Through the spirit of "African Socialism" there was a call for quantitative and qualitative expansion of all the facilities in the movement and the government attempted to revive the dead and dying societies. To make the cooperatives an instrument of rural development, the cooperative Act, 1966, was passed. By this Act, the government planned a re-establishment of the weak societies and to liquidate the dead ones. Despite government efforts, some cooperative societies still remained the loci of political agitation instead of being a channel of economic and social change. Cases of embezzlement, open fraud, and theft were recurrent. The whole episode of corruption in Kenya was brought to an end in the era after 1978. This is the Nyayo era, a period of true reform and revitalization of the movement. This period of action saw the creation of the Ministry of Cooperatives and cleansing of corrupt elements in the societies. Hence the production of coffee has taken an upward trend.

It is important to conclude this chapter by a discussion of the Lukusi Coffee Farmers' Cooperative Society.

The official register (without a reference number) shows that there are over six hundred fully registered members. A farmer is considered a full member of the society on payment of a full membership fee of five hundred shillings. Such a member enjoys all the benefits accruing from the society.

Those who are not full members form a majority number. The
society by virtue of its name, does not serve farmers
from Lukusi area only, but covers a wider area. The areas
served include Mihuu, Makemo and Ndivisi sub-locations -
these are areas within Ndivisi Location. In addition, the
society caters for coffee growers outside Ndivisi Location.
These include Kibisi in Naitiri Location and parts of Bokoli
Location.

A farmer begins to grow coffee once he or she is
registered. One can grow the crop as long as he or she can
maintain it. The land area for the crop is determined by
the number of coffee trees desired. Farmers often talk
in terms of the number of coffee trees they own rather
than the acreage under the crop. The more progressive farmers
have as much as one thousand trees (about two acres) or more
while the beginners have as few as twenty. Thus the crop
requires a relatively small acreage of land compared to
maize. The cooperative society advances both short-term
(seasonal) loans and long-term loans to willing farmers.
The loans are repaid through deductions from a farmer's net
returns, since the cooperative society is the channel for
marketing the produce.

For purposes of providing extension services, a certain
number of coffee growers is allocated to a coffee specialist.
These agents are in charge of inspection of the crop; giving
guidelines on new strategies and organizing of field
demonstrations and seminars. As Brown (1963:11) observed:

"Coffee has the supreme advantage of
 being relatively easy to grow and
 it does not require costly nurseries
 or even expensive processing machinery."
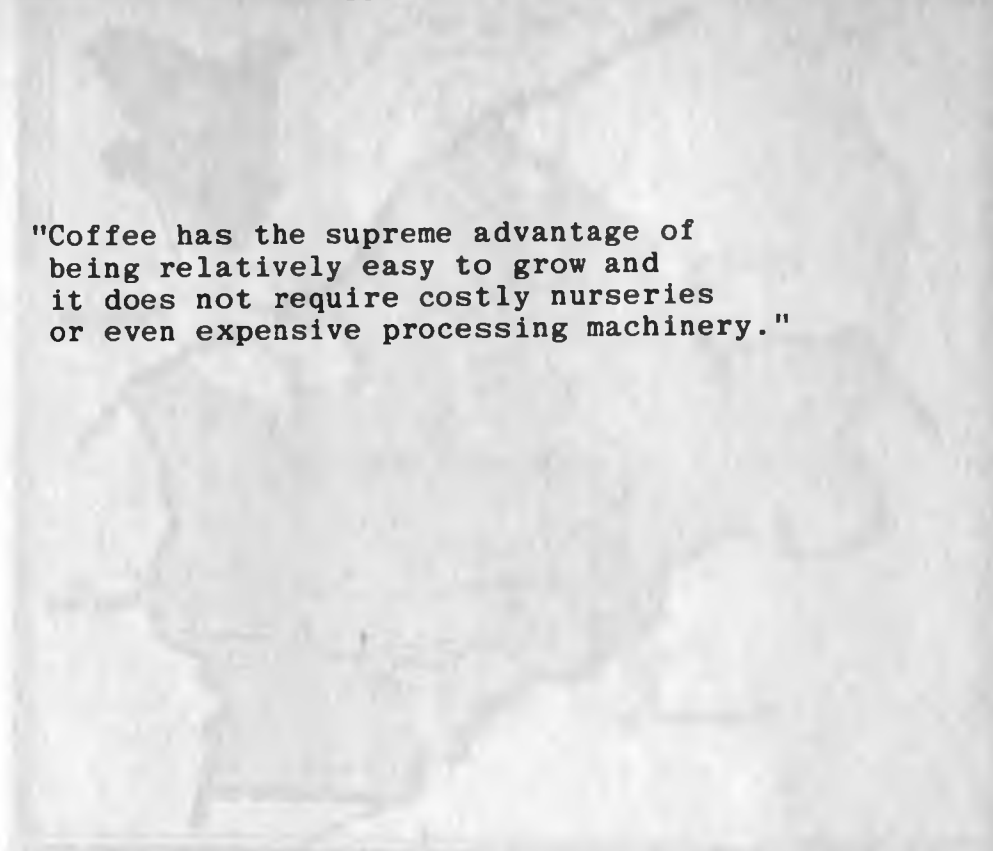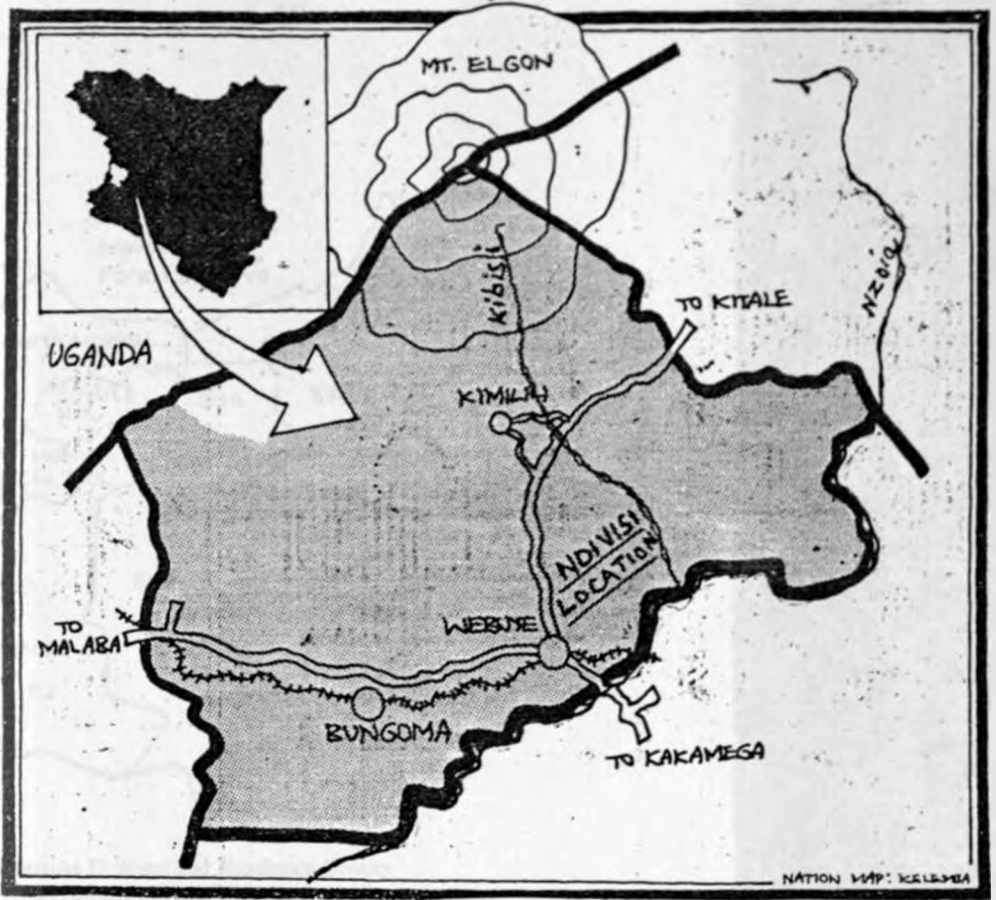
Map 1: A sketch map of Bungoma District showing the
position of Ndivisi Location
(Source: Daily Nation, March 6, 1989; p. 12)
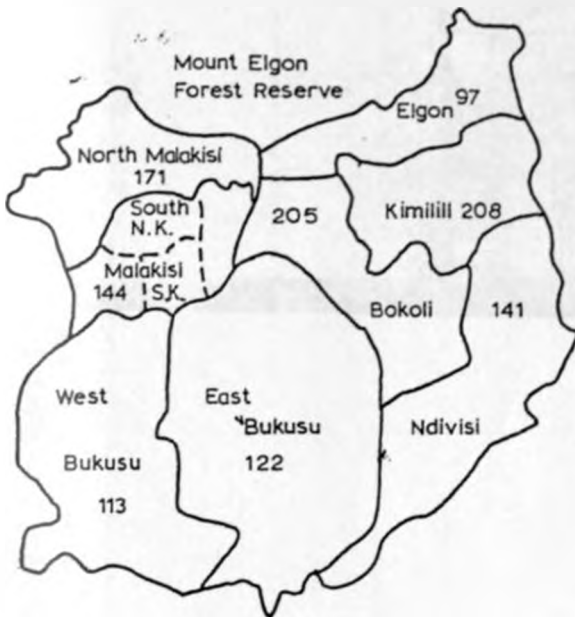
Administrative Divisions and Population Density
per square kilometre in 1969
N.K. = North Kulisiru Sub-location
S.K. = South Kulisiru Sub-location

Map 2. *Bungoma District*   Scale 1 : 400,000

(Source: De Wolf J.J., 1977;   p. 3)
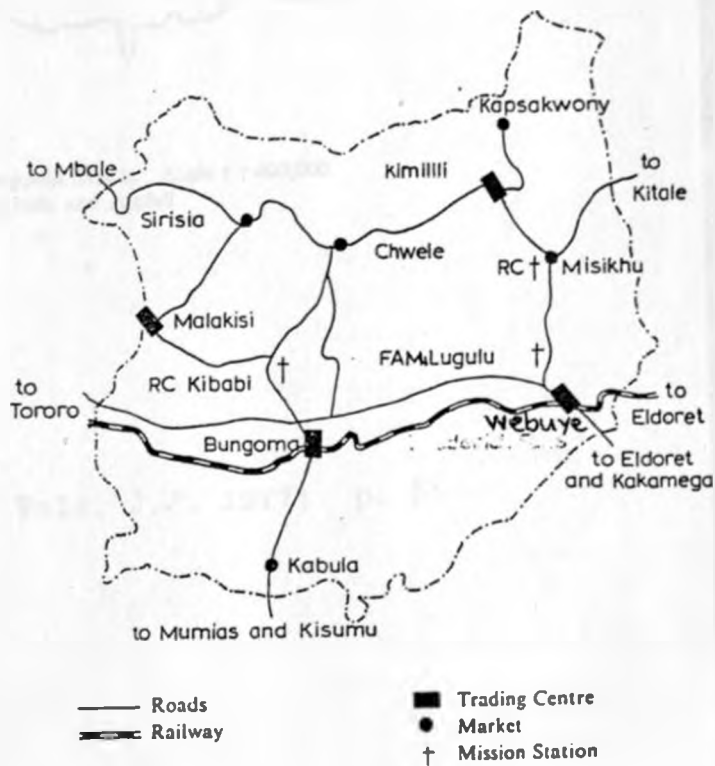
Map 3. *Bungoma District* Scale 1 : 400,000
Communications and settlements

(Source: De Wolf, J.J.; 1977, p. 4)
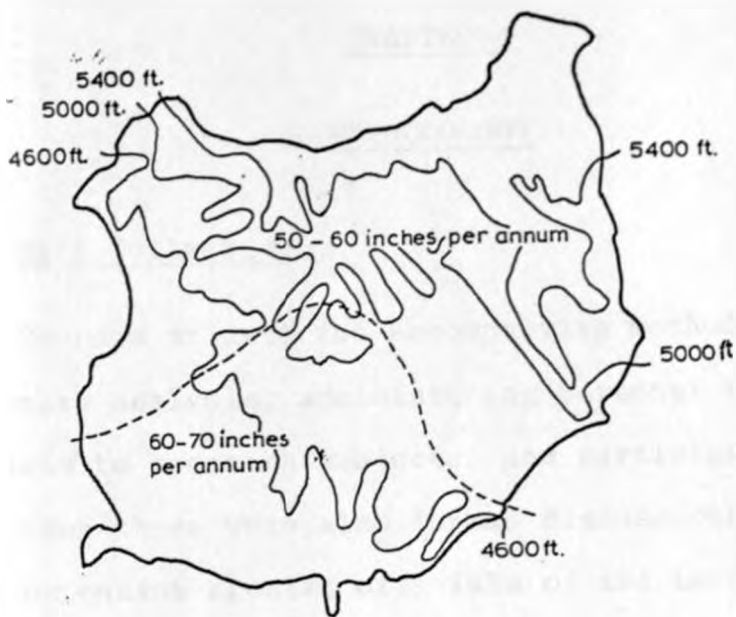
Map 4. *Bungoma District* Scale 1 : 400,000
Altitude and rainfall

(Source: De Wold, J.J. 1977; p. 5)

CHAPTER 4

METHODOLOGY

4.0   Data Collection

Sources of data and accompanying methods included
documentary analysis; administering personal face-to-face
interviews to research subjects; and participant observation.
In addition there were also formal discussions with the
coffee extension agents; officials of the Lukusi Coffee
Farmers' Cooperative Society and officials of the Lukusi
Coffee pulping plant. Two types of data were collected, that
is, quantitative (statistical) data and qualitative (non-
statistical) data. Interviews were used to collect quantitative
data. In this case, the unit of observation (respondent) was the
farmer who owned a plot within the study area and who appeared
inthe sample. Participant observation and formal discussions
were used to collect qualitative data. The process of
collecting data was mainly undertaken by the author. The
actual exercise in the field commenced in early may and
ended in late June of 1989.

4.1   Sampling

Before drawing a final sample, two considerations
had to be made. First, the sample size was to be in such
a way that it is manageable. The area covered, Lukusi,
consists of three villages of Lukusi, Misimo and Bakisa.
The three villages combined constitute about five hundred
farms. The population from which the sample was drawn

consisted of one hundred and eighty elements (farmers) which was considered convenient for the limited time in which the work was to be carried out. The second consideration was in respect of the two categories of research subjects, that is, the coffee adopters and the non-adopters. It was necessary to select them in equal proportions so that the element of bias was avoided as much as possible.

