TO INVESTIGATE THE EXTENT OF ADOPTION OF THE PACKAGE OF PRACTICES RECOMMENDED BY CENTRAL TOBACCO RESEARCH INSTITUTE, RAJAHMUNDRY BY THE TOBACCO GROWERS IN EAST GODAVARI DISTRICT OF ANDHRA PRADESH

By

S. KOTESWARARAO NAIDU

THESIS

Submitted in partial fulfilment of the requirement for the degree

MASTER OF SCIENCE IN AGRICULTURE

(Agricultural Extension)

Faculty of Agriculture

Kerala Agricultural University

Department of Agricultural Extension

COLLEGE OF AGRICULTURE

Vellayani - Trivandrum

1978

DECLARATION

I hereby declare that this thesis entitled "To Investigate the Extent of Adoption of the Package of Practices Recommended by Central Tobacco Research Institute, Rajahmundry by the Tobacco growers in East Godavari District of Andhra Pradesh" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any University or Society.

S. Kotiswaravara naidu

(S. KOTISWARA RAO NAIDU)

College of Agriculture,
Vellayani,

16th August, 1978.

CERTIFICATE

Certified that this thesis, entitled "To Investigate the Extent of Adoption of the Package of Practices Recommended by Central Tobacco Research Institute, Rajahmundry by the Tobacco Growers in East Godavari District of Andhra Pradesh" is a record of research work done independently by Shri. S. KOTESWARA RAO NAIDU, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship, or associateship to him.

Dr. A.M. PANNI
Chairman,
Advisory Committee
Associate Professor of Agriculture
Extension.

College of Agriculture,
Vellayani,

16th, August, 1978.

Approved by:

Chairman:

Dr. A.H. TAMPI

Members:

1. Dr. G. THIAGARAJAN NAIR

2. Shri. K.P. RAGHAVAN NAIR

3. Shri. P. CHANDRASEKHARAN

ACKNOWLEDGEMENT

I am extremely grateful to Dr. A.P.Pampi, Associate Professor, Division of Agricultural Extension, Chairman of my Advisory Committee, for his kind and valuable guidance, constructive criticism and constant encouragement through out the period of investigation and preparation of this Thesis.

I gratefully acknowledge the valuable guidance, and helpful suggestions, given by my Advisory Committee Member, Dr. K.E. Nair, Associate Professor in Agricultural Extension. I also place here my heart-felt thanks to him for critically reading the manuscript.

I wish to express my deep sense of gratitude to Shri. A.G.G. Menon, Professor of Agricultural Extension for the valuable suggestions and unspared pains given for the successful conduct and completion of this research project.

My sincere thanks are also due to Sarvasri K.P.Padhavan Nair and P. Chandrasekharan, Associate Professors in Agronomy, my advisory committee members, for their valuable suggestions through out the period of investigation of this research project.

I am highly thankful to Shri.C.J. Thomas, Professor in Agricultural Statistics and Smt. P. Saraswathi, Assistant

Professor in Agricultural Statistics for their advice and constant help rendered in analysing the data.

I am indebted to Dr. M.C. Gopalachari, Director, Central Tobacco Research Institute, for the co-operation and help rendered to do my post-graduation, for having suggested to this research problem and to all the pains that he has taken in arranging the Junior Fellowship Award by I.T.C. Ltd., (ILTD Division).

The financial help extended by the I.T.C. Ltd., (ILTD Division) Guntur for my Post-Graduation is also gratefully acknowledged.

Finally, thanks are also due to Kumari.S. Lalitha and Kumari.S. Bharathi Pillai for typing the manuscript with due care.

S. Koteswara Rao Naidu

(S. KOTESWARA RAO NAIDU)

C O N T E N T S

LIST OF TABLES

LIST OF ILLUSTRATIONS

INTRODUCTION

INTRODUCTION

Tobacco was discovered in South America in 1492. The Spanish explorers saw the Red Indian smoking tobacco through "Y" shaped wooden tubes called "TABACO" and named the herb as tobacco. Shortly after its discovery, Portuguese merchants brought its seeds from Brazil and initiated tobacco cultivation in several places in the Near East Countries and also in West Coast of Africa. Tobacco soon became a valuable commodity for barter and later spread rapidly all along the Portuguese trade routes to the East and other parts of the world.

The role of Tobacco in the Countries' economy is of multiple importance. Tobacco earns second largest revenue for India. The crop earns about 3,150 million rupees by way of excise revenue and 800 million rupees as foreign exchange. As an industrial crop tobacco provides means for livelihood to farmers, labourers and to the business community. The crop is grown in 0.3% of the total cultivated area in the country.

In view of the dominant role, the tobacco plays in the national economy, Government of India set up the Indian Central Tobacco Committee in 1945, who looked after the advancement of the crop in respect to production

and marketing of different types of tobacco. The committee established the Central Tobacco Research Institute at Rajahmundry (Andhra Pradesh) in 1947 for conducting fundamental research on Flue-cured Virginia tobacco and Lanka tobacco grown in the black soils of Andhra Pradesh. The Central Tobacco Research Institute through research evolved package of practices for profitable production of the crop in traditional black soils as well as the light soils of Andhra Pradesh.

As much as 90% of Flue-cured tobacco is confined to Andhra Pradesh. The East Godavari is one of the important districts of Andhra Pradesh for tobacco cultivation, where the tobacco cultivation was originally cultivated in the traditional black soils as a dry crop under conserved soil moisture, received from south west monsoon rains.

In the East Godavari district, tobacco is cultivated both as irrigated and unirrigated crop. In irrigated areas Flue-cured tobacco has been grown in 817 acres and country tobacco in 3,089 acres. Whereas under unirrigated conditions, the Flue-cured tobacco covered 17,457 acres and country tobacco in 2,501 acres. The total area of tobacco grown in the district is 23,864 acres according to 1976-77 statistics.

The latest research findings on the package of practices are being demonstrated in the farmers field under district trials and national demonstrations programme. Training is also being imparted in tobacco cultivation and curing at Rajahmundry (Central Tobacco Research Institute) and its regional stations for the extension staff, scientist and technicians from other countries. The recruits of various tobacco companies are also being trained.

The package of practices evolved from time to time has been recommended to the farmers through handouts as well as the extension staff. The most important feature is the radio broadcast by the Central Tobacco Research Institute on tobacco cultivations. In recent times, farmers tours to the Central Tobacco Research Institute and its farms has been organised by the District Development Boards.

The problem.

The Central Tobacco Research Institute farm gets an average yield of 1200 to 1400 kgs/ha. But at the same time the farmers are not getting the high yield whose average yield is only 800 kgs/ha. Hence it could be assumed that the farmers may not be following the package of practices recommended by Central Tobacco Research Institute for tobacco cultivation.

This leads us to conclude that the innovations in the production of tobacco has not reached the expected level, inspite of the high yielding potentialities of the new varieties of tobacco. The main reason for such a trend may be due to the low level of adoption of recommended practices.

What are the factors which cause this low level of adoption? This remains to be a question amongst the researchers, in the absence of systematic studies on these aspects pertaining to the high yielding varieties of tobacco released by Central Tobacco Research Institute. Hence this study has been taken up for rendering answers to this question. Researches both in India and abroad on diffusion of new agricultural technology revealed the importance of studying the farmer. In the absence of such a scientific knowledge of the tobacco growers, the recommended practices of Central Tobacco Research Institute alone may not achieve the expected results. Hence the objectives of the study is to ascertain the adoption behaviour of the tobacco growers in respect to their adoption of package of the practices, recommended by the Central Tobacco Research Institute, Rajahmundry.

Objectives.

1. To assess the extent of adoption of package of practices recommended by Central Tobacco Research Institute, Rajahmundry by the farmers.

2. To study the relationship between extent of adoption by the farmers and their selected situational and personal variables.

3. To explore the reasons for non-adoption of recommended practices, if any.

Limitations.

The present study had the attendant limitations of time and personnel. A study of this nature in detail would require considerable amount of time, men and material. For a single study to explore this area in a greater depth and in a comprehensive manner will be far from easy of accomplishments. These limitations have been taken into consideration in deciding the variable and size of the sample. Only few variables that have a direct bearing to adoption behaviour could be included in this study.

This study has been confined only to the tobacco cultivation in black cotton soils in the East Godavari district of Andhra Pradesh. This attempt has been made towards getting a clear picture regarding different levels of adoption of package of practices recommended by Central Tobacco Research Institute. Its findings, therefore may not be applicable to other parts of the country.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Review of related researches helps the research worker to acquaint himself with the various empirical procedures used and also with the findings obtained by those studies. Such a review provides a basis for theoretical frame work and helps in derivation of hypothesis.

This review is presented in the following sections.

I. General review on past researches on adoption for selection of factors related to adoption.

II. Review on past researches on situational and personal variables related to adoption.

III. Review on extent of adoption.

A. Extent of adoption of package of practices recommended.

B. Extent of adoption of individual practices selected for this study.

IV. Reasons for non-adoption of package of practices.

Along with the above the hypothesis derived for the study are also presented.

I. General review on past researches on adoption for selection of factors related to adoption.

Adoption can be considered as an overt behaviour. It is the result of a mental process through which an

individual passes from first knowledge of an innovation to a decision to adopt or reject. Wilkening (1952) opined that the adoption of an innovation is a process composed of learning, deciding and action over a period of time. Emery and Oeser (1958) viewed adoption of a farm practice as a consequence of communication.

Human behaviour may be observed from two points of view, namely, the one of an outsider and the other of the behaviour himself. Behaviour at the first instance can be observed as the behaviour of others and the situation in which such behaviour occurs. It is thus possible to attempt to explain behaviour interms of the interaction between the individual and the situation in which we have seen him operating. This is the objective or external frame of reference. The second approach seeks to understand himself. It attempts to understand the behaviour of the individual interms of how things seems to him. This frame of reference has been called the perceptual, personal or phenomenological frame of reference.

According to Parsons (1951) any act involves actors, a situation of action and the orientation of the actor to that situation. "Situation" refers to the organism and the environment in theoretical relationships without action of the organism having

taken place. Here "Environment" refers to all those things outside the "organism" to which action may be related. Further they stated that behaviour of any living organism is called "action" only when it is analyzed interms of situations in which it occurs. The situation consists of objects both social (individual and collectivities) and non social (physical and cultural). Each actor has a system of relation to objects which may be goal objects, resources, means, conditions, obstacles or symbols. Each of these orientation of action is a conceptualization which the actor has interms of which he wants (goals), what he sees (how the situation appears to him) and how he intends to get from the objects he sees the things he wants.

Wilkening (1952) postulated that acceptance of innovation may be viewed as a function of social relations in an ideological system (ideas, values and sentiments) of farmer. Dewey and Humber (1956) suggested that human behaviour has a trinomial nature which involve three components. 1. Man's biological heritage - including both that which is transmitted genetically and the modification of this heritage through experience, 2. Environment - with social,

cultural and geographic aspects and 3. Acquired variables - including the subjective and covert ideas, beliefs, knowledge and feelings on one hand and the covert, objectively observable factors on the other. This conceptualization of behaviour gives importance to personal and situational factors.

Human behaviour is a multivariate phenomenon. Many workers have taken the positions suggesting that individual characteristics and situational factors account for most of the variability in human behaviour.

Based on the above discussion, for the study, the variables have been grouped as situational and personal variables. Adoption is a process involving of many factors and hence more than one aspect of an individual behaviour must be measured in order to explain the variation in adoption behaviour. Studies on adoption have brought to light innumerable variables that effect adoption behaviour. For the purpose of this study a manageable system of important variables that can be adopted to empirical measurement have been selected on the basis of an extensive review. The variables selected are the following

A. Independent variables.

i. Situational variables.

a. Farm size.

b. Market orientation.

ii. Personal variables.

a. Age.

b. Education.

c. Economic status.

d. Social participation.

e. Knowledge of the practices.

f. Information sources used, it includes mass media, interpersonal-cosmopolite sources used, interpersonal localite sources used and commercial agency.

g. Practice attributes, it includes simplicity-complexity, cost of innovation, profitability and suitability.

B. Dependent variables.

i. Adoption behaviour.

II. Review on past researches on situational and personal variables related to adoption.

Situation is an important element of the theory of action. Parsons and Shills (1965) stated that situation

refer to the organism and the environment in theoretical relationship without action of the organism having taken place. Here environment refers to all those things "outside" the organism to which action may be related. Further they stated that behaviour of any living organism is called action only when it is analyzed interms of the situation in which it occurs. The situation consists of objects. The objects may be other actors of physical or cultural objects. Also each actor has a system of relations to objects which may be goal, objects, resources, means, conditions, obstacles or symbols. Every human action is a function of the interaction of three variables: experience, current values and attitudes and the current situation, according to Newcomb et al (1969).

Bohlen et al (1966) describing the smallest unit act theory tested three stages in human behaviour, the receipt of the stimulus, the interpretation of the stimulus and the circumstances under which it is received and a response or action. The importance of situation factors is implied in this action theory. Several research studies in other countries as well as in India such as Beal and Bohlen (1957), Copp, Sill and Brown (1958), Lionberger (1960), Jaiswal (1965), Rahudkar (1967) and Nair (1969) have shown that certain

situational and personal characteristics of the farmer are associated with adoption of new farm practices.

From the review, it is postulated that the situational and personal variables are important in understanding and predicting the adoption behaviour of the farmers. The selected situational and personal variables will be examined in the following section.

i. Situational variables.

a. Farm size.

It is matter of common experience that a farmer having an uneconomic holding cannot aspire for introducing innovation on his farm. While it is admitted by all that the size of holding greatly accelerate the adoption of agricultural practices. Empirical evidence to indicate the exact extent of this influence is rather limited. There is a need to know the relationship of size of holding with the acceptance of improved package of practices.

Gross (1949) found that adopters had larger farms than others. Gross and Taves (1952) observed that adopters had larger farm and higher income. Marsh and Coleman (1954, a) found that farmers operating larger holdings were likely to adopt more practices.

Coleman (1955) noted that farmers with large holdings were most often contacted by extension agencies and they were also found to adopt more practices than operators with small holdings.

Study by Copp (1958) revealed that the primary variables involved in adoption behaviour are expressions of the size of farm operating unit and the personality orientation of the farm operator towards his work. Rogers and Capenor (1960) observed that farm operators who made greater use of their extension agent were characterised by more education, a higher social status, larger farms, higher farm incomes and higher adoption of farm practices scores, earlier awareness of new farm practices and a tendency to be early adopters. Dhaliwal and Sohal (1965) concluded that extension agency has concentrated it's contacts with farmers having high education level and high income status.

Hence it is postulated that the farmers' size of holding will be directly related to adoption of improved practices of tobacco cultivation.

b. Market orientation.

Adoption of improved agricultural practices increases the output of farm product. There must be a market for these products and price for them high enough to repay the farmer for his cash costs and his effort in producing

them. Beal and Sibley (1967) and Nair (1969) revealed that farmers who perceived a good market and price for the produce of high yielding varieties adopted the varieties more than the other farmers who had an unfavourable perception. Lack of market and low price for the produce were two main reasons mentioned for non-adoption of high yielding varieties. The farmer's perception of the existence of markets for the increased production, the ease of marketing and his confidence in remunerative prices will have a strong influence on adoption. It is expected that if a produce has a good market and which can be sold easily at good prices, then the adoption of the innovations resulting in increased production of that particular produce will be high.

Hence it is postulated that market orientation will be directly related to adoption of improved practices of tobacco cultivation.

ii. Personal variables.

a. Age.

Cross and Treves (1952), Hess and Miller (1954) and Copp (1958) have stated that elderly farmers seemed to be less inclined to adopt new farm practices than younger ones. Some studies by Wilson and Gallup (1955) have shown highest adoption at middle age. They also stated that young farmers who may desire to make changes

in farming were not always in a position to do so because of capital restrictions or the decision may rest with the moneylender or with the person who owned the farm. Although some evidence indicated that older farmers were less receptive to change than younger ones, failure to adopt new practices does not necessarily mean that they are not receptive to change. Lionberger (1942) found that elderly farmers had different problems than middle aged and younger ones.

In India, studies by Pandit (1964), Choudhary (1967), Jaiswal and Singh (1968) revealed that farmers of middle aged (26-45) were better adopters than younger or older farmers. Rai (1967) found that age had no relationship with the adoption of improved agricultural practices. Rajendra (1968) observed that age was not found to play an important role in descriminating between the two groups of adopters. Bhaskaram and Mahajan (1968) also found that age of the farmers had no appreciable association with the adoption of the practices in relation to the extension methods. Study by Patel and Singh (1970) evident that age was not found to be differentiating characteristic between adopters and non-adopters of farm planning. Prashad and Sinha (1971) observed that the impact of farmers' age seem to have been significant in the use of information sources at

the final decision to adopt or not. Behera and Sahoo (1975) observed that age of the farmers did not seem to have any relationship with either awareness of national demonstration programme on adoption for improved agricultural practices or attending field days.

Based on the above review it is postulated that farmers' age will be directly related to adoption of improved practices of tobacco cultivation.

b. Education.

While generally sharing the basic belief that education can cure most ills of society, farmers have not always felt that schooling beyond the eighth grade is needed for farming. Schooling has been valued as a means of increasing knowledge about new farm technology. The assumption is that schooling facilitates learning, which inturn is presumed to instil a favourable attitude toward the use of improved farm practices. The relationship between years of schooling and rate of adoption of farm practices is likely to be indirect, except in case where persons learn specifically about new practices in school. Where this is not the case education may merely create a favourable mental atmosphere for the acceptance of new practices. Since favourable orientation may be gained outside the school room, correlation between years

completed and adoption of farm practices is not always high. Nevertheless more than eight years schooling is almost always associated with higher adoption rates than lesser amounts. These have been observed by many researchers namely Wilkening (1952), Lionberger (1955), Marsh and Coleman (1955), Copp (1958) and Lionberger (1960).

In India, study by Singh, Dhaliwal and Sohal (1965) inferred that the extension agency has concentrated its contacts with the farmers having high educational status, in relation to adoption of agricultural practices. Rai (1965) observed that higher the education of the farmer, greater is the interest in reading various kinds of literature in relation to the approved agricultural practices. Ratanchand and Gupta (1966) viewed that the innovators and early adopters in general were better educated. Bhaskaran and Mahajan (1968) opined that education in general had shown a positive relationship with response to extension teaching both in respect of retention of knowledge and acceptance of practice. The more educated a farmer better the response to the stimulus of extension teaching. Singh and Singh (1970) expressed that education status of the family was significantly contributing in explaining the adoption behaviour of the farmer. Grewal and Sohal (1971) observed that the higher educational level of farmers and their family members coupled with much richer previous experience,

contributed significantly, in favour of refugee farmers, in the speed of innovation. Study by Prasad and Sinha (1971) revealed that the farmers' education had significant relationship in the use of information sources at the final decision for use or not.

Hence it is postulated that farmers' level of education will be directly related to adoption of improved practices of tobacco cultivation.

c. Economic status.

Chapin (1928) had described socio-economic status as the position an individual or a family occupied with reference to the prevailing average standards of cultural possessions, effective income, material possession and participation in the community. Bee (1939) opined that education is an important factor in giving status, but is not a primary cause of class distinction. According to Belcher (1951), the material position items tended to be more stable indicators of socio-economic status than those dealing with social participation or cultural possessions. Kolb and Brunner (1952) have used the following ten indices - wealth, education, ethnicity, occupation, place of residence, personal behaviour and appearance, kinship affiliation and family reputation, religious affiliation and religious activity,

association membership and activity in community leadership. Study by Burchinal (1959) revealed that person's occupation is probably single most reliable index of his socio-economic status. Yeld (1960) stated that one can say that occupation broadly determine the social position of both men and women.

