FARMERS' KNOWLEDGE AND PERCEPTION OF IMPROVED TECHNOLOGY

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Research Study No. 34
March 1980

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FARMERS' KNOWLEDGE AND PERCEPTION OF IMPROVED TECHNOLOGY

- A study of five farming systems-

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FOREWORD

The farmer's decision to use superior farm inputs or to carry out an improved farm practice depends on a large number of factors which are internal as well as external to him and to his farm. The knowledge and attitudes the farmer possesses about these inputs and practices are two factors that influence his behaviour. But these represent the variables that could be changed or developed with external influence. This is exactly what extension in agriculture attempts to do.

What extension does is to make the farmers aware of superior inputs and practices, make them knowledgeable about them and encourage them to accept and use them. This study is an attempt to understand what the farmers know and what they think of improved inputs and farming practices which extension agencies have attempted to impart on them. The study also examines the effectiveness of communication channels that the extension services employ to impart knowledge and create favourable attitudes among the farmers.

The main objective of this study is to help the organisations involved in extension and education in agriculture develop their methodologies through a better understanding of the farmer and his learning process. It is hoped that some of the ideas presented here could be of use to other educational channels such as those concerned with health, nutrition, etc.

Although literature on diffusion of innovations and related topics are immense in the world very little work on these subjects have been done in Sri Lanka. The ideas on small farmers communication behaviour that have been developed in the South East Asian context might not apply to Sri Lankan situation in the same way it applies in certain other countries. In terms of literacy rates educational attainments and exposure to communication media, the Sri Lankan farmers show certain distinct characteristics. This study, therefore, is a good starting point in understanding communication behaviour of our farmers.

The study was conducted by a team of Research & Training Officers consisting of Messrs A.M.T. Gunawardana, M.L. Wickremasinghe and Mrs. S. Abeyratna. Mr. Gunawardana functioned as Co-ordinator. All of them were responsible for the writing of this report. I am thankful to them for their effort.

T.B. Subasinghe
Director

AGRARIAN RESEARCH & TRAINING INSTITUTE

ACKNOWLEDGEMENTS

We take this opportunity to acknowledge the assistance received from the officers of the Rubber Research Institute and the Department of Agriculture who helped us in various ways in conducting this study. Special mention should be made of Messrs A.B.Dissanayaka (Head, Agricultural Economics and Extension Division), and H.D.B.H.Gunasekera (Economist) of the RRI, Ratmalana. Messrs. W.E.W.de Mel and J.H. Suwaris, Rubber Extension Officers of the RRI assisted us in our data collection work in the rubber growing areas. The assistance given by Dr.N.Sivaratnam (Veterinary surgeon, Galaha), Mr.E.M.P.Bandaranayaka (Agricultural Instructor-Ipalogama), Mr.D.E.D.J.Abeysekera (Agricultural Instructor-Minuwangoda) in our data collection effort in their respective areas is acknowledged. We are particularly grateful to their staff for accompanying us to the farmers whom we wanted to meet.

The advice given in sample selection by Miss.T.Sanmugam (Research & Training Officer, statistics) as well as suggestions and comments given on the draft by Prof.Norman Uphoff (University of Cornell) are acknowledged with thanks. We are thankful to Dr.S.Pinnaduwage (Faculty of Agriculture, University of Peradeniya) for his valuable comments and suggestions given on the draft report. The Statistical investigators recruited for the study Messrs. D.P.S.Kulasinghe, S.J.Silva, P.D.A. Amarasekera and K.L.N.Fernando did an excellent job in the collection and processing of data. Miss. Anne Fernando, handled the typing of the draft and the final document and her assistance is acknowledged.

We wish to thank Mr.H.A.Siriwardana, Information and Publication Officer for editing the document prior to publication. A word of thanks to the staff of the printing section for their effort.

The assistance of the farm families who willingly provided the information is deeply appreciated.

Authors.

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S U M M A R Y

The effectivenees of extension work lies mostly in the success of transmitting relevant agricultural information to the farming population. One of the measures of effective extension work therefore, is the farmers awareness, the knowledge they possess and their acceptance of the information presented to them by the extension services. This study was proposed with the specific objective of ascertaining farmers' knowledge of certain recommended practices and their attitudes towards these practices. The study also attempts to examine the role played by communication channels in imparting knowledge and in forming (or changing) farmers attitudes.

The study was undertaken in reference to three agricultural enterprises, namely, paddy farming, rubber growing and dairying. To ensure representativeness, three paddy farming areas were selected to correspond to the different environmental conditions under which paddy farming is carried out in the country. Two of these areas (referred in the text as Dry Zone high constraint and Wet Zone locations) represent relatively difficult farming conditions, while the other (Dry Zone Low Constraint location) exhibits relatively more favourable conditions for farming.

The major issues raised in the report are: the need for different extension approaches in the more developed and less developed paddy farming areas; the need for greater emphasis for farmer education in agricultural extension work; the importance of qualitatively upgrading management as opposed to encouraging adoption of improved inputs since adoption rates are high, while adoption levels are low; the high penetration of mass media to the farming communities although the reach of agricultural messages through these sources is low; evidence of the role that mass media can play in communicating development messages and the absence of strong opinion leadership.

A summary of the text is presented in the following sections:-

1. PADDY FARMING

1.1 *Use of Improved Varieties*

The two Dry Zone situations showed a higher rate of adoption of new improved varieties of paddy than the Wet Zone Study location. The fewer number of varieties cultivated as well as the marked preference shown to a variety or few varieties, in-the Low Constraint situation shows that farming tends to be more homogeneous (meaning lesser individual variations among farmers) under more homogeneous physical conditions.

With respect to the study locations, the main reason for the selection for varieties as given by farmers was the possibility of obtaining a higher yield. There was no evidence to believe that under difficult farming conditions or non-commercialised farming conditions, farmers under-estimate

the importance of the yield factor.

Farmers in the two Dry Zone locations perceived a marked difference in yield between new improved varieties and traditional varieties under all levels of fertilization. On the contrary, those in the Wet Zone location perceived only a marginal difference. This could be cited as the reason for the former group's preference for New Improved Varieties compared with the latter. In the case of the latter group because of the smaller yield difference perceived by them, other factors which influence the selection of traditional varieties could override the yield factor.

The task of extension in a more homogeneous farming area, such as the Dry Zone Low Constraint location is comparatively an easier one, as in terms of both the knowledge levels and knowledge needs, farmers are relatively homogeneous (fewer individual variations compared to a more difficult farming area). This favours the use of group methods of extension and use of printed material more extensively in extension work as the individual needs among farmers are not different from each other. The Training and Visits System of extension suits better in more developed farming areas where conditions are relatively more homogeneous.

The evidence indicates that there is little need for extension services to attempt to popularise new improved varieties of paddy in Dry Zone areas in general and the well Irrigated Areas in particular. Even new varieties that may be available in future should reach farmers with little extension effort.

In areas where environmental conditions are conducive to the cultivation of paddy, a stepwise approach to extension work, popularising the variety first could be beneficial as once the variety is accepted, the adoption and gradual upgrading of other complementary practices could subsequently be encouraged because in such an area, adopting a variety with a minimal level of other inputs and management will be unlikely to lead to disappointing results. The same argument will not hold for a difficult physical environment. In such an area the best extension strategy is to popularise the entire package of practices together. The same argument could be extended to other crops or varieties which are introduced for the first time.

1.2. *Fertilizer Use In Paddy*

The proportion of farmers possessing knowledge of fertilizer recommendations for paddy was highest in the wet zone study location, while fertilizer usage was highest in the Dry Zone Low Constraint study location. The situation with regard to fertilizer use and knowledge of fertilizer recommendations can be summarised in the following manner:

	DZLC	DZHC	WZ
Fertilizer usage	High	Low	High
Knowledge of fertilizer recommendations	Low	Low	High

Although a relatively small proportion of farmers from all study locat-

ions were aware of fertilizer recommendations, the average quantities used per acre fertilized in all three areas did not vary substantially from the actual recommended quantities, however, the quantities used by individual farmers varied substantially from each other as well as from the recommended quantities. When comparing the quantities used by farmers who were knowledgeable of recommended quantities with those who were not knowledgeable, what is used by the former group was closer to recommended quantities, indicating a closer adherence to knowledge when knowledge is available.

When considering the extension needs of the two Dry Zone locations, on the basis of knowledge levels and usage of fertilizer, there is a need for more promotional work (encouraging farmers to use fertilizer) in the high constraint area, and more educational work in the low constraint area.

One must be cautious in interpreting the knowledgeability of farmers on the basis of their awareness of specific fertilizer recommendations, as such knowledge is usually gained through exposure to formal learning situations and with little relationship experience in farming. Farmers knowledge of the nutrients added in the form of fertilizer which reflects an understanding of principles of fertilizer use was low for all study areas.

The reasons reported for non use as well as lower use of fertilizer indicate that apart from financial difficulties farmers knowledge on fertilizer use, their understanding of the usefulness become important factors governing use and non-use as well as its use in the most desirable manner. The season under study was unique in that liberal credit was made available to farmers, the availability position of fertilizer was satisfactory and fertlizer enjoyed a 75% subsidy.

1.3 *Pest Control*

Farmers of the Dry Zone low constraint location were found to be more knowledgeable of pest problems compared to the farmers of the other two study areas. This observation, which does not agree with farmers knowledge of fertilizer recommendations, can be explained in terms of the measure of knowledge used. Knowledge of fertilizer recommendations represents knowledge gained mainly through exposure to learning situations while knowledge of pest problems is usually gained through practical experience in farming.

A wide variation among farmers in their use of insecticides was observed. Although, there was a pattern in the incidence of pests, a corresponding pattern was not observed in using insecticides for their control.

It would be desirable if an independent organisation, like the Extension Services could keep the farmers informed of the most suitable insecticides for the control of different pests, periodically through advertising over newspapers as the newspaper reach to the farming community appears to be high.

2. RUBBER GROWING

2.1 *Use of Improved Clones of Rubber*

An exceptionally high preference for Pb 86 compared to other clones was observed. Any new clones to be introduced in future in order to win the confidence of farmers should be exceptionally good performers under farmers conditions and will demand a heavy extension input. The best way of introducing new clones seems to be through the Estates, as the information flow from Estates to small holders appears to be high. One of the most important factors that had influenced the initial adoption of clones by farmers is the satisfactory performance of most varieties in the nearby estates.

Although, a high adoption of clones is observed, the yield potential of these clones in the farmers' mind is not high. The way farmers perceive the yield potential of budded rubber, although it has not affected their use of improved clones, may have affected their use of complementary practices, such as the use of fertilizer. It appears therefore, that there is a need to educate farmers on the potential of budded clones, particularly with regard to their potential under improved methods of management.

2.2 *Rubber Replanting Subsidy Scheme*

A very high level of awareness of the Subsidy Scheme was apparent although some lack knowledge of 'how' to make use of the subsidy. The main reason for not replanting lands that should be replanted was unclear titles. Some of the other reasons given for not undertaking replanting could be overcome by intensive promotional work. Use of posters, advertising in newspapers and radio are some of the possible ways of publicising. Such promotional work, particularly newspaper advertisements, should not only be designed to motivate farmers to make use of the subsidy, but should be informative, providing detail information on 'how' to make use of the subsidy including the manner of registration of lands. Making available application forms through local outlets or having them as part of the newspaper advertisement itself(including those for registration of lands) should help. Making available printed advisory literature of educational nature in the form of pamphlets or booklets could help in making growers confrom to the requirements of the subsidy.

2.3 *Fertilizer Use in Rubber Cultivation*

The proportion of farmers who use fertilizer as well as the quantities used are low, particularly for plantings in tapping. The higher level of use of fertilizer in young plantings could be attributed to the Subsidy Scheme which compels growers to maintain a minimum standard of cultivation, as well as to the visible effect of fertilizer on young plants. However, it was found that for,younger plantings, the quantities used, quantities recommended and farmers estimates of recommended quantities were not very different from each other. But for older planting both the quantities used as well as farmer's estimate of recommendations were less than the actually recommended quantities.

When reasons for non-application of fertilizer were examined, economic difficulties emerged as the most important. However, it is doubtful whether the reason is purely economic when considering the price fetched by rubber at present, the attractive replanting subsidy and the subsidy enjoyed by fertilizer which was 75% at the time of the study. The situation could be related to the conditions that existed a few years ago when rubber fetched very low prices particularly since the data on fertilizer use also refer to quantities used in the past. The reason therefore, may be partly economic and partly the lack of a strong motivation for the extra sacrifice required to fertilize rubber which depends on their understanding of the advantages of fertilizer. The probable answer to this problem seems to be an economic approach to extension work rather than an agronomic one.

2.4 *Tapping of Rubber*

Although rubber growers do realise the superiority of alternate day tapping, they practice daily tapping. This is due to the daily income that is important to the small holder. When considering the reasons that favour daily tapping, discouraging this practice seems to be an extremely difficult task. It appears that those growers who follow alternate day tapping are those who maintain a higher standard of cultivation in general. If alternate day tapping is to be encouraged, the general standard of cultivation needs improvement so that growers will begin to pay greater care and attention to the plantings. It is therefore suggested that encouraging alternative day tapping should not be taken in isolation, but taken as a package with other cultural practices and should begin from the establishment of the planting. Stressing the importance of the tapping life of the plant in extension work could also help.

3. DAIRY INDUSTRY

3.1 *Improved Breeds of Cattle*

A preference to High Yielding Improved breeds of cattle was observed. About 2/3rd of the farmers thought that natural fertilization was superior to artificial insemination. The common belief reported elsewhere that the progeny resulting from artificial insemination consists of more bull calves, was not prevalent among the farmers interviewed. The same reasons were identified as merits of natural fertilization and artificial insemination by the two groups of farmers who held different views of the superiority of these two methods.

A lower importance was given to feeding and routine management of dairy animals, Unlike in feeding and management, farmers attached a greater importance to aspects relating to breeding; they were more knowledgeable and often adhered to what they knew. Further, a greater uniformity in views held by farmers regarding these matters was observed. This observation can be explained in terms of the importance attributed to a certain operation. The more important the operation is, the more cautious the farmers are, and they often follow what is recommended unlike in the case of a routine operation.

4. FACTORS INFLUENCING KNOWLEDGE

It is the personal variables such as education, exposure to mass media

and extension contact, that showed a relationship with knowledge. The more static variables such as size of holding and tenancy did not show a relationship. The measure of knowledge used in this instance is knowledge of fertilizer recommendations which represents a component of knowledge gained mainly through exposure to learning situations with very little or no relationship to experience in farming. There was no evidence that farmers in the more developed and commercialised farming areas were more knowledgeable than those in other areas as far as our measure of knowledge was concerned. However, on another aspect of knowledge (knowledge of pest control) which is mainly experience based, this group was found to be more knowledgeable.

5. THE ROLE OF COMMUNICATION

5.1 *Mass Media*

The penetration of mass media in all study locations was high. It was evident that the potential does exist for use of mass media to carry development messages.

With regard to newspaper readership the community reading habit was evident. The most popular reading location was the village boutique/ tea kiosk. The percentage of respondents who reported reading newspapers at home was less than the percentage of respondents who reported buying newspapers. This peculiar feature may be attributable to the community reading habit of the villagers. According to the study, most respondents read the newspapers to obtain extra village news. Although, the exposure to weekly newspapers was high exposure to magazines was low.

Both ownership and exposure to radio were higher than to newspapers. Unlike in the case of newspapers, the most popular listening location for the radio was the home. As in the case with the newspaper the most popular reason cited for listening to the radio was to obtain extra village news. However, entertainment and recreation was also cited by many as an important reason for listening to the radio. Compared to newspapers, the radio enjoyed a higher credibility level in the eyes of the respondents.

The patterns of exposure to print media and radio are summarised in Table A and B respectively.

Although the exposure to mass media is high, the reach of agricultural information was low. The assumption is that either the rate of relay of agricultural messages was low or that programmes/features failed to attract the attention of the audience.

There is evidence to show that mass media if used effectively, do have a role to play in promoting new ideas among a rural population. The evidence indicates that in the case of a agro chemical, mass media have not only provided the awareness, but also performed the persuasion function in some instances.

5.2 *Sources of Expert Agricultural Information*

Although the exposure to newspapers and radio is high, the reach of agricultural messages through these media is low. With regard to mass

media originating with the change agencies, although the awareness was high, the reach both in terms of ownership and exposure was low. The gap between awareness and actual use seems to be very high, the reasons for which may be inadequacies in distribution and/or presentation, levels of comprehension and reading habits of the farming community or it may be related to the usefulness of the media themselves.

In so far as the dissemination of agricultural information is concerned, the most important source of information is the Extention Agent. The pattern and frequency of contact varied in the different study areas. Of the three paddy areas, the two dry zone locations recorded a higher level of contact. The participation in group activities was generally lower.

5.3 *Sources of Information for Selected Agricultural Innovations*

The role of various communication channels in imparting knowledge and promoting adoption in relation to three innovations in paddy were monitored during the Survey. The three innovations studied were: BG11 - 11 a New High Yielding Variety of paddy, the basal fertilizer mixture for the area and a type of agro-chemical which is widely advertised over newspapers. With regard to the variety of paddy and the type of fertilizer, interpersonal channels had exerted the biggest influence in imparting knowledge and promoting adoption in the three study areas. Except in one area where the influence of the KVS was high, it is the neighbourhood groups, that had played the keyrole, especially in legitimising and promoting agricultural innovations. With regard to the agro-chemical studied which was advertised heavily over newspapers and radio, a somewhat different picture was observed. Mass media had played an important role in creating awareness about this chemical, while it had even influenced some in their decisions to adopt the innovation. These results reveal a role for the mass media in imparting knowledge of agricultural innovations and to a lesser extent in promoting adoption of specific innovations.

5.4 *Opinion Leadership*

Although the evidence in the study suppprts the observation that friends, neighbours and fellow farmers are important sources of agricultural information, no strong opinion leadership in agriculture was evident in any of the study areas. Further, according to the evidence, opinion leaders are more commonly found in the more cosmopolite and urban areas compared with the more rural locations. The opinion leaders identified, had certain common features. Almost all of them possessed a higher level of education as well as a higher economic standing, compared with the respondents who identified them. In the few cases, where the level of education was lower, it was compensated by knowledge and experience in farming. In the rubber area where the largest number of opinion leaders were identified, technical competency was given high priority in deciding opinion leadership.

Table A

PATTERN OF EXPOSURE TO PRINT MEDIA

	Dry Zone Low Constraint-Paddy (DZLC)	Dry Zone High Constraint-Paddy(DZHC)	Wet Zone Paddy (WZ)	Rubber	Dairy
Ownership of Daily Newspapers	Low	High	High (Highest for paddy locations)	High	High (Highest for all locations)
Readership pattern of Daily Newspapers	High (Roughly the same for all paddy locations)			High	High (Highest for all locations)
Non-readership of Daily Newspapers	Low	Low	Low (High compared to other paddy locations)	n.a.	n.a.
Credibility levels for Daily Newspapers	Comparatively Low (Roughly the same for all paddy locations)	Comparatively Low	Comparatively Low	Comparatively High	Comparatively High
Most popular reading	Boutique/Tea Kiosk	Boutique/Tea Kiosk	Home	Home	Boutique/Tea Kiosk
Reasons for reading Daily Newspapers	(Same for all study locations)				
Weekly Newspaper Penetrration	High	High	High (Highest for paddy locations)	High (Highest for all locations)	Low
Exposure to Magazines	Low	Low	Low	Low	Low
Exposure to Cartoon Books	Low	Low	Low	Low	Low

Table B PATTERN OF EXPOSURE TO RADIO

	Dry Zone Low Constraint-Paddy (DZLC)	Dry Zone High Constraint-Paddy (DZHC)	Wet Zone Paddy (WC)	Rubber	Dairy
Ownership of Radio	High	High	High (Highest for paddy locations)	High	High (Highest for all locations)
Exposure to Radio	High	High	High (Highest for paddy locations)	High	High (Highest for all locations)
Most popular listening location	Home	Home	Home	Home	Home
Reasons for listening to Radio	Same for all paddy locations			n.a.	n.a.
Credibility levels	High	High	High	High	High (Highest for all locations)
Regularity of exposure	High	High	High	n.a.	n.a.