4.1.1 The Population

The population for study consisted of one hundred and eighty farmers who owned plots within Lukusi area. Two methods were used to obtain this population. First, it was necessary to identify the coffee growers. Their names were obtained from the Lukusi Coffee Farmers' Cooprative Society. One hundred Coffee growers were identified. A second step was a cross-survey of the whole area to identify the non-growers. Again one hundred non-coffee growers were identified. The final population, which formed the sampling frame, was obtained by selecting ninety elements from each category using the lottery method. Altogether there were one hundred and eighty elements which formed the population and therefore the sampling frame from which the final study sample was drawn.

4.1.2 Sampling procedure

From what is outlined above, it is true to say that some form of multi-stage sampling was used. The particular method of sampling that was used is simple random sampling. The objective behind its use was to give each member of the

population an equal chance of being selected only once with
the population involved likely to be evenly represented.

From the selected sample of one-hundred and eighty
individuals, another simple random sample of ninety indviduals
was selected using the same lottery method. The sample
thus represented fifty percent of the population. Each
individual in the population was represented on a piece
of paper on which the name was written and folded. one-hundred
and eighty pieces of paper were mixed up in a box and
thoroughly shaken. The pieces were picked one at a time
without being replaced. The sampling fraction was therefore,
not kept constant. Out of the final sample that was selected,
56.7 percent (51 individuals) were coffee adopters, while
the non-adopters represented the remaining 43.3 percent
(39 individuals).

4.2   Interviews

To collect quantitative data, a pre-pared structured-
questionnaire was administered to respondents. Before
administration, the questionnaire which was in English, was
translated into local dialects; Tachoni and Bukusu. The
questions were open-ended. This format was preferred to
pre-coded or closed questions to allow for probing deeply
into aspects which could be concealled. Thus the respondents
had a chance to express their views with maximum freedom
and in detail. The interview method was used because of
its quick advantage over other methods of data collection
given that the research period was very short. The

questionnaire had to be administered to a few in dividuals
in the neighbouring village of Lutacho. The necessary
alterations were made to make it applicable to the prevailing
conditions, to ensure clarity and consistency.

The task of interviewing the respondents was a daily
routine. Each respondent was informed of the exercise well
in advance so that some kind of rapport was established in
the first instance. This enabled the respondent to avail
himself or herself in the appropriate time. Since the author
is from the area and is competent in the local dialects, the
need for interpreters did not arise. The questions that were
posed to the farmers roughly covered three areas; the farmers'
socio-economic characteristics; their reasons for adopting
and not adopting cultivation of coffee; and systems 'of
information about the crop which they might have encountered.
Most interviews took place in the farms and some at local
market centres, the coffee factory and in the grazing fields.

For each item in the questionnaire, a corresponding
response was recorded in the same order for every respondent
(Appendix I). The main items included in the interview
schedule are listed in Appendix II.

4.3   Participant-observation.

Complementary to the interview technique was the
participant-observation method of data collection. This
method was possible on account that the researcher is from

the community under study. Previous experience and
participation in community activities necessitated its
application as a method of data collection. Unlike the
interview method, participant -observation was aimed at
collecting qualitative data which were to be compared and
contrasted with quantitative data. Participant-observation
helped the researcher grasp the real situation better than
what the respondents could give when asked. Like the interview
method, participant-observation also focussed on three
variables pertaining to the adoption and non-adoption of
coffee production by farmers, that is, characteristics of
the farmers' socio-economic status; situational factors; and
informational factors.

For socio-economic characteristics, it was vital
to observe farmers' possessions and other attributes to
determine the degree of their wealth. For instance, farmers
who had large numbers of livestock, permanent houses,
diversified sources of income and expensive items, were
rated at being rich or economically sound. Farmers who
owned few or no livestock, temporary houses, had scarce
income sources and less expensive items, were rated as being
poor or economically handicapped. Those who fell in between
these categories were considred as being moderate or
economically fair. The farmers' literacy level was determined
by observing the types of books or newspapers they read, the
language they used in local barazas, chiefs' meetings or in
church e.g vernacular, Kiswahili or English. Through
observation, farm sizes were rated as small (less than ten
acres); medium (between ten and twenty acres) and large
(over twenty acres).

The researcher participated in activities that involved the supply of farm-production inputs; observation of modes of transporting inputs such as vehicles, ox-carts, sledges or human potterage; as well as participation in transporting the produce to the coffee factory to obtain data on situational factors.

For informational factors, it was necessary to observe and participate in field demonstrations; attend farmers' meetings; observe farmer-extensionist interactionism; as well as farmer-to-farmer interactionism. Through informal discussions, it was also possible to observe the types of farmers' newspapers, newsletters and magazines they read.

4.4 Documentary Analysis

A number of works provide background information to the area under study inthe fields of history and settlement (Were, 1967: 84-95); agricultural innovations (Misiko, 1976; Ogutu, 1985); and other general development programmes (Thurman, 1968). A review of the existing literature on agricultural innovations was undertaken from various materials e.g. books, journals, working/discussion papers, reports, statistical abstracts, and development plans; found in libraries, the central bureau of statistics and the district development office. Records in the coffee cooperative society and the factory at Lukusi also generated valuable information.

4.5   Problems Encountered in the Field

4.5.1 Nature of teh Season.

The study was conducted during the busiest season of
the year. Within this area, as in other parts of Western
Province, the period between March and June is one in which
farmers are usually busy in their farms. Planting of crops
(maize, beans, millet, sorghum, etc) and weeding are the major
preoccupations. As a result of this most farmers would not be
interviewed as arranged, which forced the researcher to
spend more time than planned. Some farmers gave priority to
their own work although they were duly informed in advance.
Thus the interviewing exercise would take place according to
a farmer's willingness to be interviewed at the time he or
she felt, was suitable and not according to the researcher's
decision. Some farmers who owned several plots (this is a
polygamous community) could not be spotted at the expected
home. This called for making fresh appointments and
adjusting the time schedule, hence placing a constraint on
time allocation.

The season is also characterized by food shortages.
Males, who happen to be the farm decision makes, are involved
in various activities to obtain money for procuring food.
Travelling on bicyles for long distances in search of grains
to buy is a recent and common phenomenon in the area. SOme
men, and sometimes women, are employed as farm workers on
part-time basis to earn money in order to sustain a living.

The unexpected absence of such people in their homes posed
a problem of delay before proper time for the interview
could be found. Sometimes heavy rains and mud could curtail
a day's business by making some parts of the study area
quite inaccessible. Some respondents could not be traced
easily because they went grazing their animals. Such
situations caused delays and other inconveniences.

4.5.2 Poor Farm Records

Some respondents did not have any records of their
day to day transactions. For example, most of them did not
have any records showing their expenditure on farm production
or income from their produce. Lack of records meant that
reliance was placed upon their own estimation of expenditure
and income. The result of this is that most respondent tended
to make exaggerations.

4.5.3 Mortality

Most research subjects in the sample could not be found
as anticipated. These included those employed far away from
their homes and others who were long diseased although the
registers still bear their names. There was also a case
where a respondent was arrested and sentenced to imprisonment
for possessing an illicit brew. This differential loss of
research subjects was only solved by purposeful replacement.

4.5.4 Nature of the Research Instrument

Some respondents were uncooperative when asked
on issues they perceived to be sensitive such as age and
income which they considered a private affair. Their
cooperation could only be cultivated by assurance that
everything would be taken strictly confidential. Some
respondents demanded some form of payment for their information.
This was more so to those who were not familiar with the
researcher but on explaining the objective of the exercise
and through exercising honesty, they would reverse their
mind. Some respondents mistook the researcher for a new
extension worker and would welcome him with blames for
failing to be in touch with them. They apologized on
establishing the researcher's identity.

4.5.5 Time factor

Interviews were conducted on a face-to-face basis
rather than sending out questionnaires to individual
respondents. A lot of time was spent on asking questions
and at the same time recording down the responses given by
the respondents. It took a lot of time to complete a
discussion with a single respondent. As for the researcher
this was not a problem but for the respondents, they tended
to be brief and thus limit their answers. It could be it was
because they were constrained with time or that they were
not interested in providing full cooperation.

4.6   Data Analysis

Analysis involved a description of the characteristics
of the respondents in relation to the measured variables.
The actual number and percentage distribution were used
to describe the sample. For qualitative data, analysis
involved description of observed impressions emanating from
participant-observation. For quantitative data statistical
measures were used in computing data for each variable
which involved drawing frequencies and tabulation; analysis
of the mean as a measure of central tendency in a frequency
distribution based on the formula.

$$\bar{X} = 1/n \; \Sigma X_i$$

where $\bar{X}$ is the mean; n, the number of values or
observations and ΣX_i, the sum of values.

Analysis of measures of variation or dispersion,
that is, the variance, the standard deviation and the
range, was done using the following formulae:

variance, $S^2 = \dfrac{1}{n} \; \Sigma(X_i - \bar{X})^2$

standard deviation, $S = \sqrt{\dfrac{1}{n} \Sigma(X_i - \bar{X})^2}$

range = L-S, where L is the largest
         value and S the smallest value in a
         frequency distribution.

Analysis of the Pearson's-product-moment correlation coefficient between two variables, X and Y, was based on the formula.

$$r = \frac{\frac{1}{n}\Sigma XY - (\bar{X})(\bar{Y})}{\sqrt{(\frac{1}{n}\Sigma X^2 - (\bar{X})^2)\ (\frac{1}{n}\Sigma Y^2 - (\bar{Y})^2)}}$$

Where $\bar{X}$ is the mean of the values in the X variable and $\bar{Y}$ is the mean of the values in the Y variable.

And, lastly a scattergram test was employed.

CHAPTER 5

DATA PRESENTATION   ANALYSIS AND INTERPRETATION

The objective in this chapter is to search and identify meaningful patterns of relationship in the data; to answer the research problem and to test the formulated hypotheses. Analysis of data involved examination and interpretation of the three base factors which expose the general environmental conditions of the population. These factors are socio-economic, situational and informational.

5.1   POINTERS OF SOCIO-ECONOMIC STATUS

The variables measured here in relation to adoption or non-adoption of coffee production by farmers within Lukusi area are the respondents' ages, formal educational level, wealth and operational capital, and farm size.

5.1.1   Ages of Farmers

On the basis of this variable, respondents were categorized as:

(a)   young: those below 35 years of age

(b)   middle - aged: respondents ranging from 35 years to 55 years

(c)   old-age: respondents over 55 years of age.

The data obtained in respect of this criterion, for the whole sample and expressed in actual numbers of respondents and in percentage figures are presented in table 2.

CATEGORIES OF	ADOPTERS		NON-ADOPTERS		TOTAL	
FARMERS	NO	%	NO.	%	NO.	%
Young	3	3.3	3	3.3	6	6.6
Middle-age	22	24.5	20	22.2	42	46.7
Old-age	26	28.9	16	17.8	42	46.7
Total	51	56.7	39	43.3	90	100

Table 2:   Farmer-Categories by age.

Another method that was used to categorize the respondents on the basis of age was the use of age groups. The sample contained respondents ranging from the twenties to the eighties. This is shown, in the form of grouped data, in table 3

AGE-GROUP	NUMBER OF RESPONDENTS	
	ADOPTERS	NON-ADOPTERS
20-29	1	0
30-39	3	5
40-49	12	11
50-59	12	11
60-69	8	11
70-79	10	1
80-89	5	0

Table 3:   Distribution of farmers by age-groups

In order to establish the mean ages in the two samples, and to discern variations in age, a frequency distribution was drawn for each category of respondents, that is, adopters and non-adopters. These are shown in table 4.

ADOPTERS				NON-AOPTERS		
29	50	63	82	30	50	63
34	51	63	82	31	50	64
34	52	64	84	34	50	65
38	53	65		37	51	65
40	53	70		38	53	66
40	54	71		40	54	68
40	54	71		41	54	70
44	55	73		44	56	
44	55	74		44	57	
45	56	75		45	57	
45	57	76		46	58	
45	58	76		47	61	
46	60	77		47	61	
46	61	78		48	62	
48	61	81		49	62	
49	63	81		49	62	

Table 4: Distribution of age in the sample:

From the frequency distribution in table 4, the mean age, range, variance and the standard deviation of the three age categories for each of the two respondent samples were calculated.

(a) Adopters:

(i) young farmers, x_i = 29, 34, 34.

mean, $\bar{x}$ = $\frac{1}{n}$ Σx_i

= $\frac{1}{3}$ x 92. = 32.3

= 32 years

Range = L - S = 34 - 29 = 5

= 5 years

Variances, s^2 = $\frac{1}{n} \Sigma (x_i - \bar{x})^2$

(x_i)	$(x_i - \bar{x})$	$(x_i - \bar{x})^2$
29	-3	9
34	2	4
34	2	4

$\Sigma(x_i - \bar{x})^2$ = 17

s^2 = $\frac{1}{3}$ x 17 = 5.66

= 5.7

Standard deviation , $s = \sqrt{\dfrac{1}{n} (x_i - \bar{x})^2}$

$$= \sqrt{\dfrac{1}{3} \times 5.7} = \sqrt{2.38}$$

$$= 2$$

(ii) <u>Middle-age farmers</u>:

x_i = 38, 40, 40, 40, 44, 44, 45, 45, 45, 46, 46, 48, 49, 50, 51, 52, 53, 53, 54, 54, 55, 55.

mean, $\bar{x} = \dfrac{1}{n} \Sigma x_i$

$$= \dfrac{1}{22} \times 1047 = 47.59$$

$$= 48 \text{ years.}$$

Range $= L - S = 55 - 38 = 17$

$$= 17 \text{ years.}$$

variance, $s^2 = \dfrac{1}{n} \Sigma (x_i - \bar{x})^2$

$$= \dfrac{1}{22} \times \overset{27.68}{609} = 27.68$$

$$= 27.68$$

standard deviation $= \sqrt{27.68} = 5.26$

$$= 5.3$$

(iii) Old-age farmers:

$$x_i = 56, 57, 58, 60, 61, 61, 63, 63, 63, 64, 65, 70, 71,$$

$$71, 73, \quad 74, 75, 76, 76, 77, 78, 81, 81, 82, 82, 84$$

mean, $\bar{x} = \dfrac{1}{n} \times \Sigma x_i$

$$= \dfrac{1}{26} \times \overset{70.076}{\underset{1}{1822}} = 70$$

$$= 67 \text{ years}$$

Range $= L - S = 84 - 56$

$$= 28 \text{ years}$$

Variance, $s^2 = \dfrac{1}{n} (x_i - \bar{x})^2$

$$= \dfrac{1}{26} \times \overset{74.692}{\underset{1}{1942}}$$

$$= 74.69$$

standard deviation, $s = \sqrt{74.69} \qquad = 8.757$

$$= 8.76$$

(b) <u>Non-adopters</u>

   (i) <u>young farmers</u>

$$x_i = 30, 31, 34.$$

Mean, $\bar{x} = \frac{1}{n} \Sigma x_i$

$= \frac{1}{3} \times 95 = 31.66$

$= 32$ years.