In India, Rajendra (1968) observed that socio-economic status of farmer was sufficient in descriminating between the two groups of early adopters and late adopters. Singh et al (1968) concluded that adopters belonged to high economic status. Inderjit Sekhon (1970) observed that socio-economic status played an important role in adoption of recommended practices. Kar, Misra and Choudhuri (1970) stated that higher socio-economic status to a certain degree facilitates adoption of innovation. Choukidar and George (1972) concluded that farmers in general who had favourably responded to high yielding variety programme belonged to middle socio-economic status category. Singh and Sharma (1973) observed that economic status was found hardly to be associated with adoption behaviour of farmers. Behera and Sahoo (1975) found that economic status of the farmer did not seem to have any relationship with either awareness of national demonstration programme or attending field days in adoption of improved agricultural practices.

Based on the above review of past researches, it is postulated that economic status of the farmer will be directly related to adoption of improved agricultural practices of tobacco cultivation.

d. Social participation.

The concept refers to the association of an individual with formal organisation. It's positive relationship with adoption has frequently been demonstrated. Association with formal organisation makes it possible for the farmer to get in contact with progressive farmers, extension workers and there by increase his knowledge of new practices which will result in a higher level of adoption of practices. Hence it is expected that a farmer's adoption behaviour will be positively related with his extent of social participation. Reddy and Kivilin (1968) found that participation in formal organisation was positively and significantly related to adoption of high yielding varieties. Gupta (1968) pointed out that greater number of participants with smaller holdings were members of co-operative societies as compared to bigger farmer. Vyas et al (1969) found that there was significant difference in the membership in co-operative society between adopters and non-adopters of hybrid bajra. Most of the adopters were members of

co-operative society. Nair (1969) found that social participation was significantly related with adoption and there was significant difference between adopters and non-adopters with respect to this variable. Membership in formal organisations, helps the farmers to come in contact with different agencies and information sources and hence are likely to be more progressive and respective to new ideas and practices.

Hence it is postulated that social participation will be directly related to adoption of improved practices of tobacco cultivation.

e. Knowledge of the practices.

One of the main tasks of extension education is to provide or improve the knowledge of the farmers about the improved farm practices because knowledge as a component of behaviour plays an important role in the behaviour of an individual. Greater knowledge of improved practices would lead to a higher adoption. Once knowledge is acquired and retained in the mind, it undergoes and produces changes in the thinking process and a sort of mental alchemy will take place. The result of this active functioning of knowledge may sometimes be seen in the overt behaviour of the individual in the action or in decisions taken. Sizer and Porter (1960) emphasised the importance of farmers knowledge regarding fertilizer

composition and prospective use interms of increased yield per acre in arriving at a decision to use it. Johnson and Haver (1953), Hess and Miller (1954), Williams (1958) and Rogers and Havens (1961) opined that knowledge played an important role in adoption and decision making processes. Raper and Tappan (1943), Brander and Straus (1959) have concluded from their studies that over adoption occurred from insufficient and incorrect knowledge of the innovation. Thus often knowledge influences on the intellectual phases of human behaviour producing responses both favourable and unfavourable.

In India, a study by Singh and Singh (1970) revealed that knowledge of package of practices was significantly contributing in explaining the adoption behaviour of the farmer. Choukidar and George (1972) found that farmers lack of knowledge regarding the recommendations was one of the major factors responsible for the non-adoption of the package of practices. Study by Supe and Salode (1975) showed that formal education of the farmer participants was found to be significantly related to their level of knowledge but not to their level of adoption of practices demonstrated.

Based on the above review of past researches, it is postulated that farmers knowledge of the package of practices will be directly related to adoption of improved practices of tobacco cultivation.

f. Information sources used.

To induce farmers to adopt improved techniques of agriculture, a powerful and successful change agent has to bring the fruits of research to the doors of cultivators Only when the farmers remain in continuous contact with the new researches, they can apply this valuable knowledge in their fields with the help of the change agents. According to Hoffer (1942) stated that irrespective of casual relationships and of the conditions or circumstances that intervene between exposure to new ideas and the active use of them, number of sources used or contacts with information sources was positively related to adoption rates. Ryan and Gross (1950) stated that neighbours were major sources of original knowledge about hybrid seed. Wilkening (1952), Marsh and Coleman (1954, b) stated that high dependence on relatives and friends as sources of information is usually negatively associated with the adoption of new farm practices. Rogers (1958) in his study on the importance of personal influence on adoption, found that the personal sources, such as individual contact

with the neighbours, proved effective in the adoption process. Supe (1959) found that the village level worker was the most sought out source of information, followed by friends and neighbours.

In India, a study by Singh and Jha (1965) concluded that the non institutionalized sources of information were rated high over institutionalized sources in the initial stages of adoption, whereas the institutionalized sources of information were rated high over non institutionalized sources in the advanced stages of adoption. Singh, Dhaliwal and Sohal (1965) concluded that frequency of contacts with extension agency was significantly related to the adoption of agricultural practices. Rai (1965) observed that adopters of the new ideas had favourable attitude towards government programme and also said that greater the number of information sources sought, greater was the extent of adoption. Shankariah and Singh (1967) opined that once the farmer is associated with the higher credible sources such as agricultural scientists, extension workers and progressive farmers, his knowledge of improved methods will increase significantly irrespective of his farm size, economic status and formal education. Lakshmanna and Satyanarayana (1967) viewed that for effective agricultural development through the adoption

of innovation, the sources of information like the government agency and mass media have to be strengthened to play a much bigger part in future. Champawat and Intodia (1970) observed that result demonstration was the main source of adoption of innovation. Supe (1971) suggested the necessity of changing the information source credibility of the farmers in order to develop their rationality which would help in making them adopt more innovations. Study made by Patel (1972) indicated that greater the number of communication channels employed by a village level worker, the greater the likelihood of his being effective as communicator. Findings further indicated that the more personal the form of communication the more impact it has influencing farmers to make changes in farm practices behaviour. Padheria and Patel (1975) concluded that the majority of the respondents obtained information about improved farm practices for the selected crops from the village level workers and the next important sources of information was neighbours and relatives. Ponjaiyam, Srinivasan and Oliver (1977) observed that for the selection of variety and season, neighbours and friends were the most utilized sources followed by radio, whereas in the case of the practices of seed rate and spacing radio ranked first followed by personal experience.

Thus it is postulated that information sources used will be directly related to adoption of improved practices of tobacco cultivation.

g. Practice attributes.

Anonymous (1950) reported that spraying equipment for plant protection measures were so high priced that it looked unprofitable for small growers, to attempt to control disease. Barnett (1953) stated that cost of acquiring or using a novelty might be prohibitive as far as some potential acceptors were concerned. Graham (1956) studied that different adoption rates in upper and lower classes were due to complexity of ideas. Roy (1957) found that 'initial cost' and 'high cost of a practice' as important limitations to the use of new farm practice. Bertrand (1958) stated that the decisions of commercialized farmers were made primarily within the context of costs and return. Liondstrom (1958) viewed that money saved due to low cost of a practice as compared with that in vogue was a reason for adoption of new practice. Rivin (1960) found that the complexity of farm innovation was highly related to their rate of adoption. Kelkar and Sohoni (1965) opined that a practice which did not involve major change in the practice already in vogue, which was simple to work with and was associated

with some previous experience of the adopters, which did not involve risk, which did not need constant technical guidance and skill in its management, which was balanced one and generally fulfilled the need of the farmers as the old practice did, would be adopted easily. Singh and Babu (1968) concluded that profitability and productability preference are the highest ranked values for the adoption of improved practices. Another important finding of the study is that simplicity of adoption too was ranked very low in the same context, which showed that the complexity of the adoption of a particular improved practice is not so much discouraging to an Indian farmer. What he needs, is to be motivated by assurance of high profit and greater productivity. Momi and Sohal (1975) have concluded that risk by its absence turned out to be most important factor in the adoption of the innovation and cost was found to be the least important. Non-compatability and complexity were also the important reasons for their non adoption.

Hence it is postulated that practice attributes will be directly related to adoption of improved practices of tobacco cultivation.

III. Discussion of past researches on extent of adoption.

A. Extent of adoption of package of practices (combination) recommended.

Programme Evaluation Organisation (1968, b) in their

report on high yielding varieties programme of kharif 1967 pointed out that above a fifth of the total participants adopted all the four practices, namely seed treatment, chemical fertilizers, plant protection and inter-cultural operations for paddy. Adoption in combination of any three of the four practices was reported by 38.40 per cent of participants for paddy and by about 60 per cent of participants in jowar, maize and bajra. Those who followed any two practices were only 30 per cent. The remaining one-tenth of the participants adopted only one of the four practices. They also found that the proportion adopting in combination increased with the increase in the size of the operational holding of the participants. They have concluded that a sizeable proportion of cultivators, particularly the smaller of them, were yet to realize the value of package of practices.

In their report on high yielding varieties programme for wheat in rabi 1967-68 (1969, c) indicated that about four fifths of the participants used chemical fertilizers. The applications of nitrogen, phosphorus and potash in combination was reported by about a quarter of the participants. For the paddy in rabi 1967-68 about 32 per cent of the participants adopted

the four practices in combination, namely, seed treatment, chemical fertilizers, preventive plant protection measures and inter-culture operations. The extent of adoption in combination increased with the size of the operational holding of the participants. However combined adoption of chemical fertilizers and preventive plant protection measures to the exclusion of other items was not reported are significant proportion by the participants, but chemical fertilizers and inter-culture operations was observed to be a more popular combination. They further reported (1969, b) on high yielding varieties programme for paddy of Kharif (1968) that 5 per cent of the selected participants who cultivated high yielding paddy reported non adoption of any of the four practices specified, while about a quarter of the participants adopted only one of the four practices. Fifteen per cent adopted all the practices in combination and 25 per cent adopted three out of four practices in combination.

Study by Mishra, Mundra and Intodia (1968) revealed that yield from improved practices is higher than the corresponding yield from local practices. They suggested that yield of maize can significantly be increased by adopting package of improved agricultural practices. Such increase inturn will improve the economic condition of the farmer who would be motivated to adopt more improved practices.

Programme evaluation organisation (1969, c) in their report regarding with cultivation of wheat, paddy and jowar in rabi 1968-69 has also pointed out that the adoption of package of practices was not very encouraging for the two principal food crops, namely, paddy and wheat. Only 17 per cent of the participating farmers adopted the four practices, namely, seed treatment, chemical fertilizer, preventive plant protection measures and inter culture operations for paddy.

Nair (1969) stated that the high yielding varieties programme has not made an impact interms of the intensity of cultivation. Though the coverage was satisfactory the level of adoption of recommend practices was low. This showed that the farmers were not yet convinced about the need for the full adoption of all the recommended practices so as to get the expected results.

Study by Sinha and Dhasin (1968) showed that lack of irrigation facilities, irregular supply of material and economic factors emerged as the most important factors influencing the low adoption of the practices.

Study by Jaiswal, Roy and Singh (1970) mentioned that 80 to 92 per cent of sample farmers adopted high yielding varieties of different crops within three years of their introduction. They found that levels of

adoption of high yielding varieties of the respondents were below 50 per cent of their cropped area. This was mainly due to the security-orientation of farmers. The extent of adoption of different varieties however varied considerably among the sample farmers.

Singh and Rana (1970) stated that only three per cent of the farmers were adopting all the practices of the packages. The rest of them were adopting 2 to 5 practices, the use of high yielding varieties being common to all. The mean number of the practices adopted by the sample was 3.70. The use of the high yielding varieties, application of fertilizers and irrigation were the most adopted practices, while the plant protection measure, proper time of sowing and right depth of sowing were the least adopted ones.

Study by Sharda Pathak and Dargan (1971) stated that the number of practices adopted varied considerably from stratum to stratum. They opined that the extent of adoption was associated with cultivators' participation in the programme. They observed that when number of practices increased, the adoption percentage was decreased in all the categories.

B. Extent of adoption of individual practices.

Desai and Narayanan (1967) observed that the use of fertilizer for hybrid maize was less than 50 per cent

of the recommended dose in case of nitrogenous fertilizers and less than 25 per cent in case of superphosphate.

Gupta (1967) reported that for hybrid maize in Aligarh district of Utterpradesh 50 per cent of the participants did not use even half of the recommended dose, 10 per cent applied full dose and 40 per cent did not apply any fertilizer at all. But his study (1968) on high yielding varieties programme in Saharanpur for paddy revealed that more than 60 per cent did not use even half of the dose.

Sisodia (1968) in his study of high yielding varieties programme for wheat in Indore district reported that 80 per cent of the farmers used the recommended dose of nitrogen. Only 20 per cent of the participants applied recommended dose of phosphatic fertilizers. About 60 per cent of the participants applied potassic fertilizers and the difference between the recommended dose and the quantity actually applied has been less only by 6.38 per cent.

Rao (1968) in his study on the economics of IR.8 paddy in west Godaveri district reported that the use of fertilizer was only 40 per cent of the recommended level.

Desai and Desai (1968) in their study on high yielding varieties programme in Kaira district also

found that a large majority of the participants used fertilizers far below the recommended dose. They found that 30 per cent did not apply any fertilizer.

Sharma (1969) in a study on the high yielding varieties programme for IR. 8 paddy in Karnal district found that most of the participants applied the recommended dose of nitrogen, while the application of the other two nutrients especially potash was below the recommended dose. He further reported that there was no significant relationship between the size of holding and fertilizer application.

Nair (1969) stated that the level of fertilizers use was below the recommended dose. His study further revealed that farmers were using only small doses of fertilizers and lack of availability of fertilizers in time also contributed towards low level of adoption.

Study by Sinha and Bhasin (1968) showed that out of 130 farmers who had heard and known about green manuring only 34 adopted it.

Padheria and Patel (1975) found that only about one fourth of the adopters used compost manure as per recommendation in bajari and paddy crops. Only 17.5 per cent of the farmers in case of paddy and 22.5 percent

of farmers in the case of wheat crop used nitrogenous fertilizers as per recommendation. In the case of phosphatic fertilizers, about one third of the adopters were found to use according to the recommended dose for paddy, wheat, bajara and cotton. While in the case of potassic fertilizers only half of the adopters used potassic fertilizer according to the recommended dose, while the remaining half used less than the recommended dose.

IV. Reasons for non adoption of package of practices recommended.

Desai and Narayana (1967) in their study of high yielding varieties programme for hybrid maize in Madhya Pradesh reported that the reasons for non adoption given by farmers were 1. high cost of inputs, 2. too risky nature, 3. more profitability of the local maize, 4. lack of conviction in success of hybrid maize and 5. unsuitability of the varieties for the existing pattern.

Programme Evaluation Organisation (1968, c) on high yielding varieties programme for wheat in Rabi 1967-68 has pointed out the following reason for non adoption. The reasons were lack of irrigation, non-availability of seed, high cost of inputs, need

for more labour, non-availability of credit, preference to desi varieties, lack of knowledge, small size of holding, low market value and less fodder.

Gosh (1969) reported that the reasons mentioned by farmers for non adoption of the high yielding varieties of paddy in Birbhum district of west Bengal were 1. inadequate irrigation, 2. unsuitability of soil, 3. situation of fields at far distance, 4. lack of convication about the yield, and 5. need for large quantity of fertilizer.

Vyas et al (1969) in their report on hybrid bajra programme in Gujarat mentioned that lack of resources, lack of knowledge, high cost of seed, unsuitability for consumption and use fodder were the main reasons for non adoption.

Jaiswal, Roy and Singh (1970) concluded that farmers who did not possess irrigation facilities would be handicapped for the adoption of high yielding varieties.

Sharda Pathak and Dargan (1971) stated that awareness and consciousness amongst the cultivators towards the adoption of these practices were high but the main handicaps were uncertain supplies of the various inputs and lack of their purchasing power.

lack of spare parts and repairing facilities and higher cost of implements were the causes for not taking the use of the implements.

Study by Jha and Shaktawat (1972) revealed that inadequate irrigation facilities, lack of finance, cost of seed, non-availability of seeds at the time of sowing, lack of knowledge, have played an important role for non adoption of hybrid bajra.

Study by Choukidar and George (1972) stated that there was enough evidence to point out the farmers' lack of knowledge regarding the recommendation was one of the major factors responsible for the non adoption of the package of practice.

Momi and Sohal (1975) stated that non-compatibility and complexity were the important reasons for non adoption

Derivation of hypothesis.

Based on the review, the hypothesis of this study are formulated. In this study two types of hypothesis, as explained by Rogers (1969), will be used: theoretical and empirical. Theoretical hypothesis are the relationships posited between concepts. In order to test the theoretical hypothesis each concept is operationalized for empirical measurement. An empirical hypothesis

corresponds to the theoretic hypothesis, but it expresses the postulated relationship between two operations.

In this section the specific theoretical hypotheses and the corresponding empirical hypotheses will be stated.

Hypotheses.

1. Theoretical: There will be positive relationship between farm size and adoption of improved practices of tobacco cultivation.

Empirical: The number of acres cultivated with improved practices of tobacco cultivation will vary directly with the adoption score.

2. Theoretical: There will be positive relationship between market orientation and adoption of improved practices of tobacco cultivation.

Empirical: The market orientation score of the farmer will vary directly with the adoption score.

3. Theoretical: There will be positive relationship between age and adoption of improved practices of tobacco cultivation.

Empirical: The age of the farmers will vary directly with the adoption score.

4. Theoretical: There will be positive relationship between education and adoption of improved practices of tobacco cultivation.

Empirical: The education score will vary directly with adoption score.

5. Theoretical: There will be positive relationship between economic status of the farmer and adoption of improved practices of tobacco cultivation.

Empirical: The economic status score will vary directly with the adoption score.

6. Theoretical: There will be positive relationship between social participation of the farmer and adoption of improved practices of tobacco cultivation.

Empirical: The social participation score will vary directly with the adoption score.

7. Theoretical: There will be positive relationship between knowledge of the practices and adoption of improved practices of tobacco cultivation.

Empirical: The knowledge of the practices score will vary directly with the adoption score.

8. Theoretical: There will be positive relationship between information sources used and adoption of improved practices of tobacco cultivation.

Empirical: The information sources used score will vary directly with the adoption score.

9. Theoretical: There will be positive relationship between farmers' perception of practice attributes and adoption of the improved practices of tobacco cultivation.

Empirical: The practice attributes score will not vary directly with the adoption score.

MATERIALS AND METHODS

MATERIALS AND METHODS

In this chapter the location of the study, the sampling procedures used, the procedure for selection of variables adopted and the methods used for measurement of variables selected are discussed. The procedures followed for collecting the data and statistical procedures used in the analysis of the data are also discussed in the chapter.

Location of the study.

The study was conducted in two blocks of East Godavari district of Andhra Pradesh. The two blocks, selected purposively for the study were Rajanagaram and Korukonda.

A list of major tobacco growing villages of the two selected blocks was obtained from the respective block offices. Four villages, two from each block were selected at random for the study. The selected villages were Thorredu and Katheru in Rajanagaram Block and Chinnakondepudi and Raghudevapuram in Korukonda Block.

Selection of respondents.

