IMPACT OF INTEGRATED HORTICULTURAL DEVELOPMENT PROGRAMME IN JUNAGADH DISTRICT OF GUJARAT STATE

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JANUARY - 2006
(Registration No-04-5443-02)
IMPACT OF INTEGRATED HORTICULTURAL DEVELOPMENT PROGRAMME IN JUNAGADH DISTRICT OF GUJARAT STATE

A THESIS SUBMITTED TO JUNAGADH AGRICULTURAL UNIVERSITY IN PARTIAL FULFILMENT AND REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN EXTENSION EDUCATION

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ABSTRACT

Horticulture sector covering only 8.00 per cent of the total crop area in the country, contributes 24.50 per cent of GDP and 54.55 per cent to export earnings in the agriculture sector. Horticulture has become an integral part of food and nutritional security and an essential ingredient of economic security. Adoption of horticulture by small and marginal farmers has brought prosperity in many regions of the country.

Gujarat is one of the fruit producing states in the country. Taking into consideration the importance of horticultural crops and for its rapid development, Government of Gujarat has started separate department of horticulture in 1991. Also the state government had launched a programme named “Integrated Horticultural Development Programme” in eighth five year plan. The main theme behind the programme was to increase the area and production of horticultural crops.

In Junagadh district of Gujarat state Horticultural Development Programme is running successfully since 1991 to increase area and production
of horticultural crops. But Junagadh district has major area under mango crop and farmers are interested to develop mango orchards and due to this, the scheme has introduced a new area for mango orchard development in Junagadh district.

The consequences impact of Integrated Horticultural Development Programme is reflected in terms of the level of knowledge and extent of adoption of mango production technology and attitude of beneficiaries towards Integrated Horticultural Development Programme. Therefore, it is felt worthwhile to investigate the “Impact of Integrated Horticultural Development Programme” with respect to level of knowledge and extent of adoption of respondents about IMPT. Keeping these points in view, this investigation was undertaken with the following specific objectives:

1. To study the personal, socio-economic, psychological and extension communication characteristics of the respondents.
2. To develop a standardized knowledge test to measure the knowledge of respondents about mango production technology.
3. To assess the level of knowledge of the beneficiaries and non-beneficiaries of Integrated Horticultural Development Programme with respect to recommended mango production technology.
4. To develop a standardized adoption index to measure the adoption of respondents about mango production technology.
5. To determine the extent of adoption of the beneficiaries and non-beneficiaries of Integrated Horticultural Development Programme with respect to recommended mango production technology.
6. To develop a standardized attitude scale to measure the attitude of respondents towards Integrated Horticultural Development Programme.
7. To determine the attitude of beneficiaries and non-beneficiaries towards Integrated Horticultural Development Programme.

8. To explore the relational analysis of the selected variables of beneficiaries and non-beneficiaries of the Integrated Horticultural Development Programme.

9. To determine the constraints faced by the beneficiary farmers in taking benefit of Integrated Horticultural Development Programme.

10. To seek the suggestions offered by the beneficiaries and non-beneficiaries for making the Integrated Horticultural Development Programme more effective.

In order to realize the above objectives, total 128 beneficiary farmers were selected purposively from 22 villages of five selected talukas viz., Visavadar, Junagadh, Mendarda, Malia hatina and Una. The same number of non-beneficiary farmers was selected randomly from the respective villages. In order to measure the level of knowledge and extent of adoption of respondents, the standardized scales developed for the purpose were used. The selected independent variables were measured either with the help of developed scale or by developing schedules and indices. The data were collected by personal interview either at home or at farm. The data so collected were coded, classified, tabulated and analyzed in order to make the findings meaningful and are summarized as under:

1. There was a positive and significant difference between the characteristics of BFs and NBFs viz., area under orchard, yield index, annual income, social participation, extension participation, mass media exposure, opinion leadership, overall modernity, innovation proneness, farm mechanization, innovativeness, progressiveness, self confidence, self
responsibility, market intelligence, level of attitude, level of knowledge, and adoption index. In case of education and size of land holding, negative and non-significant difference was found between BFs and NBfs. Two characteristics viz., age and occupation were found similar with the BFs and NBfs respondents.

2. Majority (70.31%) of the BFs had medium level of knowledge about IMPT followed by high (15.63%) and low (14.06%), respectively with mean knowledge score of 28.51. Whereas 68.75 per cent of the NBfs were belonged to medium level of knowledge category followed by low (18.75%) and high (12.50%), respectively with mean score of 19.23 about IMPT. Both the groups differed significantly with each other.