Range $= L - S = 34 - 30$

$= 4$ years

variance $= \frac{1}{n} \Sigma (x_i - \bar{x})^2$

(x_i)	$(x_i - \bar{x})$	$(x_i - \bar{x})^2$
30	-2	4
31	-1	1
34	2	4

$$\Sigma (x_i - \bar{x})^2 = 9$$

$s^2 = \frac{1}{3} \times 9 = 3$

$= 3$

standard deviation, $s = \sqrt{\frac{1}{n} (x_i - \bar{x})^2}$

$= \sqrt{3}$

$= 1.73$

(ii) **Middle-age farmers**

$x_i = 37, 38, 40, 41, 44, 44, 45, 46, 47, 47, 48, 49, 49, 50,$
50, 50, 51, 53, 54, 54.

mean, $\bar{x} = \frac{1}{n} \Sigma x_i$

$\qquad = \frac{1}{20}$ x 981 0 49.05

$\qquad = 49$ years.

Range, $= L - S = 54 - 37$

$\qquad = 17$ years

Variance, $s^2 = \frac{1}{n} \Sigma(x_i - \bar{x})^2$

$\qquad = \frac{1}{20}$ x 565 28.25

$\qquad = 28.25$

standard deviation $= \sqrt{28.25} = 5.315$

$\qquad = 5.3$

(iii) <u>Old-age farmers'</u>

$x_i = 56, 57, 57, 58, 61, 61, 62, 62, 62, 63, 64, 65, 65,$ 66, 68, 70.

mean, $\bar{x} = \frac{1}{n} \Sigma x_i$

$\qquad = \frac{1}{16}$ x 997 62.31

$\qquad = 62$ years

Range, $= L - S = 70 - 56$

$\qquad = 14$ years

variance, s^2 = $\frac{1}{n}$ $\Sigma(x_i - \bar{x})^2$

$= \frac{1}{16}$ x 243   15.187

$= 15.19$

standard deviation $= \sqrt{15.19}$ $= 3.897$

$= 3.9$

The relationship between age and adoption or non-adoption of coffee was measured by comparing the ages of the respondents and the number of adopters or non-adopters. A statistic that was considered appropriate for this measurement was the pearson's - product - moment - correlation coefficient. Correlation is the degree to which variation in one variable corresponds to or is related to variation in another variable, hence the idea of covariation. Using a correlation coefficient, we can establish whether the relationship between two variables is perfect (linear); positive or negative; high or low; or whether there exists no correlation at all. The correlation coefficient increases or decreases as the strength of the relationship increases or decreases.

The pearson's - product - moment - correlation coefficient, r, is derived as:

$$r = \frac{cov}{s_x\, s_y}$$

where cov, is the variance; s_x is the standard deviation
on the x variable, and s_y is the standard deviation on
the y variable. For computational purposes the following
formulae are used:

$$s_x = \sqrt{\frac{1}{n} \Sigma x_i^2 - \bar{x}^2}$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - \bar{y}^2}$$

$$cov = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y})$$

$$r = \frac{\frac{1}{n}\Sigma x_i y_i - (\bar{x})(\bar{y})}{\sqrt{(\frac{1}{n} \Sigma x^2 - (\bar{x})^2) (\frac{1}{n}\Sigma y^2 - (\bar{y})^2}}$$

In the workings that follow the x variable represents
age and teh y variable represents the number of adopters
or non-adopters. The units in the x variable are derived
from the age-group figures in table 3. These have been
reduced as a matter of convenience. Each age category is
given a corresponding number of respondents. Table 5 shows
the method of calculating the correlation coefficient
between age and adoption as derived from the data in table 3.

x_i	y_i	x_i^2	y_i^2	x_iy_i
2	1	4	1	2
3	3	9	9	9
4	12	16	144	48
5	12	25	144	60
6	8	36	64	48
7	10	49	100	70
8	5	64	25	40

$\Sigma x_i=35$ $\Sigma y_i=51$ $\Sigma x_i^2=203$ $\Sigma y_i^2=487$ $\Sigma x_iy_i=277$

Table 5: Calculation of correlation coefficient between age and adoption.

The first step is to calculate the mean for both x and y variables, thus

$$\bar{x} = \frac{1}{n} \Sigma x_i = \frac{1}{7} \times 35 = 5$$

$$\bar{y} = \frac{1}{n} \Sigma y_i = \frac{1}{7} \times 51 = 7$$

Next is to find cov, s_x and s_y

$$cov = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y})$$

$$= (\frac{1}{7} \times 277) - (5)(7) = 39.57 - 35 = 4.57$$

$$= 5.6$$

$$s_x = \sqrt{\frac{1}{n} \Sigma x_i^2 - (\bar{x})^2} = (\tfrac{1}{7} \times 203) - (5)^2 = 29-25$$

$$= 4$$

$$= 2$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - (\bar{y})^2} = (\tfrac{1}{7} \times 487) - (7)^2$$

$$= \sqrt{20.57} - 49 = \sqrt{20.6}$$

$$= 4.5$$

$$r = \frac{cov}{s_x \cdot s_y} = \frac{4.6}{2 \times 4.5} = \frac{4.6}{9} = 0.511$$

$$r = 0.511$$

The correlation coefficient between age and adoption is seen
to be positive. However, it is not a perfect positive
correlation, neither is it positively low (weak) nor
positively high (strong) i.e. it is not close to zero and
it is not close to one.

This correlation between age and adoption is shown
on a scatter diagram in figure 4
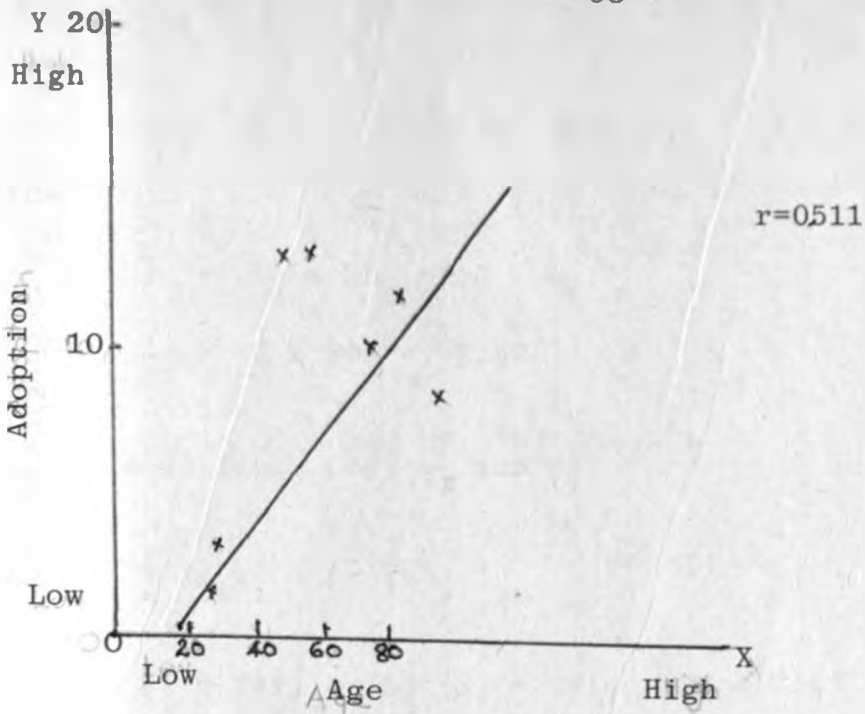
FIGURE 4:   Scatter diagram showing the relationship
            between age and adoption.

Calculation of correlation coefficient between age and non-
adoption followed the same procedure.   The data for this
are also derived from table 3.

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
3	5	9	25	15
4	11	16	121	44
5	11	25	121	55
6	11	36	121	66
7	1	49	1	7
$\Sigma X_i = 25$	$\Sigma y_i = 39$	$\Sigma x_i^2 = 135$	$\Sigma y_i^2 = 389$	$\Sigma x_i y_i = 187$

Table 6:   Calculation of correlation coefficient between
           age and non-adoption.

First we calculate the mean for both variables, thus

$$\bar{x} = \frac{1}{5} \times 25 = 5$$

$$\bar{y} = \frac{1}{5} \times 39 = 5.57 = 6$$

Next we find Cov, s_x and s_y.

$$\text{cov} = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y})$$

$$= (\frac{1}{5} \times 187) - (5)(6) = 37.4 - 30 = 7.4$$

$$s_x = \sqrt{\frac{1}{n} \Sigma x_i^2 - (\bar{x})^2} = (\frac{1}{5} \times 135) - (5)^2 = 27 - 25 = 2$$

$$= 1.4$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - (\bar{y})^2} = (\frac{1}{5} \times 389) - (6)^2 = 77.8 - 36$$

$$= \sqrt{41.8} = 6.46 = 6.5$$

$$r = \frac{\text{cov}}{s_x s_y} = \frac{7.4}{1.4 \times 6.5} = \frac{7.4}{9.1} = 0.813$$

$$= 0.813$$

This correlation between age and non-adoption is tested by the use of a scatter diagram as shown in Figure 5
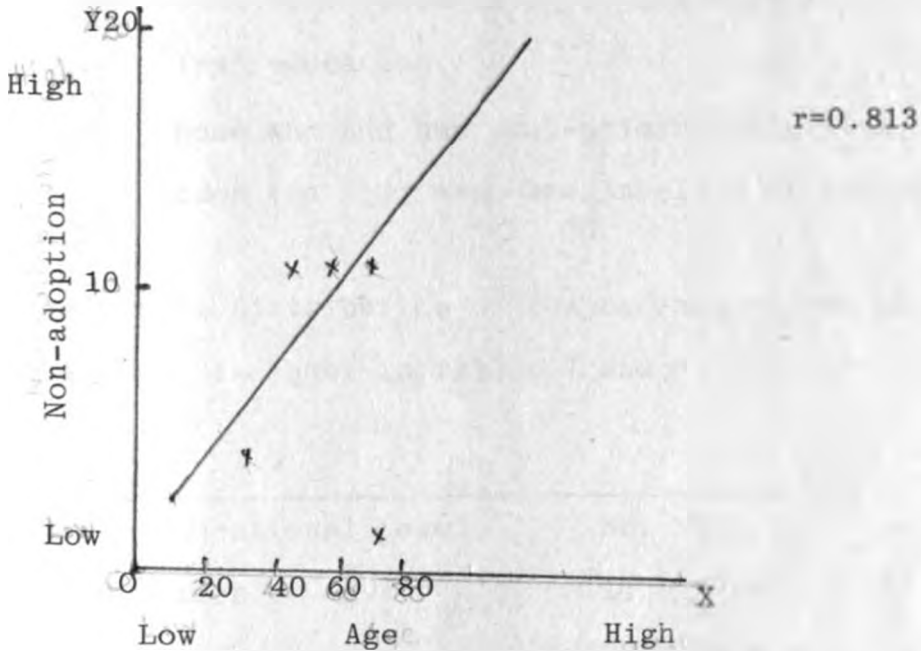
Figure 5: A scatter diagram showing the relationship between age and non-adoption.

The correlation coefficient between age and non-adoption is seen to be positive and high. However it is not perfect since it does not show a one-to-one relationship between the two variables.

5.1.2 Formal Educational Level

To measure this variable in relation to adoption and non-adoption, respondents were categorized into three groups:

(a)   those without any formal education. These were coded
        zero (0)

(b)   those with basic formal education (primary school level.)
        These were coded five (5) and were labelled as having
        'low' education.

(c)   those who had had post-primary education. These were
        coded ten (10) and were labelled as having 'high' educatio

The sample distribution of respondents on the basis of this
criterion is shown in tables 7 and 8.

Formal Educational Level	No.	%
No education	14	27.5
Low	28	54.8
High	9	17.6
Total	51	100

Table 7:   Distribution of respondents by formal educational
           level for adopters.

Educational Level	No.	%
No education	13	33.3
Low	24	61.5
High	2	5.2
Total	39	100

Table 8:   Distribution of Respondents by formal educational
           level for non-adopters

A correlation coefficient was calculated for each of the two types of respondents to ascertain the relationship between formal educational level (x variable) and adoption or non-adoption (y variable). The x variable is represented by the code number for each level of education while the y variable is represented by the actual number of respondents.

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
0	14	0	196	0
5	28	25	784	140
10	9	100	81	90
$\Sigma x_i = 15$	$\Sigma y_i = 51$	$\Sigma x_i^2 = 125$	$\Sigma y_i^2 = 1061$	$\Sigma x_i y_i = 230$

Table 9: Calculation of correlation coefficient between formal educational level and adoption

In table 9,

$$\bar{x} = \frac{1}{n} \Sigma x_i = \frac{1}{3} \times 15 = 5$$

$$\bar{x} = \frac{1}{n} \Sigma y_i = \frac{1}{3} \times 15 = 17$$

$$\text{cov} = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y}) = (\frac{1}{3} \times 230) - (5 \times 17) = 17.6 - 85$$

$$= -8.3$$

$$S_X = \sqrt{\frac{1}{n} \Sigma x_i^2 - (\bar{x})^2} = (\frac{1}{3} \times 125) - (5)^2 = \sqrt{41.7 - 25} = \sqrt{16.7}$$

$$= 4.1$$

$$S_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - (\bar{y})^2} = \sqrt{(\frac{1}{3} \times 1061) - (17)^2}$$

$$= \sqrt{353.7 - 289} = \sqrt{64.7}$$

$$= 8.04$$

$$r = \frac{cov}{s_x s_y} = \frac{-8.3}{4.1 \times 8.04} = \frac{-8.3}{33} = -0.2515$$

$$= -0.252$$

The correlation coefficient between formal educational level and adoption is negative and low (weak), hence there is no clear relationship between the two variables. The correlation coefficient between formal educational level and non-adoption is worked using table 10.