A list of tobacco growers from each selected village was prepared. It was decided to select 106 farmers on

the basis of probability proportionate sampling.

The number of tobacco growers to be selected and interviewed in each village was decided on the basis of the formula given below.

$$C_i = \frac{n_i}{N} \times 106$$

where N = Total number of tobacco growers in all the four villages.

n_i = Number of tobacco growers in the i^{th} village.

C_i = Number of tobacco growers to be interviewed in the i^{th} village.

Using the above formula 106 respondents were selected by using random numbers from all four villages.

Selection of variables.

The variables which might influence adoption behaviour were identified after a comprehensive review of literature related to adoption.

Judges ranking was used to select the variables relevant to the study. The list of variables was given to the Assistant Agricultural Officers of State Agricultural Department of Andhra Pradesh and to the Extension experts of the Agricultural college at Vellayani. They were requested to indicate the importance of each variable

in influencing the adoption behaviour by marking on a four point continuum ranging from least important to more important. A weight of "four" was assigned to most important "three" to important, "two" to less important and "one" to least important. For each variable, a score was obtained by adding up the product of the frequency and corresponding weight. The variables were ranked based on the total score thus obtained. Nine variables which obtained high ranks were finally selected for the study. They were:

1. Farm size.
2. Market orientation.
3. Age.
4. Education.
5. Economic status.
6. Social participation.
7. Knowledge of the practices.
8. Information sources used.
9. Practice attributes.

Measurement of adoption.

Several methods have been used to quantify the adoption behaviour by various research workers. Notable among those who utilized a scale for measuring adoption in some form or other were Wilkening (1952), Duncan and Kreetlow (1954), Marsh and Coleman (1955) Pliegel (1956),

Emery and Ocser (1958), Linderstrom (1958), Ramsey and others (1959), Beal and Rogers (1960), Bose (1962), Chattopadhyay (1963), Beal and Sibley (1967), and Supe (1969).

Wilkening (1952) used an index for measuring the adoption of improved farm practices. He realised the importance of potentiality of adoption. The index of adoption used was the percentage of practices adopted to the total number of practices applicable for that operator. Because of the differential nature of practices, he suggested differential weights in the adoption index.

Duncan and Kreetlow (1954) used a 25-item index of farm practice adoption, adopted from the index developed by Wilkening. Each respondent was given a score based on the number of practices he had adopted from the list of 25.

Marsh and Coleman (1955) also used a "Practice adoption score" computed as the percentage of applicable practices adopted.

Fliegel (1956) constructed an "Index of adoption" of farm practices using the correlation of several adoption variables. He factor analysed each of the 11 practices selected. Non-adoption was given a value of "zero" and adoption a score of "one".

Beal and Rogers (1960) studied in detail the adoption of two farm practices. A simple adoption scale was computed which credited an individual with one point for adoption and zero point for non-adoption.

Chattopodhyay (1963) has constructed an "Adoption quotient" to measure farm practice adoption. He has taken into consideration the different variable like potentiality, extent, weightage and time in developing the adoption quotient.

Beal and Sibley (1967) used various methods of scoring. They were:

1. Unweighted proportional adoption score.
2. Weighted proportional adoption score.
3. Weighted aggregate adoption score.

They found that unweighted proportional adoption score was highly correlated with other types of scores. In this method each practice adopted was given a score of one and the total adoption score was made proportional by dividing the number of practices adopted with the total number of relevant practices.

Supe (1969) used an unweighted practice adoption score. He selected 10 practices of cotton and for each practice the total score for complete adoption was 6.

The practices divisible, were assigned partial scores for partial adoption.

Adoption of package of practices for tobacco recommended by Central Tobacco Research Institute, Rajahmundry, the dependent variable in this study, was measured by the adoption quotient as developed by Singh and Singh (1974) which was a modification of the Adoption quotient developed by Chattopadhayay (1963). The formula for calculation of Adoption quotient used in this study was.

$$\text{Adoption quotient} = \frac{\Sigma e/p}{N} \times 100$$

where

Σ = is the summation,

e = extent of adoption of each practice,

p = potentiality of adoption of each practice and

N = Total number of practices.

The components considered for the computation of adoption quotient were the following

Potentiality.

Potentiality of adoption of package of practices for tobacco is conceived as the maximum degree to which a farmer can extent his adoption, if he so wishes, depending on the maximum utilization of the resources he commands or can command.

Extent of adoption.

Extent of adoption is the degree to which a farmer has actually adopted a practice. When the extent of adoption equals the potentiality, adoption is maximum or high, when the extent is nil adoption is nil, when the extent is more than the potentiality then it is over adoption.

Extent of adoption of package of practices of the nursery and mainfield.

The adoption scores of 106 farmers were arranged in ascending order and then quartile method was used for categorisation of the adopters.

Accordingly the respondents, having adoption score upto 80 were taken as low adopters, those having adoption score between 80 to 90 were teken as medium adopters, those having adoption score between 90 to 100 as high adopters and those having adoption score above 100 were taken as over adopters.

Extent of adoption of selected practices.

The purpose of analysis is to examine the details of the extent of adoption of the various recommended practices included were:

i. Nursery.

a. Varieties.

b. Farmyard manure used.

c. Nitrogen used for basal dressing.

d. Phosphorus used for basal dressing.

e. Potassium used for basal dressing.

f. Seed rate followed.

g. Nitrogen used for top dressing.

ii. Mainfield.

a. Deep ploughing by tractor or crow-bar.

b. Farmyard manure used.

c. Nitrogen used.

d. Phosphorus used.

e. Potassium used.

f. Spacing followed.

g. Intercultivations.

The farmers' percentage level for each practice mentioned above were calculated and tabulated.

In case of manures and fertilizers, the purpose of analysis is to examine the details of the extent of adoption of the various dosages of organic and inorganic fertilizers recommended for the cultivation of tobacco. Here Nitrogen, Phosphorus and Potassium of inorganic fertilizers and farmyard manure were considered. In this analysis the total quantity of fertilizers applied

interms of the active nutrient per acre has been considered.

Measurement of situational and personal variables.

1. Farm size.

Farm size was measured in acres cultivated by an individual farmer. Total area cultivated, both tobacco lands as well as area cultivated with other crops were taken into consideration. The farm size was categorised as follows

The mean farm size of the 106 respondents was 15.05 with a standard deviation 12.03. The respondents having farm size upto the value of mean minus one standard deviation were included in the category of low size of farm holding, those having farm sizes between mean plus or minus one standard deviation were brought under medium size of farm holding. Those having farm size above mean plus one standard deviation were included in the high size of farm holding group. Accordingly, the range of area of the three categories were:

Farm size	Acres
Low	≤ 3
Medium	3-27
High	≥ 27

2. Market orientation.

Market orientation of the respondent was measured on a continuum ranging from zero to three. The respondents were categorised into different groups using the following procedure.

The mean market orientation of 106 respondent was 3.01 and with a standard deviation 1.00. The respondents having market orientation score upto the value of mean minus one standard deviation were brought in the category of low level of market orientation, those having market orientation score between mean plus or minus one standard deviation were included in the category of medium level of market orientation. Those having market orientation scores above mean plus one standard deviation were taken as having high level of market orientation. Accordingly, the range of scores of the categories were as follows

Category	Score
Low	≤ 2
Medium	2-4
High	≥ 4

3. Age.

Age was operationalized as the number of years completed at the time of enquiry. The respondents

were categorised under the following groups.

Category	Year
Young	≤ 35
Middle aged	36-50
Old	≥ 51

4. Education.

Education was measured by assigning scores for different educational levels as per the scoring system followed in the socio-economic status scale of Trivedi (1963). The scoring was as follows

Illiterate	0
Can read only	1
Can read and write	2
Primary level	3
Middle school level	4
High school level	5
Graduate level	6
Above	7

The respondents were categorised into three groups. They were:

Category	Score
Illiterate	0
Upto primary	3
Above primary	>3

5. Economic status.

The economic status of a farmer was measured by a modified form of the socio-economic status scale developed by Trivedi (1963). This modified form was used by Murthy and Singh (1974) for Andhra circumstances, to determine the socio-economic status of farmers in West Godavari district.

The items of the scale and their scores were as follows

i. Family.

		Point
a.	Type.	
	Single	1
	Joint	2
b.	Size.	
	Upto Five	1
	Above Five	2
ii.	House.	
a.	Number.	
	One	1
	Two	2
	Three	3
b.	Type.	
	Kucha	1
	Mixed	2
	Pucca	3

		Point
iii.	Farm power.	
a.	Bullocks.	
	Nil	0
	One to two	2
	Three to four	4
	Five to six	6
b.	Tractor.	6
c.	Oil engine or electric pump	6
iv.	Material possession.	
	Bullock-cart	1
	Cycle	1
	Chairs	1
	Radio	1
	Improved agricultural implements	2

The respondents were categorised into low, medium and high socio-economic status groups. The mean economic status score for 106 farmers was 10.01 with a standard deviation of 5. The respondents having economic status score upto the value of mean minus one standard deviation were brought under low economic status, those having economic status score between mean plus or minus one standard deviation were brought under medium economic status and those having economic status score above mean plus one standard deviation

simple technique used by Singh and Singh (1974). Questions were asked on the recommended practices to determine the knowledge of the respondents. The total knowledge score of each respondent was calculated as follows

$$\frac{x_1}{n} \times 100$$

where x_1 = number of questions answered correct

n = total number of question asked.

The respondents were categorised into different levels using the following procedure. The mean score of knowledge of the practices for 106 farmers was 67.2 with a standard deviation of 12.40. The respondents having knowledge of the practices score less than the value of mean minus one standard deviation were brought under low knowledge of the practices. Those having knowledge of the practices score between mean plus or minus one standard deviation were brought under medium knowledge of the practice and those having knowledge of the practices score above the mean plus one standard deviation were brought under high knowledge of the practice.

Knowledge Level	Score
Low	< 55
Medium	55-80
High	> 80

8. Information sources used.

The information sources used by each respondent was measured in the following manner. All the possible sources of information for agricultural technology were listed and these were grouped into 4 categories as used by Wilkening (1962).

a. Mass media sources.

b. Interpersonal cosmopolite sources.

c. Interpersonal localite sources.

Each respondent was asked to indicate as to how often he got information regarding agricultural technology from each of listed sources. The responses were scored in the following way

Response	Score
Most often	3
Often	2
Sometimes	1
Never	0

Response scores were summed across each item to calculate information source used indices. The respondents were categorised into different groups using the following procedure. The mean information sources used score for 106 farmers was 16.29 with a standard deviation of 6.30. The respondents having

information sources used score upto the value of mean minus one standard deviation were brought under low information sources used, those having the information sources used score between mean plus or minus one standard deviation were brought under medium information sources used and those having information sources used score above mean plus one standard deviation were brought under high information sources used.

Levels of information sources used.	Score
Low	≤ 10
Medium	10-23
High	≥ 23

9. Practice attributes.

In this study only four attributes namely simplicity-complexity, cost of innovation, profitability and suitability were included. All these attributes were quantified interms of farmers' perception of these attributes with respect to practices namely, varieties, fertilizers, deep ploughing spacing and intercultivation. Farmers' perception of the attributes of each of above practices of cultivating high yielding varieties of tobacco was obtained on a five point rating scale. The scoring was as follows

a. Simplicity-complexity.

1	2	3	4	5
Very difficult	Difficult	Neither difficult nor easy	Easy	Very easy

b. Cost of innovation.

1	2	3	4	5
Very high	High	Neither high nor low	Low	Very low

c. Profitability.

5	4	3	2	1
Very profitable	Profitable	Some what profiteble	Least profit-able	Not at all profit-able

d. Suitability.

5	4	3	2	1
Most suitable	Suitable	Some what suitable	least suit-able	Not at all suitable

The practice attributes were categorised as follows. The mean practice attributes score of 106 farmers was 13.10 with a standard deviation 2.06. The respondents having the practice attributes score less than to the value of mean minus one standard

deviation were brought under low practice attributes, those having the practice attribute score between mean plus or minus one standard deviations were brought under medium practice attributes and those having the practice attribute score above the mean plus one standard deviation were brought under high practice attributes.

Practice attributes	Score
Low	< 11
Medium	11-15
High	> 15

Data collection.

The questionnaire was pretested by obtaining the responses from 25 tobacco farmers, those were not included in the sampling. Based upon their responses and remarks, the questionnaire was modified wherever it felt necessary. The data were collected by inverviewing the farmer by the researcher. The respondents were interviewed individually.

Statistical measures.

Parametric statistical techniques were used to provide a basis for acceptance or rejecting the empirical hypothesis. The parametric statistical methods used in this study were mean, standard deviation and zero order correlation.

RESULTS

RESULTS

This chapter has three parts

I Extent of adoption.

A. The extent of adoption of package of practices by farmers in tobacco cultivation.

B. The extent of adoption of recommended Nursery and Mainfield practices in tobacco cultivation.

C. The extent of adoption of individual practices selected.

II Adoption behaviour.

A. Relationship between selected independent (situational and personal) variables and with dependent variable that is adoption behaviour of the farmer.

B. Interrelationship of the selected independent (situational and personal) variables.

III Reasons for non-adoption of the recommended practices.

I Extent of adoption.

Table 1: A. The extent of adoption of package of practices in total.

The adoption score regarding the adoption of all the recommended practices of tobacco cultivation of the respondents are presented in table below.

Adoption score	Number of farmers (N=106)	Farmers (percentage)
0- 20	0	0.00
20- 40	0	0.00
40- 60	1	0.94
60- 80	17	16.04
80-100	44	41.50
100-120	35	33.02
120-140	5	4.72
140-160	0	0.00
160-180	2	1.89
180-200	2	1.89

Mean adoption score: 97.8

It can be seen from the table that sizeable percentage of farmers (41.50%) secured adoption score between the range of 80 to 100. As much as 33.02% secured adoption score between the range of 100 to 120. So as much as 74.52% of farmers were in the score range of 80 to 120. As much as 50.9% of farmers were found to be below the mean value and rest were above the mean.

Table 2: Adopters categories.

The respondents were grouped into different categories of adopters based on the categorization principle explained in the methodology. The data regarding the different categories of adopters are given in table below.

Adoption categories	Range of adoption score	Number of farmers (N=106)	Farmers (percentage)
Low	< 80	18	16.99
Medium	80-90	19	17.92
High	90-100	25	23.58
Over	> 100	44	41.51

The data revealed that a sizeable percentage of the respondents were over adopters. As much as 41.51% of them were found to be in this category. The next major group of farmers were high adopters that is 23.58%.

Table 3: D. Extent of adoption of recommended practices for nursery and mainfield.

In order to find out the rate of adoption of the different practices recommended for the nursery and mainfield, separate adoption scores of the respondents were worked out. The scores are presented in table 3.

Table 3.

Adoption Score	Package of practices			
	Nursery		Mainfield	
	Number of farmers (N=106)	Farmers (percentage)	Number of farmers (N=106)	Farmers (percentage)
0- 20	0	0.00	0	0.00
20- 40	0	0.00	0	0.00
40- 60	5	4.72	1	0.94
60- 80	29	27.36	13	12.26
80-100	39	36.79	39	36.79
100-120	19	17.92	37	34.91
120-140	8	7.55	11	10.38
140-160	2	1.89	3	2.83
160-180	4	3.77	2	1.89
Mean adoption score: 92.9			Mean adoption score: 102.1	

It is seen from the above table that in the case of nursery 36.79% of farmers were having adoption score between the range of 80 to 100. It is also observed that next majority of the farmers (27.36%) were found to possess adoption score between a range of 60 to 80. More than half of the farmers (64.15%) were found to possess adoption score between a range of 60 to 100. Only 4.72% of the farmers were having scores below 60, whereas 31.13% of farmers had score between the range of 100 to 180.

In the case of mainfield, the data revealed that a sizeable percentage of the respondents (36.79%) were found to possess adoption score between a range of 80 to 100. A sizeable percentage of respondents ie. 34.91% were also having scores between a range of 100 to 120. More than half of the farmers 71.70% were found to possess adoption score between a range of 80 to 120. As much as 13.20% of farmers were had scores below 80 and 15.10% of them were found to possess the adoption scores between a range of 120 to 180.

In the case of nursery 59.6% of farmers were having scores below the mean value of adoption score and the rest were above mean. But in the case of mainfield 57.5% of farmers were below mean and rest were above mean.

Table 4: Adopters categorised practice wise.

The data regarding the adopters categorised as low, medium, high and over for the two groups of practices are given table 4.

Table 4.

Adoption categories	Adoption score range	Nursery		Mainfield	
		Number of farmers (N=106)	Farmers (percentage)	Number of farmers (N=106)	Farmers (percentage)
Low	< 80	34	32.08	14	13.20
Medium	80- 90	18	16.98	16	15.10
High	90-100	21	19.80	23	21.70
Over	> 100	33	31.13	53	50.00

In the case of nursery, the table revealed that the sizeable respondents (32.08%) were low adopters. As much as 31.13% of respondents were over adopters.

In the case of mainfield practices, half the respondents were over adopters (50%). The percentage of high adopters were 21.70%. It could also be seen from the table that a sizeable percentage of farmers were over adopters in both the groups of practices.

I. C. The extent of adoption of selected package of practices.

i. Nursery.

a. Varieties.

Table 5: Tobacco varieties grown by the farmers.

The data regarding the adoption of the different varieties by the respondents are given in table 5.

Table 5.

Varieties	Number of farmers (N=106)	Farmers (percentage)
*CTRI special	29	27.36
*Kanakaprabha	15	14.15
Sp. cross	30	28.30
FCV. special	32	30.19

*Varieties recommended by Central Tobacco Research Institute.

Table reveals that only about forty percent of farmers were using the recommended tobacco varieties, namely, CTRI. special and Kanakaprabha. The percentage of farmers who have grown FCV. special was 30.19% and 28.30% of farmers have grown Sp.cross, both the varieties were not recommended by Central Tobacco Research Institute.

b. Farm yard manure used.

Table 6: Extent of use of farmyard manure by the farmers

Farmyard manure is normally used as manure in tobacco cultivation also. The different doses of farmyard manure used by the tobacco growers is shown in the table below.

Table 6.

Use of farmyard manure	Number of farmers (N=106)	Farmers (percentage)
Not used	91	85.85
Below recommendation used	15	14.15
Full recommended dose used	0	0.00

It is seen from the table that majority (85.85%) of farmers never applied farmyard manure to their nursery as basal dressing. But 15 farmers (14.15%) used the farmyard manure below the recommended dose of 20 tonnes per acre in the tobacco nursery.

c. Nitrogen used for basal dressing.

Table 7: Extent of nitrogen used by the farmers.

Tobacco is a leafy crop and hence nitrogenous fertilizers application is a major practice followed by tobacco growers. Their extent of use of the nitrogenous fertilizers is given in the table below.

Nitrogen fertilizer used	Number of farmers (N=106)	Farmers (percentage)
Not used	18	16.98
Below recommended dose	0	0.00
Recommended dose	20	18.87
Above recommended dose	68	64.15

It is evident from the table that a sizeable percentage of farmers (64.15%) used nitrogen to their nursery above the recommended dose of 4 kgs. of nitrogen per acre. Whereas 18.87% of farmers followed the recommendation. But as much as 16.98% farmers never applied nitrogenous fertilizer in their nursery as basal dressing.

d. Phosphorus used for basal dressing.

Table 8: The extent of phosphorus used by the farmers.