3. The practices like varieties, chemical fertilizers, planting distance, irrigation, disease control, tillage, organic manure, insect-pest control and use of hormones were adopted more than 60.00 per cent by BFs. The less than 60.00 per cent adopted practice was inter cropping. The higher (more than 60.00%) adopted practices of IMPT by NBfs were: chemical fertilizers and variety. The less than 60.00 per cent adopted practices by the NBfs were: planting distance, tillage, organic manure, inter cropping, insect-pest control, irrigation, use of hormones and disease control. The adoption index of BFs was found significantly higher than NBfs.

4. Majority of the BFs (67.97%) and NBfs (64.06%) were medium adopters of IMPT with mean adoption index of 81.10 and 44.41, respectively. Both the groups differed significantly with each other.

5. Majority (71.10%) of the BFs had favourable attitude towards IHDP with 86.20 mean attitude score. Whereas 64.84 per cent of the NBfs had favourable attitude towards IHDP with 56.20 mean attitude score. Both the groups differed significantly with each other.
6. There was a positive and significant association between the knowledge level of BFs about IMPT and their education, yield index, extension participation, mass media exposure, innovation proneness, self confidence, level of attitude and adoption index whereas, age of BFs had negative and significant association with their level of knowledge. In case of NBFs, positive and highly significant association with the level of knowledge about IMPT was observed with extension participation, innovation proneness and adoption index.

7. A positive and significant association was observed between the extent of adoption of BFs about IMPT and their characteristics viz., education, yield index, extension participation, innovation proneness, farm mechanization, level of attitude and level of knowledge whereas, age of BFs had negative and significant association with their adoption index. In case of NBFs, innovation proneness, farm mechanization and level of knowledge were positively and significantly associated with their adoption index.

8. For BFs, nine independent variables contributed towards 61.32 per cent (R² = 0.6132) of the variation in the level of knowledge of BFs about IMPT. The order of contribution of these nine variables in descending order was adoption index, education, self confidence, mass media exposure, age level of attitude, innovation proneness, extension participation and yield index. Incase of NBFs, three independent variables contributed towards 54.77 per cent (R² = 0.5477) of the variation in the level of knowledge of NBFs about IMPT. The order of contribution of these three variables in descending order was adoption index, innovation proneness and extension participation.

9. For BFs, eight independent variables contributed towards 58.56 per cent (R² = 0.5856) of the variation in the extent of adoption of BFs about
IMPT. The order of contribution of these nine variables in descending manner was level of knowledge, level of attitude, extension participation and yield index, innovation proneness, farm mechanization, education and age. Incase of NBFs, four independent variables contributed towards 51.53 per cent ($R^2 = 0.5153$) of the variation in the extent of adoption of NBFs about IMPT. The order of contribution of these three variables in descending order was level of knowledge, extension participation, and farm mechanization and innovation proneness.

10. For BFs, the highest positive and direct effects on the knowledge of BFs about IMPT were exerted by variable adoption index, size of land holding, education and innovation proneness whereas, extension participation had highest total indirect effect followed by mass media exposure, education, level of attitude, occupation, yield index and self confidence. For NBFs, the highest positive and direct effects on the knowledge of BFs about IMPT were exerted by variable adoption index, followed by the area under orchard, innovation proneness and extension participation.

11. The highest positive and direct effects on the extent of adoption of BFs about IMPT were exerted by variable level of knowledge followed by extension participation, level of attitude, occupation. The highest positive and direct effects on the extent of adoption of NBFs about IMPT were exerted by variable education followed by innovation proneness, yield index, size of land holding, farm mechanization, self confidence and progressiveness. The area under orchard, innovation proneness and extension participation whereas, age had highest total indirect negative effect followed by area under orchard.

12. The important constraints faced by the BFs in taking benefit of IHDP were: lack of awareness about recent recommendations of IMPT; insufficient guidance about after care of orchard; lack of publicity about
IHDP; lack of credit facility; insufficient staff of the state department to visit all the BFs; difficult process of getting subsidy; lack of awareness about scheme IHDP and delaying in providing subsidy which is granted.