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
0	13	0	169	0
5	24	25	576	120
10	2	100	4	20
$\Sigma x_i = 15$	$\Sigma y_i = 39$	$\Sigma x_i^2 = 125$	$\Sigma y_i^2 = 749$	$\Sigma x_i y_i = 140$

Table 10: Calculation of correlation coefficient between formal educational level and non-adoption.

In Table 10,

$$\bar{x} = \frac{1}{n} \Sigma x_i = \frac{1}{3} \times 15 = 5$$

$$\bar{y} = \frac{1}{n} \Sigma y_i = \frac{1}{3} \times 39 = 13$$

$$\text{cov} = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y}) = (\frac{1}{3} \times 140) - (5)(13)$$

$$= 46.7 - 65 = -18.3$$

$$s_x = \sqrt{\frac{1}{n} \Sigma x_i^2 - (\bar{x})^2} = (\frac{1}{3} \times 125) - (5)^2$$

$$= 41.7 - 25 = 16.7$$

$$= 4.1$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - (\bar{y})^2} = (\frac{1}{3} \times 749) - 169$$

$$= \sqrt{249.7 - 169} = \sqrt{80.7} = 8.98$$

$$r = \frac{-18.3}{4.1 \times 8.98} = \frac{-18.3}{36.8} = -0.497$$

$$= -0.497$$

The correlation coefficient between formal educational level and non-adoption is negative and low. There is no clear relationship between the two variables.

5.1.3 Wealth and operation capital

In adopting any new agricultural innovation, wealth and operational capital to a large extent, have a considerable impact on the eventual decision-making of the farmer. Wealth as an 'economic actor' coupled with rationality, seem to be a major cause of the differences in economic behaviour, among most farmers. The degree to which an innovation is successfully adopted depends on the manner in which the farmer

deploys his wealth or the utilization of the operational capital at his disposal. In the study area the amount of wealth and operational capital was observed to be among the major indicators of economic choice among the respondents. The information collected for this variable included a farmers' aggregate of assets; total annual income from farming; and annual income from other off-farm occupations, if any. The sample contains respondents of various levels of economic rank. One indicator that was used to determine the amount of wealth and therefore operational capital, available to the farmers was their total annual income. On the basis of income respondents were placed on a continuum in an ascending order, from the lowest to the highest. The lowest stratum of respondents consists of farmers with 'very low' annual income that is, those earning less than K£ 250. The next group in the scale consists of those earning more than K£ 250 per annum but less than £500 per annum. Farmers with a total annual income of over K£500 but less than K£750 were considered "average earners". High income earners are those whose annual income exceeds K£750 but less than K£1000 while those who get over K£1000 per annum were labelled "very high" income earners. The data for various groups of income earners are given in table 1 and Figures 6 and 7.

INCOME CATEGORY	ADOPTERS		NON-ADOPTERS	
	No.	%	No.	%
Very low	7	13.7	27	69.2
Low	17	33.3	3	7.7
Average	10	19.6	4	10.3
High	2	4.0	2	5.1
Very high	15	29.4	3	7.7
total	51	100	39	100

Table 11:   Distribution of respondents by annual income.
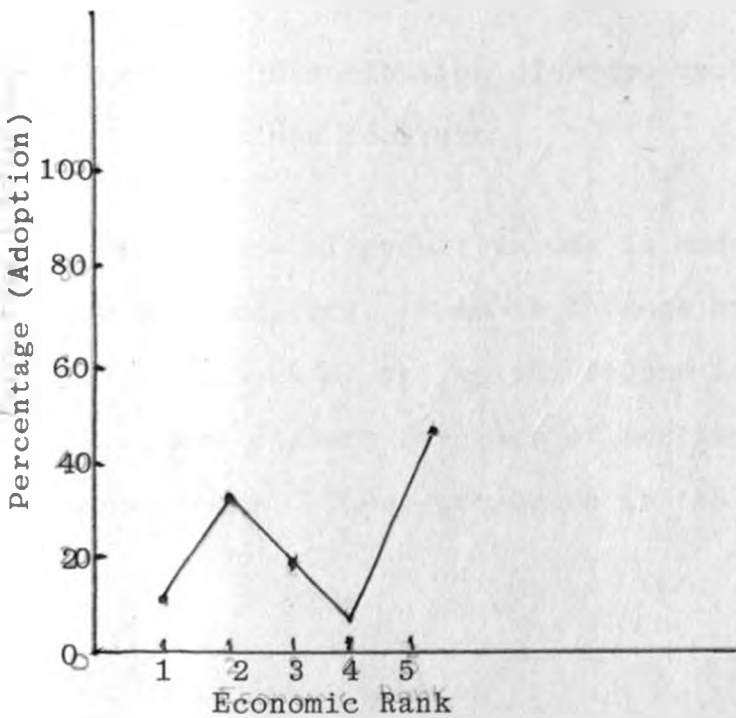
Figure 6:   Distribution of respondents by economic rank
           for adopters.
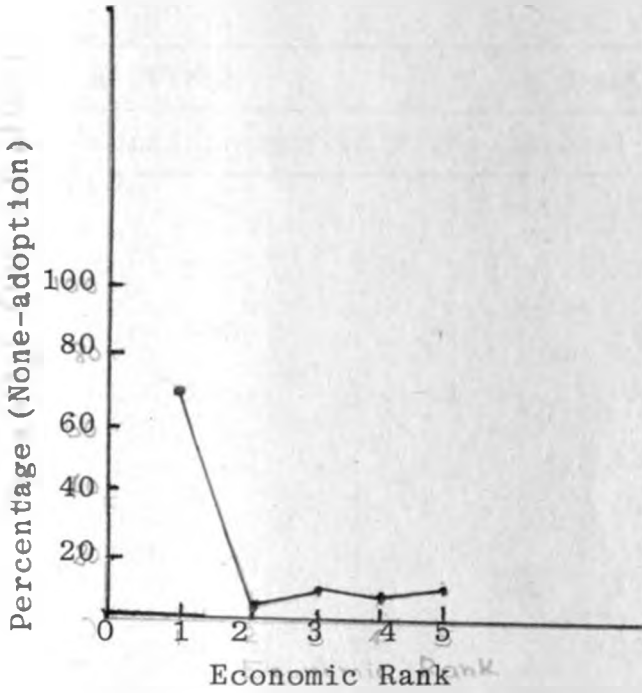
Figure 7: Distribution of respondents by economic rank for non-adopters

A comparison of annual income is made between the adopters and non-adopters. This is is done by constructing frequency distributions of the actual income figures for every category of income earners for each of the two categories of respondents. These are shown in tables 12 - 16

ADOPTERS		NON-ADOPTERS	
Annual income in £	No.	Annual income in £	No.
100	4	50	3
125	1	75	2
150	1	80	1
200	1	85	1
		100	7
		150	5
		175	1
		200	7
Total: 875	7	Total 3490	27
Mean: 125		Mean: 129.3	

Table 12: Distribution of income for"very low"income earners

ADOPTERS		NON-ADOPTERS	
Annual income in £	No.	Annual income in £	No.
250	6	300	2
300	3	350	1
350	1		
400	4		
450	3		
Total:5700	17	Total: 950	3
Mean: 335.3		Mean: 316.7	

Table 13: Distribution of income for "low income" earners.

ADOPTER		NON-ADOPTERS	
Annual income in £	No.	Annual income in £	No.
500	6	500	2
550	1	650	2
600	3		
Total:5350	10	Total: 2300	4
Mean: 535		Mean: 575	

Table 14: Distribution of income for "average-income" earners

ADOPTERS		NON-ADOPTERS	
Annual income in £	No	Annual income in £	No
750	1	750	1
800	1	900	1
Total:1550	2	Total:1650	2
Mean: 775		Mean: 825	

Table 15: Distribution of income for "high-income" earners

ADOPTERS		NON-ADOPTERS	
Annual income in £	No.	Annual income in £	No.
1000	5	1000	1
1350	1	1250	1
1500	1	1500	1
1750	1		
2100	1		
2500	2		
3050	1		
4250	1		
4500	1		
5500	1		
Total:34100	15	Total: 3750	3
Mean: 2273.3		Mean: 1250	

Table 16:   Distribution of income for "very-high" income
earners.

Correlation coefficients between income and adoption;
and between income and non-adoption were calculated.   The
values in the x variable are mean income figures in each
category of income but these have been reduced by dividing
by 100 as a matter of computation.   The fractions that
result are ignored.   The y variable is   represented by the
actual number of respondents in each income category (tables
12-16).   The working is shown in tables 17 and 18.

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
1	7	1	49	7
3	17	9	289	51
5	10	25	100	50
7	2	49	4	14
22	15	484	225	330
$\Sigma x_i = 38$	$\Sigma y_1 = 51$	$\Sigma x_i^2 = 568$	$\Sigma y_i^2 = 667$	$\Sigma x_i y_i = 452$

Table 17: Calculation of correlation coefficient between income and adoption.

$$\bar{x} = \frac{1}{n} \Sigma x_i = \frac{1}{5} \times 38 = 7.6$$

$$\bar{y} = \frac{1}{n} \Sigma y_i = \frac{1}{5} \times 51 = 10.2$$

$$Cov = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y}) = (\frac{1}{5} \times 452) - (7.6)(10.2)$$

$$= 90.4 - 77.52 = 12.88$$

$$s_x = \sqrt{\Sigma \frac{1}{n} x_i^2 - (\bar{x})^2} = (\frac{1}{5} \times 568) - (7.6)^2$$

$$= \sqrt{113.6 - 57.76} = \sqrt{55.84} = 7.472$$

$$= 7.47$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - (\bar{y})^2} = (\frac{1}{5} \times 667) - 104.04$$

$$= \sqrt{133.3 - 104.04} = \sqrt{29.36} = 5.418$$

$$= 5.42$$

$$r = \frac{cov}{s_x s_y} = \frac{12.88}{7.47 \times 5.42} = \frac{12.88}{40.49} = 0.318$$

$$= 0.318.$$

The correlation coefficient between income and adoption is low (weak) and positive.

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
1	27	1	729	27
3	3	9	9	9
5	4	25	16	20
8	2	64	4	16
12	3	144	9	36
$\Sigma x_i = 29$	$\Sigma y_i = 39$	$\Sigma x_i^2 = 243$	$\Sigma y_i^2 = 767$	$\Sigma x_i y_i = 108$

Table 18. Calculation of correlation coefficient between income and non-adoption.

$$\bar{x} = \frac{1}{n} \Sigma x_i = \frac{1}{5} \times 29 = 5.8$$

$$\bar{y} = \frac{1}{n} \Sigma y_i = \frac{1}{5} \times 39 = 7.8$$

$$Cov = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y}) = (\frac{1}{5} \times 108) - (5.8)(7.8)$$

$$= 21.6 - 45.24 = -23.64$$

$$s_x = \sqrt{\frac{1}{n} \Sigma x_i^2 - (\bar{x})^2} = (\frac{1}{5} \times 243) - (5.8)^2$$

$$= \sqrt{48.6 - 33.64} = \sqrt{14.96} = 3.867$$

$$= 3.87$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - (\bar{y})^2} = (\frac{1}{5} \times 767) - (7.8)^2$$

$$= \sqrt{153.4 - 60.84} = \sqrt{92.56} = 9.620$$

$$= 9.62$$

$$r = \frac{cov}{s_x s_y} = \frac{-23.64}{3.87 \times 9.62} = \frac{-23.64}{37.23} = -0.6349$$

$$= -0.635$$

The correlation coefficient between income and non-adoption is negative and high. However it is not a strong negative correlation.

5.1.4 Size of land

On the basis of this variable, all farms in the sample were categorized according to size as follows:

i. all farms measuring less than five acres were labelled 'very small' farms.

ii. farms measuring between five and nine acres inclusive, were considered 'small' farms.

iii. farms ranging from ten acres to fourteen acres were labelled 'fairly large' farms

iv. farms measuring fifteen acres and above were labelled 'large' farms.

Table 19 shows the distribution of farm sizes based on this criterion, for both adopters and non-adopters.

Farm category	ADOPTERS		NON-ADOPTERS	
	No.	%	No.	%
Very small	13	25.4	20	51.3
Small	14	27.5	16	41.0
Fairly large	10	19.6	1	2.6
Large	14	27.5	2	5.1
Total	51	100	39	100

Table 19: Distribution of farms by size.

A comparison of farm sizes between the adopters and non-adopters
was made by drawing frequency distribution tables and working
out the mean acreage of farms in each category of farms
(table 20 and 21).

ADOPTERS		NON-ADOPTERS	
ACREAGE	NO.	ACREAGE	NO.
2	6	2	3
3	3	3	6
4	4	4	11
5	2	5	6
6	4	6	1
7	2	7	2
8	5	8	5
8	1	9	2
10	6	10	1
11	3	18	1
12	1	30	1

Table 20 contd/....

ACREAGE	NO.	ACREAGE	NO.
15	6		
16	1		
17	1		
20	3		
21	1		
30	1		
60	1		

Table 20:   Distribution of individual farms by acreage.

FARM CATEGORY	MEAN ACREAGE	
	ADOPTERS	NON-ADOPTERS
Very small	2.8	3.4
Small	6.9	6.8
Fairly large	10.5	10.0
Large	21.0	24.0
Mean total	10.3	11.1

Table 21:   Comparison of mean acreage of farm between adopters
            and non-adopters.

Correlation coefficients between size of land and adoption;
and between size of land and non-adoption are worked out
from tables 22 and 23 respectively. The x values are derived
from the mean figures for acreage, ignoring the fractions

(see table 21). The values in the y variable are the actual number of adopters or non-adopters (table 19)

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
2	13	4	169	26
6	14	36	196	84
10	10	100	100	100
21	14	441	196	294
$\Sigma x_i = 39$	$\Sigma y_i = 51$	$\Sigma x_i^2 = 581$	$\Sigma y_i^2 = 661$	$\Sigma x_i y_i = 504$

Table 22: Calculation of correlation coefficient between size of land and adoption.