FARMERS KNOWLEDGE AND PERCEPTION OF IMPROVED TECHNOLOGY

INTRODUCTION

Improved technology in agriculture and its implications for agricultural development is a subject that has generated vital interest in recent times, given the exigency of increasing production at the national level. But while agricultural innovations have accelerated in Sri Lanka in the past decade, its impact on national indicators of economic performance has been relatively poor. Between 1969 and 1977, food production averaged a per capita increase of 1.3 per cent per annum.(1)

Many studies have extensively explored the socio-economic constraints of agricultural development in peasant agriculture and the possibilities of expanding production limits through more efficient resource use and management. Attention has also been paid to the implications of technological change for the socio-economic and political fabric of the rural agrarian sector. While factors affecting the adoption of improved technology are multifarious - technical, social and cultural - we are concerned here specifically with the extension education component which is an important catalytic ingredient in the process of innovation adoption and diffusion and which has hitherto attracted little research attention. With considerable expenditure on land development, and government programmes also focussing on relieving socio-economic impediments to adoption, with price support programmes, rural credit schemes and so on and given the complexity of many new agronomic requirements of improved technologies, a limiting factor in the future may forseeably be a knowledge gap, compounded by the lack of needed attitudes/motivation for the adoption of improved practices.

This study thus proposes to analyse the knowledge and attitudes of farmers in three important agricultural sectors - paddy cultivation, rubber growing and dairying - towards improved agricultural practices, paying attention to the socio-economic attributes of the farmers, characteristics of the new techniques, various channels of information to which farmers are exposed and the ultimate level of utilisation of the improved technology. It is hoped that this study can highlight areas that need further as well as intensive extension activity, so that with the necessary socio-economic requisities, such as the sufficient availability of material inputs, credit, etc., the extension/education component can contribute to the effective utilisation of these other factors of production, with positive conseqences for productivity and the overall pattern of rural development.

SCOPE AND OBJECTIVES

The specific objectives of the study are:-

(a) To determine the extent of farmer knowledge of selected innovations.
(b) To identify attitudes of farmers towards these innovations.
(c) To analyse the socio-economic-psychological environment of farmers and the extent to which these factors influence farmer perception and

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(1) Based on data from food balance sheets: Department of Census and Statistics.

adoption of improved technology.

(d) To determine the effectiveness of communication channels in imparting knowledge and in forming attitudes conducive to the adoption of these innovations.

It will be opportune perhaps to present here a brief description of what is meant by improved technology and other terms used in this study. While, improved technology can encompass not only new or superior inputs, but also management practices, this paper has specifically taken the term to denote:

(a) Varieties of seed or planting material which usually have a higher yield potential than those previously cultivated;

(b) Management practices which have a proven potential for higher yield with use as recommended. Specifically in this study it means fertilizer use and pest control in paddy farming; use of cover crops , soil conservation, tapping systems, disease control and manufacture of quality sheet in rubber cultivation; and use of improved breeds, improved management and breeding in dairy production. The improved technology considered in this paper is not necessarily a matter of recent innovation; rather it is generally in a form which is perceived as superior or which is made available in a new way to the farmers concerned. It does not mean to imply however that adoption of this technology is beneficial in all situations.

Adoption signifies the act of accepting an innovation and utilising it effectively and is therefore the ultimate goal of extension activity. However, adoption in itself can be to different degrees. One of the major problems in Sri Lanka and one of our major concerns here is the often partial adoption of recommended management practices that should accompany the cultivation of new varieties. For example, although a very large proportion of farmers have adopted improved varieties of paddy, a majority of them have only partially adopted the other recommended practices of the package to desirable levels. While some farmers may be disinclined to adopt the full package because of the low productivity of the land, prohibitive costs of recommended practices and so on, others may lack the knowledge or the conviction of the benefits of adoption. That is to say that in addition to the knowledge(and occasionally the skill) required to carry out a practice, a needed requisite is that farmers must have the conviction of the advantages of higher investments that usually accompany improved technology if they are to adopt practices as recommended.

Attention has been devoted to the characteristics of innovations as well as to their advantages as perceived by farmers, as this is an important determinant of adoption and the continued use of technology. By and large the characteristics of an innovation are of a technical or an economic kind, though they are ultimately linked. An attempt has also been made to determine congruence with existing practices and experiences as this can markedly affect the rate and level of adoption.

Communication channels have an important role to play in providing knowledge, imparting skills and in forming changing attitudes. This represents the major variable over which extension has control and this

aspect therefore is of particular concern in this study.

In a limited way an attempt has also been made to identify the more important socio-economic variables which have some relationship to knowledge of improved technology.

If innovative behaviour is considered within the total context of a particular society, attention must also be given to the attitudes and values that are held by those within that society as they can eventually stimulate or inhibit change. To this extent an attempt has been made to gauge farmer attitudes to change.

A study of knowledge and perception of techbology is inadequate to guage the extent to which farmers are benefitting from improved technologies without actually analysing production performance itself. In other words it will not be correct to assume that a farmer who is more advanced than another in his level of adoption, consequent to having more knowledge, is also more efficient and productive. Moreover, an analysis of the dynamics of power in village societies is also of crucial importance in order to determine why some farmers are better able to exploit the new technologies than others because of certain inequities in the socio-economic system. These aspects however have received little attention in the paper. This can be considered as one of the major limitations of the study.

METHODOLOGY

(a) *Selection of Locations*

One of the main impediments to devising policy and programme measures for overcoming the obstacles to adoption and for providing better extension services has been the lack of precise understanding of the knowledge levels and needs of farmers, their attitudes to technological change, and ways and means by which they obtain information for different crops-livestock under farmer conditions. With this in mind the following agricultural situations were selected to represent a diversity of economic, social and environmental conditions which were felt to be fundamental to an understanding of the behavioural aspects of farmers:

1. Three paddy growing areas with two areas having high physical, environmental and social constraints and a comparable area displaying a minimum of such constraints to increasing paddy production.

i. A cluster of villages comprising of Pamunuwa, Matammana, Nilpanagoda and Yagodamulla from the Minuwangoda A.I. range in the Colombo district. These villages are dependent on the vagaries of monsoonal rains, have relatively poor soil drainage conditions and are highly fragmented.

ii. A cluster of villages comprising of Machchagama, Padukkulama, Ittikattiya, Bulankulama, Meegassagama and Periakulama in the Anuradhapura district in the Ipalogama A.I. range. These are purana villages, fed by small village tanks which are dependent on rainfall for irrigation. Though not readily apparent from the sample, the areas belonging to the Puranawela are characterised by excessive fragmentation and tenmurial problems.

iii. A cluster of villages comprising of Karambewa and Aswadduma in Anuradhapura district in the Ipalogama A.I. range which fell into the low constraint category. Water supply here is much more secure as it is under major irrigation.

2. An area with small holding rubber where culture of the crop as well as the type of innovations are different from paddy farming and where the coverage of extension services is also comparatively thinner. This area also has relatively more urban cosmopolitian influences than the other areas.

3. An area with dairy farming which with an animal husbandry enterprise would present further diversity for a study of knowledge and perception of improved technologies.

(b) *Investigation Procedure*

The field work was conducted during the period March to May 1978. Data was collected with a structured questionnaire and included information under the following broad categories for the five areas:

(i) The socio-economic background of farmers.

(ii) Sources and levels of farmers knowledge of selected innovations appropriate to the particular farming system and their levels of adoption.

(iii) Attitudes to selected innovations.

(iv) Communication channels utilised and their relative effectiveness in imparting the necessary information / skills.

(v) The wider psychological-social environment of farmers.

(c) *Sampling Procedure*

The analysis is based on information collected from samples of farmers from the respective study areas. The details of the samples are as follows:

Crop & Agroecological zones	District	Villages selected	Total No. of farm households*	Sample
Paddy-Wet Zone (high constraints)	Colombo	Pamunuwa Mattammana Nilpanagoda Yagodamulla	196	38
Paddy-Dry Zone (high constraints)	Anuradha-pura	Padukkulama Ittikattiya Meegassagama Bulankulama Machchagama Periyakulama	261	35

Paddy-Dry Zone (low constraint)	Anuradha-pura	Karambewewa Aswedduma	213	34
Rubber	Colombo	Haltota** Paragastota**	868	62
Dairy	Kandy	Nilambe**	52	43

* Farm household - a household operating a paddy holding or a household owning rubber or dairy animals.

** Grama Sevaka Areas.

CHAPTER 1

KNOWLEDGE OF AND ATTITUDES TOWARDS IMPROVED TECHNOLOGY

The level of knowledge possessed by farmers on techniques of crop production is one determinant of the achievable level of production. So are the attitudes possessed by farmers towards these production techniques. In extension/education work (whether it is in agriculture, health or in family planning), what is usually attempted are: (i) to create knowledge of the idea that one wishes to encourage: (ii) to form or change individuals' attitudes towards the ideas so that they are more favourable; (iii) to secure adoption of the idea. Knowledge therefore, may be considered as the first product of an extension activity.

Certain studies have taken the view that knowledge and attitudes are not important limiting factors as far as paddy production in Sri Lanka is concerned. It was stated in B.H.Farmer's volume on *Green Revolution in Sri Lanka and Tamil Nadu:* "when we examine the reasons given by cultivators.....for not adopting High Yielding Varieties (HYVS), it is not advice or knowledge but the supply of inputs - including water which emerge as most critical in the eyes of farmers."(1) Studies done by the ARTI also have given greater weight to supply of inputs, availability of water, and size of farm holdings as factors affecting production.(2) Yet, even if knowledge is not considered important at present it may become an important factor in future. With large sums of money spent on improving the quality of land through irrigation and with improved input supply and produce marketing systems, knowledge (or the personal factor) may well become a limiting factor determining agricultural productoion in Sri Lanka. Knowledge is not only an important factor affecting acceptance (or adoption) of a farming practice but also one determining how well the practice is carried out (quality of the practice). So the fact that other studies have given little weight to knowledge factors does not mean they should continue to receive little attention.

We would suggest further that the fact that a person is 'aware' of something or thathe is'using'it does not mean that he possesses satisfactory knowledge about it. He might use it without knowing adequately about it.

In other words, adoption of a practice does not mean complete or sufficient knowledge of it. (The corollary is also true: a person might possess complete knowledge of something but yet not use it). Rogers(3) identifies three types of knowledge, namely awareness knowledge - knowledge of the presence or availability; 'how to' knowledge - information necessary to

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(1) Farmer B.H.(1977) *Green Revolution:* Cambridge Commonwealth Series. The Macmillan Press Ltd., London.

(2) ARTI (1974) *The Agrarian Situation Relating to Paddy Cultivation in Five Selected Districts of Sri Lanka.*

(3) Rogers, Everett M. and Shoemaker, F.Floyd. (1977). *Communication innovations: A Cross Cultural Approach.* Collier - Macmillan Ltd.,London.

use it properly; and principles knowledge - knowledge of working principles.

In agriculture, what usually happens is that farmers who become aware of new technology and gain some knowledge of how to use it do attempt to use it. The goal of extension services is also to make farmers 'adopt' new technology. Adoption could take place anywhere along the 'continuum' from (Un) awareness to complete knowledge.

Adoption

(Un)awareness ——————————— Complete Knowledge

The question of attitudes is more complicated than this. Attitudes refer to a positive or a negative reaction towards something (technology in this instance). In extension work we are not only interested in providing knowledge but also in creating attitudes in the desired direction. Attitudes usually follow awareness and may change as we go from awareness to adoption and use. In other words, attitudes change with knowledge and experience. The relationship between behaviour and attitudes is complex. It is probably most often the case that attitudes develop with awareness and may get modified over time with knowledge and experience. Adoption provides knowledge and experience, which could modify the existing attitudes.

We must emphasise here that knowledge and attitudes are just one of the many variables affecting production. There are a whole host of others - socio-economic, institutional and structural - affecting production. As was stated in the introduction, in this study we are interested essentially in this variable of knowledge and perceptions and in examining ways and means of manipulating it in order to achieve a higher rate of adoption of technology and therefore a higher level of production. This chapter examines the present situation with regard to knowledge and attitudes. In other words, it examines what knowledge do farmers possess and what attitudes they bear towards improved technology under different agricultural settings.

1.1 PADDY CULTIVATION

The area under paddy cultivation in Sri Lanka can be classified according to the system of water supply into Major Irrigation, Minor Irrigation and Rainfed areas, each occupying about 1/3rd of the total asweddumised extent. The three study locations for paddy selected on the basis of constraints to paddy cultivation fell under the three systems of water supply. The two dry zone situations represent;
(1) Major Irrigation area (referred to as low constraint location meaning that the constraints to increasing paddy production are minimal);
(2) an area fed by small village tanks (referred to as the high constraint location, meaning that constraints to increasing paddy production are greater) and the third paddy area was selected from the Rainfed Wet

Zone which has a high constraint situation for paddy cultivation.(1)

1.1.1 *Use Of Improved Varieties Of Paddy*

Use of improved varieties of paddy has spread to such an extent that certain researchers have even spoken of 'over-adoption' of high yielding varieties in comparision to the adoption of other components of the package of practices.(2) This study also showed a high level of adoption of New High Yielding Varieties, particularly in the two dry zone situations. (see table 1.1.) The higher incidence of traditional varieties undre wet zone conditions is due to the popularity of longer maturing varieties in the Low country wet zone areas, as Maha paddy varieties.

Table 1.1 Varieties of paddy cultivated by farmers

	DZLC		DZHC		WZ	
	No:	%	No:	%	No:	%
	(N=34)		(N=35)		(N=38)	
NHYV	33	97	33	94	23	61
OHYV	4	12	7	20	1	3
TV	-	-	2	6	15	40

The number of varieties that were grown increased from 5 and 6 in the DZLC and DZHC situations respectively to 11 in the WZ situation, due again to the large number of traditional varieties grown. Another important feature that emerged was the very high popularity of BG 11-11 and BG 34-8 under well irrigated conditions. The proportion of farmers who exclusively grew these two varieties dropped from 85 under DZLC conditions, to 63 under DZHC conditions and to 42 under wet zone conditions. This indicates a more homogeneous situation in terms of adoption of varieties in the area with assured water compared with the other two areas. (particularly to the wet zone area). This can be explained as due to the comparatively more homogeneous physical conditions found in the said area.

Although new improved varieties are reocmmended for use under all agro-climatic conditions there is no doubt that they will perform best under well irrigated dry zone conditions, as in these areas, in addition to the availability of water, other factors such as tenancy, size of paddy holdings, extent of fragmentation, are favourable to paddy farming.

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(1) The abbreviations DZLC, DZHC and WZ will be used in the text to refer to the three study locations; dry zone low constraint location, dry zone high-constraint location, and wet zone location, respectively.

(2) Dias, H.D. (1977) "Selective adoption as a strategy for agricultural Development; lessons from adoption in S.E. Sri Lanka", in *Green Revolutions* Cambridge Commonwealth Series , op cit.

The selection of a particular variety by a farmer depends on the potential of that variety to satisfy his needs. In other words the selection depends on farmers' perception of the characteristics of the variety in the light of his needs. He will also take into consideration the extent of risk involved in the selection(or the probability of getting the expected outcome). As illustrated in Table 1.2, irrespective of the water conditions, the main reason for the selection of varieties is the possibility of obtaining a higher yield. Other reasons were of secondary importance, though considerably more important in the two high constraint areas. There was no evidence to believe that under difficult farming conditions as well as under non-commercialised farming conditions, farmers under estimated the importance of the yield factor (see Table 1.2)

Table 1.2 Reasons given by farmers for selecting the variety/varieties cultivated

Reasons	DZLC(N=34)		DZHC(N=35)		WZ(N=38)	
	No. of farmers reporting	% of farmers reporting	No. of farmers reporting	% of farmers reporting	No.of farmers reporting	% of farmers reporting
Higher Yield Potential	25	74	26	74	27	71
Other Reasons	13	38	23	66	20	53

Of the other reasons given, weight of paddy and selection of varieties to suit water supply conditions were the major considerations in the Dry zone areas, while, palatability, tradition of cultivating, and adhering to the same variety cultivated by other farmers in the tract were the more important considerations cited in the wet zone area. Thus, even the 'other considerations' favour high yielding varieties in the dry zone areas, while these do not necessarily favour yielding varieties in the other area. On the contrary, the reasons given favour traditional varieties.

The use of traditional varieties particularly in the wet zone area could be explained on the basis of these 'other considerations' of farmers, Although a majority of farmers under all conditions had considered yield as an important factor, the relative importance given to the yield factor may not be the same under all conditions. The degree of importance placed will depend on how high the yield potential of new varieties are compared with the yield potential of traditional varieties and the probability of achieving it (i.e the risk factor) in the particular agricultural situation. This difference in yield potential is small under difficult farming conditions, particularly under wet zone conditions, while the probability of achieving even this difference is low. The perceived difference in yield potential (i.e. the yield difference as seen by farmers) is even smaller than the actual yield difference

(see Table 1.3) (1) while the perceived probability is even smaller than the actual probability. Hence, a lesser importance attributed to yield factor by the wet zone farmers may be expected and as a result the 'other considerations' which favour traditional varieties could over-ride the yield factor.

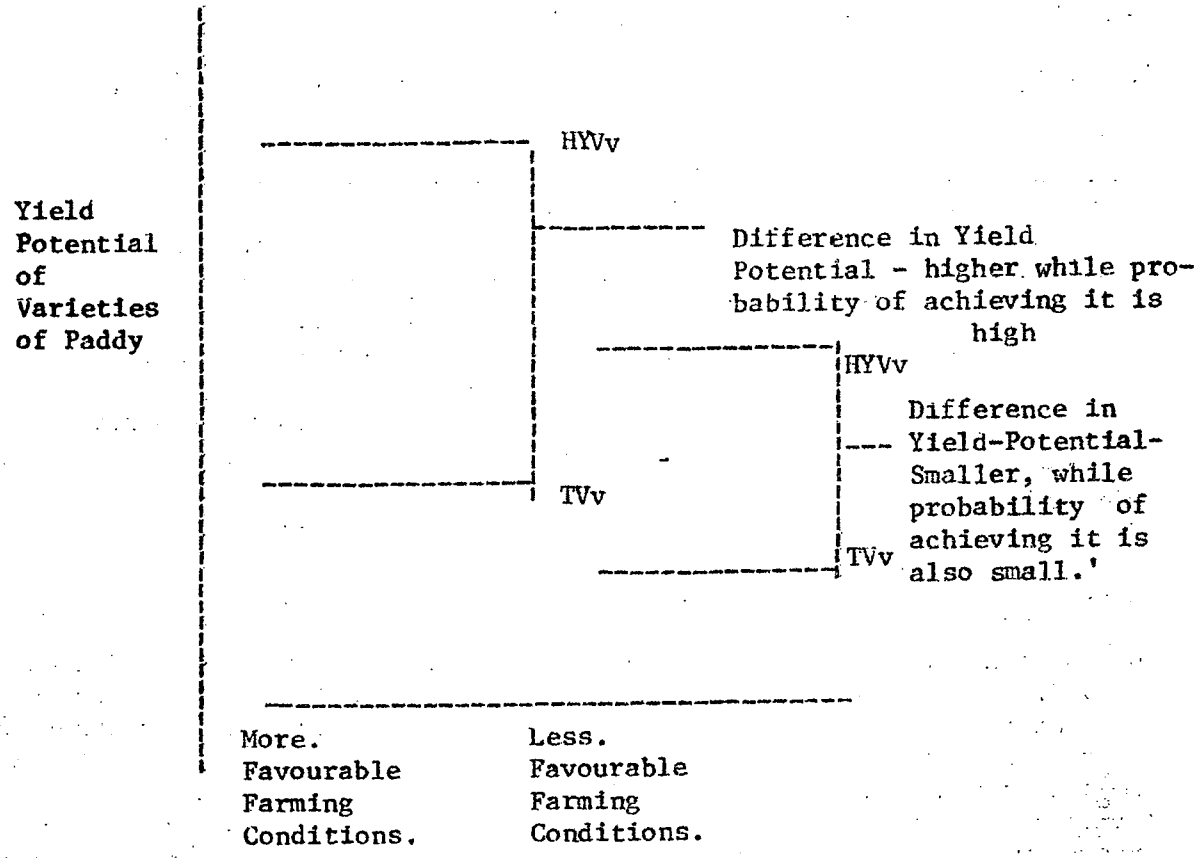

Table 1.4 illustratesfarmer ranking of paddy varieties according to their estimate of yield potential. Comparing Table 1.4. with Table 1.1 gives a measure of farmers who realise the yield potential of improved varieties, but do not use them. We can see that although nearly 40% of the farmers from the wet zone had used traditional varieties only about 15%, consider them superior to improved varieties in terms of yield potential. The balance should represent the farmers who accept the superiority of improved varieties in terms of yield but do not use them probably due to other considerations.