13. The important suggestions made by the BFs for making IHDP more effective were: lack of awareness about recent recommendations of IMPT; timely guidance should be given about IMPT; there is need to establish market and remunerative minimum prices for horticultural produce by the government; costly horticultural technologies and inputs should be subsidized; extension system should be streamlined to disseminate latest production technologies; there is need of publicity of scheme IHDP for the farmers and credit facilities should be made available for establishment of new mango orchard.
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CERTIFICATE –III

Date: 24/04/2006

This is to certify that the thesis entitled "IMPACT OF INTEGRATED HORTICULTURAL DEVELOPMENT PROGRAMME IN JUNAGADH DISTRICT OF GUJARAT STATE" submitted by ROTADIYA DAXABEN GOVINDBHAI to Junagadh Agricultural University, Junagadh in partial fulfillment of the requirements for the degree of Ph.D. in the subject of Extension Education after recommendation by the external examiner was defended by the candidate before the following members of the examination committee. The performance of the candidate in the oral examination was satisfactory; we therefore, recommend that the thesis be approved.

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This is to certify that KOTADIYA DAXABEN GOVINDBHAI student of Ph.D. (class) Extension Education (Department) has made all corrections/modification in the thesis entitled “IMPACT OF INTEGRATED HORTICULTURAL DEVELOPMENT PROGRAMME IN JUNAGADH DISTRICT OF GUJARAT STATE” as suggested by the external examiner and the advisory committee in the oral examination held on Dt. 24/4/2006 The final copies of the thesis duly bound and corrected have been submitted on 26-4-2006.

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Place: Junagadh. (D.G.Kotadiya)

Date:

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<td>Std.</td>
<td>Standard</td>
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</tbody>
</table>
INTRODUCTION

All the enterprises are interested in increasing the productivity. The agriculture being an enterprise is not an exception to this. Every country feels today an inclination and indispensability for the economic bone of our economy where about 65 per cent of the population depends upon this sector. It supports 70 per cent of the country's population, which contributes 30 to 35 per cent of GDP and generates about 20 per cent of export earnings (Mehta, 1998). It provides employment for approximately 62 per cent of the work force. It also provides fruits to about 960 million population and raw material to several industries (Singh, 2000). Fifty years of Indian agriculture is a history of bagging bown image (food deficit) to green revolution and then to self-sufficiency and now exporting fruits. The various revolutions such as Green, White, Blue, Brown and Red are the most striking success stories of the post independence Era.

India has a wide variety of climate and soils on which a large number of horticultural crops such as fruits, vegetables, tuber crops, mushroom, ornamentals, medicinal and aromatic plants, plantation crops, spices, etc. are grown. Soon after independence, India faced the challenge of providing food security to millions of its people. The government of India has attempted for achieving self-sufficiency in food production especially in cereals. The research and development initiatives taken by the Government of India resulted in Green Revolution in the late 60’s and early 70’s. However, it was only in mid 80’s that the Government of India identified horticulture sector as a means of diversification for making agriculture more profitable through efficient land use, optimum utilization of natural resources and creating skilled
employment for rural masses. Development of horticulture, for which the Indian topography and agro climate are well suited, is an ideal method of achieving sustainability of small holdings.

The tenth plan envisages a four per cent annual growth rate in the agriculture sector. The achievement of this growth rate would be possible, if the annual growth rate of horticulture is maintained at 6 to 8 per cent (Annon., 2001). Being prominent crop after food grains and oil seeds, horticulture will be treated as a lead sector in agriculture and rural development. Horticultural crops give more production per hectare as well as provide employment throughout the year, improve environment and provides large quantity of nutrients. So, horticultural development possesses front position in agriculture sector.

The massive transformation has been possible owing to concentrated efforts in implementing an agricultural strategy that consist of technological breakthrough and their application in agriculture. There has been a great role of agricultural scientists, extension workers as well as hard and dedicated work by Indian farmers and supportive policies of the Government.

Horticultural research and development was at very low ebb until the third five-year plan and received meager attention even thereafter. However, the plan investment in horticultural research and development increased significantly since the seventh five-year plan, which resulted in considerable strengthening of research and development infrastructure. The department of agriculture and co-operation of ministry of agriculture is the nodal department for over viewing horticultural development in the country. The division of
horticulture was separated from the division of crops in 1981 and in 1985; a position of horticulture commissioner was created.

The research and development programme in horticulture have received an impressive support from the Eighth five-year plan onwards. As a result, the research infrastructure has increased manifold with the setting up of a number of new institutes, national research centers in several crops, important both from domestic as well as export point of view. Development of infrastructure in the ministry of agriculture and ministry of commerce has been created to take care of production and trade of important horticultural crops. There has been a significant increase in the budget allocation for horticultural development programmes, which received 40-fold increase from seventh to eighth plan. 10.00 per cent of the ICAR budget and 17.00 per cent of the department of agriculture and co-operation budget is earmarked for horticulture sector in ninth plan.

