preference, scientific orientation, attitude towards agriculture and attitude towards shifting cultivation.

The analysis of this study was conducted in two phases. In first phase, descriptive statistics was used to analyze the independent socio-economic variables. The number, percentage and rank of all variables were presented in the findings. In second phase, correlation and multiple regression analysis was conducted to see the relationship of the dependent and independent variables. An effort was also made to analyze the significance of the independent variables over dependent variables through multiple regression. All data tables are presented in the findings chapter.

Summary of the findings

There were 240 respondents from four NHH states. Out of which 120 respondents were from project area and remaining 120 were from the non project area. It was found that 26.7 per cent respondents of both the categories were less than 30 years age category, 51.2 percent were in 30-50 years category and more than 22 per cent respondents were in the age group of more than 50 years category. It was also found that highest percentage of the respondents were in the age group of 30-50 years. The percentage of the respondents from each state were same i.e. 25 percent. The mean age of the respondents of adopted area was 38.39 years and non-adopted area 2.50 years. The overall age of all respondents ranged in between
18 to 75 years and mean age was 40.19 years.

Education is one of the most important indicator of the adoption. It was found that more than 60 per cent respondents were illiterates. Only 15.6 percent respondents were having primary level education, 11.25 per cent were having middle level education, 9.18 per cent were having high school level education and about 3 percent respondents were having either intermediate or above education. It clearly indicates that the educational level of the farmers of these states are not very high, it is therefore, the awareness, knowledge as well as adoption of latest agricultural technology may be not high.

Since occupation plays a significant role in adoption of agricultural technology, it is considered in this study. The major occupations of the respondents were farming, farming with service and finally farming with business. It was found that majority of the respondent (67.5 %) in project as well as non project area were involved in farming occupation. About one fourth of the respondents were engaged in farming along with service and only about 6 percent respondents were engaged in farming with business. Since the majority of the respondents were depending on agriculture and most of them illiterate, the economic condition of the farmers in these states was very poor.
Caste is another social variable contributing in the adoption of agricultural technology. It was found that majority of the respondents in this area were tribals. Non-tribals were however, found in very little percentage. It was found that more than 67 percent respondents were tribals and less than 33 percent were non-tribals. However, the percentage of tribals in non-project area was higher (36.67%) and the percentage of non-tribals was higher (19.58%) in project area.

The religion of the respondent was another independent variable considered for the study. The religion of the respondents was categorized in two categories; Christian and Hindu. There were more than 28 percent Christians and more than 71 percent Hindus respondents in this study. It was also found that there was no respondent of Christian community in Arunachal pradesh.

Type of house was another socio-economic indicator considered in this study. It was assumed that PAKKA houses were sign of prosperity where as KACCHA houses indicate the poor socio-economic condition. It was found that more than 67 percent respondents were having KACCHA houses where as less than 33 per cent respondents were having PAKKA houses. The finding also indicates that there was no significant difference in the housing of the respondents of the project area as well as non-project area.
There were three types of land in these states: rainfed, rainfed+jhuming and irrigated land. It was found that more than 67 percent respondent were having rainfed land, 22 percent respondents were having rainfed+jhuming type land and only about 11 percent respondents were having irrigated land. Except Sikkim, all other states were having jhuming type of land. It was also found that the respondents of non-project area of Meghalaya were not having irrigated land at all. The highest percentage of the respondents both in project and no-project have rainfed type of land.

The income of the respondents was categorized in three categories i.e. low (<9,000), medium (9,000-15,000) and high (>15,000). It was found that more than 38 per cent respondent fall in the category of < 9,000 family income, more than 28 percent fall under 9,000-15,000 family income and more than 32 percent fall under > 15,000 or high income group of family income. There was no much difference in the family income of the respondents of the project and non-project area. The mean family income of the respondents of adopted area was Rs.12,423.58 and non-adopted area Rs. 12,490.67. The overall family income of all respondents ranged in between Rs. 00 to Rs. 69,000 and mean family income was Rs.12,457.13.

Farm power used by the farmers was one of the important independent variables considered in this study. The farm power was categorized in two categories, indigenous and improved. It was
assumed that the farmers who have improved farm power may be the adopters of the improved agriculture technologies. It was found that more than 72 percent respondents were having indigenous farm power and only about 26 percent respondent were having improved farm power. It was found that majority of the farmers have traditional farm power in non-project area where as majority of the farmers of the project area were having improved farm power. In other words there was significant impact of the ICAR projects on the farmers in terms of improved farm power.