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(1) As illustrated in Table 1.3 the difference in yield potential as perceived by farmers of the wet zone area between new improved varieties and traditional varieties at all levels of fertilization is smaller compared to the same figures for dry zone farmers.

Table 1.3 Farmers estimates of yield potential of different variety groups of paddy under three levels of fertilisation (in Bu/Acre).

	DZLC			DZHC			WZ		
	At Recom: Level	At ½ recom: Level	No. fertilizer	At recom: Level	At ½ recom: Level	No. fertilizer	At recom: Level	At ½ recom: Level	No. fertilizer
New High Yielding varieties	85	59	33	99	72	49	60	39	20
Old High Yielding varieties	62	45	28	71	53	39	62	39	22
Traditional varieties	48	39	35	67	51	38	51	35	20

The main points that emerge in the foregoing discussion can be summarised as follows:

1. Yield is the most important criterion governing the selection of varieties by farmers under all environmental conditions studied.

2. Most farmers under all environmental settings consider the superiority of improved varieties over traditional varieties in terms of their yield potential.

3. The cultivation of traditional varieties in the wet zone situation may be explained in terms of the following: (a) some farmers consider traditional varieties to be superior to improved varieties in terms of yield potential; (b) in the case of others the perceived yield potential of improved varieties although higher than traditional varieties, the yield difference is not high enough (while the probability of achieving it is low) to motivate them to adopt these varieties. The proportion of farmers in group (b) is larger than in group(a).

Table 1.4 Farmers Ranking of paddy varieties, according to their yield potential

	DZLC(N=34)		DZHC(N=35)		WZ(N=35)	
	No. of farmers	% of	No. of farmers	% of	No. of farmers	% of
Place 1						
NHYV	32	94	31	89	28	74
OHYV	2	6	3	9	6	16
TY	-	-	1	3	3	8
Place 11						
NHYV	2	6	2	6	3	8
OHYV	32	94	30	86	28	74
TY	-	-	2	6	4	11
Place 111						
NHYV	-	-	2	6	6	16
OHYV	-	-	1	3	2	5
TY	34	100	29	83	28	74

When farmers were asked to rank varieties (both new and old) according to their superiority, a greater degree of homogenity was seen under the dry zone situations, particularly under DZLC situations. 94% of the farmers ranked BG 11-11 and BG 34-8 as the most suitable Maha and Yala variety respectively, while the farmers in the wet zone area have ranked a number of varieties as the most suitable type.(Table 1.5)

Table 1.5 Identification of the most suitable variety of paddy by farmers.

	Percentage of farmers reporting					
	DZLC(N=34)		DZHC(N=35)		WZ(N=35)	
	Maha	Yala	Maha	Yala	Maha	Yala
BG 11-11	94	-	80	9	34	34
H4	6	-	6	-	8	11
BG 34-8	-	94	6	71	5	6
BG 34-6	-	3	-	6	3	3
BG 90-2	-	-	9	3	29	29
BG 34-4	-	-	-	3	-	-
H8	-	-	-	-	8	-
BG 34-11	-	-	-	-	-	3

It is seen that under more homogeneous environmental conditions, individual variations in knowledge and perception among farmers are comparatively smaller, thus making the task of extension easier, The training and visits system of extension will be suited more in areas where conditions are more homogeneous, such as the DZLC situation since under more homogeneous environmental conditions individual variations in knowledge and attitudes tend to lessen.

The discussion points out that little effort is necessary for the extension services to attempt to popularise new improved varieties of paddy in the dry zone areas in general and the well irrigated areas in particular. This trend may be true even for the future. Even any new varieties that may be available in future should reach farmers with little extension effort. However, with regard to wet zone areas, there appears to be a need for further extension input in popularising varieties.

In areas where environmental conditions are conducive to the cultivation of paddy, a stepwise approach to extension work, popularising the variety first could be beneficial. Once the variety is accepted, the adoption and gradual upgrading of other complementary practices could subsequently be encouraged because in such an area adopting a variety with a minimum of other inputs and management is less likely to lead to disappointing results. The same argument will not hold for a difficult physical environment. In such an area the best extension strategy is to popularise the entire package of practices together. Since only then a satisfactory increment in performance of varieties could be expected.

1.1.2 *Fertilizer Use In Paddy*

Use of fertilizer can be considered as the most important of the package of improved practices needed to reap the benefits of new varieties of paddy. For maximum returns on fertilizer, its correct use is of prime importance. Correct use means the use of adequate quantities

of the correct types at the required times according to the age of the crop, taking into consideration the environmental factors, such as rainfall. In order to achieve this end, the Department of Agriculture has for the benefit of farmers, released recommendations of fertilizer for different areas of the country.

Farmers' knowledge of fertilizer recommendations is therefore an important determinant of the correct use of fertilizer. Our study shows that the proportion of farmers possessing knowledge of fertilizer recommendations (either fully or partially) was 38.2% for DZLC area, 34.2% for DZHC area and 52.6% for wet zone, demonstrating that there was little difference in knowledge among the farmers in the two dry zone situations, but that the wetzone farmers were more knowledgeable than others. Although a smaller proportion of DZLC farmers were knowledgeable about fertilizer recommendations, a much larger proportion had used fertilizer.(1) Fertilizer use was lower in the DZHC area - reasons for which are examined later. The higher use of fertilizer and lower knowledgebility of specific recommendations in the DZLC area suggests that although farmers are not knowledgeable of ' recommendations ' they are aware of the advantages of fertilizer and possess some knowledge of the types and quantities of fertilizer to be used.

The situation with regard to fertilizer use and knowledge of fertilizer recommendations can be summerised in the following manner:

	DZLC	DZHC	WZ
Fertilizer use	High	Low	High
Knowledgebility of fertilizer recommendations	Low	Low	High

The extension input required in the DZLC area is therefore an upgrading of knowledge of farmers on fertilizer use, while in the DZHC area it is more promotional activity encouraging farmers to use fertilizer. Arising from this, it is possible to make a general comment on extension approches. That is, in areas where a satisfactory level of initial technology use has been achieved greater emphasis should be given to farmer educational work.(2)

Farmer training programmes and use of printed material (advisory leaflets and journals) should occupy an important place in extension work in these areas.

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(1) The liberised credit system operated in the season under study and the comparatively more satisfactory situation with regard to the availability of fertilizer coupled with the 75% subsidy that fertilizer enjoyed could have encouraged fertilizer use in the season in all study areas.

(2) Extension work has two main functions, namely, promotional functions and educational function. By promotional function is meant the process of encouraging the adoption of improved technology, while educational function referes to an improvement in knowledge and understanding.

Extension methods can be classified into (mainly) promotional or (mainly) educational activities, on the basis of the expected outcome of the methods.

Promotional Activities (mainly)	Educational Activities (mainly)
Posters.	Farmer Training Classes
Laid out demonstrations	Method demonstrations
	Printed Material (pamphlets and journals)
Personal contacts	
Radio Programmes	
Film Shows	

Although, a small proportion of farmers from all three areas had knowledge of fertilizer recommendations, the actual quantities used by all farmers who used fertilizer (average amounts) did not vary substantially from the actual recommended quantities (Table 1.6) This means that although a majority of farmers were unaware of the recommendations, the quantities they had used were close to the recommended quantities. This suggests that their learning has been mainly through experience and not through exposure to formal learning situations.

Although the average amounts presented in the table do not reflect this difference, it should be noted that the amounts used by farmers who were aware of recommendations were closer to what they knew as recommended quantities, indicating a closer adherence to what is known when the knowledge is available. The other group of farmers varied substantially from each other in the quantities used. In other words, there were fewer individual variations within the group of farmers who were knowledgeable of the recommendations.

Farmers' knowledge of the nutrients added in the form of fertilizer was also ascertained as it reflected more indepth understanding of the benefits of fertilizer. Only a very small proportion of farmers from all three areas were aware of the nutrients supplied in fertilizer as is shown in the table (table 1.7)

Table 1.7 Farmers' knowledgeability of nutrients supplies as fertilizer

Nutrients	Percentage of farmers knowledgeable of nutrients supplied		
	DZLC (N=34)	DZHC (N=35)	WZ (N=35)
N	9 %	11 %	8 %
P_2O_5	-	-	5 %
K_2O	-	3 %	3 %

The reasons for non-application of fertilizer as well as for deviating from the recommended quantities were ascertained (Table 1.8), As illus-

Table 1,6, Table comparing fertilizer usage, farmers knowledge of recommended quantities and the actually recommended quantities

Dressing and type of fertilizer	Fertilizer usage - quantity per acre used in cwt, and percentage of farmers used, (4 - 4½ M varieties)						Farmers knowledge of fertilizer recommendations; average quantity identified as recommended and the % of farmers who identified recommended quantities						Actual Fertilizer recommendations. (4 - 4½ M varieties)		
	DZLC		DZHC		WZ		DZLC		DZHC		WZ		DZLC	DZHC	WZ
	Qty:	%	Qty:	%	Qty:	%	Qty:	%	Qty:	%	Qty:	%	Qty:	Qty:	Qty:
Basal dressing (V_1/V_2/Granules)	1.11	(85)	0.82	(35)	1.33	(76)	1.15		0.89		1.23		1-1.5	1-1.5	2.0
1st top dressing (Urea)	0.72	(94)	0.55	(59)	0.71	(68)	0.65	(38)	0.85	(38)	0.78	(53)	0.25-0.5	0.25-0.5	0.25-0.5
2nd top dressing (Urea)	0.75	(79)	0.54	(47)	-	-	0.85		0.65				0.25-0.5	0.25-0.5	-
3rd top dressing (Urea)	-	-	-	-	-	-	-		-	-	-	-	0.75	0.75	-
2nd top dressing (TDM)	-	-	-	-	1.08(74)		-		-	-	1.24	-	-	-	0.75

trated in the table, the reasons varied for the three study locations. For the DZLC situation, the nmajor reason for deviating from recommendations was identified as lack of knowledge of recommended quantities. The other major reason apart from financial difficulties (which is common to all three areas) is the view farmers expressed that what is added was sufficient, which again reflects a lack of understanding of required quantities.(1) This was identified as an important reason for their practices by wet zone farmers too. Lower use due to lack of knowledge of fertilizer recommendations indicates a knowledge problem, while the view that farmers hold that 'what was added was sufficient' means there is an attitudinal barrier as well. The former is easier to overcome than the latter.

The primary reason apart from financial problems given for non-application of fertilizer by farmers in the DZHC area is their view that fertilizer is not necessary particularly as the fields were left fallow for several seasons. Lack of knowledge was again reported by some. Unavailability was not identified as an important factor, except by very few farmers. These reasons suggest that when fertilizers are available, farmers' knowledge about fertilizer use and their understanding of its utility becomes an important factor governing use and non-use as well as its usage in the most desirable manner.

Table 1.8 Important reasons given by farmers for non-use of fertilizer (at the recommended level) as well as for deviating from recommendations.

Reasons	Percentage of farmers reported		
	DZLC (N=34)	DZHC (N=35)	WZ (N=35)
Financial problems	27	23	18
Lack of knowledge	38	14	16
Farmers holding the view that 'what is added is sufficient'	29	6	13
Farmers holding the view that fertilizer is not necessary	-	20	-
Farmers holding the view that fertilizer is not necessary particularly because the fields were left fallow for a number of seasons	-	11	-
Unavailability	6	6	8

(1) Fertilizer recommendations are only indications of requirement of fertilizer and are broad generalisations, for wide geographic areas. Hence, it is not correct to pass judgements on what an individual farmer practices based on the recommendations. It is used here as a standard for purposes of comparison.

It is generally accepted that farmers attach a greater importance to urea in choosing fertilizer for paddy, particularly because of its visible effects when added to a paddy crop. Farmers in the DZLC area, however, placed an equal importance on both basal mixture and urea with 94% and 97% respectively identifying them as very important rather than moderately important and not important. A similar pattern was observed in the wet zone situation with 92% and 84%, respectively, identifying basal mixture and urea as very important, while 92% placed the same importance on TDM. Under the DZHC situation, however, a lesser importance was attached to both fertilizer types with 57% and 77% of farmers identifying basal mixture and urea as very important. As expected, the importance placed on basal mixture was less, compared to urea.

The lower importance placed on fertilizer by farmers of DZHC area can be further explained in terms of farmer's estimates of the yield potential of different variety groups of paddy under different levels of fertilization . As illustrated in the table 1.2 the expected yield by farmers of DZHC situation for all levels of fertilizer use (recommended, ½ recommended level, and no fertilizer) was higher for all variety groups when compared to the same figures for the other two areas. The higher level of expectations from fertilizer particularly at low levels of fertilization and even without fertilizer would have led them to use less quantities than in the other areas as was shown in the earlier discussions.

The DZHC situation demonstrates certain important issues regarding fertilizer usage. The evidence indicates that the non-usage as well as lower usage of fertilizer in this area is not due to its non-availability, but is primarily due to the fact that farmers thought that what they did was correct. This was further supported by other evidence, such as the lower importance placed on fertilizer and higher expectations of returns even at lower rates of usage.

The season under study was one of the best seasons for paddy farming in Sri Lanka. The weather was favourable, liberal credit was made available to the farmers, availability of fertilizer was satisfactory and fertilizer enjoyed a 75% subsidy. Non availability of these conditions which usually act as constraints to fertilizer use did not have many adverse effects in this season. It is evident from the earlier discussions that when these conditions are favourable, knowledge and attitudinal barriers begin to operate affecting the use of improved technology.

1.1.3 *Pest Control In Paddy*

Pest control in paddy is an area where much emphasis is given in farmer education work. Unlike other improved cultural practices, pest control involves a reaction to a problem where immediate action is required. This makes the task of the farmer difficult. Pest control involves from the farmers' point of view identifying the pest, assessing the damage, selecting a control method (very often an insecticide), and applying of control measures.

The evidence with regard to farmers' knowledge of the pest problems indicates that in general, farmers in the DZLC area are more knowledgeable about the pest problems; a larger proportion of them were able to identify the specific insects that usually affect their paddy (table 1.9). In

In respect of the knowledge of various insecticides for the control of pests the three areas varied slightly. For instance, the number of time the names of insecticides were mentioned, varied from 37 in the DZLC situation to 30 and 24 in the DZHC and wet zone situations respectively.

Table 1.9 Farmers knowledge of pest problems in paddy cultivation

Pest/pest problem	Percentage of farmer reported DZLC (N=34)	DZHC(N=35)	WZ(N=35)
Paddy fly	56	69	76
Stem Borer	59	31	8
Leaf roller caterpiller	41	37	3
Hopper burn (leaf hopper damage)	24	-	3
Caterpiller damage (unspecified)	6	34	21
Insect damage (unspecified)	-	9	11
Other pests (identified)	12	9	21

The extent of dependence of farmers on outsiders for advice could be cited as further evidence of farmers' knowledgeability . As illustrated in the table 1.10 the dependence on outside sources for advice on identification and/or control of pest problems has been least in the DZLC situation. Further, greater dependence on neighbour farmers and farmer friends was observed in the other areas, particularly in the wet zone areas. It is usual that with an increase in knowledge, farmers tend to depend on specialised sources of information and increasingly less on unspecialised sources, such as friends and neighbours.

Table 1.10 Sources of advice for identification and control of pest problems

Source	Proportion of farmers who sought advice DZLC(N=34)	DZHC(N=35)	WZ(N=35)
Neighbour farmers and friends	3	9	24
KVS	29	57	16
AI	-	3	8

As was pointed out earlier in the discussion, wet zone farmers were more knowledgeable of the fertilizer recommendations, than the farmers of the other two areas. On the other hand the preceding discussion showed that regarding pest problems and their control, farmers of the DZLC area were most knowledgeable. This difference could be explained in terms of the types of knowledge we have been discussing. Knowledge of fertilizer

recommendations is a type of knowledge usually learnt through exposure to formal learning situations or external sources of information, while knowledge of pests (particularly identification of pests) and their control is a more practical type of knowledge which can be best gained through experience in farming.

In the Maha 1977/78 season, the major pests have been paddy fly, stem borer and marasmia in the two dry zone situations and paddy fly in the wet zone. Although a certain pattern was observed in the incidence of pests, such a pattern was not seen in adopting control measures. A large number of insecticides have been used in all three areas. It is likely that farmers may have used different insecticides to control the same pest. The number of insecticides used respectively by 21, 18 and 21 farmers in the three areas was 10, 9 and 8 respectively. In addition, there were farmers who had not specified the insecticides they had used. This evidence suggests that there is no pattern in the use of insecticides even in any one area. The pesticides farmers adopt are usually governed heavily by what are locally available and promotional work by the firms marketing agro-chemicals, in addition to farmers knowledge and experience and exposure to extension advice. With a large number of insecticides available, it is likely that farmers will find it difficult to select what is suited to them. It is desirable if an independent organisation, like the Extension Services in addition to its usual farmer education work could publicise its recommendations through advertising in newspapers as newspapers reach the farming community rather widely. In addition a great emphasis to pest control in farmer education work (compared to other management practices) seems necessary.

1.2. *Rubber*

Sri Lanka has a total area of 560,000 acres planted with rubber, of which about 32% is managed by small holders.(1) The smallholders generally produce ribbed smoked sheet (RSS) amounting to approximately 25% of the total annual production of 150,000 tons.

The extension work on smallholder rubber is handled by the small holders division of the Rubber Research Institute. This institute has the dual function of improving the standard of cultivation of rubber small holdings and upgrading the quality of sheet rubber produced. In the extension work on rubber cultivation, emphasis is given to the use of improved clones, fertilizer application, soil conservation, cover-cropping and control and prevention from diseases while at the same time attempts are made to improve the technical knowledge of small holders in sheet manufacture. The Rubber Research Institute has launched a programme to improve the quality of sheet rubber through the establishment of Group Processing Centres.

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(1) According to the classification adopted by the Rubber Controller: Lands below 10 acres are classed as smallholdings.

1.2.1. *Use of Improved Clones*

The total acreage of high yielding rubber in the island is in the region of 417,670 acres (figures for the year 1974). The major part of this high yielding rubber was planted after the Government's Rubber Replanting subsidy scheme which came into operation in 1953.[1]

Examination of the area under improved clones of rubber for the rubber growers in the sample reveals a considerably large extent under budded rubber (84% of the extent) and a district preference to one of the improved clones, namely PB86. This clone alone occupied 70% of the extent under rubber and 70% of the growers in the sample cultivated it either exclusively or in association with other clones.

An important feature about clones is that most growers were in a position (except for the 4 who identified themselves as having budded rubber only) to identify the varieties they cultivate and also to list the varieties according to their suitability for the area. When growers were asked to list the available varieties a distinct superiority (PB86) was again observed. Sixty ranked PB86 to the first position as against only one who ranked a RRIC variety first. This evidence clearly indicated the exceptionally high preference to PB86 over other clones of rubber. This preference to PB86 has been mainly due to the good performance of this clone under small holder conditions, coupled with the unsatisfactory performance of some of the other clones under these conditions. It seems therefore, that any new clones to be introduced in future in order to win the confidence of the rubber growers should be good performers under their conditions and will therefore demand a heavy extension input. In a long duration plantation crop where the decision will affect them for the next 20 years or so, it is likely that cultivators, particularly small holders, will select the path of least risk. They will prefer a variety that has performed moderately well under their conditions than one claimed to be better. This has been aggravated by the poorer performance of some of the varieties introduced earlier under smallholder conditions (superior clones that did not perform satisfactorily under farmers conditions). This will make the introduction of any new varieties extremely difficult. It seems that growers are unlikely to accept new varieties before their performance is demonstrated to them. Hence, the best way of introducing new clones seems to be through the rubber estates as the information flow from estates to smallholders appears to be high. One of the most important factors that had influenced the initial adoption of clones is the satisfactory performance of these clones in the close by estates.