These efforts coupled with growers’ enthusiasm for horticultural crops have paid rich dividend. Horticulture sector covering only 8.00 per cent of the total crop area in the country, contributes 24.50 per cent of GDP and 54.55 per cent to export earnings in the agriculture sector during eighth plan period. Horticulture has become an integral part of food and nutritional security and an essential ingredient of economic security. It has emerged as an indispensable part of agriculture, offering a wide range of choices to farmers for crop diversification. Adoption of horticulture by small and marginal farmers has brought prosperity in many regions of the country.
There is a growing awareness about the advantages of horticultural crop production, and this is bound to go up with the increase in socio-economic status of the people. Its role in the country’s nutritional security, poverty alleviation and employment generation is becoming increasingly important.

India, today, is the second largest producer of fruits and vegetables in the world contributes 10 and 13.38 per cent of the total world production of fruits and vegetables, respectively. The availability of flowers has increased significantly. India is a treasure house of medicinal and aromatic plants. It is the largest producer, consumer and exporter of spice and spice products in the world. There have been gluts in the production of several important crops. Thus, India is at the brink of a Golden revolution in Horticulture. Resultantly, horticulture has moved from rural confines to commercial venture (Annon., 2001).

Now a days many states have separate department of horticulture and several of these have separate secretaries, commissioners and ministers for horticulture. The horticulture department at centre implements the programme through department of horticulture in all the states and provides the leadership to co ordinate activities for the promotion of horticulture.

Gujarat is one of the fruit producing states in the country. Since 1989-90, all the activities, related to horticultural development were coordinated with the state department of agriculture. Taking in to consideration the importance of horticultural crops and for its rapid development, Government of Gujarat has started separate department of horticulture in 1991. Also the state government had launched a programme named
“Integrated Horticultural Development Programme” in eighth five-year plan. The main theme behind the programme was to increase the area and production of horticultural crops.

At present, the department of horticulture is following this programme successfully in the entire state. Junagadh district is also a fruit-growing region and majority of talukas are taking benefit of this programme.

1.1 STATEMENT OF THE PROBLEM

India is the second largest fruit producer in the world. Out of total cultivated area, fruits occupy about 33 lakh hac. area and 329 lakh tones production. At present in Gujarat, 5.40 per cent of total agricultural land is under horticultural crops (Anon, 2001). The district wise area and production of fruit crops in Gujarat is given in table-1.

Gujarat is one of the fruit producing states in the country and Junagadh district ranks second in the area under fruit crops in Gujarat state. The improvement of the socio-economic status of the peasantry and fulfillment of the nutritional requirement of rural people would be possible only through the expansion of horticultural crops in the area. Realizing this, department of horticulture, Gujarat State has started “Integrated Horticultural Development Programme” (IHDP) to increase the area and production of Horticultural crops since 1990-91.
Table-1: District wise area and production of fruit crops in Gujarat state (2003-04)