From table 22,

$$\bar{x} = \frac{1}{n} \Sigma x_i = \frac{1}{4} \times 39 = 9.8$$

$$\bar{y} = \frac{1}{n} \Sigma y_i = \frac{1}{4} \times 51 = 12.8$$

$$cov = \frac{1}{n} \Sigma x_i y_i - (\bar{x})(\bar{y}) = (\frac{1}{4} \times 504) - (9.8)(12.8)$$

$$= 126 - 125.4 = 0.6$$

$$s_x = \sqrt{\frac{1}{n} \Sigma x_i^2 - (\bar{x})^2} = (\frac{1}{4} \times 581) - (9.8)^2$$

$$= \sqrt{145.25 - 96.04} = \sqrt{49.21} = 7.014 = 7.01$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i^2 - (\bar{y})^2} = (\frac{1}{4} \times 661) - (12.8)^2$$

$$= \sqrt{165.25 - 163.84} = \sqrt{1.41}$$

$$= 1.19$$

$$r = \frac{cov}{s_x s_y} = \frac{0.6}{7.01 \times 1.19} = \frac{0.6}{8.34} = 0.0719$$

$$= 0.072$$

The correlation coefficient, between size of land and adoption is positive but very low (weak). Thus no relationship between the two variables can be ascertained.

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
3	20	9	400	60
6	16	36	256	96
10	1	100	1	10
24	2	576	4	48
$\Sigma x_i = 43$	$\Sigma y_i = 39$	$\Sigma x_i^2 = 721$	$\Sigma y_i^2 = 661$	$\Sigma x_i y_i = 214$

Table 23: Calculation of correlation between size of land and non-adoption.

From Table 23,

$$\bar{x} = \frac{1}{n}\Sigma x_i = \frac{1}{4} \times 43 = 10.75 = 10.8$$

$$\bar{y} = \frac{1}{n}\Sigma y_i = \frac{1}{4} \times 39 = 9.75 = 9.8$$

$$cov = \frac{1}{n}\Sigma x_i y_i - (\bar{x})(\bar{y}) = (\frac{1}{4} \times 214) - (10.8)(9.8)$$

$$= 53.5 - 105.8 = -52.3$$

$$s_x = \sqrt{\frac{1}{n}\Sigma x_i^2 - (\bar{x})^2} = (\frac{1}{4} \times 721) - (10.8) = (180.25 - 116.64$$

$$= 63.6 = 7.97$$

$$s_y = \sqrt{\frac{1}{n} \Sigma y_i{}^2 - (\bar{y})^2} = \sqrt{(\frac{1}{4} \times 661) - (9.8)^2}$$

$$= \sqrt{165.25 - 96.04} = \sqrt{69.21} = 8.319$$

$$= 8.32$$

$$r = \frac{cov}{s_x s_y} = \frac{-53.2}{7.97 \times 8.32} = \frac{-53.2}{66.3} = -0.8024$$

$$= -0.802$$

The correlation coefficient between size of land and non-adoption is highly negative. As one variable increases, the other one decreases and vice-versa. Thus, as the size of land increases, the number of non-adopters decreases, hence most of the non-adopters own small pieces of land.

Having analyzed the socio-economic variables quantitatively, it is now possible to compare and contrast these with data collected from observation. First it was observed that within Lukusi area or Ndivisi Location in general, farmers on the whole range from the youthful age, that is, from about the age of twenty, to the very old ones. This pertains to the general farming mostly dominated by the cultivation of maize and other food crops. However, this is not the case with coffee. What was observed in regard to coffee growing reveals the same, pattern as that for the statistical data obtained about the age of the coffee farming population. It was observed that the majority of farmers who grow coffee are middle-aged and above. It was suggested by the author that a possible reason for a few young farmers

engaging in coffee production was that they do need it
because most of them do not have labour resources e.g.
dependants who could engage in diversifying their domestic
production to meet various needs. For middle-aged and the
old farmers, diversification in production was a necessity.
They have large numbers of dependants, they need to elevate
their economic status through accumulation of wealth.
Coffee is preferred by this group because it provides a steady
cash income to meet these costs. Most young farmers have
greater interest in employment in order to earn direct money.

Investigation about the respondents' formal educational
level and that of the Lukusi community generally, revealed
that the level of illiteracy within the population is low.
Many people could nead and write. It was observed that
majority of the farmers have attained at least some kind of
formal education very few farmers are completely illiterate.
However, a few farmers fall in the category of people with
high education, that is, post-primary education. Thus there
is no sharp contrast between the lower stratum and the upper
stratum of the population in terms of educational achievement.
Therefore, the Lukusi farming population is characterized by
all levels of formal education, with low education as the
majority. This pattern applies to both the adopters and the
non-adopters. Therefore both data, obtained through observation
and those obtained quantitatively tally (tables 7 and 8).

Observation also focussed on respondents' wealth
which was used as a measure of the operational capital at
their disposal. A farmers' wealth was determined by observing
and assessing his or her assets. These comprise land, the
number of livestock, property owned by the farmer and off-
farm occupations that generate income for the farmer. There
exists a very small difference in wealth among the farmers
in this area. For example, most farmers hardly own over ten
acres of land and it is on these plots where livestock is kept
and mixed cropping is carried out. However, it was observed
that slightly wealthy farmers were those endowed with large
tracts of land and those who involved themselves in other
off-farm activities. This means that they are able to diversify
their income compared to those who owned small pieces of land
and depend solely on the farms for their economic activities.
Generally therefore, farmers here are neither too poor nor too
rich. This contrasts sharply with the data obtained from the
respondents through interviews. The statistical data reveal
that majority of the non-adopters are within the low economic
group while the adopters are fairly spread in the various
economic ranks (Table 11).

The distribution of land was discussed in chapter three.
It was noted that the area is characterized by the presence
of very many small plots that measure under ten acres.
Although some farmers have larger acreage of land, most of it
is in fragments. Fragmentation is partly a result of the high
population density and the traditional system of land

inheritance. In the latter case farmers subdivided large
pieces of land into small plots for their sons. Consequently,
individuals holding over twenty acres of land are rare. But
the statistical data provide a different picture. They reveal
that the majority of the non-adopters own small plots compared
to their adopter counter parts. And among the adopters, the
distribution of land according to size is fairly spread
although the small plots are slightly dominant (Table 19).

5.1.5   Testing of Hypothesis 1

The first hypothesis states: Farmers' positive response
to coffee growing is determined by a favourable socio-
economic status at inception. What was implied in this
hypothesis by definition of variables is that the old-age
farmers are likely to respond to coffee growing positively
than those in other age categories; that wealthy farmers are
likely to respond positively than the poorer ones; that a
high formal educational level initiates positive response by
farmers than the low educational level; and that farmers
with large pieces of land will respond positively than those
with small farms.

The analysis provided shows that the distribution of
farmers by age takes the same pattern for both adopters and
non-adopters. Both categories contain a very small proportion
of young farmers (3.3 percent in each case). The distribution
of middle-age farmers gives the same impression for both

adopters and non-adopters (24.5 percent and 22.2 percent
respectively). However majority of the adopters are old-age
farmers (28.9 percent) while the old-age farmers do not form
a majority of the non-adopters. Generally the majority of
respondents are middle-age and above in both cases (Table 2, 3
and 4). This is an indication that there is no specific age
that determines a farmers response to the adoption of coffee
cultivation, whether positive or negative response.

There are further indicators of this similarity between
the adopters and the non-adopters. The mean age for young
respondents in both cases is 32 years, the range is 5 years
for adopters and 4 years for non-adopters; the variance for
adopters is 5.7 and that for the non-adopters is 3; and the
standard deviation for adopters is 2 and that for the non-
adopters is 1.73. As for middle-age, the mean age for adopters
is 48 years and that for non-adopters is 49 years; the range
is 17 years in both cases; the variance is 27.68 for adopters
and 28.25 for non adopters; and the standard deviation is
5.3 in both cases. The mean age for old-age adopters is 70
years with a range of 28 years. The mean age for old-age
non-adopters is 62 years with a range of 14 years. Thus the
distribution of old-age non-adopters is more consistent than
that of the old-age adopters. This attribute causes difference
observed in the variances and standard deviations. The
variance for old-age adopters is 74.69 with a standard deviation
of 8.76. The variance for old-age non-adopters is 15.19 with
a standard deviation of 3.9.

The correlation coefficient between age and non-adoption is positive and strong (r = 0.8). Likewise the correlation coefficient between age and adoption is positive and strong (r = 0.5). Thus an increase in one variable causes an increase in the other variable in both cases. It is there-fore, argued here that age has no effect in determining the response farmers give to the innovation.

It is observed that the majority of the respondents are characterized by low formal education. In both cases of adopters and non-adopters, the proportion of respondents with a high formal educational level is very minimal (Tables 7 and 8). The correlation coefficients between formal educational level and adoption; and formal educational level and non-adoption, are both low and negative (r = 0.252 and r = 0.497 respectively). This is an indication that there are no clear relationships between the two variables in each case. It thus suggests that farmers' formal educational levels do not determine their response to the innovation under review.

The majority of the respondents cannot be described as being very wealthy; the low-income group from a majority. However, the greatest proportion of low-income earners is seen among the non-adopters (69.2 percent) compared to the adopters (13.7 percent). The distribution of respondents in all levels of income earnings for both the adopters and the non-adopters is an indication that differences in wealth

and operational capital would not solely determine the farmers' response to adopting coffee cultivation (Table 11, Figures 6 and 7).

The mean income earnings in various levels of economic rank were compared between adopters and non-adopters. There are no distinct differences between the two categories of respondents except for the very high income earners (Tables 12 - 16). The correlation coefficient between income and adoption is positive but low (γ = 0.318), hence there is no clear relationship between the two variables - an increase in one does not necessarily lead to an increase in the other; neither does adecrease in one variable lead to a decrease in the other. The correlation coefficient between income and non-adoption is negative and high (γ =-0.635) - an increase or decrease in one variable might lead to an increase or decrease in the other variable. However the strength of this relationship is not one-to-one (perfect).

The distribution of land by size in relation to respondents is represented by Table 19. As can be seen the population is dominated by ownership of small farms. This is more so for the non-adopters. As for the adopters, the distribution of farms in various categories of size is well spread with no category dominating. However, the fact that respondents are distributed in all categories for both adopters and non-adopters, suggests that differences in farm size do not solely determine a farmers' response to adopting

coffee cultivation. Differences could be attributed to
other factors. The mean acreages of various farm sizes were
compared between the adopters and non-adopters. These show
that the differences are very minimal. The patterns for
adopters and non-adopters take the same trend (Table 21).

The correlation coefficient between land size and
adoption and that between land size and non-adoption give
sharp contrasts. The one between land size and adoption is
very low and positive ($\gamma = 0.072$) suggesting no clear
relationship between the two variables. The other, between
land size and non-adoption is very high and negative ($\gamma = -.802$)
suggesting that an increase in one causes an increase in the
other variable. This anomally, however, could be explained
in terms of errors made in sampling. The sample for the
non-adopters is very small compared to that for the adopters.
An increase in sample size would probably eradicate the error.

The foregoing discussion on the socio-economic status
of the respondents as revealed by both statiscal and
qualitative data makes it obvious that age does not determine
farmers' response to adopt the cultivation of coffee; formal
educational level is not a determinant to farmers' response
to coffee cultivation; and wealth and operational capital
do not cause a differential response to coffee cultivation
by farmers. It also shows that the size of land owned by
farmers, plays no significant role in determining their
response to the adoption of coffee farming. The first hypothesis
is therefore proved false, hence it is rejected.

5.2 SITUATIONAL DETERMINANTS OF DIFFERENTIAL RESPONSE

The variables measured under this heading include, the availability of farm production inputs, the cost of farm production inputs; produce prices, the distance between input markets and the farm; availability of labour; and availability of credit facilities.

5.2.1 Availability of Farm Production Inputs

It was assumed that an agricultural innovation is diffused widely and faster if the farm production inputs are easily available to farmers. This depends on the ease with which the supplying centres are accessible to farmers; the amount of inputs; the time the inputs are available; and the farmers' purchasing power which is wholly determined by the amount of operational capital at their disposal. It was assumed that a combination of these factors would ensure the availability of production inputs to the farmer.

The main farm production inputs for coffee that were considered are spray chemicals (pesticides) and fertilizers. Coffee fertilizers that are commonly used in the area are chemical fertilizers, e.g. Calcium Ammonium Nitrate (C.A.N.) which have to be purchased, and natural fertilizers, e.g. farm yard manure. Chemical fertilizers, commonly available in Lukusi area are expensive and are rarely used by the bulk of the population in the area. Farm yard manure is mostly available on the farms. It is prepared by the farmers themselves on their farms but this depends on the availability of animals

on the farm since it is prepared from cowdung. Green manure
and composite manure are often used to supplement farmyard
manure.

On the basis of the foregoing, response given by the
farmers with regard to the availability of farm production
inputs were put into three classes of, easily available;
available through difficulties; and not available.For each
response the actual number of respondents and percentage
figures were computed for both adopters and non-adopters
(Table 24).

	ADOPTERS		NON-ADOPTERS	
Availability of inputs	No.	%	No.	%
Easily available	19	37.25	12	30.77
Available through difficulties	32	62.75	12	30.77
Not available	0	0.00	15	38.46
Total	51	100	39	100

Table 24: Availability of purchased farm production inputs.

The data in table 25 summarizes information on the
availability of farm yard manure to the respondents.

	ADOPTERS		NON-ADOPTERS	
Farm yard manure	No.	%	No.	%
Available	37	72,55	30	76.92
Not available	14	27.45	9	23.08
Total	51	100	39	100

Table 25:   Availability of farm yard manure.

5.2.2   Cost of farm production inputs

Availability of farm production inputs alone may not be a sufficient condition for the adoption of coffee production in Lukusi area.   The cost, that is, the price of the inputs plays a significant role in determining the availability and amount of farm production inputs to the farmers.

For this variable, respondents were asked what they felt about the costs of inputs in respect of coffee production. Their attitudes towards the cost of inputs were ranked on an ordinal   scale as follows:

(1)   Low

(2)   Fair

(3)   High

(4)   Very high

The actual numbers and percentage figures for respondents in each category were recorded and tabulated (Table 26). The pattern of the responses is shown in figures 8 and 9.