An attempt was made to examine how rubber growers perceive the yield potential of budded and seedling rubber under two systems of tapping, namely, daily and alternate day tapping. It was observed that although they do recognise the higher potential of budded rubber over seedling rubber, they do not see an appreciable difference in terms of the poundage per acre (see the mean value given in the table below (Table 1.11). Although a mean value of 10 lbs per tapping day seems to be satisfactory under smallholder conditions the median value indicated that 50% of growers perceive a yield potential of less than 10 lbs per tapping day.

[1] Rubber Controller., Annual Report for the Year 1974:Rubbers Controllers Department.

A more realistic indicator of farmer perception of yield potential is the values given for daily tapping as a majority of growers tap daily, which as appears in the table is relatively low. The way growers perceive the yield potential of budded rubber, although it has not affected their use of improved clones, could have an affect on the adoption of other cultural practices. For example, if they underestimate the potential of improved clones it might affect the extent to which they use fertilizer on them.

Tanle 1.11 Rubber growers' perception of yield potential of budded and seedling rubber under daily and alternate day tapping.

	Budded rubber daily tapping	Budded rubber alternate day tapping	Seedling rubber daily tapping	Seedling rubber alternate day tapping
No: of farmers	59	56	53	51
Maximum* value	15.0	20.0	10.0	12.0
Minimum* value	1.0	2.0	2.0	1.0
Range*	14.0	18.0	8.0	11.0
Mean*	7.08	10.08	4.67	5.90
Median*	6	10	4	6

* Unit - lbs of RSS rubber per acre per tapping day.

It appears therefore that there is a need to educate growers of the potential of budded clones particularly the potential with improved methods of management. It appears from the study that although rubber growers have taken to new clones they have not aceepted the other practices to the same extent needed to obtain higher yields from these clones.

1.2.2. *Rubber Replanting Subsidy Scheme*

Sixty-one of the 62 rubber growers interviewed were aware of the rubber replanting subsidy scheme, while 70% of those interviewed had made use of the subsidy scheme. Although a very high level of awareness of the subsidy scheme was apparent, some lacked knowledge of how to make use of the subsidy scheme. For example, details such as how to apply for the subsidy where to get application formswere some of the information needed by them. Some were unaware of the need for registration, the manner of registering lands with the Rubber Controller, as well as the way of looking

for prior registrations.

Another important factor that appears from the survey, is that 42% reported possessing block of rubber which needed replanting, but no action had yet been taken except, for 6 of them who had submitted applications for the subsidy. Although the reasons given are highly varied this means that almost every other farmer had a block of rubber that needed replanting. Looking at the reasons given for not undertaking replanting, except for two of the reasons given - i.e. unclear titles, and economic difficulties, over others namely, preference to change over to other crops, preference to continue tapping for some more time, and competition from other demands may be overcome by compaigns publicising the advantages of the subsidy scheme. Use of posters, advertising in newspapers and radio, use of films, etc., are some of the possible ways of publicising Economic difficulties should not be of major concern since the subsidy is attractive and payments under the subsidy begin with the clearing of land. Further the income from the sale of firewood could easily finance the clearing operations.

Posters displayed at public places such as post-offices, could be a more powerful publicising medium than even newspaper advertisements. Particularly when the reach of mass media is high (see Chapter 3), they can be used with advantage. Use of more than one medium in publicising will assure a better reach and could supplement each other. Newspaper advertisements and posters should be designed to motivate farmers to undertake replanting and should as much as possible attempt to provide details information of 'how' to make use of the subsidy scheme. Highlighting the financial advantages fof the subsidy and explaining how the payments are made may be useful as financial problems have been identified as one of the reasons for not undertaking the subsidy. Making application forms available through local outlets or having them as part of the advertisement itself (including forms for registration of lands) and making the procedure of registration and application for the subsidy simple could make things easy for the rubber grower.

With regard to instructions sent to growers under the replanting subsidy scheme, evidence indicates that they mainly indicated 'what' should be done while lesser importance was attached to 'how' and 'why' something should be done. Making available printed advisory literature in the form of pamphlets or booklets containing detailed instructions could help in making growers conform to the requirements of the subsidy. They may be sold for a nominal sum.

1.2.3 *Fertilizer Use in Rubber*

With regard to farmers' knowledge of fertilizer recommendation for rubber, 10% of the farmers knew the names of the different mixtures recommended while 86% knew it only as 'rubber fertilizer'. The table 1.12 illustrates the different levels of fertilizer usage by farmers and their knowledge of fertilizer recommendations.(1) According to the table, roughly 60%

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(1) Certain difficulties arose in determining the quantity of fertilizer used by growers as they had plantings of different ages. The data on fertilizer usage given here includes what growers use at present and what they used in the past. For example in instances where a grower only had a planting at tapping, data pertaining to fertilization of young plants refers to quantities that he used when the plants were young.

of the respondents have indicated the recommended quantities while 60% apply (or have applied) fertilizer to young plants while only 40% apply (or have used) fertilizer for older plantings. The quantities applied were either equal or close to the recommended quantities in the case of young plantings (particularly first and second year) while the quantities were less than the recommended quantities in older plantings (particularly after the 5th year). The higher level of use of fertilizer in young plantings (both in terms of the number of farmers who had used fertilizer as well in terms of quantity used per acre in relation to recommended quantity) could be attributed to the subsidy scheme which compels growers to maintain a minimum standard of cultivation, as well as to the visible effects of fertilizer on young plants.

On comparing the level of knowledge of fertilizer recommendations with the quantities used, it was observed that for young plantings, there was no marked difference in quantity of fertilizer identified as recommended and the quantity that was actually used. But for older plantings the quantities identified as recommended was higher than what was actually used.

When examining the closeness of the farmers' knowledge of the recommended quantities with what is actually recommended it was observed that the proportion of farmers who identified the correct level of application dropped with the increase in the age of the planting from 1st year to the 5th - 6th year and increased slightly thereafter. A larger number of farmers knew the recommended quantities of fertilizer for younger plants. This was not purely due to the fact that they were more knowledgeable about recommendations for younger plants but was due more to their estimates of the requirements which conincided with the quantities recommended for younger plantings.

When reasons for non-application of fertilizer were examined, economic difficultues emerged as the most important. Seven out of 12 and 25 out of 36 farmers who gave reasons for not applying fertilizer to young plantings and for older plantings respectively gave economic reasons as the reasons for non-application. The other most important reason is of direct concern to extension services - i.e. growers holding the view that mature plantings need no fertilizer . Twenty five percent of growers gave this as the reason for non use of fertilizer and therefore cannot be regarded as unimportant. This view reflects their lack of knowledge and understanding of the advantages of fertilizer. Although growers had identified economic factors as the main reason for non use of fertilizer, it is doubtful the reason is purely 'Economic' but can also be tied up with a lack of motivation as well as a lack of understanding of the advantages of fertilizer. Although, rubber fetched satisfactory prices during the last few years and further rubber enjoys an attractive replanting subsidy in addition to the fertilizer subsidy which was 75% at the time of the study the situation was not satisfactory a few years back when rubber fetched very low prices. This should be kept in mind when interpreting the data since the information refers to the usage at present as well as what was used in the past. Even the present position with regard to fertilizer usage could have a relationship to the past experiences.

The reasons for lower rates of use could again be the same coupled with a lack of understanding of the required amounts. The satisfactory

Table 1.12 Table showing the variation in the levels of fertilizer use; The figures refer to the number of growers using fertilizer at the different levels; The figures in brackets indicates the number of growers who identified that level of fertilizer as the recommended quantity; The arrows refers to the actual recommended quantity

Quantity of fertilizer / Age of planting	Less than 0.5 lbs.	0.5-/1 lbs.	1-/ 2 lbs.	2-/ 3 lbs.	3-/ 4 lbs.	4 lbs. and above	% of growers reported using fertilizer (N=62)	% of growers who reported recommended quantities (N=62)
		(No. of farmers)						
1st year	04	10	14	05	05	01	63%	--
	(3)	(13)	(13)	(7)	(1)	(3)	--	60%
		←———	——→					
2nd year	01	08	12	07	04	06	61%	--
	(-)	(7)	(15)	(6)	(3)	(8)	--	63%
		←———	——→					
3-4 years	-	07	111	07	05	05	56%	--
	(-)	(2)	(12)	(10)	(6)	(8)	--	61%
				←——→				
5-6 years	-	-	14	05	04	03	42%	--
	(-)	(1)	(9)	(9)	(3)	(13)	--	56%
					←——→			
7th year & after	-	02	12	08	01	03	42%	--
	(-)	(1)	(10)	(11)	(4)	(10)	--	58%
				←——→				

situation regarding fertilization of young plantings is due to the subsidy which compels them to use the fertilizer.

The probable answer to the problem of non use (as well as lower rate of usage) seems to be an economic approach to extension work rather than an agronomic one. As was said earlier, the reason for non- usage of fertilizer is not likely because rubber growers cannot meet the extra cost of fertilization but the lack of a strong motivation to bear the extra cost. The only way to overcome this situation is to educate growers of the cost and returns of fertilizer thus, making them understand the advantages of using fertilizer in monetary terms. Such educational work should for the first instance aim at farmers owning young plantings, particularly 4th year on-wards as this is the age at which fertilizer usage begins to drop, and further maximum benefits of fertilization could be expected from plantings of this age group. The extension services has the dual function of encouraging the use of fertilizer by those who do not use at present while encouraging others to adhere to recommended levels . Since rubber is fetching very high prices at present and as the replanting subsidy is made even more attractive, this seems to be the best time for a campaign to promote fertilizer use in rubber.

1.2.4 *Use of Cover Crops*

Cover cropping is a recommended practice in the cultivation of rubber and has a number of desirable effects on the growth of the plant. Attempts are made under the replanting subsidy to maintain a satisfactory cover during the pre-tapping phase.

Of the rubber growers interviewed, 1/3rd reported having (or had) a good cover crop in their plantings. With regard to their awareness of the advantages of cover cropping it was found that they viewed cover cropping more as a means of improving soil fertility and preventing weed growth than so much as a means of preventing soil erosion.

Table 1.13 Rubber growers perception of advantages of cover cropping (Percentage growers who identified the following as an advantage of cover cropping)
N = 62

	Before suggesting alternatives	After suggesting alternatives	Total
Improves soil fertility	76	21	97
Prevents weed growth	63	34	97
Prevents soil erosion	50	39	89
Adds organic matter to soil	36	24	60

Information presented later in this chapter shows that in general lesser importance is given to aspects of soil conservation by growers when compared to other cultural practices such as fertilization and weed control. Considering cover cropping more as a means of soil conservation and as a means of improving soil physically, while at the same time educating farmers on the advantages of soil conservation could thus help in further popularising cover cropping. Further farmers lack knowledge of how to establish cover crops, where to buy seeds etc, and these seems to be other factors that need consideration in extension work.

1.2.5 *Tapping Rubber*

The table below indicates rubber growers' views on a suitable system of tapping for rubber compared to the system they follow at present.

Table 1.14 Rubber growers' selection of the most suitable system of tapping and the distribution of growers according to the system they follow at present.

	Most desirable system (No: of farmers)	System followed (No:of farmers)
Daily tapping	01	44
Alternate day tapping	53	12
Once in three days	08	---
Total	62	56

As revealed in the table, although growers realise the superiority of alternate day tapping, they tap daily. This is mainly due to the daily income that is important to the smallholder. It is very likely that smallholders will continue to tap daily as long as the prices of rubber remain attractive. When the figures for yield potential of budded and seedling rubber are examined it is seen that from daily tapping farmers perceived a possibility of obtaining 3/4 of the yield that they can get per day from alternate day tapping. The other factor that favours daily tapping is that in most smallholdings tapping is done by the cultivator himself or by a family member. Even the wages paid to hired labour are low compared to the price of rubber so that they find it cheaper even to employ hired labour for daily tapping. In instances where the cultivators own only one block of rubber for tapping, apart from the daily income aspect the need for providing continuous employment to hired labour also favours daily tapping. Discouraging daily tapping therefore seems to be an extremely difficult task.

The reasons for the choice of alternate day tapping as the most suitable system of tapping was examined (Table 1.15) . It was found that growers consider 'protection' of the plant as the most important reason for their choice. Daily tapping leads to a physiological disease called *Brown Bast* which results in the drying of trees. The important factor that emerged is that growers do not consider the duration of tapping (or the life span of the plant) as an important one. Weight and quality of latex on the other hand were identified as importatnt

by a larger number of growers.

Table 1.15 Reasons given for the selections of alternate day tapping as the most suitable system of tapping

Reasons	No: of growers
Protection of the plant	40
Higher weight content in latex	30
Better quality of latex	16
Longer duration of tapping	07

One way of discouraging daily tapping and encouraging alternative day tapping therefore appears to be to direct extension work for the growers to realise the importance of the tapping life of plant. It also appears that those growers who follow alternate day tapping are those who maintain a higher standard of cultivation in general. It seems that if alternate day tapping is to be encouraged, the general standard of cultivation needs improvement so that growers will begin to take a greater care and pay more attention to the plantings. It is therefore suggested that encouraging alternate day tapping should not be taken in isolation but as a package with other cultural practices, such as fertilizer use, soil conservation, cover cropping, weeding and manufacturing quality sheet, and should begin from the establishment of the planting. Once a satisfactory standard is reached before the commencement of tapping it is easier to encourage a farmer to take to alternate day tapping. There is evidence in fact to believe that the selection of the tapping system is influenced by the nature of growth achieved during the pre-tapping phase.

The Rubber Research Institute recommends a minimum girth of 18 inches a height, of 3ft. from the bud union which is usually achieved in 6 years' in a well maintained holding for commencement of tapping. With regard to farmers knowledge of the suitable girth or age for commencement of tapping, 25% of those interviewed considered age as the suitable criterion another 25% identified girth, while the balance gave both as suitable criteria. Almost all the growers knew that uneven growth of the bark is due to damage of tissues during tapping, while 80% of them knew that it can be prevented by careful tapping. The balance thought that it can be avoided by application of chemicals (fungicides). Application of fungicides for disease control was viewed by these 20% as a way of encouraging uniform bark growth.

1.2.6 *Use of Chemicals for Disease Control*

Use of chemical fungicides for disease control was popular with over 80% of growers reporting the use of fungicides. The interval of application varied between 1-3 months, with a majority (50%) applying it once a month. There was no marked difference in the rates of application in dry and wet weather.

With reference to the reasons for application of chemicals more than 50% of the farmers viewed the effect as encouraging bark growth, while

a slightly smaller number viewed it as a means of preventing bark decay (which is the symptom of the fungus disease for which chemicals are used). Smaller number of farmers also viewed these chemicals as preventing bark drying, increasing latex production and preventing uneven growth of bark. The popularity of fungicides by farmers is not solely due to their disease preventive properties, but due to other properties that farmers feel that chemicals have an impact on. It seems that growers value the bark growing properties more than the disease preventive properties of these chemicals.

1.2.7. *Importance Attributed to Various Cultural Practices*

The importance attached to various cultural practices is indicative of the extent of adoption of these practices. In rubber as in any other crop these practices have a complementary relationship with each other and they must be adopted as a package if maximum benefits of the practices are to be enjoyed. In other words adopting the practices in isolation will have a lesser impact on overall yield and a lower return/cost ratio for any one practice. The table below summarises the importance given by farmers to various cultural practices.

Table 1.16 Rubber growers ranking of importance of cultural practices
(% of growers) N=62

	Important	Somewhat Important	Not Important	Total
Use of budded rubber	91	07	02	100
Fertilization (young plants)	93	07	--	100
Fertilization (mature plants)	78	20	02	100
Soil conservation	37	63	--	100
Cover cropping	33	65	02	100
Weed control	22	74	04	100
Use of chemical fungicides	53	45	02	100
Correct tapping system	78	22	--	100

It is evident from the table that farmers place a greater importance on use of budded rubber and fertilization (particularly fertilization of young plants) and following the correct system of tapping more than the importance attributed to other cultural practices. Although they place a great importance to these three practices it was evident from the earlier discussion that except for the use of budded clones the other two practices are

not widely adopted. On the other hand soil conservation, cover cropping and weed control are practices for which lesser importance has been attributed. Thus, we have two sets of factors, one where the lower rate of adoption is due to the lesser importance attributed, while the other for which a greater importance is given but not adopted for other reasons.

1.2.8 *Manufacture of Quality Sheet Rubber*

Manufacture of quality sheet rubber is a very important aspect, in extension work for rubber, particularly at present as the price difference between grade 1 and other grades is high. It was found that only two (2) farmers out of the 62 interviewed, manufacture part of their rubber to grade 1 standard and only a 1/3 reached grade 2 standard. Even among the latter group only half of them reported manufacturing more than 50% of the sheets to grade 2 standard. On the basis of the quantity of sheet rubber sold for different grades the following table was prepared.

Table 1.17 Proportion of RSS rubber sold under different grades (total sample)

Grade	Proportion of rubber (%)
Grade 1	2
Grade 2	23
Grade 3	49
Grade 4	26
Grade 5	1

Thus, it is seen that about half the rubber produced by rubber growers interviewed is sold as grade 3 sheet rubber. The reasons for the poor quality sheet as reported by growers are given in table.

Table 1,18 Reasons given for the poor quality of sheet

Reason	No: and percentage of growers	(N=53)
Inefficient service rendered by smoke house keepers.	30	57
Grade decided by buyers	19	36
Non-use of sieve	19	36
Non-use of sodium	07	13
Not covering sheets during coagulation	07	13
Use of hired labour	07	13
Unavailability of a smoke house at all or unavailability of a properly constructed smoke house	06	11

The above reasons indicate that majority of the growers do not own proper smoke houses and depend on hired service. The most important reason for poor quality of sheets is the poor service provided by smoke house owners. This indicates that educating farmers on quality sheet manufacture will not help unless the smoke house keepers are also trained. It is likely that smoke house owners who provide hired service employ hired labour as smoke house keepers. In addition to the training it is necessary that there should be some incentive for manufacturing quality sheets which can come only through a higher rate of payment from growers to the smoke house owners. There appears to be another major reason which acts as a barrier, that is the attitude that farmers hold that even if farmers do produce quality sheet they can not get the suitable grade as the grade is decided by the buyer. This can only be overcome by encouraging competition among buyers and competition by the Commodity Purchase Department.

If the marketing problem is overcome there is every reason to believe that it is possible to encourage farmers to produce quality sheet. At present there is a lack of knowledge even among growers as well as those who process rubber on hire on techniques of producing good quality sheet. The fact that even those who process rubber on hire are themselves rubber growers makes them receptive to extension work. It is necessary that they (smoke house owners) and hired labour who are employed as smoke house keepers should be trained in techniques of quality sheet manufacture. In addition to the task of providing the know-how on techniques of quality in sheet manufacture, the extension service has another important role of encouraging (or motivating) farmers to take to quality sheet making. If the farmers are sufficiently motivated they will influence the smoke house owners who perform a hired service either by offering economic incentives or through other means. Extension services could make use of newspaper articles, advertisements, posters, handouts, in their campaigns containing messages highlighting the economic advantages of making superior grade sheet. However, for extension services to be successful the marketing difficulties should be remedied first.

1.3 *Dairy Industry*

The dairy industry was selected as an enterprise for this study for the purpose of studying farmers knowledge and attitudes towards an animal husbandry enterprise. The area selected - Nilambe is a traditional dairy area from the mid-country of Sri Lanka. This area has relatively favourable climatic conditions for rearing of improved breeds of livestock.

The study area falls within the area where the mid-country dairy development programme is operating. Of the farmers interviewed, some were recipients of cattle under this programme and as a result their level of management was also higher and they often had close contact with extension personnel because of the more intensive extension inputs. However, in the analysis of the data these farmers were not treated differently form others.