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of district</th>
<th>Area (ha.)</th>
<th>Production(M.T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ahmedabad</td>
<td>6771</td>
<td>94093</td>
</tr>
<tr>
<td>2.</td>
<td>Amreli</td>
<td>7333</td>
<td>50736</td>
</tr>
<tr>
<td>3.</td>
<td>Banaskantha</td>
<td>2470</td>
<td>21709</td>
</tr>
<tr>
<td>4.</td>
<td>Bharuch</td>
<td>10400</td>
<td>335311</td>
</tr>
<tr>
<td>5.</td>
<td>Narmada</td>
<td>4812</td>
<td>172208</td>
</tr>
<tr>
<td>6.</td>
<td>Bhavnagar</td>
<td>19519</td>
<td>167672</td>
</tr>
<tr>
<td>7.</td>
<td>Dang</td>
<td>467</td>
<td>2205</td>
</tr>
<tr>
<td>8.</td>
<td>Gandhinagar</td>
<td>5080</td>
<td>51218</td>
</tr>
<tr>
<td>9.</td>
<td>Jamnagar</td>
<td>1776</td>
<td>20315</td>
</tr>
<tr>
<td>10.</td>
<td>Junagadh</td>
<td>26200 (II)</td>
<td>208897</td>
</tr>
<tr>
<td>11.</td>
<td>Porbandar</td>
<td>1057</td>
<td>7290</td>
</tr>
<tr>
<td>12.</td>
<td>Kutch</td>
<td>18920</td>
<td>173413</td>
</tr>
<tr>
<td>13.</td>
<td>Kheda</td>
<td>7284</td>
<td>96017</td>
</tr>
<tr>
<td>14.</td>
<td>Anand</td>
<td>22947</td>
<td>631838</td>
</tr>
<tr>
<td>15.</td>
<td>Mehsana</td>
<td>12210</td>
<td>105677</td>
</tr>
<tr>
<td>16.</td>
<td>Patan</td>
<td>1038</td>
<td>8841</td>
</tr>
<tr>
<td>17.</td>
<td>Panchmahal</td>
<td>1970</td>
<td>15674</td>
</tr>
<tr>
<td>18.</td>
<td>Dahod</td>
<td>1100</td>
<td>6430</td>
</tr>
<tr>
<td>19.</td>
<td>Rajkot</td>
<td>1383</td>
<td>10156</td>
</tr>
<tr>
<td>20.</td>
<td>Sabarkantha</td>
<td>10885</td>
<td>111758</td>
</tr>
<tr>
<td>21.</td>
<td>Surat</td>
<td>22900</td>
<td>581849</td>
</tr>
<tr>
<td>22.</td>
<td>Surendranagar</td>
<td>2750</td>
<td>23377</td>
</tr>
<tr>
<td>23.</td>
<td>Baroda</td>
<td>14930</td>
<td>296383</td>
</tr>
<tr>
<td>24.</td>
<td>Valsad</td>
<td>29805 (I)</td>
<td>164687</td>
</tr>
<tr>
<td>25.</td>
<td>Navsari</td>
<td>17565</td>
<td>133155</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>251568</strong></td>
<td><strong>3550709</strong></td>
</tr>
</tbody>
</table>

Source: Directorate of Horticulture, Gandhinagar

In Gujarat state, production of mango fruit is 4.57 lakh metric tones from an area of 65.27 thousand hectares. It is more than 50.00 per cent of the total area under fruit crops in the state. (Annon., 2002).

Balsar, Junagadh, Surat, Baroda, Mehsana and Bhavnagar are the predominant mango growing districts of Gujarat state.
Junagadh is the second largest district in the state having 96,456 tones annual production from an area of 13,448 hectares and productivity is about 7.173 tones/hectare. (Anon., 2002)

In Junagadh district of Gujarat state Integrated Horticultural Development Programme is running successfully since 1991 to increase area and production of horticultural crops. But Junagadh district has major area under mango crop and farmers are interested to develop mango orchards and due to this, the scheme has introduced a new area for mango orchard development in Junagadh district.

The success of any development programme depends on degree of involvement of the farmers in the programme. But involvement of the farmers always depends on the feasibility of the programme.

Integrated Horticultural Development Programme, as a major plan of new strategy of horticultural production was introduced with the assumption that its wide spread impact will generate a dynamic spark resulting in to the economic revolution among the farming community.

The consequences impact of Integrated Horticultural Development Programme is reflected in terms of the level of knowledge and extent of adoption of mango production technology and attitude of beneficiaries towards Integrated Horticultural Development Programme. Therefore, it is felt worthwhile to take up the present study entitled “Impact of Integrated Horticultural Development Programme”. The important questions involved in the study are:
1. Which are the factors associated with the level of knowledge, extent of adoption and attitude of beneficiaries and non-beneficiaries towards IHDP?

2. Which are the factors responsible for variation in the level of knowledge, extent of adoption and attitude of beneficiaries and non-beneficiaries towards IHDP caused by independent variables?

3. Which are the suggestions offered by the beneficiaries and non-beneficiaries for making the IHDP more effective?

1.2 OBJECTIVES OF THE STUDY

The general objective of the study was to assess the impact of Integrated Horticultural Development Programme on level of knowledge, extent of adoption and attitude of farmers towards IHDP. In view of the main objective following specific objectives are formulated:

11. To study the personal, socio-economic, psychological and extension communication characteristics of the respondents.

12. To develop a standardized knowledge test to measure the knowledge of respondents about mango production technology.

13. To assess the level of knowledge of the beneficiaries and non-beneficiaries of Integrated Horticultural Development Programme with respect to recommended mango production technology.

14. To develop a standardized adoption index to measure the adoption of respondents about mango production technology.
15. To determine the extent of adoption of the beneficiaries and non-beneficiaries of Integrated Horticultural Development Programme with respect to recommended mango production technology.