Phosphorus is also important for tobacco cultivation. It is applied as basal dressing for tobacco nursery as indicated by the table below.

Phosphatic fertilizer used	Number of farmers (N=106)	Farmers (percentage)
Not used	0	0.00
Below recommended dose	31	29.25
Recommended dose	30	28.30
Above recommended dose	45	42.45

It is seen from the table that all farmers were using phosphorus in their tobacco nursery as basal dose. Amongst them 42.45% of farmers applied more than the recommended dose, namely 19.2 kgs. of phosphorus per acre. But as much as 28.30% of the tobacco farmers applied the recommended dose. The data also revealed that 29.25%

of farmers applied the phosphorus fertilizer below the dose recommended by the Central Tobacco Research Institute.

e. Potassic fertilizer used for basal dressing*

Table 9: Extent of potasium used by the farmers.

The extent of use of the potassic fertilizers by the tobacco farmers is given in the below table, eventhough there is no specific recommendation for basal dressing in the nursery.

Potassic fertilizer used	Number of farmers (N=106)	Farmers (percentage)
Used	25	23.58
Not used	81	76.42

*No specific recommendation by Research Institute.

From the table, it is evident that one fourth of the farmers applied potassic fertilizer to their nursery as basal dressing. 76.42% of farmers never used potassic fertilizer for their nursery.

f. Seed rate.

Table 10: Seed rate followed by the farmers.

Tobacco is a transplanted crop. Seedlings are raised in beds and gets ready for transplanting at the age of 50 days. The seed rate followed by tobacco growers are shown in the table herewith.

Table 10.

Seed rate used	Number of farmers (N=106)	Farmers (percentage)
Below recommendation	0	0.00
Recommendation	22	20.75
Above recommendation	84	79.25

It is evident from the table that as much as 79.25% of tobacco farmers used the seed rate above to the recommendation, namely 2 to 3 kgs. per hectare. Remaining 20.75% of farmers followed the recommended seed rate for raising seelings.

6. Nitrogenous fertilizer used as top dressing.

Table 11: Extent of nitrogen used as top dressing.

Top dressing in the nursery with nitrogen is very important being a leafy crop. More or less the quality of the leaf has to be kept up. Farmers top dress with nitrogenous fertilizers to their tobacco seedlings are shown below.

Nitrogen used	Number of farmers (N=106)	Farmers (percentage)
Not used	0	0.00
Below recommended dose	2	1.89
Full recommended dose	42	39.62
Above recommended dose	62	58.49

It is evident from the table 11 that all farmers applied nitrogenous fertilizers to their tobacco nursery as top dressing. 58.49% of farmers applied more than the recommended dose, namely 30 kgs. of nitrogen per acre. 39.62% of farmers followed the recommendation.

ii. Mainfield.

a. Deep ploughing by tractor or crow-bar.

Table 12: The extent of deep ploughing by farmers.

Deep ploughing is a very important recommendation of Research Institute in tobacco cultivation. Farmers used both tractor and crow-bar for the purpose. The table below indicates the extent of their use by farmers in cultivating tobacco.

Deep ploughing	Number of farmers (N=106)	Farmers (percentage)
Not practising	47	44.34
Once in every year	8	7.55
*Once in 2 years	36	33.96
Once in 3 years	15	14.15

*Recommended by Central Tobacco Research Institute.

It is seen from the table that sizeable percentage of farmers (44.34%) did not practice deep ploughing either by tractor or crow bar. Whereas 33.96% of

farmers were practising deep ploughing once in 2 years, which is the recommendation of the Central Tobacco Research Institute. 14.15% of farmers practised deep ploughing only once in three years. The table also reveals that 7.55% of farmers followed deep ploughing every year.

b. Farmyard manure used.

Table 13: The extent of farmyard manure used by the farmers.

Farmyard manure is basally applied to the mainfield also by the tobacco growers. The extent of their use of the manure is as follows.

Farmyard manure used	Number of farmers (N=106)	Farmers (percentage)
Not used	37	34.91
One fourth of the recommended dose	6	5.66
Half of the recommended dose	13	12.26
Three fourth of the recommended dose	30	28.30
Full recommended dose	8	7.54
Above the recommended dose	12	11.33

It can be seen from the table, that 65.09% of farmers applied farmyard manure to their crop. But,

of them, only 7.54% of farmers followed the recommendation, namely 3 metric tonnes per acre. Whereas 34.91% of farmers never applied farmyard manure to their crop. 28.30% of farmers applied three fourth of the recommended dose.

c. Nitrogenous fertilizer used.

Table 14: Extent of nitrogen used by the farmers.

Nitrogen is also important for the transplanted tobacco crop, since the quality and yield of leaves pays more to the tobacco growers. Hence the dose of nitrogenous fertilizer used by them is indicated herewith.

Nitrogen used	Number of farmers (N=106)	Farmers (percentage)
Not used	0	0.00
One fourth of the recommended dose	0	0.00
Half of the recommended dose	0	0.00
Three fourth of the recommended dose	0	0.00
Full recommended dose	14	13.21
Above the recommended dose	92	86.79

The data in the above table showed that almost all farmers applied nitrogen to their tobacco crop. As much

as 86.79% of farmers of them applied more than the recommended dose, namely 9 kgs. of nitrogen per acre. But it is seen from the table that only13.21% of tobacco farmers applied the recommended dose in full.

d. Phosphatic fertilizer used.

Table 19: Extent of phosphorus used by the farmers.

Tobacco growers apply phosphatic fertilizer also in the mainfield, an element being important to plant growth. The extent of use of the same is as follows.

Phosphorus used	Number of farmers (N=106)	Farmers (percentage)
Not used	16	15.09
One fourth of the recommended dose	1	0.94
Half of the recommended dose	16	15.09
Three fourth of the recommended dose	16	15.09
Full recommended dose	16	15.09
Above the recommended dose	41	38.68

It is seen from table that more than one third (38.68%) of farmers applied phosphorus above the recommended dose of 16 kgs. P_2O_5 per acre. Whereas the percent of farmers using half, three fourth and full dose of recommended phosphatic fertilizer to their

crop was the same (15.09%). 15.09% of farmers never used any phosphatic fertilizer for the tobacco crop.

e. Potassic fertilizer used.

Table 16: Extent of potassium used by the farmers.

Potassic fertilizers have been certainly recommended for the transplanted crop. The farmers have followed the recommendation of Central Tobacco Research Institute in varied doses.

Potassium used	Number of farmers (N=106)	Farmers (percentage)
Not used	14	13.21
One fourth of the recommended dose	0	0.00
Half of the recommended dose	0	0.00
Three fourth of the recommended dose	18	16.98
Full recommended dose	13	12.26
Above the recommended dose	61	57.55

It is seen from the table that 86.79% of farmers used potassic fertilizer to their tobacco crop. Amongst them, 57.55% of farmers used potassic fertilizer above the recommended dose of 12 kgs. of K_2O per acre. At the same time 13.21% of farmers were not at all using the potassic fertilizer. Only 16.98% of farmers applied

potassic fertilizers at the rate of three fourth the recommended dose and 12.26% of farmers used full recommended dose.

f. Spacing followed for the crop.

Table 17: Different spacings practiced by the farmers.

Tobacco being a transplanted crop specing is a very important practice followed by tobacco growers. They plant tobacco seedlings under five spacings.

Spacings followed	Number of farmers (N=106)	Farmers (percentage)
*32" x 32"	6	5.66
31" x 31"	5	4.72
30" x 30"	66	62.26
29" x 29"	20	18.87
28" x 28"	9	8.49

*Spacing recommended by Central Tobacco Research Institute.

It is seen from the table that sizeable percentage of farmers (62.26%) were practising the spacing of 30" x 30". Whereas 18.87% of tobacco farmers practised 29" x 29". But only 5.66% of farmers were practising the spacing as recommended by Central Tobacco Research Institute, namely 32" x 32".

6. Intercultivation practices followed for the crop.

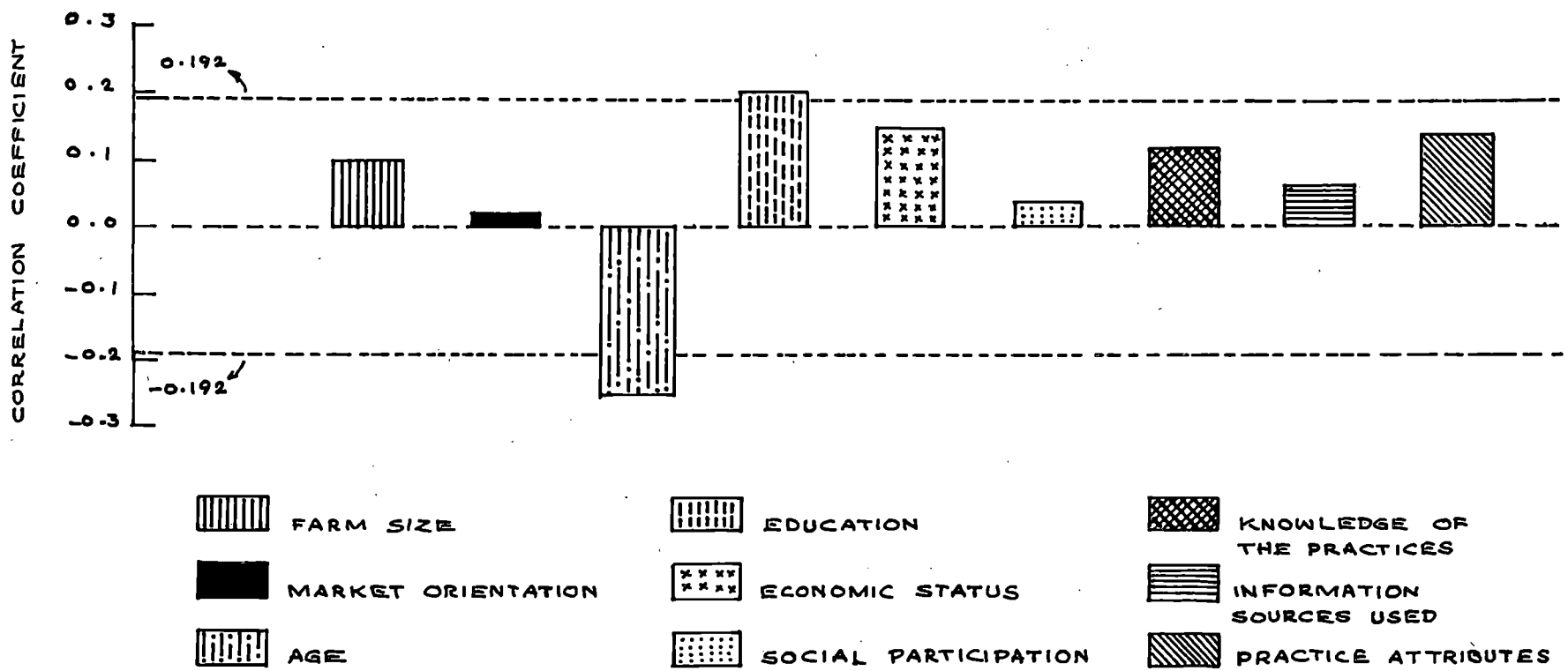
Table 18: The extent of intercultivation practices followed by farmers.

In tobacco cultivation, Central Tobacco Research Institute has recommended to use gorru and guntaka to intercultivate 4 times. Many farmers use the implement as shown in the table below.

Intercultivation practices	Number of farmers (N=106)	Farmers (percentage)
Not practised	0	0.00
One fourth of the recommended practices followed	1	0.94
Half of the recommended practices followed	29	27.36
Three fourth of the recommended practices followed	48	45.28
Full recommended practices followed	28	26.42

It is evident from the table that all farmers were practising intercultivation in tobacco cultivation. A sizeable percentage of farmers (45.28%) were undertaking three fourth of the recommended number of intercultivations. As much as 27.36% of farmers were practising half of the recommended number of intercultivation. Another (26.42%) were practising full recommended intercultivations to their crop.

RELATIONSHIP BETWEEN EXTENT OF ADOPTION AND SELECTED SITUATIONAL AND PERSONAL VARIABLES



0.192 :– SIGNIFICANT CORRELATION COEFFICIENT AT 0.05 LEVEL.

INDEPENDENT VARIABLES

FIG: 1

II Adoption behaviour.

A. Relationship between adoption behaviour and selected situational and personal variables. (Fig.1)

For each variable the null hypothesis is stated first. The null empirical hypothesis is tested by the zero-order correlation coefficient and is either accepted or rejected. The term significant relationship will be used to indicate 0.05 level of probability. With a sample of 106 farmers a correlation coefficient (r) of 0.192 is needed for the 0.05 level of probability.

1. Situational variables.

a. Farm size.

Null hypothesis: The number of acres cultivated will not vary directly with the adoption score.

The computed correlation coefficient is 0.0988 which is not significant at the 0.05 level of probability. The null hypothesis is accepted. The data do not support the proposition that there is positive relationship between farm size and adoption of improved farm practices.

Table 19: Size of farm holdings of farmers.

There are tobacco growers with both small and big size of farms, even extending an area of more than

25 acres. This has been evidently shown by the table given below.

Size of farm holding	Farm holding (acres)	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Low	≤ 3	6.82	8.00	5.26	0.00
Medium	3-27	79.54	84.00	78.95	77.78
High	≥ 27	13.64	8.00	15.79	22.22

From the above table, it can be observed that more than three fourth of the farmers from all categories of adopters fell under medium farm size holdings. The table shows that from all the categories farmers having low farm size is below 8%, whereas 22.22% of low adopters possessed high acreage.

b. Market orientation.

Null hypothesis: The market orientation score will not vary directly with the adoption score.

The computed coefficient of correlation is 0.0134, which is not significant at 0.05 level of probability. The null hypothesis is accepted. This do not support the proposition that there is positive relationship between market orientation and adoption of improved farm practices.

Table 20: Levels of market orientation of farmers.

Tobacco being a cash crop the farmers will have to be aware of the fluctuations in the market price of the product. Invariably the farmers' access to the market information depended on their aptitude towards the business.

Levels of market orientation	Market orientation score	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Low	≤ 2	31.80	36.00	31.60	38.90
Medium	2-4	50.00	48.00	36.80	44.40
High	≥ 4	18.20	16.00	31.60	16.70

From the table, it is observed that a sizeable percentage of the farmers from all categories of adopters are having medium level of market orientation. The table reveals that one third of the farmers fell in all the categories of adopters are having low level of market orientation. 50% of the over adopters have medium level of market orientation.

ii. Personal variables.

a. Age.

Null hypothesis: The age will not vary directly with the adoption score.

The computed coefficient of correlation is -0.2481 which is significant at 0.05 level of probability. The null hypothesis is refuted. These data support the proposition that there significant and negative relationship between age and adoption of improved practices. This means age increases adoption will decrease.

Table 21: Range of age groups of farmers.

Innovative behaviour of farmers shall depend on their age. The risk that has to be taken also relates to the nature of the crop. Thus farmers of different age group is likely for respond to the improved techniques of farming differently.

Age groups	Age (years)	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Young	≤ 35	40.91	36.00	36.84	27.78
Middle aged	36-50	47.73	52.00	52.63	55.55
Old	≥ 51	11.36	12.00	10.53	16.67

From the table, it is evident that a sizeable percentage of farmers or about half of the number of farmers from all adoption categories are found to be middle aged. Next, one third of the farmers among of all adoption categories are young. Remaining farmers who belonging to old age are less in all adoption categories.

b. Education.

Null hypothesis: The education score will not vary directly with the adoption score.

The computed coefficient of correlation is 0.1928 which is significant at 0.05 level of probability. The null hypothesis is refuted. These data support the proposition that there is a positive relationship between education and adoption of improved farm practices.

Table 22: Education status of farmers.

Education of the farmers will certainly have influence on their accessibility to information pertaining to improved methods of tobacco cultivation. Farmers with different levels of education may behave differently as indicated by the table below.

Education	Farmers (percentage) (N=106)			
	Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Illiterate	34.10	20.00	52.58	50.00
Primary	36.36	48.00	15.79	27.78
Above primary	29.54	32.00	31.63	22.22

From the above table, it is observed that one third of the farmers in over adopters (36.36%) are educated upto primary followed by illiterates 34.10%. In higher

adopters' category, the majority of the farmers have education to primary level and above (80%). As much as 52.58% of the medium adopters are illiterate followed by remaining with primary and above primary education. Half of the low adopters are also illiterate. It is evident comparatively that farmers who have education above primary level are more (32%) in high adopters and very less in low adopters.

c. Economic status.

Null hypothesis: The economic status score will not vary directly, with the adoption score.

The computed coefficient of correlation is 0.1449 which is not significant at 0.05 level of probability. The null hypothesis accepted that is not refuted. These data do not support the proposition that there is positive relationship between economic status and adoption of improved agricultural practices.

Table 23: Economic status of farmers.

Tobacco being a cash crop will certainly provide opportunities for better living and thus the status of the farmers are increased. The farmers who adopt improved farming practices are likely to get more income from their crop. The influence of the cash

crop in the status of the tobacco growers is indicated in the table herewith.

Economic status	Economic status score	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Low	≤ 5	6.82	16.00	5.26	11.10
Medium	9-15	77.27	60.00	63.16	77.77
High	≥ 15	15.91	24.00	31.58	11.13

From the above table, it is seen that more than sixty percent of farmers from all adoption categories belonged to medium economic status group. And remaining farmers from all categories are belonging to high and low economic status, amongst whom about one third of the high economic status group found to be medium adopters (31.58%).

d. Social participation.

Null hypothesis: The social participation score will not vary directly with the adoption score.

The computed coefficient correlation is 0.0387 which is not significant at 0.05 level of probability. The null hypothesis is accepted. These data do not support the proposition that there is positive relationship between social participation and adoption of improved farm practices.

Table 24: Social participation of farmers.

Farmers living in villages do have opportunities for community life. Sociologically they do preserve their social behaviour based on the situational and personal factors around them. This has been evidenced by the table given below.

Social participation status	Social participation score	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
No	0	65.91	60.00	57.89	88.88
Medium	1	29.55	36.00	31.58	11.12
High	2	4.54	4.00	10.53	0.00

It is evident from the table, that more than half of the famers from all categories have no social participation. One third of adopters from all categories except low adopters group have medium social participation. As much as 88.88% of low adopters have no social participation all.

e. Knowledge of the practices.

Null hypothesis: The knowledge of the practices score will not directly with the adoption score.

The computed coefficient of correlation is 0.1196 which is not significant at 0.05 level of probability. The null hypothesis is not refuted. These data do not support the proposition that there is positive relationship between knowledge of the practices and adoption of improved farm practices.

Table 25: Knowledge level of farmers.

The technology breaks through and the farmers are also exposed to new information through various media. These changing technology influences the different categories of farmers with regard to their know how. This is true to tobacco farmers also.

Knowledge levels	Knowledge score	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Low	< 55	18.19	12.00	10.53	16.67
Medium	55-80	70.45	64.00	84.21	77.78
High	> 80	11.36	24.00	5.26	5.55

From the table, it is seen that sizeable majority of the farmers from all categories are having medium level of knowledge about the package of practices. The table also reveals that one fourth of high adopters are having high knowledge about the practices.

f. Information sources used.

Null hypothesis: The score on information sources used will not vary directly with the adoption score.

The computed correlation coefficient is 0.0601, which is not significant at 0.05 level of probability. The null hypothesis is not refuted. These data do not support the proposition that there is a positive relationship between information sources used and adoption of improved farm practices.