1.3.1 *Improved breeds of Cattle*

The animals reared by the farmers interviewed were mostly improved breeds of cattle. The table below illustrates the different breeds of cattle reared. The types of animals kept did not show a concentration of any one breed (among the exotic breeds), although in terms of farmers evaluation of breeds certain breeds appear to be considered superior to others.

Table 1.19 Breeds of cattle reared by the sample farmers

Breed	Percentage of cows	Percentage of all animals kept
Ayrshire	17	16
Freisian	25	26
Jersey	27	22
Crossbred	20	21
Sinhala	5	6
Others	7	8

With regard to the yield that could be obtained from different exotic breeds the farmers were of the opinion that with good management Friesians give higher yields than the other two commonly reared breeds namely, Ayrshires and Jerseys. The production level achieved by farmers from Friesian animals were however lower, compared to others. The figures in Table 1.20 illustrate this point. Table 1.20 presents the production achieved by the farmers and the farmers view of the level of production achieved by good farmers in the area. The latter gives a measure of farmers estimate of the potential of these animals. It is seen from the table that what they thought the potential is, was roughly equivalent to twice what they get at present.

Table 1.20 Average production obtained by farmers and their estimate of the production achieved by better farmers of the area from different breeds of cattle .(Unit - litres / day)

	Farmers level of production	Proudction achieved by better farmers in the area
Ayrshire	6.3	10.8
Friesian	5.3	12.1
Jersey	6,0	10.6
Crossbred	4.2	9.4
Sinhala	3.0	6.0

It is evident from the figures that both in terms of the production achieved by the farmers as well as in their perception of potential, there is a distinct difference between the improved and local breeds. However, the farmers also perceive a yield potential of twice what they get at present even from the local breeds, which illustrates the room for improvement in management. The extension task of encouraging farmers to rear improved breeds does not appear to be much of a constraint.

1.3.2. *Feeding of Dairy Animals*

The same importance attributed to rearing of improved breeds has not been given to their management. For instance the type of feeding adopted does not adequately compensate for the potential of these animals. The lower level of feeding observed cannot be attributed solely to a lack of knowledge or understanding .A number of other factors, the most important of which are,the unavailability of land for establishing grass,and the high cost of concentrated feeding compared to the returns from sale of milk,and the numerous marketing difficulties involved in the sale of milk were experienced by farmers at the time of the study. Therefore, the poor feeding experienced cannot be attributed solely to a lack of knowledge or understanding of feeding dairy animals. It is in fact difficult to identify these latter factors as important in the light of the other problems experienced. However, the study showed that there were some constraints in knowledge and understanding and certain attitudinal barriers which could be overcome by extension work.

Although farmers had been quick to adopt improved breeds they have been slow to adopt the other requirements necessary to benefit from the potential of these animals. This situation is comparable with the rapid spread of new varieties in paddy without a comparable improvement in levels of management.

A major constraint appears to be the lower importance given to feeding in general and grassland farming in particular. In their priorities in land utilisation, greater importance was given to other crops, and lesser importance to grass which may be due to its hidden value.(1) The pressure on land has aggravated this problem. A number of farmers did not own any land suitable for establishing pasture. In many instances grass was brought from elsewhere (Crown land, reservation, etc.) for feeding the cattle without cultivating their own land. Of the farmers interviewed roughly 50% had established pastures. Hence, any extension activity encouraging farmers to establish pastures should take into consideration their priorities in land utilisation and should be done in such a manner as to meet their other needs as well. This calls for research in systems for land utilisation taking into consideration various socio-economic needs of the farmer and his family.

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(1) An exception was the farmers who had obtained cattle under the Mid-country Dairy Development Programme who were compelled to establish grass before receiving/purchasing animals.

The other important aspect is the low level of management of established grass, which can be remedied through extension effort because additional input required from the farmers for improving the level of management does not seem to be very high. Of those who had established grass, varieties of Guinea, both A and B, were cultivated by 75%(1). Use of cowdung was the common method of fertilization (adopted by 72% of farmers) while use of chemical fertilizer was reported by only one of the farmers. Except for two farmers interviewed, the others had no fixed system of cutting grass, and harvesting was done according to the requirement for fodder and growth of grass.

When farmers were asked about the most suitable varieties of grass for the area, a preference to Guine grass was observed. 53% of farmers identified Guinea varieties, compared to 14% who showed preference to other types and 31% who were unable to mention the name of a variety. In terms of amounts of grass fed to cattle, only 50% of the farmers had estimates of quantities fed and could therefore indicate the amounts quantitatively. Even the quantities fed varied considerably from farmer to farmer, from 40 lbs, to 200 lbs., per milking animal per day. Although, some variation in quantities fed is expected depending on the yield of milk, the stage of the growth, etc., such wide variations are indicative of individual variations among farmers, in their levels of feeding.

With regard to feeding of concentrates to dairy cattle, considerable individual variations among farmers were again observed. Considering the ingredients used,64% of the farmers used poonac alone, while the balance used both poonac and rice polish. Regarding the use of mineral mixture, 40% of farmers reported using it. The amount of concentrates fed to cattle varied among individual farmers from 1 lb. to 10 lbs, per cow per day.

When farmers were asked to name ingredients for a suitable system of feeding for feeding dairy cows, a considerable individual variation among farmers was again observed. Equal proportions of farmers (25% each) identified the following combinations - i.e. poonac and rice polish with mineral mixture, poonac alone with mineral mixture, poonac and rice polish without mineral mixture and poonac only as suitable systems of feeding concentrates. Even their knowledge of the amounts of concentrates and grass that should be fed showed considerable variation.

All these evidence points out to individual variations among farmers in their systems of feeding adopted and in their knowledge and understanding of a suitable system of feeding. The aim of extension should be to minimise such individual variations.

1.3.3. *Breeding of Dairy Animals*

Breeding of dairy animals is a very important aspect in any dairy development programme in order to improve the quality of the stock. Animal breeding is an aspect about which farmers could hold various views

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(1) Some farmers could not name the variety they had cultivated.

for or against what the extension holds. Hence, it is important to understand the views that farmers hold in order to be successful in extension work. The extension services (including the supporting services) can then either change their strategies to accommodate farmers' views or they could attempt to change farmers' views through educational inputs.

As indicated earlier the evidence indicates that farmers are convinced of the superiority of exotic breeds of cattle. With regard to farmers' opinion on artificial insemination, 68% of farmers thought that natural fertilisation was superior to artificial insemination. The main reason given for preference of natural fertilisation in order of importance were, more superior young animals (44%), failure of artificial insemination (32%), and convenience of the method (28%). The common belief that the progeny resulting from artificial insemination consists of more bull calves was not prevalent among farmers interviewed. The reasons for farmers preference to artificial insemination were also the same, namely, superior young and convenience of the method.

Although, there were individual variations among farmers on matters pertaining to feeding, such variations were observed to a lesser degree in matters relating to breeding. For instance, 80% of farmers knew that an animal should be covered in 2-3 months time after calving at the second or the third heat, while 74% accepted the need of a 2-3 months dry period. In other words there was greater uniformity in the views held by farmers regarding these matters. Furthermore, it was observed that farmers did not deviate much from what they knew. This observation can be explained in terms of the importance attributed to a certain operation. The more important the operation is, the more cautious the farmers are, and they often follow what is recommended unlike in the case of a routine operation. The negligence on the part of farmers is not only due to a lack of knowledge, but due to a lesser importance placed on these routine practices. The routine management aspects, therefore, need greater emphasis in extension work, Such extension work should not only aim at providing knowledge, but also in making farmers understand the importance of adhering to these practices.

1.3.4. *Milking*

The same comment made earlier regarding routine management practices could be made here as well. There was greater deviation from the reocmmendations in the way farmers carried out these management practices. The proportion of farmers who carried out the following management practices, namely, washing of animal before milking, feeding of calves with the help of a bucket (not allowing the calf to suckle from the mother), and performing mastitis tests, was small. These pracitces represent some of the management practices that are routine in nature, which does not give an immediate reward and therefore are not important from the farmers point of view, but useful in the long run. It is such practices which are most difficult to popularise even though they need very little effort from the point of view of the farmers. Such practices need greater extension effort and may be a different extension approach.

1.3.5. *Marketing of Milk*

Milk producers, like other farmers, usually undergo numerous difficulties in marketing their produce. Apart from utilising the assistance provided by the State, the only other way of overcoming these difficulties is for the producers to help themselves through the formation of their organisations. The extension services could assist farmers by keeping them aware of the availability of marketing channels, and the manner of utilising these channels to their maximum benefit, assisting farmers to form their marketing organisations, etc.,

Farmers knowledge of the prices offered by the different amarketing organisations operating in the area is used as a measure of the knowledge of farmers of the alternative marketing channels available. The evidence indicated a lack of awareness of prices offered by organisations(1) other than the one with which the farmer had dealings. Only 15% of the farmers knew the price offered (or the pricing procedure) by another marketing organisation other than the one to which he or she sold his milk. There seems to be a serious lack of awareness of market information, which is a primary requisite in Marketing Development.

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(1) Marketing organisations includes the Cooperatives, Private Collectors and the Milk Board.

CHAPTER 2

FACTORS INFLUENCING KNOWLEDGE

In this Chapter, the main objective is to examine the relationship between some of the more important socio-eocnomic variables and farmers' knowledge of improved technology. The analysis is limited to the combined data for the three paddy situations studied. It would have been better if the analysis could have been done using the data from one of the paddy areas preferably the DZLC situation as this represents an area with favourable conditions for paddy farming. Due to the small sample it was necessary to extend the analysis to cover all paddy growing areas considering them as a group. Hence, any conclusions drawn here are conditioned by this limitation.

The measure of knowledge used here is farmers' knowledge of fertilizer recommendations for paddy cultivation. Accordingly, farmers were grouped into two categories:-

1. Those knowledgeable including those possessing complete knowledge as well as partial knowledge. (A scoring system was used and those above a certain score were considered knowledgeable).

2. Those not knowledgeable of the recommendations.

Farmers were classified into these two groups on the basis of their response to the question on fertilizer recommendations. The way farmers had used fertilizer was not used as a criterion for determining knowledgeability. Only the farmers who knew that there exists a certain recommendation for fertilising paddy and those who possessed some knowledge of it fell into the knowledgeable group. It is possible that farmers who knew how to fertilize paddy but did not know the recommendations could have been left out of the knowlegeable group.

This measure of knowledge may not be the best measure to gauge knowledge, specially in peasant farming, but was taken as it is a convenient and a practical measure. The socio-economic variables considered here are:-

1. Mass Media Exposure
2. Extension Contact
3. Basic Education
4. Water Supply Situation
5. Size of Operational Paddy Holding
6. Tenancy

Mass Media Exposure and Extension Contact are different from the other variables, as they represent variables which can be manipulated while others are more static in nature.

With reference to the relationship between Mass Media Exposure and farmers knowledge it was found that the group of farmers with highest Mass Media Exposure had the largest proportion of farmers knowledgeable of fertiliaer recommendations.

This group of farmers had a mass media exposure index of 10 - 12 meaning that they were exposed to Radio, weekly Newspapers and daily News Papers

at least few times a week if not daily.

Table 2.1 Relationship between knowledge of fertilizer recommendations and Mass Media Exposure

Mass Media Exposure Index	Knowledge of Fertilizer Recommendations			
	Knowledgeable		Not Knowledgeable	
	No:	%	No:	%
0 - 3	11	31	25	69
4 - 6	6	34	12	67
7 - 9	9	31	20	69
10 - 12	16	53	14	47

The evidence that only those with the highest level of exposure showed some difference in their knowledge levels, indicates that in order for the mass media to have an impact 'agriculturally' it should have a high intensity of exposure. Agricultural messages are usually read or heard by those with high intensity of exposure.

In the same manner extension contact also showed a positive relationship with knowledge of fertilizer recommendations. A larger proportion of farmers who had contact with extension services had knowledge of fertilizer recommendations. This observation supports the view that farmers who maintain closer relationships with extension services are usually more knowledgeable than others.

Table 2.2 Relationship between knowledge of fertilizer recommendations and Extension Contact

Extension contact in Maha 77/78	Knowledge of Fertilizer Reocmmendations			
	Knowledgeable		Not Knowledgeable	
	No:	%	No:	%
Yes	20	48	22	52
No	24	38	40	63

This relationship between level of basic education of the farmers and their knowledge of fertilizer recommendations was similar in that farmers who had a higher basic education were more knowledgeable of fertilizer recommendations. It is very likely that farmers with a higher basic education are more receptive to extension education. This hypothesis

can be extended to other educational fields other than agriculture, such as health, family planning, and community development. Whatever the field is, the efforts of the educators will be more rewarded if the respondents have a higher level of basic education.

Table 2.3 Relationship of knowledge of fertilizer reocmmendations with basic education.

Level of education	Knowledge of fertilizer recommendations			
	Knowledgeable		Not knowledgeable	
	No:	%	No:	%
No education	4	67	2	33
Primary education (Up to Grade V)	13	27	35	73
Secondary education (Grade V - G.C.E(O.L)	18	50	18	50
Higher education (Passee G.C.E.(O.L)/ G.C.E.(A.L)	10	59	7	41

Another important variable that is of interest in this study is the water supply. The three paddy areas for the study were selected mainly taking into consideration the water supply situation in the three areas. The data showed that of the three areas the wet zone had the largest proportion of farmers having knowledge of fertilizer recommendations, compared with the other two areas, the latter between them showed no difference. This difference cannot be explained in terms of the physical (or environmental) differences in the three areas as the wet zone areas have the least favourable environmental conditions for paddy cultivation. The farmers in the three areas did not further show a difference in their educational attainments. Hence, this difference may be assigned to the greater degree of cosmopoliteness and higher level of exposure to information of the wet zone farmers.

Table 2.4 Knowledgeability of farmers of the three study areas on fertilizer recommendations.

Study area	Knowledgeable		Not Knowledgeable	
	No:	%	No:	%
Dry zone low constraint	13	38	21	62
Dry zone high constraint	12	34	23	66
Wet zone	20	53	18	48

Earlier evidence however, showed that farmers in the Dry Zone Low constraint area showed a better understanding of pest problems affecting their paddy. This difference in observations may be attributed to the types of measures of knowledge taken. Knowledge of fertilizer recommendations is a measure of 'informative' knowledge (meaning that such knowledge is gained from exposure to formal learning situations or exposure to external sources of information) while knowledge of pest problems is a more appropriate measure of the knowledgeability of practical farming problems.

Both size of holding and tenancy did not show any relationship with knowledge of fertilizer. There was no evidence to support the view that farmers with larger holdings or owner operators are more knowledgeable than others.

Table 2.5 Relationship between knowledge of fertilizer recommendations and size of operational paddy holdings.

Size of operational Paddy holding	Knowledge of fertilizer recommendations			
	Knowledgeable		Not Knowledgeable	
	No:	%	No:	%
Less than 1 Acre	12	44	15	56
1 Acres to less than 2 acres	8	44	10	56
2 Acres to less than 3 acres	9	45	11	55
3 Acres to less than 4 acres	6	35	11	65
4 Acres and above	9	69	4	31

Considering the limits of the measure used, namely knowledge of fertilizer recommendations, which represent a component of knowledge gained through exposure to learning situations with very little or no relationship to experience in farming, it is the personal variables, i.e. Education, Exposure to Mass Media, Extension Contact and cosmopoliteness that showed a relationship with knowledge. The more static variables did not show a relationship. There was no evidence that farmers in more developed and commercialised farming areas were more knowledgeable than those in other areas as far as our measure of knowledge was concerned. However, on another aspect of knowledge (knowledge of pest control) which was mainly experience based, these farmers were found to be more knowledgeable.

CHAPTER 3

FACTORS INFLUENCING KNOWLEDGE-THE ROLE OF COMMUNICATION

The objective of this chapter is to assess and analyse the communication environment in the selected study villages in so far as it affects the knowledge and attitudes of the farmer population in respect of the particular agricultural enterprises - which form the bases of the study. Specifically, our task is to determine the effectiveness of the communication channels in imparting knowledge and in forming and / or changing farmer attitudes towards selected innovations in paddy, rubber and the dairy industry.

Communication is a fundamental human process by which messages are conveyed from a source to a receiver or a number of receivers. In the diffusion of agricultural innovations where a change agency or a change agent acting on behalf of the agency attempts to introduce new technologies through a particular social system (a group of people such as a village) communication plays a very important role. When the change agent introduces a new technology to a particular social system, he in effect attempts to direct change in a predetermined manner in order to achieve specific objectives. In such a situation the communication strategies that the change agent uses become vital to the successful implementation of his programme. It is through communication that the potential adopter first comes to hear of the innovation, learns more about it and decides to adopt it. Accordingly in a programme of directed social change, where the introduction and the diffusion of innovations is the central concern, communication programmes are expected to fulfil the following basic functions.

1. To create an awareness or consciousness about the innovation/ package of innovations.
2. To transmit information about the innovation/ package of innovations which in turn would pave the way for correct decision making, attitude formation and behaviour change on the part of the client/client groups.
3. To disseminate information about the innovation/package of innovations throughout a social system or a group which would result in the legitimisation of the specific innovations.
4. To persuade a client/client group to adopt the specific innovations.
5. To obtain feedback from the clients/client group.

Although communication is central to diffusion of innovations, it is only one of many interacting and interdependent factors which affect the adoption of innovations. Very rarely does communication exert an independent effect on human behaviour. Mosher(1)who has contributed

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(1) Mosher-quoted in EWCI report on the International Conference on Information Education and Communication, 1975.

a fund of knowledge to the processes of communication and education in rural development has developed a model to explain how communication interacts with other variables in promoting/constraining agricultural change. His concept of 'achievement distribution' pre-supposes two sets of ceilings called the technical ceiling and the economic ceiling. The technical ceiling is 'the highest physical production achievable when costs are not taken into account'. The eocnomic ceiling is the production potential under farmers field conditions taking into consideration the ecological, institutional and social constraints. The achievement distribution is the actual performance of the farmer. According to Mosher the 'knowledge gap' which could be remedied through communication effort is the difference between the economic ceiling and the actual yield. Thus, it is seen that communication is one of the many factors that promote/inhibit the adoption of new agricultural practices - a factor which nevertheless is no less important than any other.

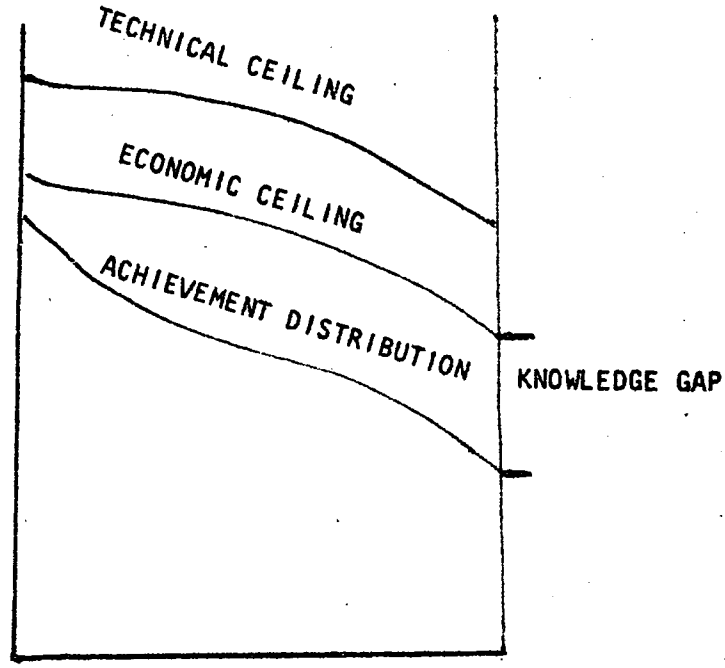

Figure 1. Simplified version of - Mosher's concept of achievement distribution showing the knowledge gap which may be corrected by communication efforts.

Of the five main elements present in a communication situation-source, message, channel, receiver, effect-our emphasis then would be on the channels of communicationm operating in the study villages i.e., the paths through which the villagers obtain their information. Rogers defines the communication channel as the means (medium) by which messages travel from a source to a receiver. There are two categories of channels - the media channels and the interpersonal channels. It is these

channels that form the basis of this chapter. In assessing the effectiveness of the channels the relationship of the source and the receiver is considered, in so far as they affect the channel. The message content of a communication situation does not come within the purview of this study and hence is considered only minimally.