16. To develop a standardized attitude scale to measure the attitude of respondents towards Integrated Horticultural Development Programme.

17. To determine the attitude of beneficiaries and non-beneficiaries towards Integrated Horticultural Development Programme.

18. To explore the relational analysis of the selected variables of beneficiaries and non-beneficiaries of the Integrated Horticultural Development Programme.

19. To determine the constraints faced by the beneficiary farmers in taking benefit of Integrated Horticultural Development Programme.

20. To seek the suggestions offered by the beneficiaries and non-beneficiaries for making the Integrated Horticultural Development Programme more effective.

1.3 SIGNIFICANCE OF THE PROBLEM

There is hardly any study so far conducted and reported on this important aspect in Saurashtra region of the Gujarat state. Hence, this study will confine to investigate the impact of Integrated Horticultural Development Programme. The study will attempt to know the personal, socio-economic, psychological and extension communication characteristics of farmers. The results of the study will be most useful to planner; administrator and extension functionaries for restructuring and reframing the management approach in right direction. The finding of this study will certainly
be of much helpful to the administrator and field workers, while developing and implementing the new programme for benefit of the rural farmers.

1.4 LIMITATIONS OF THE STUDY

1. However, all the possible precautions will be taken to make the study precise, specific and reliable, yet because with the single investigator the study was restricted to Junagadh district of Gujarat state only.

2. The study was based on prevailing situation of individual perception and expressed opinion of the respondents.

3. Only some of the characteristics of the respondents were studied.
CHAPTER - 2

REVIEW OF LITERATURE

The purpose of this chapter is to review the literature related to the problem under study.

There are not enough studies directly concerning to the present investigation. A comprehensive review of literature is an essential part of any scientific investigation. Its main purpose apart from determining the work done in past and assisting in delineation of problem area, are to provide a basis for theoretical frame work, to provide an insight in to methods and procedures, to suggest operational definitions of major concepts and to provide a basis for interpretation of findings. With this background and keeping the objectives of the study in mind, the available related literature was reviewed and discussed under following heads.

2.1 CHARACTERISTICS OF THE RESPONDENTS

2.1.1 Age

Chothe (1983) found that majority (54 and 52 per cent) of the ND and non-ND farmers were from the middle age group.

Mayani (1987) revealed that the mean year of age of large and small groundnut growers was 43.45 and 40.05 years, respectively.

Karkar (1998) reported that the mean age of beneficiaries and non-beneficiaries was 45.80 and 47.03, respectively.

Jadav (2001) revealed that more than half (55.33 per cent) of the onion growers were in middle age group, where as 24.17 and
22.50 per cent of the respondents were young and old age group, respectively.

Jahagirdar And Sundaraswamy (2003) revealed that 54.00 per cent of the respondents were old followed by middle age (30.00%) and young (16.00%), respectively.

Chauhan et al. (2003) stated that majority (63.75%) of the respondents had middle age followed by young age (26.25%) and old age (10.00%).

Gakkhar et al. (2003) inferred that majority of the beneficiaries (52.60%) and non-beneficiaries (52.40%) were of young age group. Almost equal number of beneficiaries and non-beneficiaries were middle and old age group.

Javiya (2004) reported that nearly three fifth of the groundnut growers (61.00%) belonged to middle age group followed by 26.00 per cent and 13.00 per cent of the respondents belonged to young and old age group, respectively.

Shahoo (2004) revealed that 52.50 per cent of the respondents were middle aged, where as 25.84 per cent and 21.65 per cent of the respondents belonged to old and young age group, respectively.

Savaliya (2004) concluded that more than half (51.56 per cent) of the cattle owners were in middle age group, where as 25.83 and 22.50 per cent of the respondents were old and young age group, respectively.
2.1.2 Education

Patel (1981) stated that majority (50 and 58 per cent) of the respondents from trained and untrained groups, respectively had primary education; whereas 36.00 per cent and 27.00 per cent of the respondents had secondary education.

Gorfad (1993) observed that 52.00 per cent of the mango growers were educated up to secondary level, whereas 17.00 per cent and 31.00 per cent of the mango growers were illiterate and educated up to primary level, respectively.

Rakholia (1996) reported that the mean educational level of beneficiaries and non-beneficiaries of the watershed development programme was 6.33 and 4.00, respectively, which differed significantly.

Chothani (1999) stated that 38.00 per cent of the mango growers were educated up to primary level, whereas 30.00 per cent of them were educated up to secondary school level, 17.00 per cent were illiterate and 15.00 per cent were educated up to higher secondary and college level.