The respondents of these states were having normally the bicycle, radios, TV, wooden cots and very few agricultural implements. These materials were categorized in low, medium and high categories. Then the respondents were distributed as per their material possession. It was further categorized that how much respondents in different states fall under project and non-project areas. This variable was another indicator of the farmers' adoptability. It is normally assumed that if material as mentioned above are more the adoptability of improved agriculture will also be more. It was however, found that more than 37 percent respondents had lower, 39 percent had medium and more than 22 percent had higher material possession with them. The material possession of the respondents of the project area was found more in medium and high categories but low in lower category.

The social participation of the respondents was categorized in
two categories namely, project and non-project area. It is normally assumed that more the social contacts more the information. Hence, more the adoption and change. It was found that more than 96.6 percent respondents were members of village council of the project area, whereas 59.1 percent were members of the village council in non-project area. In other organizations, the membership of the respondents of the project area was found more than the membership of the non-project area. It may be reason that the adoption in project area may be more than non-project area. It may be inferred that the ICAR programmes had significant effect on the farmers adoptability in project areas.

Extension contact was one of the important variable in this study. It was assumed that higher the extension contact higher the adoption of improved agriculture. In addition, it was expected that the extension would be more. The data revealed that in almost all extension agencies the farmers had more contacts in project area than the non-project area. It may be because of the impact of the ICAR projects in project areas. Based on the experiences of the other variables, it may be inferred that the CAR projects {first line extension} had a significant impact on the extension contacts of the respondents.

Mass media exposure was another independent variable in this study. It was assumed that more the mass media exposure more the adoption of the new agricultural technologies. The mass media
exposure scores were categorized in low, medium and high categories. It was found that more than 64 percent of the respondent had lower mass media exposure, more than 27 percent had medium and more than 7 percent respondent had high mass media exposure. As far as the differences between the respondents of project and non-project area was concerned, there was no much variation.

To test the risk preference of the farmers of the project and non-project area a total of 6 questions were asked. The score obtained were categorized in three categories; Low (< 15 marks), medium (15-20 marks) and high (> 20 marks). It was found that percentage of low risk preference were found higher (43.17%) in non-project area whereas they were only 23.33 % in project area. The medium and high attitude level of the respondents of project area was higher in comparison to non-project area. It was found that the ICAR project had significant impact on the risk preferences of the project area. The over all percentage of low risk was however, found more 57.5%, followed by medium 33.75% and high 8.75%.

In order to assess the scientific orientation of the respondents, six questions were asked from the respondents of the project and non-project areas. The responses were categorized in three categories; Low (<15 marks), Medium (15-20 marks) and High (>20 marks). It was found that the scientific orientation was
higher in Low category of the non-project area (34.58%) in contrast to the project area 25.83%. The response of Medium and High category of the respondents of project area was higher than the non-project area. The overall percentage of low score was highest (60.42%), followed by medium (32.10%) and finally high (7.5%). It was found that there was significant effect of the ICAR project on the farmers of the project area.

To assess the attitude of the respondents of the project and non-project areas about hill agriculture, 10 questions were asked from both the groups. The attitude score was categorized in three categories; Low (<21 marks), Medium (21-30 mark) and High (>30 marks). It was found that low attitude score was higher (29.17%) in non-project area but only 12.08 percent in project area. The medium and high score level of project area was however, found higher than the response of the non-project area. It was inferred that the ICAR projects had a significant impact on the attitude of the farmers of the project area towards agriculture. The overall percentage of the medium level of attitude was found to be highest; i.e. 61.25%, followed by low level 31.25% and finally the high level 7.50%.

In order to assess the attitude toward the shifting cultivation of the respondents of the project and no-project area, ten questions were asked. The responses received were categorized in three categories, Low (<21 Marks), Medium (21-30 marks) and High
(30 marks). It was found that Sikkim state does not have shifting agriculture. So, it was not considered for the analysis. The data of only three states; Arunachal Pradesh, Meghalaya and Manipur was analyzed. The low altitude of the project area was high in comparison to non-project area but the medium and high altitude of the non-project area was found higher than the project area. It may be inferred that the farmers of non project area were much interested in shifting cultivation.

Awareness about Hill Agriculture:

In order to see the impact of the ICAR projects on the farmers awareness was tested. Total 11 questions related with different agricultural practices were asked from the 120 respondents of project and 130 respondents of non-project area. It was found that the level of awareness of the farmers of project area was significantly higher in terms of all eleven questions in contrast to the responses of the non project area. It may, therefore be inferred that the ICAR projects has a significant impact on the farmers of the project area.

Adoption:

In order to see the variability in adoption of the agricultural practices among the farmers of project and non-project area, an adoption analysis was conducted. Total eleven questions were asked
from the 120 respondents of project area and 120 respondents of the non-project area. The purpose was to see whether or not there is any significant difference in adoption behavior of the farmers of the project and non-project area. It was found that farmers of project area were better adopters in contrast to the non-project area. Hence, it may be concluded that the first line ICAR projects had significant impact on the adoption behavior of the farmers of project area.