Research has shown that channels act differently on different groups of people. Different client groups have their own limitations and the capabilities. Therefore, a communication channel which is appropriate to a particular client group may be totally inappropriate to another. Further channels have inherent capabilities and limitations of their own. What certain channels do , the others cannot. Therefore, when planning a communication strategy for a programme of directed social change it is vital to know what impact a particular channel will have on the attitudes, values, beliefs and knowledge levels, of the receivers and use such channel or a combination of channels to influence the client groups inthe desired way.

For purpose of analysis the communication situation in respect of each agricultural enterprise under study, namely paddy, rubber and dairying will be discussed separately under the following sub-headings:-

1. Sources of General Information: Mass Media
2. Sources of Expert Agricultural Information (a) Mass Media
   (b) Extention Agent Contact
3. Sources of Information for selected innovations.
4. Opinion leadership

3.1 *General Information : Mass Media*

It is a widely accepted view that mass media play a facilitative role in national development. Mass media are expected to create an environment which is conducive to the spread of new ideas or innovations and is often called the magic multiplier. Five categories of mass media are scrutinised in this section - newspapers, radio, magazines, weekly papers, cartoon booklets.

3.1.1. PADDY

(A) Newspapers : Predictably the wet zone villages show the highest rate of newspaper purchasing among the three study locations. In the wet zone location 45% of the sample bought newspapers in contrast to the dry zone low constraint villages, where only 29% of the sample purchased their own newspapers. In the dry zone high constraint villages 40% of the farmers purchased newspapers. Although the percentage of farmers who buy newspapers shows some variation from location to location the readership patterns seem to be more or less similar. 58% of the respondents in the wet zone location read newspapers at least once a week while in the dry zone low constraint location 50% of the farmers read newspapers. The dry zone high constraint location recorded a readership (at least once a week) percentage of 51%. Ironically the wet zone location also recorded the highest rate of non-readership. In the

wet zone location 13% of the respondents never read newspapers in contrast to 3% in both the dry zone locations.

In the dry zone study areas, the most popular reading location was the boutique cum tea kiosk. In the low constraint cluster of villages in the dry zone 53% of the respondents reported the boutique/tea kiosk as the reading location, while in the high constraint cluster of villages 37% did so. This was much evident during our survey too. In a boutique in one of the villages which looked fairly prosperous three leading Sinhala dailies were available for the clients. During our stay we saw groups of people reading the newspapers at the boutique. But the idea of community readership habit was forcefully driven home, when one of the villagers, a father figure in the village turned up at the boutique. He sat on the bench (the other two youths who were seated on the bench did not get up; which depicts another change that has overtaken the village) exchanged greetings with the two youths and started reading the newspaper. Every few minutes he made some comments and occasionally a pithy remark which made the youths break into laughter. This respondent reported purchasing a newspaper, but he obviously enjoyed reading the newspaper at the boutique--and he had a choice of newspapers at the boutique too. However, in the wet zone villages the most popular reading location was the home.

A common feature was noticeable in all three locations when the ownership pattern was compared with that of readership locations. The percentage of respondents who reported reading newspapers at home was less than the percentage of respondents who reported purchasing newspapers. This peculiar feature may be again attributed to the community reading habit of the villagers. This discrepancy is much less in the wet zone location. Another compelling reason in the eyes of the respondents in naming the boutique/tea kiosk as the main reading location may be due to the fact that a number of newspapers are available for reading at the boutique.

The survey revealed that most respondents read the newspapers to obtain extra village news. All three study locations recorded high ratings for this reason. In all locations the second most popular reason cited for reading newspapers was the desire to obtain information about development activities. Entertainment/recreation occupied the third place.

The effective use of mass media in development also depends to a large degree on the credibility level the media enjoy in the eyes of the public. However, it is a difficult task to assess the credibility level of a medium . Credibility may vary from article to article in the same medium. The survey method may not be the ideal instrument in assessing the media credibility of a sample. However, we have attempted to obtain a general picture of the credibility levels which the two main agencies of mass media communication in Sri Lanka, namely the newspapers and the radio, enjoy in the eyes of the public.

On an average, only 22% of the total sample in the three paddy locations believes almost everything that is published in the newspapers, About 48% believes about half of what is published. An almost nil credibility level is registered by 12% of the respondents.

The wet zone location recorded the highest percentage of weekly newspaper purchases. 53% of the respondents in tne wet zone sample bought weekly newspapers while the dry zone samples did not show any distinct variation as they did in the case of dailies (44% and 46%). On an average 9% of the total sample in all three paddy locations read weeklies daily.(1) 45% of the total sample of paddy farmers read a weekly at least once a week. Compared to the dailies more farmers bought weeklies. Only 38% of the respondents in all three locations bought dailies while weeklies were purchased by 47% of the respondents.

As expected, the exposure to magazines was low. The wet zone cluster of villages again recorded the highest ownership of magazines. 21% of the respondents in the wet zone bought magazines as against 15% in the dry zone low constraint location and 9% in the dry zone high constraint location. Forty percent (40%) of the respondents never read any magazines.

Studies conducted earlier have shown that a popular mass medium particularly among the school children was the cartoon booklet. It was therefore decided to determine the exposure levels of the cartoon booklets among the sample and to assess the impact of the medium in the study locations. Only 21% of the respondents in all three study locations purchased cartoon booklets, while only 10% of the respondents read cartoon-booklets at least once a week. 47% of the respondents of the total sample of paddy farmers had never read any cartoon booklets.

(B) Radio:-

The nature and the extent of radio's penetration contrasts sharply with other mass media. Patterns of ownership, exposure, listening locations and credibility levels vary appreciably from that of the newspaper, its closest rival in popularity. 81% of the respondents in the wet zone location owned radios, while the comparable figure for the dry zone low constraint location was 59%. In the dry zone high constraint locations 71% of the respondents reported owning radios. Overall, 71% of the respondents in all three paddy growing locations owned radios, while only 38% of the same sample bought daily newspapers, and 47% bought weeklies. The proportion of farmers with regular exposure to radio dropped from 58% in the wet zone location to 38% in the dry zone low constraint location.

Unlike in the case of newspapers, the most popular listening location for the radio was the home in all three study locations. Only 11%

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(1) Although there is an apparent discrepancy in these figures in reality no discrepancy is present. In Sri Lanka there is a weekly Sinhala newspaper that is being published almost on all days of the week (more than 12 weeklies are published during a week)

of the respondents in all three locations listened to the radio in tea kiosks. The comparable figure for the daily newspapers was 36%.

As in the case with the newspaper, the most popular reason cited for listening to the radio was to obtain news of the extra village environment. However, entertainment and recreation was also cited by many as an important reason for listening to the radio. To obtain information about development activities was quoted as the third most important reason.

Radio enjoyed a higher credibility level in the three study locations. On an average 58% of the respondents reported that they believe almost everything that is broadcast over the radio. About 24% believed about half of what is broadcast.

The impact of communication medium may also be determined by the regularity of exposure to the particular medium. During the survey an attempt was made to determine the patterns of exposure of regular features/programmes both in the newspaper and the radio. 53% of the respondents in all three study locations reported that they listened to specific radio programmes regularly. In contrast only 15% of the respondents in all three locations reported following regular newspaper features.

3.1.2 RUBBER

(A) *Newspaper*

It was revealed that only 39% of the respondents in the small-holder rubber growing location purchased newspapers. But 45% of the respondents reported that they read the newspapers daily. Another 41% read newspapers at least several times a week. 35% of the respondents read the newspapers at home, while for 27% of the sample the reading location was the local boutique or tea kiosk. 24% of the respondents reported that they read the newspaper at a neighbour's house. Only 9% did not read the newspapers at all.

In respect to credibility, 34% reported that they believed almost everything that was published in the newspaper. Thus, the credibility levels in the rubber growing location is much higher than that of the paddy growing locations.

In contrast to the dailies 50% of the respondents bought weekly papers. The weeklies seem to have a higher penetration in the rubber areas. 21% of the respondents reported that they read weeklies daily while 39% read them at least once a week. The most commonly quoted reading location was the local boutique.

The exposure to magazines follows a similar pattern as in the paddy, growing locations. Only 18% of respondents reported the purchase of magazines. 40% of the respondents reported that they never read any magazine .

14% of the respondents in the rubber growing location purchased cartoon booklets, but only 3% of the respondents reported reading them at least once a week.

B) RADIO

As in the case of paddy farmers, the small holder rubber growers showed a high rate of exposure to the radio. 76% of the respondents owned radios while 56% of them listened to it daily. Only 3% reported that they never listened to the radio. 69% of the small holder rubber grower respondents listen to the radio at home. 53% of the respondents reported that they believed almost everything that is broadcast over the radio - a high percentage as in the case of the paddy location.

3.1.3 DAIRY INDUSTRY

A) Newspaper:

The dairy farmers recorded the highest exposure to the daily newspaper both in terms of ownership and regular readership. While 51% of the respondents purchased newspapers 44% reported that they read the newspaper daily. Another 16% of the respondents read the newspapers at least several times a week; among the dairy farmers only 5% did not read the newspapers at all. As in the case of the dry zone paddy locations more respondents showed an inclination to read newspapers at the boutique.

While in all other study locations a higher percentage of respondents purchased weekly papers than the dailies, the dairy farmers displayed a contrary tendancy. Forty four respondents purchased weeklies. As regards readership too the highest recorded frequency of exposure to weeklies is once a week, in contrast to instances of daily exposure in all other study locations. This may be traced to the different ethnic characteristics of the dairy location. Most respondents in the dairy sample are of Tamil origin. The number of weeklies in Tamil is much less than the number available in Sinhala. The credibility levels were same as those of the rubber growing area. The exposure to magazines and cartoon booklets follows a similar pattern as in other locations with minor variations.

B) Radio

In the use of the radio too, the dairy sample recorded a higher ownership and listenership percentage when compared to the respondents in other locations. 86% of the respondents in the dairy locations owned radios, while 65% recorded that they listen to the radio daily . Another 14% said that they listened to the radio at least several times a week. The most often quoted listening locations was the home with 77% citations. Only 7% listened to the radio at the local boutique. 67% of the respondents said that they believed almost everything that is broadcast over the radio.

In evaluating the role of mass media in promoting change it should be kept in mind that the audience of mass media i.e. the people whom the mass media wishes to influence possess attitudes , beliefs and values of their own . Due to interaction with various social organisations like the family, the school, the temple, the work place, people from their young days form opinions on a variety of subjects. At the time these people are exposed to the mass media those preconveived values uncounsciously influence whatever effect the mass media may have on

them. It has been shown that people generally like to read/listen to news that reinforce their opinions.

Even if they are exposed to contrary views, they tend to distort the message to suit their beliefs. Communication researchers refer to this phenomenon as the selective process in mass media. 'The audience members do not present themselves to the radio or the television set or the newspaper in a state of psychological nudity: they are, instead, clothed and protected by existing predispositions....'(1)

Klapper goes on to say that this does not preclude mass media from promoting changes in attitudes of its audience. If a member of the audience at the time he is exposed to the media is contemplating a change of a particular set of values, then the media may promote change. In this situation too the same principle applies, i.e. the mass media generally tend to reinforce whatever predispositions the audience possess at the time of exposure.

The fact that respondents identified the importance of development oriented news in the context of the newspaper and the radio indicated the important role the mass media could play in promoting development. This is where the facilitative role of the mass media comes in.

In a development context the mass media perform two key functions. Mass media inform and educate. Rogers in the course of a lecture given in Sri Lanka during one of his recent visits referred to the mass media thus - 'One of the main functions of mass media in development, as we can see in a country like yours is that they can inform. Perhaps better than any other means we have and also at a much lower cost; the mass media can create awareness knowledge, the knowledge that some new idea exists'.

Although the theory that mass media creates awareness knowledge is very appropriate for developed societies it could be valid for some developing countries like Sri Lanka which has satisfied certain pre-conditions. But in most situations of under development, where so many inter-dependent factors like literacy, income levels, cosmopoliteness, etc., affect the mass media exposure of the citizens, this theory is open to question. When Rogers applied this concept to the Sri Lanka situation, he would have known that the mass media penetration in Sri Lanka is much deeper than in most developing countries. The following table (Table 3.1) constructed by assembling the survey data with those presented by Rogers(2) reinforces this view.

Although it is dangerous to arrive at definite conclusions from a comparison of this nature (due to differences in cultural factors - methodologies, time lags etc.,) it is fairly safe to assume that mass media penetration in Sri Lanka is much higher when compared with many other developing countries.

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[1] Klapper, Joseph T, "The Social Effects of Mass Communication" in The Science of Human Communication, edited by Wilber Schramm; Basic Books Inc. New York, 1963.

[2] Rogers Everett, M.S.Svenning, Lynne (1969) : Modernization Among Peasants: The Impact of Communication,-Halt, Rinehart & Winstron, New York.

Table 3.1 Comparative levels of mass media exposure among peasants in Columbia, India,, Kenya and Turkey compared with the study sample in Sri Lanka

Type of mass media exposure	Percentage of total sample with at least some exposure							
	Colombia modern (N = 160)	Colombia traditional (N = 95)	India Punjab (N = 84)	India UNESCO (N = 702)	India National sample(a) (N = 7224)	Kenya (N = 624)	Turkey National sample(b) (N = 6436)	Sri Lanka survey (N = 212)
1.Newspaper	60	20	34	8(c)	22	17	48	90
2.Magazine	18	06	13	8(c)	--	17	--	48
3.Radio	60	44	76	34	58	66	64	94
4.Television	13	--	--	--	--	--	--	--
5.Film	68	11	56	38	53	38	44	--
6.Weekly papers	--	--	--	--	--	--	--	67
7.Cartoon Booklets	--	--	--	--	--	--	--	39

(a) From Sen and Roy (1966:32)

(b) From Frey (1966:51)

(c) Newspaper and magazine exposure were combined as one question in the India UNESCO Study .
Courtesy - Rogers, Everett M. & Svenning Lynne (1969) : *Modernization Among Peasants - The Impact of Communication* . Halt, Rinehort and Winston, New York.

Although Table 3.1 was constructed to give a comparative picture of the levels of mass media exposure, in different countries, it is unwise to gauge the mass media penetration of the study locations from such data alone. Then how extensive is the penetration of mass media in the study villages.? Table 3.2 helps us to obtain a fuller picture of the extent and nature of penetration of mass media in the five study locations:

Table 3.2 Extent of Mass Media Penetration in the study locations percentage of total sample by ownership of Media Exposure, Reading locations, and level of credibility.

Media	Owner-ship	Daily/ Weekly exposure	Never Exposed	Lscation At home	Out side home	Credibility believes almost everything
	%	%	%	%	%	%
Newspaper	41	40	7	33	67	28
Weekly paper	47	54*	9	39	61	(did not measure)
Radio	75	54	6	69	31	44

* Weekly

Thus it is very evident that a potential does exist for using the mass media to carrt meassages of development in Sri Lanka. At the same time, the above table does indicate that there are constrainting factors which could slow down such a development. Although the reach and penetration of the radio is very satisfactory, the exposure to print media is somewhat low. Low exposure in this regard may be attributed to a number of factors. One reason may be economic. 'For purely practical economic considerations the average villager today does not get much of a chance to either read the newspaper or listen to the radio....(1). Though the above generalisation may not hold true for the radio (as the survey results bear out) the reason for low newspaper purchases may be economic. It may also be due to considerations of comprehension. Though the literacy rate in Sri Lanka is high, there may be an appreciable number who find it difficult to read and comprehend newspaper articles, even though they are considered to be literate.

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(1) Weerakoon, Bradman: Communication strategy at the village level. FPCSP Monograph - 1 (undated)

They would naturally prefer the radio.

The radio has its disadvantages too. The radio does not hold the audience. It is a sort of background medium. This was well articulated by a farmer during our interview.

'Although the radio is on from morning till evening. I do not listen'. The radio can be switched on for most of the time, but concentrated listening would be done only in the case of selected programmes. Another paddy farmer when asked about the popular radio programmes said" we go to the field at dawn and return home at dusk.. Where is the time to listen to that?". These may be extreme cases, but these responses generally symbolise the disadvantages of the radio.

The second group of constraining factors lie with the media themselves. This is borne out by the content analysis of agricultural news in the Sinhala press during the week commencing 28.08-78'. Only 10% of the total space in the Sinhala press was devoted to news, or information relating to agriculture. Out of this not a single column inch was devoted to informational or educational material on agricultural practices and allied subject matter.

Table 3.3 Content analysis of articles and news relating to agriculture which appeared in the Sinhala press for the week commencing 28-08-78' (Dailies and the Sunday papers)

Date	Total print area (column inches)	% of space devoted to agricultural news	% of space devoted to instructional/educational features on agriculture
28.08.78	5755	0.20	0
29.08.78	6091	1.31	0
30.08.78	6091	0.99	0
31.08.78	6091	0	0
01.09.78	6091	2.33	0
02.09.78	6091	1.93	0
03.09.78 (Sunday)	6644	0.45	0

This is further borne out by the fact that only 15% of the respondents in the total sample reported that they read articles or features pertaining to agriculture in the newspapers. The corresponding figure for the radio was 16%. The assumption is that either the rate of relay of agricultural messages was low, or that the programmes/features relayed failed to attract the attention of the audience.

There is evidence to prove that the mass media used effectively do have a role to play in promoting new ideas among the rural population. With reference to a chemical where mass media were used intensively for promotional activities, 47% of the respondents in the three paddy locations quoted the mass media (radio & newspaper)as the first source of information and a further 25% quoted the mass media as a further source of information while 13% admitted that it was the mass media which influenced them to adopt it (see Table 3.6) The fact that the respondents were able to identify the first source of information as the mass media supports the contention that mass media used effectively can perform the function that it is intended to do i.e. to provide awareness knowledge. In this instance it has even performed the persuasion function (See 3.4)

3.2. *Sources of Expert Agricultural Information : Mass Media*

For the purposes of this study, expert agricultural information is defined as the provision of knowledge that is essential for the efficient operation of an agricultural enterprise. Knowledge may be categorised into three types : (1) Awareness knowledge (2) How-to knowledge (3) Principles knowledge. What is generally provided by expert agricultural information sources are the latter two types of knowledge . Then expert agricultural information sources provide a kind of knowledge that is essential for the complete and efficient adoption of agricultural practices.

This type of knowledge is primarily provided by the particular extension agencies, through inter-personal sources i.e extension agents. To reinforce the inter-personal channels of the change agents, the agency resorts to mass-media support. These mass media channels may also be grouped into two: 1. Channels that are directly under the charge of the agency. 2. General mass media support i.e. the newspaper and the radio. We shall now examine the role of the general mass media.

3.2.1. *General Mass Media*

A. PADDY

In the three paddy growing locations, only 11% of the respondents were exposed to special agricultural articles at least once a week. Another 2% reported that they read such types of articles only about once in a a month. 24% of the sample were never exposed to such information. Exposure to the radio too followed a similar pattern, with 14% of the respondents being exposed to agricultural programmes at least once a week. 13% of the respondents admitted that they were never exposed to any agricultural programmes over the radio. Among the 14% who reported regular listnership, only 3 respondents (21%) were able to give the name, dates and times of such programmes.

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(1) Radio Agricultural programmes are considered with general mass media although they really originate at the extension agency.

B. RUBBER

In the small holder rubber area, 17% of the respondents reported that they read agricultural features appearing in the newspapers at least once a week. 21% of the respondents were never exposed to such articles. 11% of the respondents said that they listened to agricultural programmes over the radio at least once a week. 20% were not exposed at all. Out of the 11% who claimed weekly exposure to radio agricultural programmes every one was able to quote the name, the date and time of broadcast correctly.

C. DAIRY

In the dairy farming sample, 21% of the respondents said that they read agricultural features in the newspaper at least once a week. 28% of the sample had never been exposed to agricultural features. 27% of the respondents said that they listened to agricultural programmes once a week. Another 60% claimed that they listened at least once a month. In this study location every one had been exposed to an agricultural radio programme at one time or another, In this sample too, all 27% of the respondents who reported regular exposure to agricultural programmes were able to give the name of the programme that they listened to.