Jadav (2001) inferred that 50.00 per cent of the respondents were educated up to secondary level, whereas 35.83 per cent of them were educated up to primary level and 14.16 per cent were educated above the secondary level.

Gohil (2002) summarized that more than half (53.00 %) of the cattle owners were educated up to primary level, whereas 23.33 per cent of the respondents were educated up to secondary level, 15.00 per cent were illiterate and only 8.34 per cent of the respondents were educated above higher secondary level.
Chauhan et al. (2003) reported that a great majority of the poultry entrepreneurs (91.25%) had high school and higher level of education followed by primary level of education (8.75%).

Jahagirdar And Sundaraswamy (2003) revealed that 44.00 per cent of the respondents were of primary education category and only 4.00 per cent were illiterates.

2.1.3 Occupation

Bhoite and Barve (1984) revealed that the main occupation of the respondent farmers was farming.

Patel (1988) found that majority of respondents were having agriculture as their main occupation.

Pandya (1991) stated that the majority (72.97 %) of the farmers were engaged in farming only. However, 18.02 per cent of the respondents had farming plus business and 9.01 per cent had farming plus service as their main occupation, while none of them had service and business alone as their main occupation.

Shinde et al. (1998) reported that majority (75.00 per cent) of the respondents were engaged in agriculture and dairying as their occupation followed by 25.00 per cent were dependent on labour and dairying.

Prakash et al. (2003) concluded that a great majority (79.00) of the respondents had agriculture as their main occupation.
2.1.4 Size of land holding

Patel (1988) concluded that majority (40.00%) of the respondents had small size of land holding followed by medium size of land holding (36.67%).

Singh et al. (1991) found that majority of the farmers (82.86%) growing fruit crops had more than two hectare of land. However, only 1.43 per cent marginal farmers and 15.71 per cent small farmers had dry land fruit cultivation.

Prakash et al. (2003) opined that majority (35.00%) of the respondents had small size of land holding followed by marginal (25.00%), medium (24.00%) and large (16.00%) size of land holding, respectively.

Barad (2004) observed that more than half (54.17 per cent) of the garlic growers had medium size of land holding where as, 27.50 per cent and 18.33 per cent of the respondents possessed small and large size of land holding, respectively.

Javiya (2004) revealed that 32.00 per cent and 29.00 per cent of the groundnut growers had medium (2.1 to 4.0ha.) and large size (above 4.0ha) of land holding, respectively. The respondents with small (1.1 to 2.0ha.) and marginal (up to 1.0ha.) land holding were 26.00 per cent and 13.00 per cent, respectively

2.1.5 Area under mango orchrd

Mathiyazhagan and Singh (1986) revealed that majority of the banana growers had higher acreage under banana.
Chothani (1999) concluded that majority (56.00%) of the mango growers had medium area under mango orchard.

Solanki (2004) found that one half (50.00%) of the mango orchard growers had medium area under mango orchard followed by large (38.37%) and small (11.67%) area under mango orchard.

2.1.6 Mango yield index

Gorfad (1993) stated that 76.00 per cent pf the respondents had medium mango yield index, whereas 12.00 per cent and 12.00 per cent had low and high mango yield index, respectively.

Dangar (1996) revealed that majority (60.00%) of the chiku growers had medium yield index. While, 24.00 per cent and 16.00 per cent of the respondents had low and high chiku yield index, respectively.

Chothani (1999) opined that majority (63.00%) of the mango growers had medium mango yield index followed by high (21.00%) and low (16.00%) mango yield index.

2.1.7 Annual income

Ingle and Kude (1991) observed that majority (68.23%) beneficiary farmers of comprehensive watershed development programme had an annual income below Rs. 6000 followed by 23.08 per cent having an annual income Rs.6001 to 12000.

Patel (1991) reported that about half (47.14%) of the beneficiary farmers of WDP were having annual income Rs. 20001 and above.
Kanani (1998) found that about one third of the groundnut growers had annual income of Rs.30000 to 40000 and about three fourth of the respondents were from middle income group.

Verma (2000) revealed that 44.53 per cent of the respondents belonged to the annual income group of Rs. 20001 to 40000, while 28.51 per cent and 23.05 per cent of the respondents belonged to the income group of more than Rs.40000 and Rs.10001 to 20000, respectively. Only 3.91 per cent of the respondents fall in the income group up to Rs.10000.