When this question was asked that which were the reasons for adoption of various crop technologies, farmers ranked increased yield as the first, increased income as the second, technical guidance as the third, less risk as the fourth, credit availability as the fifth, input availability as the sixth, reduced labour as the seventh, simple technology as the eighth and convincing strategy as the ninth factor. One can easily understand that the increase in production and income were the major factors for option.

**Knowledge:**

In order to know the difference in the knowledge of the farmers of the project and non-project area, another important analysis was done. The obtained knowledge score of the respondent of the project and non-project area was categorized in three categories, i.e. Low (<10 marks), Medium (10-20 marks) and High (>20 marks).
It was found obviously that the low level of knowledge of the farmers of the non-project area was found higher (42.5%) than the project area (13.33%). The medium level of knowledge of the project area was found higher than the non-project area. Finally, the high level of knowledge of the project area was also found higher than the non-project area. It may therefore, concluded that due to the first line ICAR projects the knowledge level of the farmers of the project area was much higher than the non-project area.

In the correlation matrix of nine independent variables with knowledge as dependent variable of the farmers of project area, education \( (r = 0.383** \) ), occupation \( (r = 0.255** \) ), risk \( (r = 0.294** \) ) and scientific orientation \( (r = 0.275** \) ) were positively and significantly correlated with knowledge. It means that higher the educational level more the knowledge, better the occupation higher the knowledge, higher the risk bearing ability higher the knowledge and finally, higher the scientific orientation of the respondents more the knowledge. The variables age and land holding were negatively and not significantly correlated. The variables income and attitude were positively but not significantly correlated with knowledge.

In non-project area, the correlation matrix of nine independent variables with knowledge as dependent variable of the farmers of non-project area indicated that education \( (r = 0.264** \) ) and
land holding \((r = .277**)\) were positively and significantly correlated with knowledge. It means that higher the educational level more the knowledge and bigger the land holding more the knowledge. The remaining seven independent variables; age, occupation, farming experience, income, risk and attitude were not significantly related with knowledge. Out of these age and attitude were indicating negative relation but occupation farming experience, risk scientific orientation and attitude were indicating positive direction with knowledge.

**Multiple Regression:**

This analysis was conducted to find out which independent variables are significantly contributing in the knowledge of the farmers of the project area. It was found that attitude, education and risk preference were significant with knowledge and remaining variables were found not significant.

The same analysis was conducted to find out which independent variables were significantly contributing in the knowledge of the farmers of the non-project area. It was found that only two variables; education and land holding were found significant with knowledge. The remaining variables; attitude, scientific orientation, farming expedience, attitude, risk preference, income, occupation, and age were found not significant.
Feedback Mechanism:

The feedback mechanism was of two types; the first was the direct feedback from the farmers. It was difficult to get the actual feedback from the farmers. However, while visiting farmers' field and home, when asked about the performance and impact of the ICAR projects the feedback was provided directly by the farmers as per their own perceptions. It was found that these responses were not very sound. The second way to get feedback was from the KVK staff. The KVK staff who were responsible to implement the ICAR projects were given the feedback regarding the first line projects. These two methods were utilized to get feedback throughout the study period and documented in the study. A number of constraints also faced by the KVK staff for getting feedback from the farmers such as language, communication, remoteness, poor leadership, shyness, lack of proper rapport, transport etc.

Constraints:

More than 72 percent respondents reported that they were not aware about the hill agricultural technologies, 75 percent reported that there was no timely input supply, 82 percent reported that the costs of the input were very high. More than 84 percent respondents reported that there was lack of transportation and 93 percent reported lack of finances. In all there were 18
types of the constraints faced by the respondents. If the planners and policy makers also realize these problems faced by the farmers of the NEH region only then, there is possibility to change the agricultural pattern in the NEH region.

The scientists and KVK staff identified more than 20 constraints hindering the adoption of improved agricultural practices. It was found that lack of input was ranked as the first, untimely supply of input was the second, poor credit system as the third, lack of communication as the fourth, difficult approachability as the fifth, low exposure of mass media as the sixth etc. It is therefore, required to consider these factors in planning and implementing the ICAR or any other central or State Govt. programme.

The KVK staff ranked timely supply of input as the first, sufficient number of experts at the KVK offices as the second, strong supply and support system as the third, stopping sifting cultivation as the fourth, more linkage and coordination with the ICAR and state departments as the fifth, transport facility to the KVK staff as the sixth, more storage and marketing facilities as the seventh and sufficient credit facilities as the eighth factors. In other words, if these facilities are provided, the technologies would not only be transferred but also have significant impact on the socio-economic conditions of the farmers.