Table 26: Information sources used by farmers.

Sources of information are many today. The progressive farmers, the press, the radio as well as other methodsof disseminating informations are in the field. The tobacco growers have to choose both the media as well as information served through it. The response to such rces of information by the tobacco growers are given low.

Information sources used levels	Information sources used score	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Low	10	20.45	16.00	15.79	22.22
Medium	3	59.10	60.00	68.49	66.67
High	1	20.45	24.00	15.72	11.11

Table indicates that the majority of the farmers from all categories are using only medium information sources. One fifth of the over adopters and high adopters used information sources to the greater extent. But in the case of high adopters, as much as 24 percentage of individuals in the high information sources used are higher than the percentage of individuals (16%) used low information sources.

g. Practice attributes.

Null hypothesis: The practice attributes score will not vary directly with the adoption score.

The computed coefficient of correlation is 0.1387 which is not significant at 0.05 level of probability. The null hypothesis is not refuted. This data do not support that there is positive relationship between practice attributes and adoption of package of practices.

Table 27: Practice attributes of farmers.

Farmers have a general tendency to attribute practices differently based on certain norms fixed by them. Tobacco growers give importance to the practice recommended by the Central Tobacco Research Institute in different manner as well as in different proportion as evidenced by the table.

Table 27:

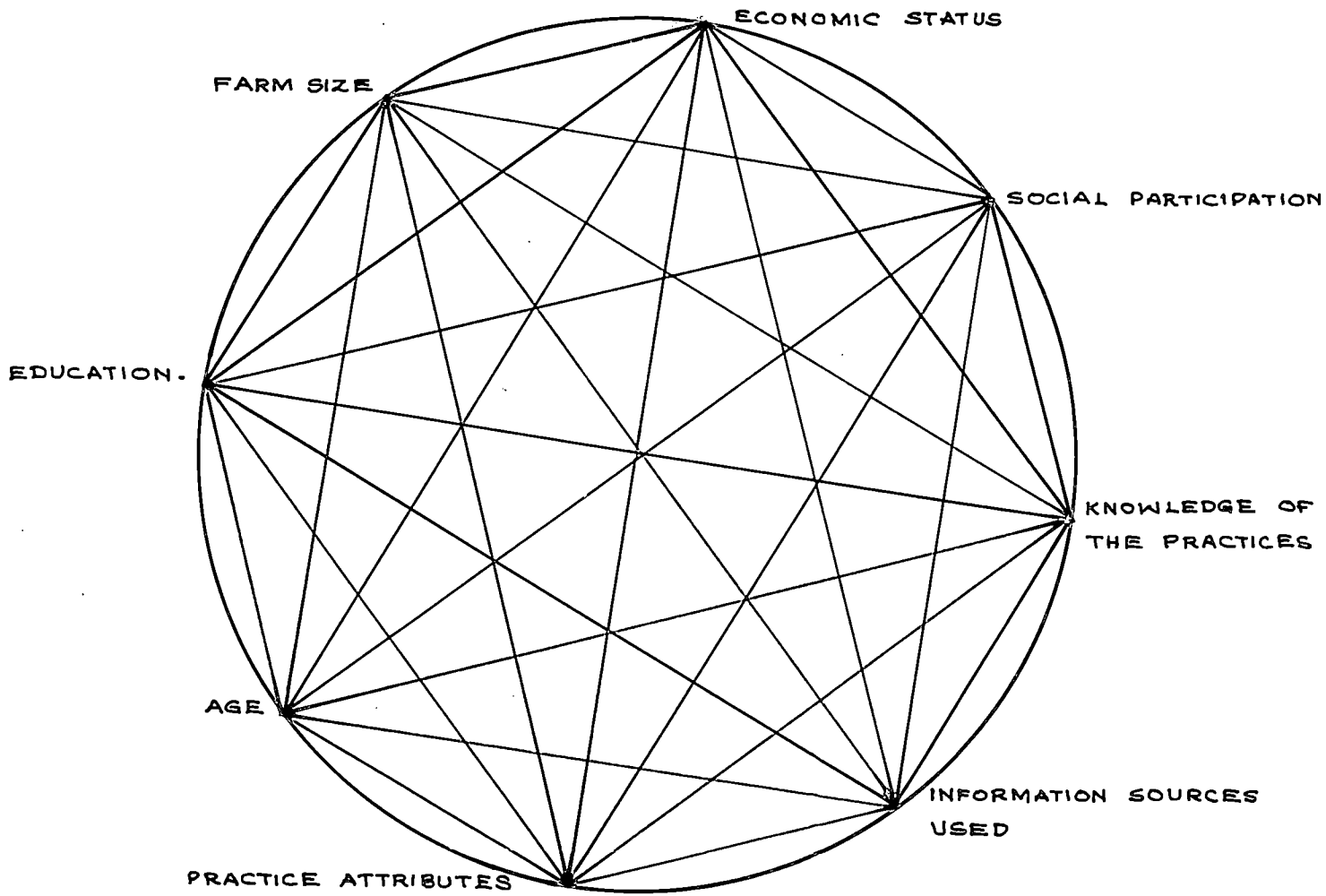
Practice attribute status	Practice attribute score	Farmers (percentage) (N=106)			
		Over adopters (N=44)	High adopters (N=25)	Medium adopters (N=19)	Low adopters (N=18)
Low	< 11	2.27	8.00	0.00	16.67
Medium	11-15	59.09	56.00	57.89	50.00
High	> 15	38.64	36.00	42.11	33.33

It is seen from the table, that more than half of the farmers from all categories are having medium practice attribute score. The table also reveals that more than one third of the farmers from all categories are having high practice attribute score.

b. Interrelationship between selected independent (situational and personal) variables.

Though certain situational and personal variables of farmers vary in respect to their extent of adoption of the recommended practices, it is likely that such an influence is possible between the variables within the tobacco farmer himself as evidenced by the table depicted b.

INTER – RELATIONSHIP OF SITUATIONAL AND PERSONAL VARIABLES OF FARMER



——— POSITIVE SIGNIFICANT

— - POSITIVE NOT SIGNIFICANT

——— NEGATIVE NOT SIGNIFICANT

FIG: 2

Table 28: Interrelationship between situational and personal variables.

X_1 = Age
X_2 = Education
X_3 = Farm size
X_4 = Economic status
X_5 = Social participation
X_6 = Market orientation
X_7 = Knowledge of the practices
X_8 = Information source used
X_9 = Practice attributes

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
X_1	-	-0.0639	0.0700	0.1300	0.056	0.0475	-0.1391	-0.1024	0.0781
X_2		-	0.3265*	0.3583*	0.1676	0.0302	0.3396*	0.1955*	0.0941
X_3			-	0.6159*	0.0179	0.0790	0.1666	-0.0405	0.0601
X_4				-	0.0864	0.0100	0.2821*	0.1253	0.1858
X_5						0.0515	0.3993*	0.3792*	0.0186
X_6						-	0.1136	0.1413	0.1500
X_7							-	0.3870*	-0.1215
X_8								-	0.0204
X_9									-

*Significant at 0.05 level.

Significant positive relationship has been seen in table 28 between education and farm size, economic status, knowledge of practices and information sources used by the farmer under study. Positive relationship also evident between farm size of the farmer and then economic status which is found to be related with knowledge of the practices possessed by the farmer. Social participation is positively related to their knowledge of the practices and the sources of information used. Similarly the knowledge of the practices positively related with information sources used by the farmer.

III The reasons for non-adoption of recommended practices.

Tobacco farmers too faces certain problems in cultivating tobacco as per the recommendation of Central Tobacco Research Institute. Attempt has been made to elicit such problems faced by the tobacco farmers in East Godavari district which has been appended below.

Table 29:

Sl.No.	Reasons	Farmers' response (percentage) (N=106)
	Varieties	
1.	Non-availability of seedlings.	69.00
2.	Low weight of leaves of the recommended variety	65.00
3.	Lack of resistance to sudden climatic changes.	23.00
4.	Non-suitability of variety to all soil types.	29.00
	Nursery	
1.	No summer ploughing done in nursery being leased lands.	35.00
2.	Pesticides application to soil are costly.	40.00
3.	Non-available and costly nursery covering material.	32.00
	Mainfield	
1.	Deep ploughing in summer, costly.	50.00
2.	Non-available and costly, of farmyard manure.	45.00

It is evident from the table, that sizeable percentage of farmers (69%), expressed that non-availability of seedlings of recommended varieties was the reason for their non-adoption of varieties. As much as 65% of

of tobacco farmers expressed the low weight of leaves as a reason for their non-adoption. 29% of farmers expressed non-suitability of the variety to their types of soil and 23% stated, lack of resistance to sudden climatic changes of the recommended variety as the reason for their non-adoption of the same.

In the case of nursery a sizeable percentage of farmers (40%) expressed that the pesticides recommended for soil application in the nursery beds is costly. 35% of tobacco farmers expressed that summer ploughing in the nursery site is not done, site being leased lands. As much as 32% farmers expressed that the recommended practice of covering the seed bed with tobacco mid-rib or paddy straw immediately after sowing is not being followed because of non-availability and the high cost of the material.

In the case of mainfield as much as 50% of farmers expressed that the recommended practice of deep ploughing by tractor or crow bar is not being done because of the cost involved in that practice. 45% of the tobacco farmers expressed that the recommended practice of farmyard manure is costly and non-available in the locality.

DISCUSSION

DISCUSSION

I. Extent of adoption of package of practices.

The data in table 1 revealed that 90.56% of the tobacco growers were just above and below the mean adoption score (97.8). Their adoption score ranged from 60 to 120. As much as 41.51% adopted farm practices over and above the extent/dose recommended by the Central Tobacco Research Institute. This might be due to their over ambitious approach in growing tobacco being a cash crop. They may have the feeling that over adoption may lead to higher crop yield and thus more profit from the crop. Table 3 has shown the difference in the extent of adoption pertaining to the package of practices followed by the tobacco growers in the nursery and mainfield. The mean adoption score of the recommended mainfield practices was higher (102.1) than that of the nursery practices (92.9). It is clear that these tobacco growers adopted practices over and above the recommendations within the mainfield. This is an indication of comparatively lesser attention given by the farmers on the recommended package of practices in preparing the nursery for tobacco cultivation. The data also indicated that among the over adopters 33 out of the 106 farmers studied were found to adopt nursery practices over and above the recommendation. At the same time 53 of

the over adopters excelled the recommendation of package of practices followed in the mainfield as indicated by the table 4. It was also seen that one third of the tobacco growers did not adopt recommended nursery practices to the desired extent. This means that the tobacco growers either used higher or lower seed rate where in both cases may result in improper growth of the seedlings.

Majority of the tobacco farmers (58.49%) used varieties not recommended by Central Tobacco Research Institute, namely, Sp. cross and F.C.V. special. Whereas, others used CTRI special and Kanakaprabha, the recommended varieties. This might be due to the lack of conviction amongst the farmers on the good qualities and high yield potential of these varieties.

The seed rate followed by a majority of farmers (79.25%) as evident from table 10, were also high, above the recommendation of the Central Tobacco Research Institute. Only one fifth of the tobacco growers used the correct seed rate, namely 2 to 3 kgs/ha. This high seed rate might be a local practice followed in local varieties of tobacco cultivation where the mortality rate of the seedling might be high.

Pertaining to application of farmyard manure to tobacco crop, (tables 6 and 13) a sizeable majority of tobacco growers (85.85%) never applied farmyard manure

for their nursery, whereas 65.09% of the farmers used it in the mainfield as a common practice. That too only 7.54% of the farmers used full recommended dose of 3 metric tons of farmyard manure per acre. Farmyard manure takes a long time to get decomposed and get mixed with the soil wherein the early growth period, namely, the vegetative leafy growth is most important. Thus quick response fertilizers may replace the use of farmyard manure.

With regard to the use of nitrogen, phosphorus and potassium fertilizers in tobacco cultivation, it is seen from table 7 and 11 that sizeable percentage of tobacco farmers applied basal doses of nitrogenous fertilizers (64.15%) as well as top dressing with nitrogen by (58.49%) in their nursery, above the recommendations of the Central Tobacco Research Institute. Nitrogenous fertilizer has also been over used in the mainfield also by 86.79% of farmers as indicated in table 14. This application of nitrogenous fertilizers far above the recommended dose might be reasoned to tobacco being a leafy cash crop. Similarly tables 8 and 15 also indicated instances of over dose of phosphatic fertilizers used by tobacco growers, both the nursery (42.45%) and mainfield (38.68%) respectively. But in this case there are sizeable percentage of farmers who used lower doses of phosphatic fertilizers. This also

coincides with the nature of crop, namely, tobacco where less importance was given to production of plant parts other than the leaf.

In respect to the use of potassic fertilizer for the tobacco crop it is interesting to note that though potash has not been recommended for tobacco nursery, 23.58% of the farmers used potash to raise tobacco seedling as per table 9. This might be due to lack of knowledge of the farmers or oversight to the fertilizer recommendations made by Central Tobacco Research Institute. But table 16 indicated that 57.55% of the farmers applied high dose of potassic fertilizers above the recommended dose. Only 12.26% farmers followed the recommended dose of 12 kgs. of K_2O per acre. Similarly a small percentage of them (13.21%) never used potash for their tobacco crop.

It is seen from table 18 that intercultivation in tobacco is a common feature, wherein only 26.42% of the tobacco growers cultivated tobacco crop with full recommended intercultivations as per recommendations of the Central Tobacco Research Institute. The remaining farmers only followed it to some extent who might not have given more attention and importance to grow tobacco. Otherwise this might be due to negligence of the farmers or it is costly to practice followed to certain farmers.

With regard to fertilizer use in the mainfield, the study revealed that the farmers used nitrogenous fertilizer to the required quantity and even more. It is interesting to note from table 14 that 86.79% of farmers applied nitrogenous fertilizer over and above the recommended dose. This practice of over fertilization of the crop may be due to the impression carried by them, in order to increase the leaf growth of tobacco. This practice could also be due to lack of proper conviction on proper fertilizer use by tobacco. At the same time it is seen from the table 15 that only 15.09% of tobacco growers used recommended dose of phosphatic fertilizer to their crop. The over adopters were also comparably less in percentage (38.68%) as compared to 86.79% of over adopters of nitrogenous fertilizers. This also supports to the prediction made on the over use of nitrogenous fertilizer, as phosphatic fertilizer had indirect relationship with leaf growth of the plant. Their lack of preference to the phosphatic fertilizer over the nitrogenous fertilizer is also evidenced by about one sixth of the farmers (15.09%) not at all using phosphatic fertilizer and two groups of farmers of 15.09% each using three fourth and half the doses of phosphatic fertilizers, recommended by Central Tobacco Research Institute. Whereas potassic fertilizers were preferred by 57.55% of the tobacco growers which is more than in the case of phosphatic

fertilizers as seen in the table 16. As much as 74 out of 106 farmers studied, followed the recommendation or even more. But as in the case of potassic fertilizers the study evidenced that 13.21% of farmers never applied potassic fertilizer to their crop. About one sixth of them (16.98%) applied three fourth of the recommended dose. When observed the adoption pattern of inorganic fertilizers, the adoption of nitrogen fertilizers was more by the tobacco growers than in the case of phosphatic and potassic fertilizers. And also observed that the percentage of farmers (86.79%) who used the nitrogenous fertilizers more than the recommended dose were high when compared to that of those who use phosphatic and potassic fertilizers. This varied response to the fertilizers may be supported by the findings of Garner (1934) who stated that nitrogen is of outstanding importance not only in its effect on the growth of tobacco but also in its influence on various elements of quality of cured leaf. Nitrogen has a specific action on leaf growth and consequently it is the nutrient which mostly influences the yield of tobacco leaf.

It is evident from the table 13 that 34.91% of farmers were not at all applying the farmyard manure in the mainfield, whereas the 11.33% of farmers used more than the recommended dose. As much as 7.54% of tobacco

farmers used the exact dose recommended by Central Tobacco Research Institute. The reasoning of the farmers for this wide fluctuation might be that the farmers had the cultivation of other crops also in both kharif and rabi seasons and hence the fluctuation. In explaining the situation these farmers were applying the farmyard manure whatever they had to the crops grown in the kharif season but in rabi season they were not in a position to apply the farmyard manure to their tobacco crop. That too the farmyard manure become scarce at the time and too costly. Thus they might be managing with inorganic fertilizers alone.

This study is in conformity with the studies by Raper and Tappen (1943), Brander and Straus (1959), Toussaint and Stone (1960), Gold Stein and Eichhorn (1961), who have concluded that over adoption occurs from insufficient and incorrect knowledge of the innovation.

In general this study on the extent of adoption of package of practices, has revealed that the sizeable percentage of farmers have adopted above the recommendations. The reason for over adoption might be due to low level of understanding or low level of knowledge of the package of practices. It is seen from the table 22, in the category of over adopters that illiterate farmers were 34.1%, farmers with primary education were 36.36%

and only 29.54% of farmers were educated above primary level. So this indicated that education status of farmers was low in over adopters. It is also seen from the same table that illiterate farmers were more in over adopters than high adopters. From the table 25 it is seen that only 11.36% of over adopters were having high knowledge about the practices. Remaining percentage of farmers (88.63%) were having middle and low knowledge about the practices. It is also seen from the same table that the percentage of individuals who were having low knowledge about the practices were more in over adopters (18.18%) than high adopters (12.00%) medium adopters (10.53%) and low adopters (16.67%). From this it could be concluded that farmers belonging to over adopters were mostly not having the full knowledge about the practices and they were also illiterate which might have led them towards over adoption.

This study revealed that there was a positive relation between education and adoption behaviour of the farmer. And also revealed that there was a positive and significant relationship between education and knowledge of the practices.

The absence of education and knowledge of practices, shall lead to either over adoption or medium adoption or low adoption.

In general with regard to the package of practices recommended by Central Tobacco Research Institute, it is evident that especially fertilizer application to tobacco has been done by farmers over and above the recommendations. This over importance shall be due to tobacco being a cash crop and also lack of proper conviction through experimental demonstrations on the quantity of fertilizers to be used by them. Lack of damonstration also holds true with regard to their lack of convication on the superiority of the varieties namely, CTRI spl. and Kanakaprabha, recommended by Central Tobacco Research Institute.

II. A. Relationship of the selected variables with adoption behaviour.

Out of nine variables examined in this study, the correlation between adoption with age and education have shown significant relationship at 0.05 level. Farm size, economic status, social participation, market orientation, knowledge of the practices, information sources used and practice attributes were not found to be significant.

1. Situational variables.

a. Farm size: As regards farm size, the relationship with adoption was not significant. This finding was in conformity of the findings of Rajendra (1968), Grewal and Sohal (1971), Supe and Salode(1975) whose studies

did not reveal any significant relationship between farm size and adoption.

However this study was in contrery of the previous studies on adoption did indicate that adoption was significantly and positively associated with farm size. Some of such studies are Rao (1968), and Reddy and Kivilin (1968) indicated that farmers with big holdings had enough financial resources and hence could adopt more practices. Nair (1969), Jaiswal, Roy and Singh (1970), Jaiswal and Singh (1971), and Perumal and Duraiswamy (1972) have also observed similar association between size of holding and adoption of different practices.