	ADOPTERS		NON-ADOPTERS	
Cost of inputs	No.	%	No.	%
Low	0	0.0	0	0.0
Fair	13	25.5	7	17.9
High	16	31.4	12	30.8
Very high	22	43.1	20	51.3
Total	51	100	39	100

Table 26. Farmers' perception of the cost of farm production inputs.
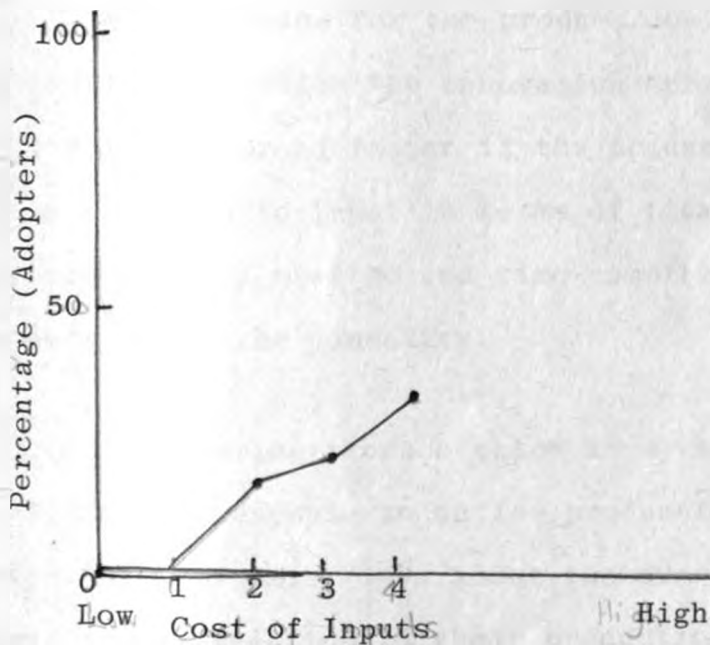
Figure 8: Farmers' perception of the cost of inputs (adopters)
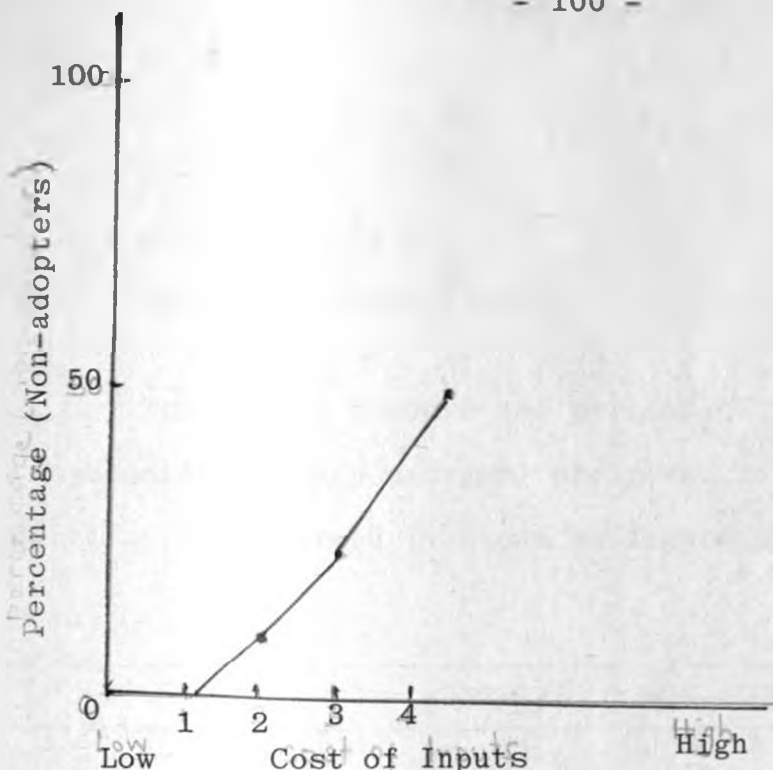
Figure 9: Farmers' perception of the cost of inputs
(non-adopters)

5.2.3 Produce prices

Market price for the produce could become a determinant
of the rate at which the innovation spreads. A new commodity
is likely to spread faster if the prices are conducive. This
is in relation to input in terms of financial expenditure,
physical energy exerted and time commitment, in the actual
production of the commodity.

Considering produce price as a variable affecting
differential response to coffee production, respondents were
asked to give their views about the current prices for the
commodity in relation to their production strategies.
Various responses were given but all were categorized as
follows:

(1)   prices are low

(2)   prices are fair

(3)   prices are high (good)

The actual numbers and percentage figures for the respondents in each category are given in table 27 and the pattern of the trend is shown in figures 10 and 11.

	ADOPTERS		NON-ADOPTERS	
Produce	No.	%	No.	%
Low	15	29.4	3	7.7
Fair	9	17.6	14	35.9
Good	27	53.0	22	56.4
Total	51	100	39	100

Table 27:   Perception of coffee prices

5.2.4   Distance Between Input Markets and the Farm

It was assumed that distance between input market and the farm acts either as an incentive or a disincentive to the adoption of the innovation. The central aspect is transportation or rather communication, that is, the accessibility of farmers to input markets. The distance to input markets determines the means and ability of farmers to deliver production inputs to their farms, which in turn influences their decision making about adopting the
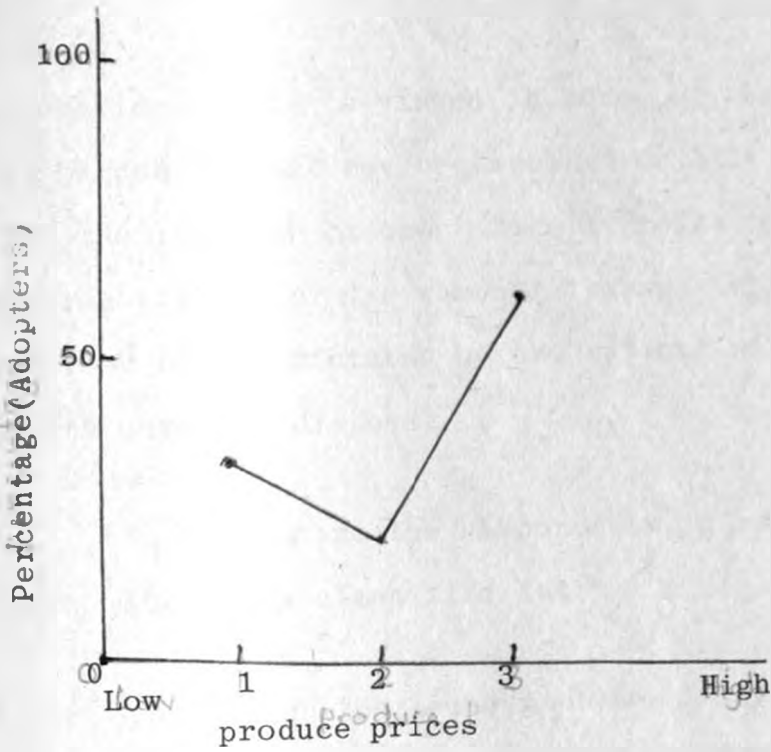
Fig. 10:   Farmers' Perception of coffee prices (adopters)
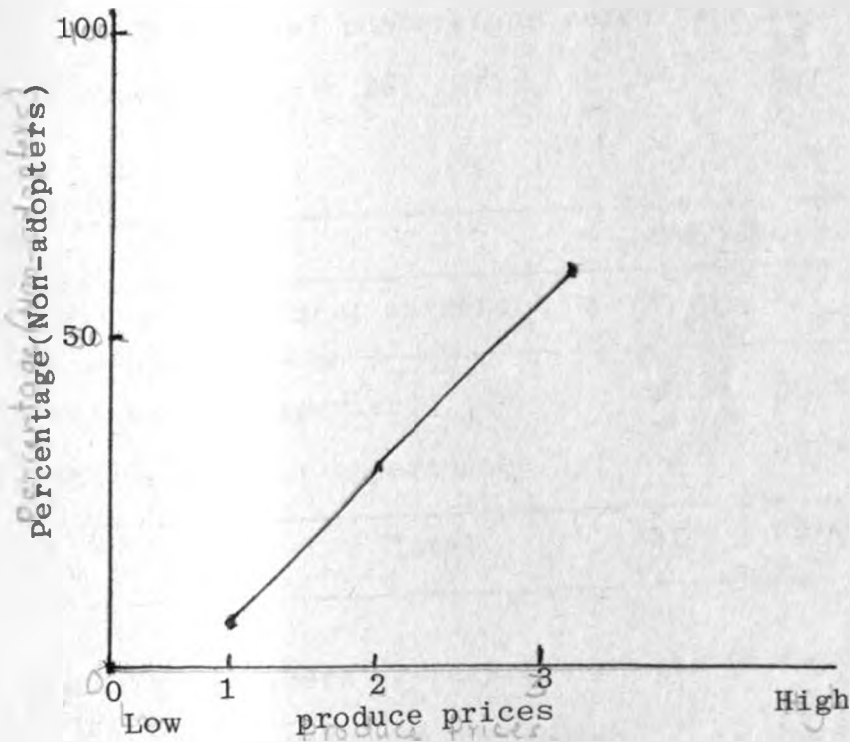
Fig. 11:   Farmers Perception of coffee prices (non-adopters).

innovation.   This is viewed in terms of the general difficulties
and hardships that may be involved or lack of such hardships.
Thus the location of ones' farm in relation to input market
centres will determine whether transportation problems do
exist or not as dictated by the various modes of transport
at the farmers' disposal.

To categorize the respondents, a nominal scale was
used.   They were classified into:

(a)   those who experience problems
(b)   those who do not experience problems (partially
       available).

The actual numbers and percentage figures for respondents
are shown in table 28.

	ADOPTERS		NON-ADOPTERS	
Distance from input markets	No.	%	No	%
Problems are experienced	20	39.2	10	25.6
Problems are not experienced	31	60.8	29	74.4
Total	51	100	39	100

Table 28:   Farmers' Perception of the Distance Between Input
            Markets and the Farms.

5.2.5 <u>Availability of Labour</u>

Availability of labour is one of the most important factors that influence agricultural production. A crop like coffee is among those crops that demand readily available labour spread throughout the year for it requires attention constantly. It is likely that before a farmer makes any decision to adopt the crop, he or she should be in a position that can avail sufficient labour.

For this variable, the most important aspect was whether labour was easily available or not because the extent of its availability varies from one individual to another. Respondents were grouped into three classes:

(a)   labour not available

(b)   labour easily available

(c)   labour available but through constraints, that is partially available.

The distribution of respondents on the basis of this categorization is given in table 29.

	ADOPTERS		NON-ADOPTERS	
Labour	No.	%	No.	%
Not available	0	0.0	0	0.0
Easily available	25	49.0	9	23.1
Partially available	26	51.0	30	76.9
Total	51	100	39	100

Table 29: Distribution of Farmers on the Basis of Labour
           Availability.

Availability of labour, whether adequate or not,is
not an end in itself.   It become necessary to find out the
kind of labour force at the farmers' disposal, that is, the
main source of labour.   On the basis of this, three sources
of labour were identified:

(a)   family labour

(b)   hired labour

(c)   family and hired labour combined.

The distribution of respondents based on this criterion
is given in table 30.

	ADOPTERS		NON-ADOPTERS	
Labour force	No.	%	No.	%
Family	36	70.6	36	92.3
Hired	1	1.9	0	0.0
Combined	14	27.5	3	7.7
Total	51	100	39	100

Table 30: Distribution of Respondents on the Basis of the
           Availability of Labour Force.

5.2.6 Availability of Credit Facilities

Availability of credit facilities is an important
dimension as far as farming is concerned. Credit not only
enables one to acquire the necessary operational capital
but also enhances his general advancement and progress in
farming business. This is more important especially for a
cash crop which can repay itself after harvest and marketing.

Farmers in Lukusi area have various options for
obtaining credit. The largest source of credit is the
Agricultural Finance Corporation with its branch at the
District Headquarters and a subbranch at Kimilili. Some
farmers obtain credit from commercial banks and from cooperative
societies of various kinds. Exclusively for the coffee
growers, the Lukusi coffee farmers' cooperative society is

within easy reach. For various reasons, some farmers were identified to have no sources of credit.

For this variable, respondents were categorized on the basis of a nominal scale variable as those accessible to sources of credit and those without such accessibility (Table 31).

Credit facilities	ADOPTERS		NON-ADOPTERS	
	No.	%	No.	%
Available	32	62.7	7	17.9
Not available	19	37.3	32	82.1
Total	51	100	39	100

Table 31: Distribution of Respondents on the Basis of the Availability of Credt Facilities.

Having analysed the data statistically, now follows
the qualitative analysis based on participant observed
impressions. First it was observed that Lukusi area is well
within an active agricultural zone. The area is served by
a fairly large market centre (Lukusi). Additionally there
are two urban centres, Webuye and Kimilili. These centres
have all the farm production inputs needed by farmers. The
major suppliers of farm production inputs are the Kenya
Grain Growers' Cooperative Union (K.G.G.C.U) with its
branches at Webuye, and Kimilili; and the Agricultural
Finance Corporation (A.F.C) with its sub-branch at Kimilili.
The coffee pulping factory also stocks some.

The inputs, largely fertilizers, are either purchased
on cash terms or are granted in the form of seasonal loan
to deserving farmers. There are also business firms that
sell inputs directly to the farmers. Production inputs
are also stocked in shops at market centres close to the
farmers.

Thus farmers within Lukusi have all kinds of
production inputs available to them. There has never been
any lack of them. What has been experienced is a delay
on the part of sellers in stocking and distributing. This
is more so with respect to the imported chemical fertilizers, a
matter that has been affecting the whole country. Farm yard/
composite manure is very much preferred by the bulk of
coffee farmers as well as the non-coffee growers because

it is easily available for "free" within their compounds
as most of them are mixed farmers. The livestock they
keep yield dung which provides manure. Therefore,production
inputs are well available to the farmers, both the adopters
of coffee and the non-adopters

The cost of farm production inputs was definitely
an inhibiting rather than a motivating factor to the
farmers in their efforts to improve, increase or even to
diversify their production activities. It is almost the
deciding factor for one's progress or retardation in farming
business. It was observed that the majority of farmers in
the area were not in favour of the prices they were being
charged for the merchandize they needed. There was a general
outcry about the exhorbitant fertilizer prices. Many
farmers complained about the year to year hiking of fertilizer
prices; consequently the poor farmers end up not purchasing
them, instead they turn to manure as the only alternative.
The researcher's impression is that the majority of the
respondents are not in favour of the costs of production
inputs.