It is seen that more dairy farmers tend to follow agricultural programmes both over the radio and in the newspaper than respondents nin any other study location. Another noteworthy feature is that the farmers in the low constraint paddy location tend to follow agricultural programmes more regularly, both in the newspaper and over the radio than the paddy farmers in other two locations, in spite of their generally low media exposure.

3.2.2. *Extension Agency Initiated Mass Media*

The mass media originating with the change agency itself[1] do not appear to have a high level of exposure. The awareness rate for such media is very high. But the penetration both in terms of ownership and exposure is very low. The gap between awareness and actual use seems to be very wide, the reasons for which may be inadequacies in distribution, and/or presentation, levels of comprehension and reading habits of farming community or may be related to the degree of usefulness of media itself, or a combination of all or some of the above factors.

(A) PADDY

In the three paddy growing areas 75% of the respondents were aware of the existence of 'Govikam Sangarawa' - a quarterly magazine of the Department of Agriculture devoted to the promotion of improved agricultural practices among the farmers of Sri Lanka. But the percentage of respondents who

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[1] Excluding radio agricultural programmes

reported purchasing the magazine was as low as 11%. The percentage of farmers who reported reading the magazine at least once a quarter was also the same, 12%. 48% of the respondents admitted to not having read the magazine at all. The most often quoted channel of distribution was the extension agent. 12% of the respondents reported to having obtained the magazine from the extension agents.

The picture does not seem bright even in the case of the advisory leaflets published by the Department of Agriculture. The awareness rate stands high with 71% of the respondents in the total sample reporting awareness. Only 7% of the respondents reported that they keep them as reference material while 3% reported reading them at least once in three months, 46% of the paddy farmers said that they never read any type of advisory leaflets.

89% of the respondents had an awareness of the agricultural film programmes. 67% reported to having seen the film at one time or another. 26% of the total sample was not exposed to any agricultural film programme.

The three paddy locations did not register any appreciable variation either in the awareness rate or actual exposure level.

3.3 *Sources of Expert Agricultural Information : Extension Agent Contact*

In sor far as the dissemination of agricultural information is concerned, the most important source of information is the extension agent. According to Rogers, the change agent (in this case the extension agent) disseminates information to increase knowledge levels about innovations and exerts influence to alter or strengthen client attitudes and beliefs to the point where they adopt recommended innovations.

An attempt was made to determine the impact of the extension services in imparting knowledge on agricultural innovations and in forming or changing attitudes of the farmers in three different ways. 1) by measuring the degree of farmer - extension agent contact 2) farmer participation in group extension activities 3) measuring knowledge levels of an agricultural innovation as against the degree of farmer-extension agent contact.

(A) PADDY

Three questions were administered to the respondents in all study areas to determine the frequency of contact between the farmers and the extension service in the Maha 77/78 cultivation season:

1) how often did you visit the Agricultural Extension Centre;
2) how often did you visit the KVS - the village level agricultural extension agent;
3) how often did you visit the contact farmer (in all three study areas the contact farmer system had been in operation for sometime)

The pattern and frequency of extension agent contact in the three paddy areas are reproduced in the table below (Table 3.4)

Table 3.4 Contact with extension agents in the three paddy locations

Location	WZ		DZ LC		DZ HC	
	NO:	%	NO:	%	NO:	%
Visited the Ag.Ext: Centre	7	18	9	27	9	26
Visited KVS	7	18	14	42	18	52
Visited contact farmer	5	13	1	3	7	20

The paddy farmers of the wet zone had low contact with all three types of extension channels while the farmers in the dry zone high constraint villages recorded the highest contact with extension agents. It is seen that in all three locations the most sought after person was the KVS. The exposure to contact farmers was generally low.

In extension, group methods such as demonstrations, field days, farmer training classes occupy a very important role mainly for two reasons. Demonstrations are useful in spreading a new innovation rapidly, especially in imparting 'how to knowledge'. Secondly in situations of shortage of extension personnel , group methods allow more farmers to be reached.

In the three study locations the survey revealed that group methods have had limited impact in the season under study. In the wet zone location only 13% of the farmers had attended a demonstration. In the dry zone the situation was worse. In the dry zone low constraint villages, only 3% of the farmers reported that they had participated in a demonstration. In the dry zone high constraint location no farmer had attended a demonstration. (In this respect we should not read too much into the data as this particular location was in the grip of a severe drought for almost 6 years) In the wet zone locations, 5% of the respondents reported that they had attended field days. The dry zone low constraint location did not record any participation while in the high constraint location 3% reported that they took part in field days. The most popular group extension method was the farmer training class. The dry zone extension agents used this method most. In the dry zone high constraint cluster of villages, 20% of the respondents had attended farmer training classes, while 8% in the low constraint villages reported participation in such activity. Only 3% of the respondents in the wet zone location had participated in farmer training classes.

Table 3.5 Percentage of respondents reporting participation in group extension activities in Maha 77/78 season

Wet zone	- 21%
Dry zone LC	- 12%
Dry zone HC	- 23%

The reasons for non-participation revealed that such activities were either not held or adequate publicity was not given to such activities. 24% of the respondents in all three study locations said that they did not have advance notice of such activities, while 56% felt that no such activities were held in their respective areas.

90% of the farmers, in all three study locations expressed a desire to participate in group extension activities in future, if such activities were arranged.

RUBBER

Of the sample of 62 rubber cultivators selected for the study only 11 or 18% reported that they visited the Extension Officer at his office in a period of six months. This is as low as the figure for the wet zone paddy location. A similar tendency where a minority of farmers had more frequent contact with the extension staff in the paddy areas is noticeable in this location too.

The participation in group extension activities was equally low. Only 3% of the respondents said that they had attended tapping training classes during the last six months. When questioned about the reasons for not participating, 40% of the respondents felt that no classes were held in their areas, while 54% admitted that they did not know about the classes. Nearly 80% of the rubber cultivators expressed a desire to attend classes if an opportunity was given for participation.

DAIRY

The dairy sample too showed a low exposure level to extension. Of a sample of 43, 16% reported that they had visited the Extension Office during the six months that corresponded with Maha 77/78. As in other locations a smaller number of farmers had more frequent contact with extension agents.

Only 9% of the dairy farmers reported that they had attended demonstrations. 2% had attended field days. However, 95% of the respondents said that they would attend classes if given an opportunity.

3.4 *Sources of Information For Selected Agricultural Innovations*

The objective of this section is to identify the key channels operating in the communication matrix of the study locations in relation to the promotion of agricultural innovations among the sample population.

Channels may be categorised as either localite or cosmopolite depending on the point of origin. According to Rogers localite channels originate within the social system of the receiver, and cosmopolite channels have their origins outside his immediate social system. For example word of mouth channels may be either cosmopolite or localite, depending on whether or not the source is inside or outside the social system of the receiver. A neighbour is a localite channel whereas an extension agent who has come from elsewhere is a cosmopolite channel;

yet both represent interpersonal communication. Mass media channels are almost always cosmopolite."(1)

The role of various communication channels in imparting knowledge and promoting adoption in relation to three innovations in paddy were monitored during the survey. The three innovation studies were : BG 11 - 11 a new HYV, the recommended basal fertilizer mixture, and a named weedicide. Respondents were asked the following questions with regard to all three of the above innovations:-

1. From whom or what source did you first hear about the innovations - Awareness function.
2. From whom did you get more information about the innovation (Respondents could qaote more than one source) - interest function
3. Who influenced you to try out the innovation (respondents could quote more than one source) - Persuasion function
4. In your opinion who or what gave the best source of information about the innovation - Credibility function

Since the exposure pattern was more or less similar for both BG 11-11 and basal fertilizer , we would present information only for BG 11-11 and for the weedicide. In the final analysis we have listed the following sources under localite interpersonal channels:spouse, relative, neighbour, friend, fellow farmer, land owner and the village school teacher. The Krushikarma Vyapti Sevaka, the Agricultural instructor, farmer training classes, demonstrations and visits to research stations, were categorised under cosmopolite interpersonal channels. The radio, the newspapers, agricultural advisory leaflets and magazines were considered mass media channels.

From table 3.6 it is quite evident that interpersonal channels had exerted the biggest influence in imparting knowledge and in promoting the adoption of BG 11-11 in the three study areas. At the time of the survey 85% of the farmers in all three study locations had cultivated BG 11-11 in their fields. An interesting feature which emerged from the above distribution is the fact that in the dry zone high constraint villages the cosmopolite interpersonal channels (extension personnel) had exerted a greater influence at all stages than the localite interpersonal channels.(2) In other two locations these sources had enjoyed much less influence in imparting knowledge and in shaping the attitudes of the farmers. Yet the overall picture remains the same. It is the neighbourhood groups, or the localite interpersonal groups that played a key role especially in legitimising and promoting agricultural innovations.

Rogers who did a similar study in Columbia comes to the same conclusion that ' interpersonal channels are of prime importance at every stage in the innovation decision process'.

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(1) Rogers Everett, MC Lynne (1969) Svenning Modernization among peasants - The impact of communication - Holt, Rinehard and Winston, 1969.

(2) Opinion leadership was almost absent in this area - see section 3.5

But there appears to be a corollary in the Sri Lanka situation in that, when mass media channels had been used (even though rarely) to disseminate information on agricultural innovations, they were found to have exerted influence in promoting adoption. This was observed in reference to a weedicide marketed in Sri Lanka where considerable effort is made to advertise it over newspapers and radio.

It is seen from the Table 3.7 that the mass-media has played an important role in creating awareness about this chemical in all three study locations. In one study location(i.e. the wet zone) it has gone even further. Here 58% of the respondents reported that they used the mass media to obtain further information (interest creation function) about the innovation, while 29% of the respondents said that mass media definitely influenced their decision to adopt the innovation. Significantly, 13% of the respondents in the wet zone felt that mass-media provided them with the best information on this product.

However, this does not warrant us to come to the conclusion (without further studies) that mass-media play a key role in promoting adoption of agricultural innovations, especially when in the two dry zone locations the adoption rate was low.(1) Only 13% of the sample farmers in the two dry zone locations reported that they had adopted this chemical up to the time of the survey. But the wet zone farmer showed a very high rate of use (74%).

But the results of the survey definitely reveal a role for the mass media in imparting knowledge on agricultural innovations and even to a lesser extent in promoting adoption of specific innovations. In all three study locations 47% of the respondents reported that they first learned about the chemical from mass media channels. 13% of the respondents in all three study locations admitted that mass-media was one of the channels that influenced their decision to adopt this product.

3.5 *Opinion Leadership*

In any community there are individuals who are more knowledgeable or competent on certain subjects and accepted as knowledgeable by other members of the Community. They usually act as sources of information for the other members of the Community. Such members are referred to as Opinion Leaders. Rogers and Shoemaker(2) define Opinion Leadership as " the degree to which an individual is able to informally influence other individuals' attitudes or overt behaviour in a desired way with relative frequency." It is a type of informal leadership, rather than being a function of the individuals formal position or status in the system. Rogers and Shoemaker add " Opinion Leadership is earned and maintained by individuals' technical competence, social accessibility and conformity to systems norms."

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(1) This could be due to the lower importance of this particular chemical in these areas.

(2) Rogers, Everett M., Shoemaker, F.Lloyd (1971) Communication of Innovations : A cross-cultural approach, Collier - Macmillan Ltd., London.

Table 3,6 Communication channels by function in the adoption of BG 11-11 in the three study locations for paddy

Percentage of respondents quoting different channels by function

Communication channels	Awareness function				Interest creating function				Persuasion function				Credibility function			
	WZ	DZ LC	DZ HC	Total for 3 locs.	WZ	DZ LZ	DZ HC	Total for 3 locs.	WZ	DZ LC	DZ HC	Total for 3 locs.	WZ	DZ LC	DZ HC	Total for 3 locs.
Localite inter-personal	58	68	48	58	60	62	51	58	53	73	54	60	50	62	40	46
Cosmopolite inter-personal	31	23	51	35	39	26	60	42	29	29	60	39	26	26	51	34
Mass Media	0	03	0	01	13	0	0	05	03	06	0	03	0	0	0	0
	(Only one source)				(One or more sources)				(One or more sources)				(Only one source)			

Table 3.7 Communication channel by function in the adoption of the named weedicide in the three study locations for paddy

Percentage of respondents quoting different channels by function

Communication channels	Awareness function				Interest creating function				Persuasion function				Credibility function			
	WZ	DZ LC	DZ HC	Total for 3 locs.	WZ	DZ LC	DZ HC	Total for 3 locs.	WZ	DZ lc	DZ hc	Total for 3 locs.	WZ	DZ LC	DZ HC	Total for 3 locs.
Localite inter-personal	39	18	14	24	47	03	06	20	53	06	06	22	45	09	0	23
Cosmopolite inter-personal	16	06	23	15	16	06	06	10	10	03	08	07	13	03	08	07
Mass Media	31	59	54	47	58	09	06	25	29	I3	06	13	13	0	06	06
	(Only one source)				(One or more sources)				(One or more sources)				(Only one source)			

Earlier studies carried out by ARTI[1] have revealed that friends, relatives, neighbours and farmers are an important source of agricultural information and influence farmer's decisions in a big way. Although the present study supports this observation, strong opinion leadership was not evident in any of the study locations. The percentage of farmers who identified opinion leaders was 27% (Rubber), 26% (Wet Zone Paddy), 18% (DZLC Paddy) 16%(Dairy) and 6% (DZHC Paddy). According to their figures, opinion leaders are commonly found in the more cosmopolite and urban areas compared to the more rural localities. For instance, opinion leadership is almost absent in the DZHC situation which was the most rural setting studied.

The Opinion Leaders identified, had certain common features. Almost all of them possessed a higher level of education as well as a higher economic standing compared with the respondents who identified them. In the few cases where the level of education was lower, it was compensated by knowledge or experiences in farming. In the rubber area where the largest number of opinion leaders was identified, technical competency was given high priority in deciding opinion leadership. For instance, of the opinion leaders identified by the rubber growers, 70% were either employees of estates (or ex-employees), grafters or owners of nurseries or experienced rubber growers who possessed special skills in rubber cultivation.

Of the various models of information flow, the two-step model has received the attention of many communication researchers. According to this model of information flow, new ideas usually trickle down through the opinion leaders to other members of the community. In the absence of strong opinion leadership, the type of information flow should be a more complex, multistage and multidirectional process. This means that information flow among farmers is not uni-directional from opinion leaders to receivers, but multidirectional often with equal exchange of information. A farmer who may be a source of information at one point of time for a certain message could be a receiver for another message at some other point of time.

The way paddy cultivation is carried out, particularly under traditional farming conditions, discourages opinion leadership. This is due to the collective nature of the culture of the crop which discourages opinion leadership and favours collective decisions. The demonstration effect of the field of one farmer on another could be a stronger influencing force in paddy cultivation than opinion leadership. This collective nature in the cultivation of paddy tends to be stronger in paddy farming under small village tanks compared to more commercialised farming under major irrigation or farming under wet zone conditions. This may be cited as the reason for the absence of opinion leadership under the DZHC conditions and somewhat higher opinion leadership under the other two settings.

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[1] ARTI-Agrarian Situation Relating to Paddy Cultivation In Five Selected Districts of Sri Lanka.

CHAPTER 4

ASPIRATIONS AND ATTITUDES

Whether a farmer chooses to adopt or reject a farming practice is affected by a myriad of factors both within and outside the individual farmer. A section will be devoted here to analyse the social aspirations and attitudes of farmers which emanate from the existing socio-eocnomic framework and which in turn are important factors in creating an environment favourable to change and adoption of improved agricultural practices - that is to say factors which can be important in contributing to a growth of a desire for change. Predictably, though important as motivational components in farmer's choice and decision making, aspirations and attitudes were the the hardest to gauge and subsequently the hardest from which to generalise. In this respect the conclusions are tentative and only form a supplement to the main thesis of the paper. It must be further emphasised that the data are presented only as perceived and articulated by the farmers in the sample.

There can usually be two levels of attitudes to innovations: (a) a specific attitude to the innovation; (b) a general attitude to change.(1) The intention here is to present the second, that is to assess farmer attitudes an aspirations to various factors in his social ambience which may impede or conduce to adoption of agricultural innovations, rather than to gauge attitudes to particular agricultural innovations *per se*. This latter aspect has been dealt with in dealt with in detail in Chapter 1.

The questions asked were of three broad types:

1. Attitudinal - relating to specific attitudes which could for' instance reveal a defensive - adherence to existing practices and arrangements or conversely, a predisposition to adopt a new idea/practice.

2. Aspirational - to determine to what extent respondents feel that various goals/ ends are within attainable reach either for themselves or their children. These change incentives in terms of aspirations can be several; including a desire for social improvement and desire for economic gain and which are ultimately the basic sources of motivation. The converse is also true, that a farmer's perception of what is not possible in his situation can often lead to his resistance of an innovation. As aspirations are intimately tied to the farmer's relationship with his kin, his elites and other community members and his perception of whether they help or hinder him form bettering himself, an attempt was made also to assess these factors.

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(1) Rogers, Everett M, Shoemaker F.Lloyd (1971) : *Communication of Innovations: a cross cultural approach*, Collier-Macmillan Ltd., London.

3. Farmer choice - to determine, assuming the feasibility of the choice, the preferences from the farmer's point of view to various alternatives. As individuals tend to apply a new idea/technique to their present or anticipated future situation before deciding whether to adopt it, it is important to gauge current farmer attitudes. Whether a farmer tends generally to be risk-averse or not can also be gauged by assessing his choices in a situation.

A series of initial questions were posed to determine farmer aspirations for children, differentiated by sex in terms of higher education and employment. A very noticeable feature was the overall high figure for all farmers, irrespective of their agricultural situation and the sex of their children, for a preference to higher educaton. A small proportion of dairy farmers compared withother farmers indicated satisfaction with a lower level of education for both male and female children but this was not of a significant amount. Actual educational standards of respondents did not appear to have an effect on educational aspirations for their children, though low constraint paddy farmers as a group were found to have the largest number with an education above the Ordinary Level, and the dry zone high constraint farmers the least.

It terms of employment, though the overall indication is a preference for employment outside agriculture and especially for white collar positions for obvious status reasons, predictably more respondents in the high constraint paddy villages (100%) and rubber (80%) fell into this category than those in the low constraint paddy areas (71%).(1) This obviously indicates farmer perception of the economic opportunities afforded by agriculture in the low constraint paddy areas as opposed to high constraint paddy areas. Interestingly a high percentage (67%) of dairy farmers did not indicate a preference to white collar employment which probably can be explained both by their slightly lower educational aspirations and their high level of fatalism (indicated later) apart from their different ethnic origin.

An interesting feature is that while parents do not appear to differentiate their children by sex in terms of education, in terms of employment they tend to be markedly sex- distinctive, preferring that their daughters worked both outside agriculture and the home, in white collar positions. This depicts a departure from traditionality of thought in terms of female employment outside the home though is also probably part of the value system and laws of inheritance that assign agricultural employment to males so that alternative avenues of employment must be sought for daughters. White collar jobs also probably denote more security.

Emphasis was also given to determining traditionality in thought/belief systems through the assessment of levels of fatilism that could provide resistance to change in terms of advancement within the particular social system. Interesting variations were found in response to the question

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(1) As it is, a large number of paddy farmers in the wet zone and rubber growing areas are part-time farmers deriving much of their income from off-farm employment (see Tables 7 and 12 in Annex.)

of whether getting ahead in life depended on fate or on one's efforts. While the majority in both the low and high constraint paddy areas in Anuradhapura felt that it depended entirely on one's own efforts (94%). of those in the high constraint wet zone area and rubber farmers, a larger per centage felt that it depended more on own efforts with an element of fate, while markedly for dairy farmers there were more (67%) who attributed life chances to fate than to effort.