Looking to the size of farm holdings of tobacco growers in table 19, it is seen that more than three fourth of the farmers had an area between 3 and 27 acres of land. All the eighteen low adopters were big farmers. Their low adoption characteristic seems to be related to high acerage of land holding. The same table indicates that the small farmers were medium and above in adopting the recommended package of practices in tobacco cultivation. This might be due to their ambition to maximise their production from their small farms. A study of distribution of farm size of the respondents as given

in table 19 reveals that they did not vary much in their level of holdings of farm size and hence this variable did not show a significant influence on adoption.

b. Market orientation: As regards market orientation the relationship between adoption and market orientation was not found to be significant. This finding was in conformity of the findings Singh and Singh (1970) whose studies did not reveal any significant relationship between market orientation and adoption.

However in contrary to this finding many of the previous studies on adoption did indicate that adoption was significantly and positively associated with market orientation. Some of the such studies are Beal and Sibley (1967), Nair (1969) and Perumal (1970) who stated that farmers who perceived a good market and price for the produce of high yielding varieties adopted the varieties more than the other farmers who had an unfavourable orientation. Absence of good market and low price for the produce were the main reasons mentioned for non-adoption of high yielding varieties. From these it can be concluded that market orientation is important which affect adoption.

It is seen from the table 20 that nearly half the number of farmers of all categories of adopters except under medium adopters, had medium level of market

orientation. This means that nearly half of them were better informed about the marketing of tobacco and about one sixth of the same categories of adopters had high market orientation. At the same time about one third of the tobacco growers found to be least informed about its market. This might be due to their lack of education and information sources used to acquire the information on the market. From the distribution of market orientation score of the respondents as given in the table 20, it was evident that all these four categories did not differ very much in their market orientation score and hence this variable did not show significant influence on adoption.

ii. Personal variables.

a. Age: Relationship between adoption and age was significantly and negatively associated with adoption. This means that age increases gradually rate of adoption decreased. On the other hand this finding indicated that middle aged and young farmers will adopt more than older people. This finding was in conformity of the findings of Choudhary (1967) who stated that middle age was favourable than old age for adoption of package of practices. Sarkar (1970) stated that age of the farmer influenced farmers to adopt the farm practices mainly for economic gains. Ambalagon (1974) stated that adopters of practices were mostly young.

However in contrary to this finding many of the previous studies on adoption did not indicate any relationship with adoption. Some of the such studies were Rajendra (1968), Patel and Singh (1970), Jayarama Reddy and Bhaskara Reddy (1972) and Chandrakandan (1973).

Table 21 indicated that about half the number of farmers in all the adopter categories were middle aged between 36 to 50 years. More than one third were young except in low adopters group and were less than 35 years. Only a small number of farmers were 51 and above. Among them the low adopters were more than the other categories (16.67%). It was evident that middle aged farmers were better adopters who were followed by the younger generation. This might be due to their confidence and experience gained in growing and marketing the cash crop. From the distribution of age groups as given in the table 21 of different categories of adopters did differ very much and hence this variable did show a significant influence on adoption.

b. Education: Education was found to be significant and positively related with adoption. This finding was in conformity to the findings of Dose (1965), Patel (1967), Rogers et al (1969) who have reported that there was significant and positive relationship between education level of the farmer and adoption of high yielding varieties.

Singh and Singh (1970) stated that education status of the family was significantly contributing in explaining the adoption behaviour of the farmer. Grewal and Sohal (1971), Jha and Shaktawat (1972) also stated that the higher educational level of farmers contributed in favour of the speed of farm innovations.

However in contrary to this finding many of the previous studies on adoption such as Wilkening et al (1962), Singh (1967), Nair (1969), Reddy and Reddy (1972) and Supe and Salode (1975) did not reveal any significant relationship between education and adoption.

Education of the farmers showing a different trend to that of their age, farm size and level of market orientation, it is seen from the table 22 more than one third of the illiterate farmers (34.10%) and one third of those who had primary education (36.36%) were over adopters. This might be due to their followership of their neighbour farmers who might be progressive. Half of the medium adopters (52.58%) and low adopters (50%) were illiterate. This might be due to their inability to understand and lack of knowledge pertaining to the package of practices recommended by the Central Tobacco Research Institute. A study of the distribution of education score of the respondents as given in the table 22,

revealed that different categories of the adoption did differ very much and hence this variable did show a significant influence on adoption.

c. Economic status: With regard to economic status of tobacco growers its relationship with adoption was not found to be significant. This finding is in conformity with Supe and Salode (1975) stated that the relationship of socio-economic status with adoption level was found to be not significant. The reason for this might be the extensive farming followed by big land holders. Due to large holding they might not be in a position to pay close attention to their farms.

However in contrary to this finding many of the previous studies on adoption did indicate that adoption was significantly and positively associated with economic status. Some of the such studies are Ratanchand and Gupta (1966) that the innovators and early adopters were enjoyed better economic status. Inderjit (1970) stated that economic status played an important role in adoption of recommended practices. Jha and Shaktawat (1972) stated that higher economic status of the farmer greater would be the adoption of hybrid bajra.

Table 23 indicated that more than two third of the tobacco growers, irrespective of their adoption behaviour

maintained a medium economic status. Whereas one fourth of the high adopters group (24%) and medium adopter group of farmers 31.58% were found to possess high economic status. Of the 44 over adopters studied all most all the over adopters (93.18%) were land lords. In general the table indicated that a sizeable majority of the farmers were economically well-off, which can be bestowed towards growing the cash crop. A study of the distribution of economic status score amongst the respondents as seen in the table 23, revealed that different categories of the adopters did not differ very much and hence this variable evidenced no significant influence on adoption.

d. Social participation: As regards to social participation, its relationship with adoption was not found to be significant. This finding is in conformity with the findings of Singh and Singh (1970) who stated that social participation was not significantly contributing to the adoption behaviour of the farmer. Similarly Bellan (1973) stated that social participation had no association with the influence of extension methods at any stage of adoption for any practice.

However contrary to this finding many of the studies by Sinha (1963), Roy et al (1968), Nair (1969) and Sundaraswamy (1971) who stated that social participation was significantly and positively related to the adoption.

It is interesting to note from the table 24 that more than half the number of farmers especially a high percentage of low adopters (88.88%) were found to belong to low group in their extent of social participation. In general, the tobacco growers never seem to give emphasis to mix with their community of tobacco growers. This behaviour may be due to their financial stability and status being traditionally acquired by growing the cash crop continuously. More or less these farmers seems to be big landlords and might be staying away from each other, thus lacking opportunities for social contacts. A study of the distribution of social participation score of the respondents as given in table 24, revealed that the different categories of adopters have not shown any difference in their social participation and hence this variable did not show any significant relationship with adoption of recommended package of practices in tobacco cultivation.

e. Knowledge of the practices: Knowledge of the practices, amongst the tobacco growers was found to have no relationship with adoption. This finding is in conformity with the study by Sinha and Bhasin (1968) who stated that adoption or rejection of agricultural innovation was the result of interaction of multitude of factors. The same factors which lead to easy and quick adoption, might lead

to its slow and low adoption or rejection. Easy and timely availability of material for instance might be associated with adoption of improved farm practices whereas untimely availability might result in its low adoption and at times even rejection. Lastly, they have pointed out that physical and economic factors were in fact limitations towards adoption of High Yielding Varieties in a country like India. The factors like irregular supply of materials, in sufficient knowledge of the practices, lack of money, poor credit facilities, poor communication were the factors studied. They did not reveal any significant relationship between knowledge of the practices and adoption.

However contrary to this finding many of the studies such as Gupta (1965), Roy (1967), Singh and Singh (1970), Choukidar and George (1972), Parameswaram (1973) and Ambalagan (1974) have stated that there was a significant and positive relationship between knowledge of the practices and adoption.

Pertaining to the extent of knowledge on the recommended package of practices among the farmers table 25 showed that a sizeable majority or two third of the tobacco growers had medium level of knowledge. One fourth of the high adopters (24%) had good knowledge on improved methods of tobacco cultivation. A study of the distribution of

knowledge of the practices score of the respondents as given in table 25, it was evident that the different categories of adopters have not shown any significant difference in their knowledge score on the practices and hence this variable did not show significant relationship with adoption.

f. Information sources used: With regard to information sources, their relationship with adoption was not found to be significant. This study is in conformity with the study by Singh and Singh (1970) revealed that personal localite and personal cosmopolite sources of information were not significantly contributing in explaining the adoption behaviour of the farmer. Supe (1971) revealed that the adoption of a particular innovation was a result of one's decision-making and therefore the informal information sources were not effective in making the farmer accept innovations.

However contrary to this finding many studies have showned significant and positive relationship with adoption. Some of the such findings were Moulik (1965) stated that different sources of information at interest stage tend to increase the level of adoption. Lakshmanna and Satyanarayana (1967) stated that for effective agricultural development through the adoption of innovation, the source of information have to be strengthened to play bigger part.

Sundaraswamy (1971), and Perumal and Duraiswamy (1972) have stated that contact with extension agency, listening to radio programmes and reading newspapers and farm journals had influenced the adoption of several practices. Zeaudeen and Srinivasan (1977) stated that the sources of channels of supply of information on improved technology greatly influenc its adoption by farmers.

It was evident from the table 26 that about two third tobacco growers belonged to all the four adopter categories who used sources of information to acquire knowledge on improved practices followed in tobacco cultivation. Whereas about one fourth over adopters (20.45%) and high adopters (24%) necessarily sought information to a greater extent which might be the reason for their higher attitude towards adopting the recommended package of practices. A study on the extent of information sources used scored by the respondents of different categories of adopters given in table 26, evidenced that the information sources used score of the respondents of different categories did not differ very much and hence this variable did not show significant relationship with adoption of improved practices in tobacco cultivation.

8. Practice attributes: Practice attributes did not show any relationship with adoption. In contrary to this finding Rivin (1960), Kalkar and Sohoni (1965), Roy (1966),

Mitra (1968), Kandan (1973), and Komi and Sohal (1975) have stated that there was a significant and positive relationship with adoption.

According to the table 27, almost all the adopters, except those in the low adopters group (16.67%) were found to attribute the package of practices recommended by Central Tobacco Research Institute. One third of them gave high attributes to the practices. This might be due to their experience and confidence developed in following practices and thus earning a better income from the crop. A study of the distribution of practice attribute scores of the respondent given in the table 27, revealed that practice attribute scores of the respondents of different categories did not differ very much and hence this variable did not show significant relationship with adoption.

The relating with the personal variables of the tobacco growers and their extent of adoption of improved farm practices by different categories of adopters among the tobacco growers, it is seen that half and more than half of farmers irrespective of the adoption category, who belonged to middle aged between 36 and 50 years, with a mediocre economic status, medium practice attributes with medium knowledge of the practices recommended by the Central Tobacco Research Institute. Whereas a sizeable

percentage or one third of the farmers were found to be young below 35 years and illiterates.

Among the over adopters, the tables pertaining to the personal variables revealed that a sizeable majority of them had low social participation (65.91%) who were young (40.91%). Amongst them a majority of farmers with medium level of knowledge (70.45%) belonged to medium economic status (77.27%) and used medium information sources (59.10%) who also attributed (59.09%) to the package of practices recommended by Central Tobacco Research Institute.

Among the high adopters, the data indicated similar low social participation wherein half the group between 36 and 50 years of age (52%), were with primary level of education (48%), medium economic status (60%), medium level of knowledge (64%) of the package of practices. Similarly amongst them, more than half the number of farmers used the information sources (60%), attributing mediocre importance (50%), to the recommendation made by the Central Tobacco Research Institute.

Regarding medium adopters, more than half of them (52.63%) were also middle aged and a higher percentage amongst them (63.13%) were with medium economic status. But a sizeable majority of them had medium level of knowledge (84.21%) who assigned medium attributes to

practices (57.89%) with medium use of information sources (68.42%). One third amongst them had above primary education (31.63%).

A very high percentage of the low adopters too (83.88%) socially participated low amongst the tobacco community in the area. Half of them were middle aged (55.55%) and paid medium attributes to package of practices. Whereas high percentage of low adopters acquired medium level of knowledge (77.78%) and used information sources to a certain extent (66.67%). Two third of them were found to be with medium economic status (77.77%).

B. Relationship between the selected variables on the farmers' extent of adoption.

Interrelation between the selected independent variables evidenced by the table 28 showed significant relationship between education and other individual variables studied especially farm size, economic status, knowledge of the practices and information sources used. In conformity with this findings Patel (1967) stated that the farmers with larger farm size and higher economic status were educated. Singh and Brahmjit (1964) stated that education was positively correlated to the increase in knowledge. Bhaskaran and Mahajain (1968) stated that education in

general had shown a close positive relationship in retention of knowledge and acceptance of the practices. Rai (1965), Jha and Singh (1966), Prasad and Singh (1971) have stated that the impact of farmers education seems to have been significant in their use of information sources and also stated that education is positively related in information seeking habit. This might be due to relativity between the educated economically viable farmers who are likely to come in contact with information sources. These economically well off farmers were able to adopt the practices as per the recommendation or over and above the recommendations of the Central Tobacco Research Institut Similarly, economic status of the farmers was also found to be significant with their practical understanding and utilization of the package of practices recommended by Central Tobacco Research Institute. In conformity with these findings Behera and Sahoo (1975) found that bigger farmers having comparatively higher economic status had better knowledge on improved farming practices.

Similarly the farmers' know-how on the practice were found to be significantly related to their extent of social participation, and extent of information sources used. In conformity with these findings Ray (1967) stated that village organisations helps to widen the outlook of the

farm people and make them receptive to the new ideas, Sankaraiah and Singh (1967) stated that if the farmers is associated with higher credible sources, his knowledge of improve methods of vegetable cultivation will increase. The relationship between the know-how of farmers and social participation is also true as farmers could increase their understanding on various improved practices through meetings and discussions with other farmers of the locality. Similarly the farmer's social participation was found to be significantly related to their extent of information sources used by them. This finding is in conformity with the study of Prasad and Sinha (1971) who stated that social participation was associated with use of various categories of information sources at all the stages of adoption supported by Sundaraswamy (1971).

III. Reasons for non-adoption of recommended practices.

While studying the problems expressed by tobacco growers, it is seen in table 29 that two third of the tobacco growers, have reasoned low market facilities as well as non-availability of the seedlings of Kanakaprabha and CTRI special varieties recommended by Central Tobacco Research Institute. A few amongst them also complained lack of resistance to sudden climatic changes and non-suitability of the varieties to all soil types. These

reasoning by the tobacco growers evidences the need for more adoptive trials of the recommended variety in different localities and regions in the state.

With regard to the practices recommended for the nursery which has been mentioned to be costly, pesticides shall be made available to the tobacco growers on subsidised rates. The farmers use leased land for nursery as their fields were clayey and thus unsuitable for raising tobacco nursery. Mixing sand with clay for nursery purposes, increased the cost of raising seedling by them. This can be solved through raising community nursery in suitable localities on an economical basis.

SUMMARY

S U M M A R Y

Though F.C.V. Tobacco cultivation is in vogue since 1928 and has gained substantial increase in acreage during the last two decades the average per hectare yield has not gone up beyond 750-800 kgs/ha. With the advent of research on this important cash crop, the Central Tobacco Research Institute, Rajahmundry, has evolved a package of practices for profitable production of the crop in traditional black soils as well as the light soils of Andhra Pradesh. By adopting these improved package of practices, the per hectare yield could easily be brought to the level of 1,400 kgs/ha. Hence it could be assumed that the farmers may not following or may be due to the low level of adoption of the package of practices recommended by Central Tobacco Research Institute for tobacco cultivation. In the absence of the details of adoption of the recommended practices of Central Tobacco Research Institute by the tobacco growers, this study has been taken up for the purpose.

Objectives.

1. To assess the extent of adoption of package of practices recommended by Central Tobacco Research Institute, Rajahmundry.
2. To study the relationship between extent of adoption by the farmers and their selected situational and personal variables.

3. To explore the reasons for non-adoption of recommended practices, if any.

Adoption is a multivariate phenomenon involving the interaction of many factors. Past studies on adoption have brought to light innumerable variables that affect the adoption behaviour. The following important variables were selected for the study.

Dependent variable: Adoption of package of practices by tobacco growers.

Independent variables of the tobacco growers.

i. Situational variables.

a. Farm size.

b. Market orientation.

ii. Personal variables.

a. Age.

b. Education.

c. Economic status.

d. Social participation.

e. Knowledge of the practices.

f. Information sources used.

g. Practice attributes.

Based on their theoretical concepts, hypotheses were framed to test their significance.

This study was conducted in East Godavari District of Andhra Pradesh. Two blocks namely, Rajanagaram and Korukonda were purposively selected. Four villages, two from each block were selected at random for the study. The selected villages were Thorredu, Katheru from Rajanagaram block and Chinnakondepudi, Raghudevapuram from Korukonda block. Probability proportionate sampling was used to decide the sample size from each village. 106 farmers were selected at random from 4 villages for the study.

Empirical measures were developed to quantify the variables included in this study. Adoption behaviour, the dependent variable of this study, was measured by the Adoption Quotient scale developed by Singh and Singh (1974) which was a slight modification of the Adoption Quotient scale developed by Chattopadhyay (1963). Number of acres cultivated was taken as the measure of farm size. Education, economic status and social participation were measured by the scoring system followed by Trivedi (1963). Knowledge of practices was measured by a technique developed by Singh and Singh (1974). A four point rating scale was used to quantify the information sources used. Perception of practice attributes namely, simplicity-complexity, cost of innovation, profitability and suitability were measured by five point attribute perception rating scale. Market orientation was measured by a schedule developed for this study.

The data was collected from 106 farmers using an interview schedule. The collected data was further analysed.

Parametric tests like zero order correlation, standard deviation and mean values used for analysis of the data. The level of probability fixed for the acceptance of hypothesis was 0.05 level.

The findings of the study.

A. General adoption pattern of the package of practices recommended for tobacco cultivation.

41.51% of farmers were over adopters, who adopted the practices above the level/dose of the recommendations made by the Central Tobacco Research Institute, Rajahmundry. Amongst the tobacco farmers studied, 23.58% of farmers were high adopters of the package of practices. Whereas 17.92% and 16.99% of farmers were medium and low adopters respectively.

Over adoption was found to be more (50%) in the case of mainfield practices like fertilizers etc. rather than in the nursery practices (31.73% of farmers) recommended by Central Tobacco Research Institute. Over adoption was also noted in nursery practices like, seed rate, fertilizers t

Only 41.51% of farmers used CTRI Spl. and Kanakaprabha varieties recommended by Central Tobacco Research Institute. In the case of farmyard manure for raising seedlings, 85.85%

of farmers were never using the manure and whereas 14.15% of farmers used, but below the recommended dose. As much as 64.15% of farmers used the nitrogen fertilizer as basal dressing for their nursery above the dose recommended by the Research Institute. 18.87% and 16.98% of farmers followed the full recommendation and not at all used nitrogen for their nursery as basal dressing respectively. In the case of phosphorus fertilizers recommended by Central Tobacco Research Institute for tobacco nursery, a sizeable percentage (42.45%) of farmers used above the recommended dose. 29.25% and 28.30% of farmers used a low dose of phosphorus and full recommended dose respectively for their nursery as basal dressing. Though there was no specific recommendation in the case of potassic fertilizers as a basal dress for nursery, 23.58% of the tobacco growers applied the potassic fertilizer to their nursery as basal dressing. As much as 79.25% of farmers used seed rate higher than the one recommended by Central Tobacco Research Institute. 20.15% of the tobacco growers strictly adhered to the recommendation. 58.49% of farmers used the nitrogen as top dressing above that of recommendation of the Institute and 39.62% of farmers used nitrogen exact recommended dose.