Produce prices for coffee were reported as having
a sharp contrast to the cost of production inputs. It was
claimed by farmers that while the costs on production inputs
were excessively high, the net returns from the produce
were staggeringly low. This implies that if the trend
remains constant, them most farmers are likely to disengage
themselves from such "unpaying" activities. This seems to
be a major reason why some farmers neglected or abandoned

the production of certain crops, including coffee, after
an initial period of active involvement in them. It was
observed that farmers were quite dissatisfied with the way
coffee prices varied from regionto region in the country.
They cited Mount Elgon, Kisii District and central Kenya
as regions where coffee commanded high prices compared to
what they (the Lukusi farmers) produced. However, it was
observed at the coffee factory during payments to farmers
that, the crop is usually graded and the prices are
determined by the quality (grade) of the produce. Hence the
higher the quality of the crop the higher the prices, and
the lower the quality, the low the prices. Following these
observations this variable contrasts sharply to that presented
in statistical terms. The statistics show that majority of the
respondents were in favour of the current produce prices
for coffee (Table 27 and Figures 10 and 11). It is suggested
that the frequent fluctuations in coffee prices has an
influence on this state of affairs.

The distances between input markets and the farms
are fairly close to the farmers. These include both local
market places and the two urban centres, that is, Webuye and
Kimilili. Production inputs are also available at the
coffee factory within Lukusi. The whole area is linked
to the nearby urban centres by a good network of roads with a
reasonably fair traffic flow of vehicles. Inputs are
delivered to the farms by a variety of means-vehicles, bicycles,
ox carts, sledges, and human potterage. The choice of any
mode of transportation depended on the distance to be covered,
the quality of inputs and the financial position of the farmer.

More affluent farmers who used large quantities of inputs
preferred using vehicles, while the less affluent who need
inputs in less quantities use cheapter means such as an
animal sledge.

Farmyard manure is readily available on most farms,
hence the need for transportation costs does not arise.
Both qualitative and quantitative data tally on this issue
therefore, the distance between production input markets
and the farm does not determine or is not of major importance
in determining farmers' response to coffee production.

Coffee production, like any other agricultural
activity, requires sufficient labour. The labour demands
for coffee include planting, weeding, mulching and fertilizer
application (top-dressing), as well as chemical spraying and
pruning, and finally harvesting. Some crops like maize and
sugar cane within Lukusi area required intensive and often
enourmous labour force at 'peak' seasons e.g. during planting,
weeding and harvesting. In between these intervals, there
is no labour required. These crops, when grown for
commercial purposes, tend to occupy a relatively large piece
of land compared to coffee. Coffee had no 'peak' seasons
of work. Rather, the labour is spread throughout the year
and is light apart from harvesting which requires a large
labour force to speed up the work depending on the area covered
by the crop. A delay in picking the ripe berries spoils their
quality.

Two sources of labour were predominant in the coffee industry that is, family labour and hired labour. The former is common while the latter is rare in the area under study. Sometimes farmers combined the two forms of labour. The availability of labour was determined by the size of the family and the economic status of the farmer. In some instances a man, his wife and children or relatives worked in their farms. Hired labour is characteristic of the more affluent farmers who have enough cash to pay workers. There is also cooperative or exchange labour whereby a number of families combine forces and work in their farms rotatively, particularly at peak seasons e.g. weeding and harvesting. It thus follows that neither the adopters of coffee nor the non-adopters lack the necessary labour required for production. In the study, both statistical and observed practices yielded similar information.

The availability of credit facilities to a farming community is also likely to be a major indicator in their response to an agricultural innovation. Credit is important especially when a farmer lacks the operational capital to initiatively invest in farming. Lukusi area is within easy reach sources of credit. The adoptes of coffee are quite conversant with the need for, and the procedures to obtain credit from various sources as indicated earlier. The majority of the farmers, however, did not have any access to, or utilized sources of credit. Among these, despite their interest in obtaining credit, did not have any idea about the procedures to obtain credit. In another instance, farmers claimed that they could or rather would not go in for loans

because they were poor. They believed that credit
facilities are only available to the rich or the well-off
farmers. Some farmers have refrained from acquiring loans
because they once received credit but incurred heavy losses to
the extent of being unable to repay, hence parts of their
plots were auctioned to offset the debt. Some farmers feel
that they should not go in for loans because the interest
rates are very high. This appears to be the reason why
some members of the coffee growers' cooperative society did
not want to utilize the credit facilities offered by the
society.

However, it was noticed that some farmers never
use these credit facilities as required or recommended by
their creditors. The loans are not used in farming, instead
they are converted into other forms of investment e.g. trading
activities. This is more so especially if the loans are given
in the form of money instead of materials. Sometimes when loans
are granted inthe form of materials, farmers sellthem for
cash money thereby diverting the money to other businessess.
Progressive farmers were identified as those who made maximum
use of credit facilities by investing as recommended by their
creditors, hence incurred no losses but gained more.

The statistical data and field participant observations
confirm that most farmers do not have access to credit
facilities, particularly non-adopters of coffee. As for
the adopters, many of them have access to credit facilities
(Table 31).

5.2.7 Testing of Hypothesis 2.

This hypothesis states: Farmers' negative response to coffee production is not influenced by the situational factors.

By definition of variables situational factors included the availability of farm production inputs; the availability of credit facilities; the cost of production inputs; produce prices; the distance between input markets and the farms; and the availability of a large labour force.

The data reveal that farm production inputs are available to both the adopters and the non-adopters, but in varying degrees. This is with regard to purchased production inputs As for the non-adopter respondents, a large proportion of them have access to farm production inputs (61.54 percent) while those completely unable to have access to production inputs account for a small proportion (38.46 percent). None of the adopters completely lacks inputs (Table 24). Both the adopters and the non-adopters who have access to the non-purchased farm production inputs (that is, farmyard manure) form a large proportion of the respondents (Table 25). Therefore the availability or unavailability of farm production inputs does not account for the differential response by farmers to coffee production. In other words, the negative response by some respondents canno be accounted for by the unavailability of farm production inputs.

As for the cost of farm production inputs, the data reveal that a large proportion of the respondents, adopters and non-adopters, are not in favour of the cost of inputs. Both the adopters and the non-adopters share the same characteristics in this respect. Consequently a differential response to coffee production cannot be accounted for by the high prices of production inputs. This factor cannot explain why some respondents responded negatively to the crop since such costs also affect the adopters. It is also revealed by the quantitative data that the majority of the respondents, both adopters and the non-adopters are in favour of the produce prices for coffee.

However qualitative data indicate that most of the farmers were not in favour of the produce prices for coffee. It has been suggested that this latter view can be associated to frequent fluctuations in coffee prices. If many adopters and non-adopters and non-adopters are in favour of the produce prices in one situation and at the same time they don't favour the produce prices in another situation, then it follows that the prices for the produce have little effect in determining adoption or non-adoption of the crop.

Alternatively it may reflect a true picture of the situation considering that written questionnaire answers sometimes can be falfsefied. And on the contrary, qualitative data are often elicited in a more relaxed situation. In addition the observation and participation approach provides individual's inner feelings. Despite the complaints of unfavourable prices

for the crop, farmers who seriously cultivate coffee
are generally relatively better off than others.

The data for both adopters and non-adopters show that a
large proportion of the respondents falls under those who
do not experience any problems with respect to the distance
between input markets and the farms. This is in agreement
with the situation as it was actually observed; farmers in
the study area are within input market centres. Distance,
therefore, does not affect the response farmers give to
coffee production.

All respondents admitted that the necessary labour
required for coffee production is at least available although
sometimes it is below their requirements. In small-scale
coffee production, a large labourforce is not necessary.
The greatest source of labour is the farmer's family iself,
supplemented by other sources.

The availability of credit facilities among coffee
adopters is positive to many of them (62.7 percent) while
those who do not have access are as small a proportion as
37.3 percent. For the non-adopters 82.1% have no access to
credit facilities (Table 31). It is suggested therefore that
some farmers have negatively responded to coffee production
because they lack credit facilities. But the situation
is rather complicated because some adopters of the crop
also lack credit facilities while at the same time some
non-adopters have access to credit facilities. It was
established that credit facilities are offered to farmers
by their cooperative society upon becoming members to it.

But probably most significant is the fact that most of
the farmers are small-scale and therefore do not need
enormous capital outlay. Furthermore they use their
own labour as capital. It is thus argued here that the
availability or unavailability of credit facilities do
not affect the response farmers give to coffee production.
Lack of credit facilities cannot account for the non-
adoption of coffee by farmers.

All the findings on the different situational
variables as revealed by the data support the hypothesis
as suggested.

5.3.0 CHANGE AGENTS

Change agents include the availability of agricultural extension agents; farmers' social participation in formal organizations; the use of mass media; and contacts with neighbours who have adopted new innovation or heard and know something about them.

The diffusion of an innovation, its adoption and spread takes place in a social system where individuals interact amongst themselves. This happens faster if the "interaction effect" is high. According to Vail (1972:53),a

> novel farming practice ------ is made available
> to farmers by change agents. The change agents
> may be members of the farmers' own community or,
> they may be outsiders such as merchants or
> government representatives. The speed with which
> a new practice is adopted by local farmers depends
> upon both the terms on which it is made available,
> and its "fit" with the resources, abilities and
> prefrences of the farming community.

The term change agent is a characterization of individuals or institutions which, willfully or through planned organizational strategies, perform specific kinds of functions to stimulate change, in this case, in agricultural practices.

5.3.1 Availability of Agricultural Extension Services

The agricultural extension agency of the Ministry of Agriculture is known to perform various functions to farmers. These include communication of recommendations; bringing alternative methods to farmers; teaching manual skills and managerial strategies; and to convey the

expected results of new practices. Dissemination of new ideas, skills and techniques to farmers is accompanied by reinforcement of the existing ones which prove to be equally important. This needs thorough propagation and is determined by the frequency with which extension agents interact with the farmers.

In Lukusi area, sources of agricultural extension include agricultural extension workers from the Ministry of Agriculture and community development agents from within Ndivisi Location. The coffee cooperative society based at the Lukusi coffee factory also maintains a team of specialists who provide extension service to coffee farmers.

Through interviews, respondents were grouped according to their frequency of contact with extension agents over a certain period of time e.g. in a week, month or year. On the basis of this criterion, respondents were classified into those with no contacts with extension agents; those with occasional contacts; and those with frequent contacts. This information is condensed in Table 32.

The figures in Table 32 show that much of the extension service is directed more to the adopters than to the non-adopters. It was established that in Lukusi area, the provision of agricultural extension services has not been consistent. Rather the extension agents arrange for a meeting or a field demonstration by invitation of a leading farmer in whose plot other farmers attend at their will. This usually happens occasionally hence there is no door-to-door

campaign by extension agents to bring farmers to an awareness
of the need to improve their techniques or to receive new
ideas. Therefore extension services in this area are less
effective, and a claim that extension attention is greatly
skewed in favour of the more progressive and wealthier farmers,
finds support (Leonard, 1972:4).

	ADOPTERS		NON-ADOPTERS	
Contacts with extensionists	No.	%	No.	%
No contacts	15	29.4	25	64.1
Occasional contacts	18	35.3	13	33.3
Frequent contacts	18	35.3	1	2.6
TOTAL	51	100	39	100

Table 32: Distribution of Respondents by Contacts with
           Extension Agents.

5.3.2 Social Participation in Formal Organizations

Formal organizations were viewed as formally organized
institutions that create an educational impact on the farmers.
It was found that farmers who took an active involvement in
any agricultural organization tended to be more informed
of the importance of innovativeness than those without any
initiative to participate. Farmers were found taking part in
various organizations such as agricultural shows, farmers
training centres, attendance at farmers' seminars, membership

to cooperative unions or socities and participation in field demonstrations.

Membership to cooperative societies; participation in field demonstrations; and attendance at agricultural shows, were used as indices, for social participation in formal organizations. In the sample, respondents were found to participate in at least one or more of these organizations. Respondents' involvement was reckoned on the fact as to whether they were officials or just ordinary members. The actual numbers and percentage figures for the distribution of respondents are shown in Tables 33 and 34 for adopters and non-adopters respectively.

ORGANIZATION	CS		FD		AD	
PARTICIPATION	NO.	%	No.	%	No.	%
YES	51	100	42	82.4	8	15.7
NO	0	0	9	17.6	43	84.3
TOTAL	51	100	51	100	51	100

Key: CS = Cooperative Societies; FD=Field Demonstrations
     AS = Agricultural Shows.

Table 33: Farmers' participation in Formal Organizations
          (adopters)

ORGANIZATION	CS		FD		AS	
PARTICIPATION	NO.	%	NO.	%	No.	%
YES	1	2.6	24	61.5	3	7.7
NO	38	97.4	15	38.5	36	92.3
TOTAL	39	100	39	100	39	100

Key: CS = Cooperative Societies; FD = Field Demonstrations;
AS = Agricultural shows.

Table 34:   Farmers' participation in Formal Organizations
(non-adopters).

5.3.3 Use of Mass Media.

For this variable respondents' possession or non-
possession of radios, magazines or newspapers or televisions
were investigated. Of supreme importance was how farmers gained
by use of these media. Hence respondents were asked to identify
the programmes or sections that were of benefit and educational
value to them as far as farming business was concerned. None
of the respondents possessed a television set. Mass media
information was restricted to the use of radio and newspapers
or magazines. Tables 35 and 36 show the distribution of
respondents based on this variable.

	RADIO		NEWSPAPER/MAGAZINE	
Use of Mass Media	NO.	%	No.	%
YES	31	60.8	28	54.9
NO	20	39.2	23	45.1
TOTAL	51	100	51	100

Table 35:   Distribution of Respondents by use of
Mass Media (adopters)

	RADIO		NEWSPAPER/MAGAZINE	
Use of Mass Media	No.	%	No.	%
YES	17	43.6	10	25.6
NO	22	56.4	29	74.4
TOTAL	39	100	39	100

Table 36:   Distribution of Respondents byUse of Mass Media
(non-adopters).

5.3.4   Contacts with Neighbours

The extent to which an individual adopts an innovation as an influence to contacts with neighbours proved difficult to ascertain.   A community is made up of a social system in which individuals are interacting from time to time and for various purposes.   Contacts between neighbours is a necessity for humans since there is always interdependence among them.   Contacts between neighbours is a variable that was used to observe the impact it has on both the adopters of coffee and the non-adopters.