Interestingly this does not correlate with the levels of mass media exposure for the various groups as described in detail in the earlier section. Mass media exposure to both radio and newspapers was very high for dairy farmers and a *priori* expectations were that this plus their geographic propdnquity to an urban center should have had some effect on their levels of fatalism and on their general outlook on life. The only explanation that can be postulated is that as a group a large proportion of the dairy farmers have a different ethnic background and this may have perceptibly coloured their outlook on life differently from that of the other respondents.

In the subsequent question of farmer perception of the possibilities for economic advancement in their current situation, a clear majority of all farmers except dairy farmers stated both that there existed every possibility, and that to their knowledge there were families who have been able to afford themselves of these economic and social opportunities for upward mobility.

The percentage who replied in the affirmative to the above, were slightly less in the case of dairy farmers, suggesting perhaps no visible or marked improvement in their standards of living as a group in the recent past and thus no basis of a prospect for financial gain in future. This was supplemented by their response to the question of whether their economic situation had improved in the last five years. A higher percentage of dairy farmers, compared with other farmers, reported no change (32%)or a change for the worse(29%). The major reason given for this was the lack of both capital and sufficient labour on the farm. For both the high constraint and low constraint paddy groups in Anuradhapura significantly more respondents (53%) reported an amelioration in their socio-economic conditions over the last five years,

As village societies sometimes tend often to conceive of individual advancement as depriving others from corresponding advancement and thus attempt to "level off" these discrepancies through in-built social mechanisms, a question was asked about what other villagers would think if the respondent or other village members were found to rise appreciably in the socio-economic hierachy. The majority of respondents stated that hard work was the essential component of advancement and that individual betterment need not be at the expense of others. This then carried the implication that respondents did not feel the deterrent effect of envy (evil eye) or a siphoning off mechanism that attempted to redistribute wealth or impose social obligations on some one who rose in the social scale.(1)

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(1) James. C.Scott, (1974), *The Moral Economy of the Peasant:* Rebellion and Subsistence in South East Asia ; New Haven.

Questions were also asked on expenditure/saving patterns and farmer aspirations for the future. A higher percentage of all farmers except the low constraint paddy farmers, indicated that their main incentive to save money was for the education of their children and in the case of paddy farmers in both areas this was followed closely by a desire to built or buy a new house. Paddy farmers in the low constraint area however were notably interested in saving money to buy farm equipment. This aptly demonstrates their preferences in a situation where farming and investment back into agriculture are profitable. Correspondingly other farmers articulated an incentive to save for a future *away* from agriculture, for example with a university education for thier children. Interestingly many rubber, dairy and wet zone farmers listed a sudden disaster in the future as an important contingency that required savings. This probably demonstrates the uncertainity in the minds of those farmers of agriculture as security in the future, especially as this was least pointed out as an important incentive to save by farmers in the low constraint paddy area.

As to the possibilities for increasing farm income, agronomic factors were featured as the biggest impediments - especially lack of adequate and secure supplies of irrigation water and to a lesser extent, poor soil and drainage conditions in the two high constraint paddy areas, which was quoted by 75% in DZHC and by 40% of the farmers in the WZ as opposed to only 17% in the low constraint dry zone paddy area. Shortage of land was also an often repeated impediment, especially as articulated by paddy farmers in the WZHC and also by rubber and dairy farmers. Probably because of the lack of good irrigation facilities the paddy farmers in the DZ did not feel that they could generate a higher income even with additional land and so this was not indicated as an impediment.

Delays in the supply of inputs by institutions and associated problems were other often repeated impediments. This was pointed out especially by the dairy farmers and by the paddy farmers in all three areas. Also interestingly some 35% of the farmers in the low oonstraint area pointed out the lack of capital as a serious obstacle to increasing their farm income.

Associated with this was farmer response to reasons for indebtedness. The answers have to be treated with reservation as the reticence to talk about it may have affected the responses - in fact the majority of all farmers said that they had no problem of indebtedness. Of those who admit such a problem those farmers in both the high constraint localities indicated that the failure of crops was a significant cause for indebtedness as was borrowing for agricultural purposes. In comparison in the low constraint area, a large number attributed indebtedness to the problem of familial obligations.

Farmers were asked their opinion about whether they felt there was a need for further education of people in the area. An overwhelming majority replied that farmers need to be further educated in production techniques. Many farmers also felt that there was room for improved participation and cooperation in rural institutions and this was most marked in the rubber growing area.

APPENDIX I

Socio-Economic Background of Farmers In the Selected Paddy Localities

The importance of the social and economic background of respondents cannot be underestimated in a discussion of farmer knowledge and perception of improved technology and the role of agricultural support services such as extension that must accompany it. Research into this aspect by several has shown that the social and economic probelms associated with diffusion and the adoption of new technology are not always inherent in the technology itself but is a direct reflection of social inequalities and economic disparities that already exist in the society. For instance, studies have shown that those farmers in areas with consistently better factor endowments so that increased profitability is assured, will more likely to and with more speed, adopt the improved technology than those farmers in situations where economic and physical uncertainity is manifest. In these latter situations, farmers are seen to prefer the continued cultivation of varieties offering promise of security, despite low productivity.

1-Physical Conditions

There are several important physical factors and constraints affecting the introduction of improved technology - timely and controlled supplies of irrigation water or regular rainfall, good soil drainage - and so forth are undoubtedly essential components. This study has attempted to control these factors through the selection of 3 paddy areas with each area displaying the lack or presence of certain physical constraints, so that the discussion of farmers knowledge and perception can be viewed against this back drop.

The physical constraints assumed to be limiting factors were:

(a) *the lack of an assured water supply* - new varieties must enjoy an assured water supply throughout the year and this naturally has consequence for adoption in areas with poor water supply where farmers will be both slow to adopt and thereafter benefit little from adoption. Even other improved management practices are best adopted under assured water supply conditions. The Dry Zone Low Constraint area is predominently undre irrigation while the Dry Zone High Constraint area is under minor irrigation and the Wet Zone High Constraint area is rainfed. Thus the low constraint area had a relatively more assured water supply. The Dry Zone Hogh Constraint area was under village tanks which dry out under drought or semi-drought conditions and the wet zone area where the paddies are rainfed was more vulnerable being subject to vagaries of monsoonal rainfall. (Table 1)

(b) *Fragmentation* - Table 2 shows that there is no significant difference in the extent of fragmentation of paddy lands between the two dry zone areas whereas it is a problem of great magnitude in the Wet Zone study locality. However, a word of caution here - the extent of fragmentation is greater in the Dry Zone High Constraint area than is readily apparent from the table as the table does not surface the extent of the problem

in the *purana wella* areas of the Dry Zone High Constraint study locality. While poor drainage and infertile soils were reported by slightly more farmers in the two high constraint areas than in the low constraint area, this was not of a significant nature to adversely affect paddy production in any of the areas and hence will not be considered a limitation.

Table 1 Water supply for paddy

	No: of farmers		
	Dry Zone Low constraint area	Dry Zone High Constraint	Wet Zone High constraint area
1. Rainfed	0	0	33
2. Major Irrigation	27	0	02
3. Minor Irrigation	05	34	02
4. Major and minor	02	--	--
5. Rainfed and minor	--	01	--
Total	34	35	37

Table 2 Distribution of paddy holdings according to farm size

Farm size	Dry Zone Low Constraint Area		Dry Zone High Constraint Area		Wet Zone High Constraint Area	
	No: of farms	% of farms (1)	No: of farms	% of farms (2)	No: of farms	% of farms (3)
½ acre	0	0	0	0	07	19
½-1 acre	03	10	02	06	16	43
1-2 acre	05	16	05	15	06	16
2 ans over	23	74	27	79	08	22
Total	31	100	34	100	37	100

(1) Information on size of three farms was not available
(2) Information on size of one farm was not available

II-Land Tenure

This is a crucial factor that influences the perception and adoption of a new technology as land ownership is inextricably linked with economic and social status and thus control of other resources. The land tenure situation indicates that the Dry Zone Low Constraint area is relatively more advantaged than its counterparts in the study. In this area, 77% of the paddy land was found to be owner-operated while in the other two area the relative proportions were 69% of the Dry Zone High Constraint and 62% for the Wet Zone High Constraint area. On the other hand the wet zone high constraint area had the highest percentage of tenant farmers (32%) while in the other areas this percentage was considerably less . The Dry Zone High constraint area was found to have the highest proportion of owner-cum-tenant cultivators (14%) while the low constraint and the wet zone areas have 12% and 5% respectively.

Table 3 Land tenure

	Dry Zone Low Constraint		Dry Zone High Constraint		Wet Zone	
	No: of farmers	%	No: of farmers	%	No: of farmers	%
Owner cultivators	26	77	24	69	23	62
Tenant cultivators	04	12	06	17	12	32
Own and tenant cultivators	04	12	05	14	02	05
Total	34	100	35	100	37	100

III-Size of Holdings

The paddy land endowment picture is presented in Table 2. It can be surmised that in relation to paddy, land fragmentation has been most pronounced in the wet zone farms. However, in the highlands it has been most pronounced in the Dry Zone High Constraint area. In the former, the average size of paddy holding was only 1.33 acres compared to over 3 acres inthe two other areas, while in the latter the average size of the highland was 1.18 acres as compared with over 2 acres in the others. It is evident that in terms of the average size of holdings the low constraint area on the whole is the most favourably endowed, as at present. As expected, a predominance of very small farms (under one acre) is found in the wet zone area. This is evidence of the contention that fragmentation of paddy land has been most acute in this area. It can be assumed that this process places yet another serious constraint on this particular area in relation to the extent to which it can reap the benefits of improved technologies. With diminishing size of holdings, a situation is likely to arise where farmers will be reluctant to invest in additional inputs as holdings may be far too small to ensure adequate returns on investments. Thus, in an area in which the problem of fragmentation is actue, it can constitute a serious obstacle to the widespread use of improved technologies,and in the context of this

study and in the future use of these technologies, it is a problem that needs special emphasis. However, within each of the study localities disparities in terms of farm size were found to be relatively small, with consequences for rural inequities which otherwise have been accentuated.

IV-Education

A brief examination of the educational levels attained indicates that a greater number of Dry Zone Low Constraint farmers have a high educational proficiency with 24% of these farmers having passed the G.C.E.(Ordinary Level) examination (Grade 10), while the corresponding proportions in the Dry Zone High Constraint and Wet Zone High Constraint area were only 9% and 16% respectively.

Table 4 Level of education of the head of household

	Dry Zone Low Constraint		Dry Zone High Constraint		Wet Zone	
	No:	%	No:	%	No:	%
No Education	02	06	03	09	01	03
Upto Grade 5	18	53	15	43	14	37
Grade 6 - O'Level	06	18	14	40	17	45
O'Level and above	08	24	03	09	06	16
	N=34		N=35		N=38	

On the whole, however the levels of education achieved in the three areas were not found to be unsatisfactory. The percentage of farmers having studied upto the Ordinary Level (Grade 10) in the three areas were 71% for the Dry Zone Low Constraint, 83% for Dry Zone High Constraint and 82% for the Wet Zone, while only 6%, 9% and 3% respectively had no education . We could therefore consider that the level of formal education, attained (in general) as having been sufficiently high so as not to form a constraint on farmers' ability to perceive the potential beneifts of adopting improved technologies.

V-Housing Conditions and Ownership of Agricultural Implements and Vehicles

Taking housing conditions as an index of the relative standards of living achieved, indicated that the Wet Zone High Constraint areas was the most advanced. In this respect 84% of the farmers in that atea had brick houses as compared to 50% and 34%, in the Dry Zone Low Constraint and High Constraint areas respectively. This finding is somewhat surprising as the expectation would have been that the low constraint area farmers had the best living conditions. 44% in this group had wattle and daub huts as compared to 66% in the Dry Zone High Constraint group and 16% in the Wet Zone. A plausible explnation for the relative 'material prosperity' of the Wet Zone group is the fact that a significant number of farming families in that area had at least one member engaged in off-farm employment, which enabled them to obtain a supplementary income. Assessing ownership of standard household items also shows that the wet zone farms are in a comparatively advantaged position. It is also interesting to note that a far higher proportion of wet zone

farmers (29%), earned incomes from crops other than paddy (from coconut, etc.,) than the other two groups (3% in both respectively). It is likely therefore, that the relatively large proportion of farm households engaged in off-farm employment and cultivation of other crops has been one of the chief reasons why the Wet Zone High Constraint farmers on the whole have been able to enjoy better living standards relative to the other two categories.

In terms of agricultural implements owned, a notable feature is the fact that none of the farmers in the high constraint areas owned tractors or tractor trailers while 9% in the Low Constraint Dry Zone owned 2-wheel tractors and 6% trailers for 2-wheel tractors.

Also the assessment of the ownership of vehicles for transport among the sample farmers showed a preponderance for low constraint dry zone farmers with 64% owning bicycles and 15% owning cars. The corresponding figures for the wet zone were 55% owning bicycles and 8% owning cars while in the dry zone constraint 43% owned cycles and none owned cars.

VI-Off-Farm Employment

In the wet zone 50% of the households had sources of supplementary income (income outside paddy) while only 26% in the Dry Zone Low Constraint group and 11% in the Dry Zone High Constraint group were in a similar position. It is probable that off-farm employment has been of more importance to the former group of farmers than to the latter two because in the case of the former, their paddy lands have been the most fragmented, thus considerably reducing the income potential from paddy, Further, their geographic propinquity to Colombo has also provided greater avenue for employment away from agriculture. In fact 47% of the wet zone farmers earned non-agricultural incomes, especially form salaried/white collar positions and through commercial enterprises. In contrast such avenues for non-agriculture income accounted for only 24% and 12% for the Dry Zone Low Constraint and high constraint areas respectively.

The production and income data for paddy cultivation was not available for the two dry zone study areas for the Maha season as harvesting operations had just begun at the time of the survey. Examining the Yala data it is seen that although the per acre yields for the Dry Zone Low Constraint area is not very much different from that for the Wet Zone area, the value of production per farm and the value of sales per farm is significantly higher for the former . However, the reported yield by the DZLC farmers appears to be low when considering the assured water supply conditions and the level of technology adoption achieved in the area.

Table 5 Off-farm employment and income

	Dry Zone Low Constraint			Dry Zone High Constraint			Wet Zone		
	No: of h/holds	%	Average income (Rs.)	No: of h/holds	%	Average income (Rs.)	No:of h/holds	%	average income (Rs.)
Salaried/White collar	06	18	5837	02	06	3840	07	18	5523
Trade/commerce	--	--	--	02	06	2200	07	18	3886
Skilled workers	--	--	--	--	--	--	01	03	1000
Agricultural labourers	--	--	--	--	--	--	01	03	1000
Non-agricultural labourers	01	03	3000	--	--	--	03	08	1520
Others	01	03	3600	--	--	--	03	08	13800
Income from other crops	01	03	4800	01	03	5000	11	29	8102
% with non-agricultural income		24			12			47	

VII Production and Income From Paddy

Table 6 Production and income from paddy

Maha	No: of farmers reported	Total extent harvested. (Ac.)	Production/ farm (Bu.)	Production/ acre (Bu.)	Value of sales/ farm (Rs.)	Value of total production/ farm (Rs.)
DZLC[1]	--	--	--	--	--	--
DZHC[1]	06	12.75	100	47.06	2222.50	4000.00
WZ	37	43.07	43.54	37.40	145.95	1741.62
Yala						
DZLC	29	109.25	155.13	41.18	3471.72	5119.55
DZHC[2]	02	1.5	42.05	56.66	--	1402.50
WZ	27	35.83	45.48	34.27	103.88	1500.88

Note : 1. The Maha harvesting had just begun at the time of the survey

2. No Yala cultivation except by two farmers due to unavailability of water for paddy cultivation.

APPENDIX II

Socio-economic background of farmers in the selected dairy and rubber localities

1. Education

While a larger percentage of dairy farmers (12%) had no education in comparision to rubber farmers (7%), a slightly larger number of farmers displayed a level of education above the Ordinary Level than the latter. Rubber farmers in turn, displayed a larger concentration in the Grade 6 to Ordinary Level category.

Table 7 Level of education and head of households

	Rubber		Dairy	
	No:	%	No:	%
No education	04	07	05	12
Upto Grade 5	22	36	21	49
Grade 6 - O'Level	27	44	10	23
O'Level and above	09	15	07	16
	N = 62		N = 43	

11. Housing conditions and ownership of household items

Taking into consideration all five study localities, rubber and dairy farmers display the greater percentage with brick housing, 89% and 86% respectively, and in the case of rubber the lowest number (10%) of wattle and daub constructions. This could be attributed perhaps to the supplementary incomes derived from off-farm employment made especially feasible by the proximity to urban centres, in this case to Colombo and Kandy. Notably also rubber farmers had the smaller family size of 4.72 persons as opposed to 6.83 for dairy farmers, while the family sizes of the paddy farmers ranged in between. Ownership of household items is also comparatively high for rubber and dairy farmers as compared with the paddy farmers.

111. Off-farm employment and income

For rubber farmers 19% reported salaried white collar employment and 11% skilled labour apart from rubber cultivation. In fact, 57% of all rubber growers also derived an income from paddy during the Maha season, while 76% derived an income from agriculture other than rubber. In the case of dairy farmers, 21% reported hiring out their labour in agriculture so as to derive a supplementary income.

IV. Ownership of rubber land

It is evident that with respect to land distribution a certain degree of inequity exists. For example, 57% of holdings owned are under two acres, while they account for 17% of the land area. Moreover, the holdings of

five acres and over, while they constitute only 13% of all holdings, account for as much as 50% of the total land area. The land distribution pattern is shown in Table 9.

Table 8 Off-farm employment and income

Employment	Rubber			Dairy		
	No: of h/holds	%	Average income (Rs,)	No: of h/helds	%	Average income (Rs.)
Salaried/white collar	12	19	5928	09	21	4120
Non-salaried employment	02	03	4980	--	--	--
Trade/commerce	01	02	3600	05	12	3040
Skilled workers	07	11	4000	01	02	3000
Agricultural labourers	--	--	--	09	21	3389
Other employment	05	08	5526	02	05	6150
Income from paddy (Y)	25	40	757	NA	NA	--
Income from paddy (M)	35	57	868	NA	--	--
Income from other crops	01	02	1800	17	40	2053
Income from livestock	--	--	--	02	05	475
% having other agricultural income			76			NA
% having non-agricultural income			37			44

Table 9 Extent of rubber land owned by size of holding

Size of holding	Farmer reporting	Total extent	average extent
Up to - 0.5 acres	06	2.20	0.37
0.5 -/ 1 acres	11	10.00	0.91
1.0 -/ 2 acres	18	29.50	1.64
2 -/ 5 acres	18	58.30	3.24
5 -/ 10 acres	04	30.00	7.50
10 acres and over	04	119.00	29.75
All groups	61	249.09	5.08

V. Ownership of cattle

As indicated in the table the number of cows averaged to 2 per farm. None of the farms had a herd strength of more than 7 cows while the number of farms with three or more cows was 9, thus showing that the herd strength per farm was small.

Table 10 Cattle population reported by farmers

Type	No: of farmers reporting	Total No: of animals	Average per farm
Cattle (Cows)	40	81	2.0
Cattle (Calves)	30	52	1.7

VI. Production and income

In 79% of the dairy households milk production is relatively low - i.e. on the average less than 10 liters per day. This 79% is responsible for 55% of the dairy milk produced on the average.

The number of dairy households earning less than Rs.3,000 per annum amount to as much as 72% of all households in the sample but the income of these families account for only 45% of the total annual income earned by all the families.

Table 11 Production of milk per day

Range (liters per day) (Rs.)	Households reporting No:	%	Total production (liters/day)	Average Production (liters/day)
0 - 5	19	50.0	68.0	3.50
5 - 10	11	28.9	78.5	7.14
10 - 15	05	13.2	58.0	11.60
15 - 20	01	2.6	17.0	17.00
Over 20	02	5.3	46.0	23.00
All groups	38*	100.0	267.5	7.04

* Five households did not respond.

The production figures for sheet rubber . The Production figures for the sample household averaged to 552.6 lbs of hsheet rubber per acre. per year and 1796.0 lbs per holding per year. This figure compares well with the national average of 700 lbs per acre for the year 1977. As was mentioned earlier a large proportion of sheet rubber manufactured was marketed in Grade 111 sheet.