A sizeable percentage of tobacco farmers (44.34%) have not done deep ploughing either by tractor or crow-bar in their mainfield but 33.96% of farmers have ploughed deeply

to their tobacco field using either tractor or crow-bar once in two years which was the recommendation of Research Institute. In the case of farmyard manure recommended to be applied in the mainfield, a sizeable percentage (34.91%) of farmers never did so. 28.30% of tobacco farmers followed three fourth of the recommendation and 7.54% of farmers applied the full recommended dose of farmyard manure to their fields. 86.79% of tobacco farmers applied nitrogenous fertilizer above the recommended dose and others followed the recommendation. Phosphatic fertilizers has been applied by 38.68% of farmers above the recommendation of Research Institute. Whereas 15.09% of tobacco farmers followed the recommendation in full. Remaining farmers either applied small quentities or nil. A sizeable percentage of farmers (57.55%) used potassic fertilizer to their fields above the dose that has been recommended by the Research Institute. 12.26% of farmers followed the recommendation and the remaining never did so. Majority of the farmers followed different spacings lesser than 32"x32", the recommendation of the Central Tobacco Research Institute. 26.42% of tobacco farmers practised full recommendation, namely four intercultivations in their tobacco field. As much as 45.28% of the farmers intercultivated their crop three times. Whereas 27.36% of the tobacco practised intercultivation two times in their mainfield.

B. Relationship within and between selected situational and personal (Independent variables) factors with adoption behaviour of the farmer (Dependent variable).

Out of nine variables studied, education was found to be positively and significantly related with adoption. Though age was found to be significant, it was found to be negatively related with adoption. Other variables such as market orientation, farm size, economic status, social participation, knowledge of the practices, information sources used and practice attributes were found to be positively related but not significant.

Education was found to be positively and significantly related to farm size, economic status, knowledge of the practices and information sources used. At the same time farm size was found to be positively and significantly related to economic status which was positively related to knowledge of the practices. Study evidenced that social participation was positively and significantly related to knowledge of the practices and information sources used by tobacco growers. Knowledge of the practices was found to be positively and significantly related with information sources used.

REFERENCES

REFERENCES

Ambalegan, S. (1974). A Study of Factors Influencing Adoption of Package of Practices for H.Y.V. of Paddy. PP.66. in Post-Graduate Research in Extension. Eds. Johnknight, A. and Subramaniam, V. (1976). T.N.A.U. Coimbatore.

Anonymous. (1950). Extension at Work in Lafourche Publication 1054, Louisiana State University and Agril.Mech.College, Div. of. Agril. Extn.

Barnett, H.G. (1953). Innovation. Mac-Graw Hill Book Company, New York, Toronto, London. 1st Ed. PP: 357-377.

*Beal, G.M., and Bohlen, J.M. (1957). The diffusion process. Ames: Iowa Agril. Ext. Ser. special report 18, (March 1957).

*Beal, G.M., and Rogers, E.M. (1960). The Adoption of Two Farm Practices in a Central Iowa Community. Agricultural and Home Economics Experiment Station, Iowa State University of Science and Technology, Ames, Iowa Special Report (26).

*Beal, George, E., Blount, Rose, C., Powers, Ronald, C., and Johnson, John, W. (1966). Social Action and Interactio in Programme Planning. Ames, Iowa: The Iowa St. University Press.

*Beal, G.M., and Sibley, E.H. (1967). Adoption of Agricultural Technology by the Indians of Guatemala. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa, Rural Sociology Report (62).

*Bee, L.S. (1939). Attitude differentials in a New York Rural Community. Cornell University, Ph.D. Thesis, P.121.

Behera, C., and Sahoo, N.S. (1975). Impact of National Demonstration as Adoption of Agricultural Practices. Indian Journal of Extension Education 11 (1 & 2): 32-39.

Belcher, John, C., (1951). Evaluation and Restranardiza-tion of Newell's Socio-economic Status Scale. Rural Sociology, 16: 253.

Bellan, T.S. (1973). A Study on the Relative Effectiveness of Extension Methods in the Adoption Plant Protection Practices for Potato in Cotacamund Block-Nilgiris District. PP.50 in Post-Graduate Research in Extension Eds. Johnknight A., and Subrahamaniam,V. (1976). T.N.A.U., Coimbatore.

Bertrand, A.L. (1958). "Rural Sociology" Mac-Graw Hill Book Company, INC, New York Toronoto, London.

Bhaskaram, K., and Mahajan, B.S. (1968). Effectiveness of Extension Methods in gaining knowledge about and Acceptance of Agrosan (GN) Seed Treatment to Cotton. Indian Journal of Extension Education, 4 (3 & 4): 28-33.

Bohelen, Joe M., and Beal, George, M., (1966). Sociological and Social Psychological factors related to credit use patterns. Mimeographed. Ames, Iowa, Department of Economics and Sociology, Iowa State University of Science and Technology.

Bose, S.P. (1965). Socio-cultural factors in Farm Efficiency Indian Journal of Extension Education (1): 192-199.

Brander Lowell., and Straus A. Murray, (1959). Congruence Versus Profitability in the Diffusion of Hybrid Sorghum, Rural Sociology, 24: P. 381-383.

Bruchinal,G. (1959). Agreement of Occupational Prestige as ranked by two empirical occupational prestige scales. The Journal of Social Psychology, 50: 355.

Champawat, J.S., and Intodia, S.L. (1970). Sources of Information at the Various Stages of Adoption of the Weedicides. Indian Journal of Extension Education, 4 (1 & 2): 116-118.

Chandrekandan, K.(1973). A Study on Farm Practice Attributes and Socio-Personal Factors of Farmers in Relation to Adoption of Agricultural Practices in Tanjavour District, Tamil Nadu, PP: 52 in post-graduate research in extension, Eds. Johnknight, A. and Subrahemaniam,V. (1976). T.N.A.U. Coimbatore.

Chapin, F. Stuart. (1928). A Quantitative Scale for Rating of Home and Social Environment. A first approximation of the measurement of socio-economic status. Journal of Educational Psychology, 19: 99.

Chattopadhyay, S.N. (1963). A Study Some Psychological Correlations of Adoption of Innovation in farming. Ph.D. Thesis, New Delhi, India, Library, Indian Agricultural Research Institute.

Choudhary, K.P. (1967). Farmers Response to Far Planning Programme in an IADP Block, Proceedings of Research Foundation Bull, B.A.C., Sabour(6 & 9):119-122.

Choukidar, V.V., and George, P.S. (1972). Adoption Behaviour and Characteristics of Farmers. Indian Journal of Extension Education, 8 (3 & 4): 40-55.

*Coleman, A.L. (1955). How Farm People Accept New Ideas. Agril. Extension Bureau. Iowa State College. Pp. 1-10.

*Copp, J.H. (1958). Towards Generalization in Farm Practices Research. Rural Sociology. 23: 103-111.

*Copp, J.H., Sill, M.L., and Brow, E.T. (1958). The function of information sources in the Farm Practices Adoption Process. Rural Sociology, 23 (June 1958).

Das, K.K., and Sarkar, R.D. (1970). Economic Motivation and Adoption of Farm Practices. Indian Journal of Extension Education 6 (1 & 2): 103-107.

Desai, D.K., and Narayana, A.V.S. (1967). Planningand Implementation in Agriculture, Studies as High Yielding Varieties Programme Vol.3 Hybrid Maize in Madhya Pradesh, Ahmedabad, Faculty for Management in Agriculture and Co-operations, Indian Institute of Management, Mimeographed.

Desai, B.K., and Desai, M.P. (1968). New Strategy of Agricultural Development in operation. A case Study in Kaira District in Gujarat. Vallath Vidhyanagar, Agro. Economic Research Centre, Sardar Patel University, Mimeographed.

Dewey, R., and Humber, W.J. (1956). An Introduction to Socio-Psychology, New York, The Mac. Millan Company.

Dhaliwal, A.S., and Sohal, T.S. (1965). Extension Contacts in Relation to Adoption of Agricultural Practices, Indian Journal of Extension Education 1 (1): 58-62.

Directorate of Economics and Statistics, Ministry of Food, Agriculture, Community Development and Co-operation, Government of India (1967). Report on the High Yielding Varieties Programme. Studies in Eight Districts, Kharif 1966-67, New Delhi.

Duncan, J.A., and Kreetlow, D.W. (1954). Selected Cultural Characteristics and Acceptance of Education Programme and Practices. Rural Sociology 19: 349-357.

*Emery, F.E., and Oeser, O.A., (1958). Information, Decision and Action Carlton: Melbourne University Press.

*Fliegel, F.C. (1956). A Multiple Correlation Analysis of Factors Associated with Adoption of Farm Practices. Rural Sociology 21: 284-295.

Garner (1934). Source: "Investigation on the effect of foliar application of nitrogenous fertilizers on chewing tobacco". Thesis submitted by Sukumaran K.M. 1963.

Goldstein, Bernice, and Eichhorn, Robert, L. (1961). The Changing Protestant Ethic: Rural Patterns in Health, Work and Leisure, American Sociological Review 26: 557-565.

Gosh, M.C. (1969). A Study of High Yielding Varieties Programme in the District of Birbhum, West Bengal, with Reference to Kharif Paddy 1968-69. Agro-Economic Research Centre, Viswa Bhatati, Santhiniketban, Mimeographed.

Gran, S.(1956). Class and Conservatism in the Adoption of Innovation. Human Relation 9: 91-100.

Grewal, I.S., and Sohal, T.S. (1971). Comparative Role of two social system in the speed of Adoption of Some Farm Practices. Indian Journal of Extension Education, 7 (1 & 2): 1-6.

Gross, N. (1949). The Differential Characteristics of Accepters and Non-Accepters of an Improved Agri.Technological Practices. Rural Sociology 14: 148-56.

Gross, N., and Taves, M.J. (1952). Characteristics Associated with the Acceptance of Recommended Farm Practices. Rural Sociology 17: 321-327.

Gupta, D.D. (1965). Adoption of Agricultural Practices by Indian Farmers. M.Sc.(Ag.) Dissertation. Research in Extension Education: 351.

Gupta D.P. (1967). The High Yielding Varieties Programme 1966-67. A Study in District of Aligarh, Uttar Pradesh. Agro-Economic Research Centre, Delhi University Mimeographed.

Gupta, D.P. (1968). Evaluation of High Yielding Varieties Programme, Rabi 1967-68. A Study of Mexican Wheat in Saharanpur District in Utter Pradesh. Agro-Economic Research Centre, Delhi University Mimeographed.

*Hess, C.V., and Miller, L.F. (1954). Some Personal, Economic and Sociological Factors Influencing Dairy Men's Actions and Success. State College, Pensylvania Agrl.Exp.Station. Bulletin 577 (June 1954).

Hoffer, C.R. (1942). Acceptance of Approved Farming Practices Among Farmers of Dutch Discent. East Lansing: Michigan Agricultural Experiment Station Special Bulletin. 316 (June 1942).

Inderjit Sekhon. (1970). The Effectiveness of Television as a medium of Communication for Imparting Scientific know-how to the Farmers. Indian Journal of Extension Education: 6 (1 & 2): 90-95.

Jaiswal, N.K. (1965). A Study of Factors Associated with Low Level of Adoption of Improved Agricultural Practices. Ph.D. Thesis, New Delhi, Div. of Agril. Extn. Indian Agricultural Research Institute.

Jaiswal, N.K., and Singh, N.P. (1968). Farmers Response to Innovation in Farming. A Study in Two East Bihar Villages, Journal of Agricultural Research, Bhagalpur University. 1 (1): 36-46.

Jaiswal, N.K., Roy, N.K. and Singh, B.S.P. (1970). Effects of Size of Holding and Irrigation Facilities on Adoption of High Yielding Varieties. Indian Journal of Extension Education 6 (1 & 2): 8-16.

Jaiswal, N.K., Singh, N.N., and Singh, B.S. (1971). A Study of Interactional Association of Selected Factors with Innovativeness in Farming. Indian Journal of Extension Education 7 (3 & 4): 110-116.

Jayarama Reddy, K., and Bhaskar Reddy,C. (1972). Adoption of Improved Agricultural Practices in Andhra Pradesh. Indian Journal of Extension Education 8 (1 & 2): 14-23.

Jha, P.N., and Singh, B.R.(1966). Utilization of Farm Information as Related to Characteristic of Farmers. Indian Journal of Extension Education 1 (4):294-301

Jha, P.N., and Shaktawat, G.S. (1972). Adoption Behaviour of Farmers towards Hybrid Bajra Cultivation. Indian Journal of Extension Education 7 (1 & 2): 24-31.

Johnson, C.L., and Naver, C.B. (1953). Decision making Principles in Farm Management. Kentucky Agril. Expt. Stn. Bul. 593.

Kar, L.N., Misra, L., and Choudhuri, U.C. (1970). Impact of Extension contacts in Influencing Farmers in Adoption of Some Selected Innovations. Indian Journal of Extension Education 6 (3 & 4): 83-96.

Kelkar, M.G., and Sohoni, A.V. (1965). Role of Farm Practices - Attributes in Adoption of Improved Agricultural Practices. Indian Journal of Extension Education 1 (3): 223-230.

Kivin, Joseph, E. (1960). Characteristics of Farm Practices Associated with Rate of Adoption. Ph.D. Thesis. Univ. Park, Pennysylvania State Univ.

Kolb, John H. and Brunner, Edmund des. (1952). A Study of Rural Society. Boston, Houghton Mifflion Company, PP.256.

Lakshmanna,C., and Satyanarayana, M.(1967). Sources of Information in the Adoption of Improved Agricultural Practices. Indian Journal of Extension Education 3 (3): 122-126.

Lionberger, H.F. (1955). Information-seeking Habits and Characteristics of Farm Operators, Columbia, Missouri Agricultural Experiment Station Research Bulletin (April 1955).

Lionberger, H.F. (1960). Adoption of New Ideas and Practices. Ames. Iowa State University Press.

Lionberger, H.F., and Coughenour, C.M. (1960). Social Structure and Diffusion of Farm Information. Columbia: Missouri Agricultural Experiment Station Research Bulletin.

Liondstrom David, E. (1958). Diffusion of Agricultural and Home Economics Practices in a Japanese Rural Community. Rural Sociology 23 (2): 171-183.

a. Marsh, C.P., and Coleman, A.L. (1954). Communication and the Adoption of Recommended Farm Practices. Agril. Ext. Station. University of Kentucky Wexington. Progress Report 22.

b. Marsh, C.P., and Coleman, A.L. (1954). The relationship of Kinship, Exchanging Work and Visiting to the Adoption of Recommended Farm Practices. Rural Sociology 19.

Marsh C.P., and Coleman A.L. (1955). The Relationship of Farmer Characteristics to the Adoption of Recommended Farm Practices. Rural Sociology 20: 289-96.

Mishra, D.K., Mundra, S.N., and Intodia, S.L. (1968). Studies on the Effectiveness of Package of Improved Practices in Maize Production on Farmers Fields of Girwa Panchayat Samiti, Udaipur, Rajastan. 4 (1 & 2).

Mitra, N.K. (1968). Relative Importance Attached to Selected Attributes of Some Farm Practices in Relation to their Adoption by Adopters-Farmers. Research in Extension Education (1970): 354.

Momi, G.S., and Sohal, T.S. (1975). Significance of Characteristics of Innovations for Adopters and non-adopters Indian Journal of Extension Education 11 (1 & 2): 74-75.

Mundra, S.N., and Batham, K.N. (1967). Impact of Caste on Adoption of Improved Farm Practices. Indian Journal of Extension Education 3 (3): 143-148.

Murthy, A.S., and Singh, S.N. (1974). Communication Behaviour of Farmers. New Heights, Darya Ganj, Delhi 1st Ed. PP. 93.

Nair, G.T. (1969). A Multivariable Study on Adoption of High Yielding Paddy Varieties by the Farmers of Kerala State. Ph.D. Thesis. New Delhi. Division of Agricultural Extension. IARI.

Nanjaiyan, K., Srinivasan, V., and Oliver, J. (1977). Different Sources and Channels Utilized by the Farmers in the Adoption of Package of Practices for Sugarcane. Madras Agril. Journal, 64 (1): 64-66.

New Comb, Theodore N., Ralph, H. Turner., and Philip E., Converse. (1965). Social Psychology New York, Holt, Rinehart and Winston Inc.

Padheria, M.M. and Patel, I.C. (1975). Adoption pattern of Recommended Farm Practices in Gujarat. Indian Journal of Extension Education 11 (1 & 2): 70-73.

Pandit, S. (1964). Study of the Role of Age, Education and Size of Farm in Relation to Adoption of Improved Agril. Practices. Res. Foundation Bull., B.A.C., Sabour. 6: 69-70.

Parameswaran, K.A. (1973). A Study on the Impact of the Cotton Package Progressive on the Adoption of Improved Farm Practices by the Farmers of Madukkarai Block Coimbatore District. PP. 58 in Post- graduate Research in Extension Eds. Johnknight, A. and Subrahamaniam, V. (1976). T.N.A.U., Coimbatore.

Parsons, T. (1951). The Social System. Gilencoe, Ill. The Free Press.

*Parsons, T., and Shilla, E.A. (1965). Towards a General Theory of Action. Cambridge, Massachusetts, Harward University Press.

Patel, P.M.(1967). Differential characteristics of Adopters and Non-Adopters of Farm Planning and Factors Associated with Adoption. M.Sc. Thesis, New Delhi, I.A.R.I.

Patel, P.M., and Singh, K.N. (1970). Differential Characteristics of Adopters and Non-adopters of Farm Planning. Indian Journal of Extension Education 6 (1 & 2): 96-102.

Patel, I.C. (1972). Communication Pattern was Procedures associated with Village Level Workers Effectiveness. Indian Journal of Extension Education 8 (3 & 4): 1-7.

Perumal, G.(1970). A Study of Factors and Agencies Responsible for the spread of Hybrid Maize in Coimbatore District. PP:7 in Post Graduate Research in Extension, Eds. Johnknight, A. and Subramaniam, V.(1976). T.N.A.U., Coimbatore.

Perumal, G. and Duraiswamy.(1972). Influence of Personal and Situational Characters on the Adoption of Hybrid Maise Cultivation by Farmers of Coimbatore District. Madras Agricultural Journal 59(4): 209-213.

Prasad, R., and Sinha, P.R.R. (1971). Farmers characteristics Influencing the use of Various Categories of Information Sources in the Adoption Process of Soil Stirring Plough. Indian Journal of Extension Education. 7(3 & 4): 99-105.

Programme Evaluation Organisation.(1968,b). Evaluation Study of the High Yielding Varieties Programme, Kharif 1967. Planning Commission, Government of India Second Report. Mimeographed.

Programme Evaluation Organisation. (1968, c). Study of the High Yielding Varieties Programme. Report for the Rabi 1967-68 Wheat 1. Planning Commission, Government of India, Mimeographed.

Programme Evaluation Organisation. (1969, b). Evaluation Study of the High Yielding Varieties Programme, Kharif 1968. Planning Commission, Government of India, Mimeographed.

Programme Evaluation Organisation. (1969, c). Study of the High Yielding Varieties Programme, Report for the Rabi 1968-69

Wheat, Paddy and Jowar, Planning Commission, Government of India, Mimeographed.