For this variable, contacts amongst farmers were observed in three types, namely contacts between neighbours because they are relatives (kinship relations); contacts between neighbours because of the general spirit of neighboulihood and contacts between neighbours made on the basis of agricultural business i.e sharing of ideas and activities pertaining to farming.

Contacts between neighbours can affect the rate at which an innovation spreads, where interacting individuals have common interests.   Table 37 shows the distribution of respondents according to this criterion.

	ADOPTERS		NON-ADOPTERS	
Type of contact	No.	%	No.	%
Kinship relations	11	21.6	8	20.5
Neighbourlihood	20	39.2	20	51.3
Agricultural business	20	39.2	11	28.2
TOTAL	51	100	39	100

Table 37:   Distribution of Respondents by Type of
Contact with Neighbours.

5.3.5   Testing of Hypothesis 3

This hypothesis states: Farmers' positive response to
coffee growing in Ndivisi Locationis determined by their
degree or level of contact with change agents.   By definition
of variables adoption or positive response is a result of
greater contacts with agricultural extension agents; social
participation in formal organizations; use of mass media; and
greater contacts with neighbours.

The study shows that a greater part of the non-
adopters have no contacts with extension agents while
a greater part of adopters do.   Therefore, extension
service, to a large extent influences adoption.   The majority
of farmers participate in field demonstrations, that is,
82.4 percent of adopters and 61.5 percent of non-adopters
are involved in field demonstrations (Tables 33 and 34).   All
adopters participate in cooperative societies while only one

non-adopter was found to participate. For both adopters
and non-adopters, the proportion of participants in
agricultural shows is very small. By comparison the
average percentage of all participants is greater for
adopters but very small for non-adopters (66.03 percent
and 23.93 percent respectively). The majority of non-
participants are non-adopters (76.07 percent). To a
certain extent, social participation in formal organizations
influences adoption of an innovation while non-participation
tends to promote negative response.

The data also reveal that the majority of the
adopters make use of mass media facilities while the majority
of the non-adopters do not. However, the differences between
the users and non-users of mass media facilities in both
cases are not extreme. On average 57.85 percent of the
adopters use mass media facilities in getting new farming
ideas, while the rest do not. Among the non-adopters 34.6
percent utilize mass media facilities, while the rest
do not. To a certain extent, the access to and utilization
of mass media facilities promotes adoption of an innovation
but to a certain extent it does not since a reasonable
proportion of the non-adopters are also exposed to the use
of mass media (Table 35 and 36).

Contacts between neighbours do not reveal anything
as far as adoption and non-adoption of coffee is concerned;
the observed contacts are dominated by kinship relations and
neighbourlihood. And for that matter, contacts for purposes
of farming are minimal.

On the basis of these findings, the hyphothesis
is partly accepted and partly rejected, that is, extension
service and farmers' social participation in formal
organizations determine farmers' positive response to the
adoption of coffee farming as an innovation; use of mass
media facilities is partly influential. On the contrary
contacts among neighbours do not facilitate fora for
acquisition or dissemination of new agricultural ideas such
as the adoption of coffee farming.

CHAPTER 6

CONCLUSIONS AND SUGGESTIONS

The purpose of this section is to present results in the form of general conclusions as revealed by the findings; to evaluate farmers' response to the adoption of coffee farming as an agricultural innovation; and to present suggestions that, might attract farmers to adopt new agricultural innovations especially in respect to coffee farming.

6.1   Conclusions

This study has shown that neither farmers' age nor their level of formal education are necessary determinants of their response to adopt coffee production. In other words, farmers do not have to attain a certain age or formal educational level in order to adopt coffee as a novel farming practice. Small-scale coffee farmers do not need to have a substantial amount of wealth and operational capital as a necessary condition to take up coffee farming. Similarly the size of land owned by farmers is insignificant in determining their differential response to coffee production. By and large the negative response to coffee production by some farmers has not been caused by the unavailability of farm production inputs; Cost of farm production inputs; lack of labour; The distance between input markets and the farms; produce prices; and lack of credit facilities. But   inadequate and in appropriate agricultural extension services have a diverse effect

on farmers' adoption of coffee farming. The social participation
by farmers in formal organizations has a great impact in
influencing them to adopt coffee production. Farmers who
participate in activities organized by formal organizations
form the majority of adopters of coffee farming. It is
observed also that access to and use of mass media facilities
for acquisition and dissemination of innovative information
have great and positive impact on farmers leading them to go
into coffee farming. But on the contrary, contacts amongst
neighbours have little impact on farmers' response to coffee
farming.

6.2   Evaluation of Farmers' Response

The respondents gave various reasons for their positive
and negative responses to the adoption of coffee farming as
an economic activity. Among the adopters, their positive
response is a result of their interest in coffee as an
agricultural product that supplemented other crops and
facilitated diversification in their farm activities. It
is a strategy that provides security against risks; the need
to obtain a stready and continous cash income for solving
emergent problems and necessities e.g. payment of school
fees; purchase of consumer goods, durable goods, cattle,
acquisition of capital assets and to meet recurrent
agricultural expenditure.

In the pre-independence period, coffee was mostly
grown by white settlers. After independence, this franchise
was extended to the Africans. Many farmers who adopted it

earlier did so as a measure of demonstrating that they could or had undergone an upward social and economic mobility. It became prestigious to grow coffee, hence coffee growers were regarded as progressive farmers, like white settlers or who have taken over from them. But coffee was also adopted because of its many and relative advantages. When well carried out coffee farming can be economically very rewarding. And, because coffee is a perennial crop lasting over one hundred years, it a form of permanent investment that can benefit many generations through inheritance. In cases where farmers had no title deeds, for their land, coffee planting legitimized ownership of land.

Coffee does not need an initial large capital outlay or a large piece of land to yield a relatively adequate subsistent crop compared to crops such as rice, maize and sugar cane. Coffee does not require a deployment of a massive labour force as in the case of sugarcane and maize which also are grown in this area; land under the former crop is not extensive. Marketing of the crop is certain and streamlined through a cooperative society. Some farmers took to coffee farming after seeing others in neighbouring areas grow affluent e.g. during the coffee boom of the 1950s in Chwele Location. It sparked off increased rate of adoption of the crop in the area of study. The latter adopters were encouraged by the success achieved by the earlier adopters.

The adoption of coffee is in response to government call to increase cash crop production. Coffee is one of the major earners of foreign exchange in Kenya; its cultivation is a contribution to national development. It can also be suggested that coffee is a relatively easy crop to grow and does not require the use of expensive or complex machinery in terms, of land preparation and harvesting. As an innovation, it is relatively easy to understand and use. Further, the crop can be tried on a limited basis for experimental purposes to predict its success or failure. And, when this done under intercropping circumstances, it minimises risks. Land under coffee can easily be restored or reverted to accommodate other crops when the former proves uneconomic, unlike sugarcane which tends to exhaust land faster and its fertility restoration takes longer.

The non-adopters of coffee on the other hand gave various reasons for their negative response. Their negative responses manifest the fact that there is general conservativeness and resistance to change among some farmers. For instance, some farmers claimed that there was no need to grow coffee because other crops were adequate and that coffee is not a food crop. They argued that coffee would reduce their cultivable areas of land suitable for essential traditional food crops. Coffee was seen as requiring a lot of labour because of the fact that it needs attention almost throughout the year. Some farmers cited of physical energy exerted; and fluctuations in prices as a commodity that could not be relied upon. It was also argued that the crop takes

too long to mature compared to the traditional crops, hence returns are not immediate. As an extension of this immediate returns mentality, some farmers saw hired employment and trading activities as the only sure answer to their cash income requirements.

Many non-adopters and those who discontinued to grow coffee are discouraged by cases of poor organization and management of the coffee cooperative society which they perceive being corrupt particularly in regard to the produce weighing and recording practices; favouritism in supplying seedlings and inputs including loans; and bribes in marketing the produce. There is also a general feeling among members of this group that society officials embezzle their funds which, whether true or not, is definitely a negative contribution to the adoption of coffee farming.

Some farmers were of the opinion that it was generally risky to take up coffee farming without prior systematic and planned training to introduce farmers to proper techniques of growing it. Most farmers grew the crop on a trial basis without the assistance of coffee specialists which sometimes lands them into losses. It is suggested that this is a manifestation of inadequate and inappropriate extension services.

6.3 Suggestions to Elevate Farmers' Level of Innovativeness

The findings of this study indicate that small-scale farmers' response to coffee production is not very much affected by the socio-economic and situational factors but

rather by lack of a well articulated set of change agents.
The suggestions made here revolve around the need to
involve the farmer through encouragement and education.

The government should be directly concerned about
cash-crop production by small-scale farmers. There is need
to provide well coordinated and persistent encouragement to
the farmers through local administrators, that is, village
heads, chiefs and community development agents on the one hand,
and Ministry of Agriculture extension agents on the other.
The coffee management authority and supervision personnel
should endeavour to reach out farmers to ensure that
recommended techniques are followed to the letter and
consequent bottlenecks addressed to immediately. This
exercise can be effected through increase in and appropriate
training of advisory staff. Farmers should be encouraged
to adopt the crop in units equivalent to their managerial
and financial capabilities with allowance for intercropping
to minimize initial uneconomic yields.

The provision of inexpensive and appropriate inputs
and in packages of varying degrees to cater for different
economic groups should be explored. Efficient cooperative
organization plus a concerted effort at expanding farmers'
organizations and their membership will speed up the
awareness of innovative practices in the location. In
addition, farmers' financial institutions should provide
better terms of credit coupled with an aggressive farmer

education programme through the mass media. These measures are likely to make farmers realize their potential in the long run.

6.4   Suggestions for Further Research.

It is suggested that a study of this nature be conducted in other parts of the country under different or similar ecological conditions for purposes of comparison.

APPENDIX I QUESTIONNAIRE

1.   Name ------------------   2.   Sex --------------
3.   Coffee Farmers' Cooperative Society number --------
        (if any)

4.   How old are you? -----------------

5.   What is your level of school education? ------------
6.   How many acres of land do you own? -----------------
7.   How many acres are under crop production?-----------
8(a) Do you grow coffee? --- (b) Why do you grow it?----
                                        (if "yes")

 (c) Why are you not growing it?--------
        (if"no")

9.   What other crops do you grow? -------------
10. How profitable are they to you? ---------
11. For how long has coffee been grown in this area?----
12. For how long have you been growing coffee?----------
13. What is your approximate annual income from

        farming? (amount in KShs.) --------

14. Do you have any other sources of income? -------
15. (if yes) (a)   What are these? -------------
                    (b)   Annual income ---------------

16. How much, by estimate, do you spent on coffee

        production eachyear? ------(amount in KShs.)

17.   How do you obtain your farm production inputs?

    (a) Cash purchases? ---------

    (b) By loan? ---------

    (c) By cash purchases and loan -------

    (d) None of the above ----------

18.   Where do you obtain your farm production inputs?

    (a) From market centre ------------

    (b) From KGGCU Kimilili -----------

    (c) From KGGCU, Webuye -----------

    (d) From AFC, Kimilili -----------

    (e) From coffee society, Lukusi -----

    (f) Others ---------

19.   Are the inputs easily available? -------(Yes/No)

20.   Does the distance between input markets and your farm pose any problems? (Yes/No).

21.   What are these problems? -------

22.   How do you overcome them? ------

23.   How do you transport your inputs?

    (a) Use of vehicle

    (b) Use of bicycle

    (c) Use of OX cart

    (d) Use of animal sledge

    (e) Human Potterage

    (f) Any other --------

24.   Do you favour the cost of inputs at present?

          (Yes/No)

25.   How is the cost of inputs?

    (a)   Low

    (b)   Fair

    (c)   High

    (d)   very high

26.   Do you have any access to credit facilities?

           (Yes/No)

27.   If yes, where do you obtain credit/loan?

    (a)   From Bank

    (b)   From KGGCU

    (c)   From AFC

    (d)   Any other ----------

28.   If no, why? ----------

29.   Do you favour the current prices for coffee?

                (Yes/No)

30.   How are the prices?

    (a)   low

    (b)   fair

    (c)   good

31.   Is labour for coffee production easily available?

          (Yes/No)

32.   How do you obtain labour?

    (a)   Family labour

    (b)   Hired labour

    (c)   Hired labour and family labour

33.   Do you make any contacts with extension officers?

                (Yes/No)

34.   How often do they visit you?

    (a)   once a year

    (b)   every week

    (c)   every month

    (d)   Any other --------

35.   Are they of any help to you? (Yes/No)

36.   How helpful are they? ------

37.   Do you participate in any farmers' formal
       organizations? (Yes/No)

38.   What are they?

    (a)   cooperative societies

    (b)   agricultural shows

    (c)   Field demonstrations

    (d)   seminars

    (e)   Any other -------

39.   How useful are they do you? ---------

40.   Do you learn about agriculture through the mass
       media? (Yes/No)

41.   What are they?

    (a)   radio

    (b)   Newspapers/Magazines

    (c)   Television

    (d)   Others --------

42.   Identify:

    (a)   the radio programmes

    (b)   the types of newspapers/magazines

    (c)   the television programmes

43.   How useful are they to you? -------------

44.   How are you related to your neighbours?

    (a)   through kinship

    (b)   through friendship/neighbourlihood

    (c)   Agricultural business

    (d)   Others ---------

45.   Are they active coffee growers? (Yes/No)

46.   Do you benefit from them or they from you? ------

47.   What advice would you give other farmers with
      regard to coffees growing?

THE END

APPENDIX II INTERVIEW GUIDELINES

PART I: FARMER'S SOCIO-ECONOMIC CHARACTERISTICS

covers questions 1-16 focussing on the following

aspects:

(a) farmer's age

(b) farmer's educational background.

(c) size of land in acres, owned by the farmer.

(d) various crops grown by the farmer

(e) farmer's perception of the profitability of

farming.

(f) farmer's annual income and sources of income.

(g) farmer's other assets.

PART II: SITUATIONAL DETERMINANTS OF DIFFERENTIAL RESPONSE

covers questions 17-32, focussing on the following

aspects:

(a) means to obtain farm production inputs

(b) distance between the farm and input markets

(c) cost of inputs

(d) produce prices

(e) accessibility to credit facilities

(f) availability of farm labour

PART III: INFLUENCE OF "CHANGE AGENTS"

covers questions 33-47 focussing on the following

aspects:

(a) farmer's social participation in formal organizations

(b) farmer's contacts with extension agents

(c) farmer's accessibility to and use of mass media.

(d) farmer's contacts with neighbours.

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