Rahudkar, W.D. (1967). Communication Pattern in Acceptance of Agricultural Practices in Chawdhari, P.S., Selected Readings Community Development, Hyderabad, N.I.C.D.

Rai, H.N. (1965). Diffusion of Information and Framers Response in Relation to an Improved Farm Practices. (Hybrid Maize). Indian Journal of Extension 1(2): 140.

Rajendra.(1968). Distance Concept in Adoption Pattern. Indian Journal of Extension Education 4(1 & 2): 83-88.

Rao, T.R. (1968). Economic Aspects of High Yielding Varieties Programme in West Godavari District. A study of IR-8 Paddy in Kharif 1967-68. Indian Journal of Agricultural Economics 23: 1968.

*Raper., and Tappan (1943). Never too old to Learn New Tricks. The Canning Programme in Green Country, Georgia Applied Anthropology 2: 3-11.

Ratanchand., and Gupta, N.L. (1966). A Study of the Adopters of Improved Farm Practices and their characteristics. Indian Journal of Extension Education 1(4): 259-267.

*Ramsey, C.M., Folson, R.A., and Spencer, G.H. (1959). Values and Adoption of Practices. Rural Sociology 24.

Reddy, M.S.K., and Kivilin, J.E. (1968). Adoption of High Yielding Varieties in three Indian Villages. N.I.C.D., Hyderabad.

Rogers, E.M.(1958). A Conceptual Variable Analysis of Technological Change. Rural Sociology 23: 136-145.

Rogers, E.M., and Capener, H.R. (1960). The Country Extension Agent and his Constituent. Research Bulletin 858 Ohio. Agri. Expt. Station Wooster Ohio.

Rogers, E.M., and Havens, A.E. (1961). The Impact of Demonstration on Farmer's Attitude Towards Fertilizers. Wooster, Ohio. Agril. Expt. Stn. R. Bul. 891.

Rogers, E.M., and Sevenning. (1969). Modernization Among Peasants. The Impact of Communication. New York, Hott, Pinechart and Winston, Inc.

Roy, R.N.(1966). A Study of Characteristics of Improved Practice as Related to Adoption. Ph.D. Thesis, New Delhi, India, Library, I.A.R.I.

Roy Ram Nandan. (1957). Study of the Causes of Success and Failure of Improved Farm Practices in an East Bihar Village. M.Sc., Thesis, Bhagalpur University.

Roy, P., Fliegel, F.C., Kivilin, J.E., and Sen, L.K. (1968). Agricultural Innovation Among Indian Farming. N.I.C.D., Hyderabad.

*Ryan, B., and Gross, N. (1950). Acceptance and Diffusion of Hybrid Seed Corn in Two Iowa Communities, Ames. Iown Agricultural Experimental Station Research Bulletin 372.

Shankariah, Ch., and Singh, K.N. (1967). Predictive Analysis of Factors Related with Knowledge of Improved Practices of Vegetable Cultivation. Indian Journal of Extension Education 1 (1): 34-42.

Sharda Pathak., and Dargan, K.S. (1971). Impact of Package Programme Works on Jute Growers and Their Reactions to Different Improved Practices of Jute Cultivation. Indian Journal of Extension Education 7 (1 & 2): 21-28.

Sharma, R.K. (1969). Evaluation of High Yielding Varieties Programme, Kharif 1968. A study of I.R.8 Paddy in Karnal District. Agro-Economic Research Centre, Delhi University, Mimeographed.

Singh, A.J., Dhaliwal., and Sohal, T.S. (1965). Extension Contacts to Adoption of Agricultural Practices and Socio-Economic Status of Farmers. Indian Journal of Extension Education 1 (1): 58-62.

Singh, B.N., and Jha, P.N. (1965). Utilisation of Sources of Farm Information in Relation to Adoption of Improved Agricultural Practices. Indian Journal of Extension Education 1 (1): 34-42.

Singh, D. (1967). A Study of the Role of Age, Education and Size of Holding in Relation to Adoption of Improved Agricultural Practices in C.D. Block, Dharmapur Dist., Jaunpur, M.Sc.(Ag.) Thesis, Government Agricultural College, Kanpur.

Singh,R.I., Ram Pyare., and Ram Vinod Rai. (1968). Group Meetings as an Extension Teaching Method in Adoption of Package of Practices in C.D. Blocks, Atrauli, Aligarh, Indian Journal of Extension Education 4 (3 & 4): 78-82.

Singh, Y.P., and Babu, V.R. (1968). A Study of Adoption of Improved Farm Practices as a Function of Positive Value. Indian Journal of Extension Education 4 (3 & 4): 71-77.

Singh, J., and Rana, O.P. (1970). Response of Farmers Towards High Yielding Varieties. Indian Journal of Extension Educatio 6 (3 & 4): 58-62.

Singh, S.N., and Singh, K.N. (1970). A Multi-variate Analysis of Adoption Behaviour of Farmers. Indian Journal of Extension Education 6 (3 & 4): 39-44.

Singh, R., and Sharma, S.R. (1973). A Comparative Study of Adoption of High Yielding Varieties Programme by the Farmers in Telivision and Non-Telivision Villages. Indian Journal of Extension Education 9 (3 & 4): 92-101.

Sinha, N.P. (1963). The Adoption Process as Related to Some Socio-personal Factors. Ph.D. Thesis. New Delhi, India, Library, Indian Agricultural Research Institute 1963.

Sinha, P.R.R., and Bhasin, N.S. (1968). Factors Influencing Low Adoption of Some Improved Farm Practices. Indian Journal of Extension Education 4 (3 & 4): 58-65.

Sisodia, J.S. (1968). Some Economic Aspects of High Yielding Varieties Programme in Indore District. Indian Journal of Agricultural Economics 23: 105-113.

Sizer, L.M., and Porter, W.F. (1960). The Relation of Knowledge to Adoption of Recommended Practices. Morgantoon, West Virginia. Agril. Expt. St. Bull.No.446.

Sundaraswamy, B. (1971). Extent of Adoption of Recommended Practices and Information Sources Consulted by the Farmers in Respect of Hybrid Jowar Cultivation in the Selected Taluk of Mysore District. Post Graduate Research in Extension, Edt. Johnknight, A. and Subrahmanian, V. (1976). T.N.A.U. Coimbatore.

Supe, S.V. (1959). Communication of Agricultural Information in Extension Block of the College of Agriculture, Nagpur.

Supe, S.V. (1969). Factors Related to Different Degree of Rationality in Decision Making Among Farmers in Buldana District. Ph.D. Thesis, New Delhi, India Library, I.A.R.I.

Supe, S.V. (1971). Farmers Information Source Credibility and its Relation to their Rational and Adoption Behaviour.. Indian Journal of Extension Education 7 (1 & 2): 29-33.

Supe, S.V., and Salode, R.S. (1975). Impact of National Demonstration on Knowledge and Adoption Level of Farmer Participants. Indian Journal of Extension Education 9 (1 & 2): 36-39.

Trivedi, G. (1963). Measurement Analysis of Socio-economic Status of Rural Families. Ph.D. Thesis. New Delhi, India, Library. I.A.R.I.

Toussaint, W.D., and Stone, F.S. (1960). Evaluating a Farm Machine Prior to its Introduction. Journal of Farm Economics 42: 241-251.

Vyas, V.S., Tyagi, D.S., and Misra, V.N. (1969). Significance of New Strategy of Agricultural Development for Small Farmers. A Cross Sectional Study of Two Area of Gujarat, Vallabha Vidhyanagar, Agro-Economic Research Centre, Sardar Patel University.

Wilkening, E.A. (1951). Acceptance of Improved Farm Practices in Three Costal Plain Countries. Agricultural Experiment Station Technical Bulletin 225. Chapel Hill, North Carolina, U.S.A.

Wilkening, E.A., Tully, J., and Presser, H. (1962). Communication and Acceptance of Recommended Farm Practices Among Dairy Farmers of Northern Victoria, Rural Sociology 27: 116-197.

*Williams, M.S. (1953). Farmers Decisions in the use of Fertilizers. Journal of Farm Econ. 40: 1407-17.

*Wilson, M.C., and Gallup, G. (1955). Extension Teaching Methods and other Factors that Influence Adoption of Agricultural and Home Economics Practices.

*Yeld, E.R., (1960). Islam and Social Stratification in Northern Nigeria. The British Journal of Sociology 11: 128.

Zeaudeen, P., and Srinivasan, M.(1977). Relative effectiveness of Information Sources in the Adoption of a Technological Change and Rate of Diffusion of Technological Changes in Agriculture. Madras Agricultural Journal 66 (7): 471-474.

*Originals not seen.

APPENDICES

APPENDIX I

Instrument used for obtaining responses from tobacco farmers for measuring their extent of adoption of package of practices recommended by Central Tobacco Research Institute

INTERVIEW SCHEDULE

Respondent No:

1. Name of the farmer:
2. Village:
3. Age:
4. Caste:
5. Education: Illiterate/can read only/can read and write/primary/middle.
6. Farm size:

Type	Area owned	Area leased in	Area leased out	Total
Irrigated:				
Non-irrigated:				
TOTAL:				

6. (a) Crops grown:

S.No.	Crop	Season-wise	Area	Variety	Remarks

APPENDIX I Continued

7. Economic status:

7 (a) Family:

(b) Type: Joint/Single

(c) Size:

(d) Family composition:

S.No.	Relation to respondent	Age	Education	Occupation Main	Occupation Subsidiary

(e) Occupation of the respondent:

Main:

Subsidiary:

(f) Farm power:

Bullocks	( )
Pump set	( )
Power sprayer	( )
Power tiller	( )
Tractor	( )
Gorru	( )
Guntaka	( )
Iron plough	( )
Others	( )

(g) Material possessions:

Bullock cart	( )
Cycle	( )
Radio	( )
Motor cycle	( )
Scooter	( )
Phone	( )
Others	( )

(h) Domestic status

Home

Thatched	( )
Tiled	( )
Terraced	( )
Other	( )

8. Social participation:

Institution	Member	Office holder	Other positions
Panchayat			
Co-operative			
Block Samithi			
Young farmers association			
Farmers discussion group			
Business intermediators			
Business community.			

9. Market orientation:

9(a)	Do you think a farmer will be able to sell his product if there is addition yields by the cultivation of high yielding varieties:	Yes/No
9(b)	Do you think the high yielding varieties produce will fetch good price when compared to local produces:	Low price/Same price/High price
9(c)	How difficult it will be, to dispose of the produce of the high yielding varieties of tobacco:	Very difficult/ difficult/Easy/ Very easy

10. Knowledge of the practices:

Varieties:

i. Can you name the high yielding varieties of tobacco recommended for your area by Central Tobacco Research Institute?

(a) CTRI Special (b) Kanakaprabha (c) FCV Special

(d) 16/103.

ii. Can you tell me the characteristics of the varieties recommended by Central Tobacco Research Institute?

(a) Is it dwarf (or) medium (or) tall?

(b) Light cast or heavy cast?

(c) Whether it is having good maturity?

(d) Whether it is having good colour?

(e) Whether it is having good percentage of grades?

(f) Whether it is having good curing?

(g) How many curable leaves can you expect from a single plant?

Seeds and Nursery:

(a) Do you raise your own nursery? Yes/No If yes

(b) What is the seed rate to be used?

(c) What is the convenient bed size?

(d) Is it desirable to change the nursery site every year?

(e) What is the need of sterilizing by rabbing?

(f) Is there any need for summer ploughing? Yes/No If yes
What are the advantages?

(g) What is the area of nursery required for raising seedlings for acre of main crop?

If no, where from you procure seedlings. Govt. agency/Priva source/other ways.

Transplanting:

(a) What should be the age/condition of seedling to transplant in the mainfield?

(b) What is the spacing between rows?

(c) What is the spacing between plants?

(d) How many seedlings are to be planted per acre?

(e) What insecticide you use in transplanting water to check the ground beetle?

Mainfield:

(a) When the deep ploughing is to be made by tractor?

(b) How much FYM/Compost to be applied?

(c) What is the recommended dose of fertilizer?

(d) Is there any need for irrigation? If it is needed please tell me the condition for irrigation?

(e) What is the method of intercultivation?

(f) How many intercultivations are necessary? at what stage?

(g) When will you do topping and suckering?

(h) How many leaves are to be harvested per plant at each priming?

(i) To load a single barn, how much area of the crop has to be harvested?

(j) What are the crops recommended for rotation with tobacco in your area?

Curing:

(a) What is the barn size you are using?

(b) Have you heard about the low profile barn and its advantages?

(c) How much expenditure in percentage for curing constitute to the total cultivation expenses?

(d) What is the substitute for coal or firewood as a fuel recommended by Central Tobacco Research Institute?

(e) Do you follow the curing schedule recommended by Central Tobacco Research Institute?

11. Information source used:

Please indicate from which of the following sources you obtain technical information about the cultivation of the tobacco and how often.

Source	More often	Often	Sometimes	Never
Mass media:				
1. News paper				
2. Radio				
3. Film				
4. Demonstrations				
5. Posters				
6. Magazines				
Inter personnel cosmopolitan sources:				
1. Fieldman				
2. V.D.O.				
3. A.E.O.				
4. B.D.O.				
5. Co-operative Officer				
6. Panchayat Officer				
7. Other block personnel				

APPENDIX I Continued

Inter personnel localite sources:

1. Neighbours
2. Friends
3. Relatives

Commercial sources:

1. ILTD Salesmen
2. National Tobacco Representatives
3. Nava Bharat & Co. salesman
4. Fertilizer dealers.

---

12. Adoption of farm practices: Varieties:

(a) What variety is being grown_____

If more than one variety, mention the extent of area under each variety:

S.No.	Variety	Extent of area

Seed & Nursery:

(a) What seed rate you follow:

(b) How much quantity of tobacco mid-ribs or other alternative material used for spreading on the beds after sowing:

(c) At what age of the seedling the cover is thinned:

(d) How many waterings you are doing in the initial stages on a sunny day?

(e) How much fertilizer you are giving as top dress with ammonium sulphate or calcium ammonium nitrate?

Bed size:	No. of times:	Dose of fertilizer:

(f) Do you adopt deep ploughing of your nursery sites during summer months? If yes, how many times? — Yes/No

(g) Whether you are raising the nursery in sandy soils or black soils? If you are raising the nursery in black soils, are you mixing any sand? If yes, how much quantity? — Yes/No

(h) Are you applying any basal dressing of FYM or filter press cake? If yes, how much quantity? — Yes/No

(i) Are you applying superphosphate and potash (or) ash as basal dressing to you nursery beds? If yes, how much quantity as superphosphate or how much quantity of potash or ash you are applying? — Yes/No

(j) Whether soil of your nursery site is poor? If yes, are you applying ammonium sulphate? If yes, what is the quantity? — Yes/No Yes/No

(K) Whether your soils are deficient in Magnesium? — Yes/No
If yes, are you applying dolamite, as basal dressing and/or top dressing? — Yes/No
If yes, how much quantity as basal dose?
(Explain symptoms of magnesium deficiency)

(l) Are you applying Endosulphan before sowing to prevent damage to seeds and young seedlings from soil pests like ants, termites, mole crickets, earthworms? If yes, how much quantity Endosulphan you apply? (OR) How much quantity of pongamia cake applied? — Yes/No

Mainfield:

(a) Are you doing Crowbarring/tractor ploughing in summer? If yes, state the frequency like every year, once in two years or once in three years? If no, what are you doing? — Yes/No

(b) Are you applying FYM to your mainfield? If yes, how much quantity applied and at what time: — Yes/No

(c) How much nitrogen applied to your field before planting? Do you apply nitrogen as top dressing? If yes, state quantity:

(d) How much phosphorus is applied to your field?

(e) How much potassium is applied to your field?

(f) What is your spacing adopted?

(g) How many intercultures you have done?

(h) How many leaves harvested at each priming per plant?

12. Practice attributes:

(a) Please give your opinion as to whether it is problem to cultivate high yielding varieties of tobacco or not? — Very easy/Easy/Neutral/Difficu Very difficult

(b) In your opinion, how much costly is the cultivation of tobacco? — Very low/Low/Medium/High/Very high

(c) In your opinion, how much profitable is the cultivation of tobacco?	Most profitable/Profitable/Somewhat profitable Least profitable/Not profitable
(d) To what extent do you consider the cultivation of high yielding varieties of tobacco is suitable in your farming situation, in view of resources available at your disposal such as type of soil, availability of irrigation source etc.	Most suitable/Suitable/Somewhat suitable/least suitable/Not at all suitable.

13. Please give the reasons for non-adoption of the recommended practices.

(a) Varieties:

1.
2.
3.

(b) Nursery:

1.
2.
3.

(c) Mainfield:

1.
2.
3.

14. Suggestions and problems: (If any)

TO INVESTIGATE THE EXTENT OF ADOPTION OF THE PACKAGE OF PRACTICES RECOMMENDED BY CENTRAL TOBACCO RESEARCH INSTITUTE, RAJAHMUNDRY BY THE TOBACCO GROWERS IN EAST GODAVARI DISTRICT OF ANDHRA PRADESH

By

S. KOTESWARARAO NAIDU

ABSTRACT OF THE THESIS
Submitted in partial fulfilment of the
requirement for the degree
MASTER OF SCIENCE IN AGRICULTURE
(Agricultural Extension)

Faculty of Agriculture
Kerala Agricultural University

Department of Agricultural Extension
COLLEGE OF AGRICULTURE
Vellayani - Trivandrum

1978

A B S T R A C T

A study has been undertaken amongst the tobacco growers of East Godavari District of Andhra Pradesh with regard to their extent of adoption of the package of practices recommended by Central Tobacco Research Institute, Rajahmundry.

Adoption behaviour was assessed interms of their situational variables namely farm size, market orientation and other personal variables namely, age, education, economic status, social participation, knowledge of the practices, information sources used and practice attributes. The variables have been selected based on an intensive review of the work done by other researchers in the field of adoption. An hypothetical approach has been followed to study the relationship between the independent variable and extent of adoption.

The extent of adoption has been measured using an Adoption Quotient developed by Chattopadhyay (1963) and modified by Singh and Singh (1974). The potentiality of the package of practices were conceived as the maximum degree to which a farmer can adopt, which was based upon the recommendation by Central Tobacco Research Institute for the respective package of practices. Scales developed

been collected from 106 farmers using a pre-tested, valid interview schedule. Data statistically analysed using appropriate parametric techniques.

Results revealed that only 41.51% of tobacco farmers used the varieties recommended by Central Tobacco Research Institute, namely CTRI Spl. and Kanakaprabha. Tobacco growers have given least importance to the application of farmyard manure to the tobacco in the nursery stage. Whereas two third of them applied the same in the mainfield. Over adoption has been evidenced with regard to seed rate as well as application of inorganic fertilizers. The tobacco growers gave over and above importance to the application of nitrogenous fertilizer. 44.34% of tobacco farmers never followed the deep ploughing either by tractor or crow bar in the mainfield.

Size of farm held by tobacco growers as well as to their orientation to the tobacco market were not found to influence their extent of adoption of package of practices recommended by Central Tobacco Research Institute. Aged farmers adopted less. Though education was found to enhance their adoption behaviour, their knowledge on the practices and sources of information used has not specifically influenced the tobacco farmers. The attributes of

package of practices were also not considered by them. Social participation did not help to the tobacco growers in adopting the practices recommended by Central Tobacco Research Institute.