Jadav (2001) inferred that 46.67 per cent of the onion growers belonged to medium annual income group, while 23.23 per cent and 30.00 per cent of the onion growers fall in to low and high annual income group, respectively.

Jahagirdar And Sundaraswamy (2003) revealed that nearly half (48.00%) of the respondents were in above Rs.33000 annual income category followed by 24.00 per cent of respondents in Rs.11000 to Rs.22000. Only 10.00 per cent of farmers were in the annual income category of up to Rs.11000.

Barad (2004) concluded that 47.50 per cent of garlic growers belonged to medium annual income group, while 22.50 per cent and 30.00 per cent of the garlic growers fall in to low and high annual income group, respectively.

2.1.8 Social participation

Purohit (1981) revealed that 58.33 per cent of the groundnut growers had low social participation.
Pichori and tripathi (1983) indicated that 36.00 per cent of the contact farmers had no social participation and another 36.00 per cent were the member of the organization only. Similarly, amongst the non contact farmers, 66.00 per cent were not member of any organization.

Amir (1996) revealed that 71.67 per cent of the summer groundnut growers had medium social participation followed by high (13.33 per cent) participation while 15.00 per cent had low social participation.

Kanani (1998) indicated that majority (66.67%) of the respondents had medium social participation where as, only 11.67 per cent of the respondents had low social participation.

Barad (2004) concluded that 61.67 per cent of the garlic growers had medium social participation followed by high (23.33%) and low social participation (15.00%), respectively.

Javiya (2004) inferred that majority (68.00%) of the respondents had medium social participation followed by low (19.00%) social participation, where as only 13.00 per cent of the respondents had high social participation.

2.1.9 Extension participation

Mayani (1987) revealed that the mean extension participation index of large and small farmers was 38.78 per cent and 41.76 per cent, respectively.

Rakholia (1996) observed that the mean extension participation index of beneficiaries and non beneficiaries was 21.35 and 7.68 , respectively. The mean difference was 13.67.
Chothani (1999) found that majority (72.00%) of the respondents had medium extension participation followed by low (15.00%) and high (13.00%), respectively.

Sagwal et al. (2000) reported in their study that majority of the respondents (52 per cent) received information from krushi mela.

Chhodvadiya (2001) found that 84.62 per cent of the demonstrator and 71.15 per cent of the non-demonstrator respondents belonged to medium extension participation. 9.61 per cent and 3.85 per cent demonstrator and non-demonstrator respondents fall in high extension participation group, respectively. The rest of 5.77 per cent and 25.00 per cent of demonstrator and non-demonstrator respondents fall in low extension participation group, respectively.

Jahagirdar and Sundaraswamy (2003) revealed that majority (70.00%) of the respondents had low extension participation followed by 30.00 per cent had high extension participation.

Javiya (2004) revealed that 69.00 per cent of the respondents had medium extension participation, where as 18.00 per cent and 13.00 per cent of the respondents had high and low extension participation, respectively.

2.1.10 Mass media exposure

Jassi et al. (1998) revealed that half of the respondents (50.00%) had medium level of mass media exposure followed by 42.00 per cent and 8.00 per cent had high and low mass media exposure, respectively.
Chauhan et al. (2003) revealed that 58.75 per cent of the respondents had medium level of mass media exposure followed by low (23.75%) and high (17.50%) level of mass media exposure.

2.1.11 Opinion leadership

Dahama (1967) reported that leaders who belonged to higher caste groups were mostly better adopter and could serve as important source of information.

Bhalara (1981) concluded that majority (65.00%) of the contact farmers had high opinion leadership while only 35.00 per cent of them had low opinion leadership.

Rakholia (1996) revealed that the mean score of opinion leadership of beneficiary farmers and non-beneficiary farmers was 3.78 and 1.53, respectively. The mean difference was 2.25.

2.1.12 Overall modernity

Gaikwad (1985) indicated that majority of the respondents (90.00%) had medium overall modernity followed by 5.72 per cent of the respondents with high overall modernity, while 4.28 per cent of the respondents had low overall modernity.

Patel (1991) concluded that majority (59.65%) of the respondents in watershed area were having medium overall modernity followed by 22.28 per cent and 18.57 per cent farmers with high and low overall modernity level, respectively.

Rakholia (1996) revealed that the mean score of overall modernity of the BF and NBFs was 27.45 and 21.80, respectively. The mean difference was 5.65.
Karkar (1998) inferred that the mean score of overall modernity of beneficiary farmers and non-beneficiary farmers was 20.22 and 16.72, respectively. The mean difference was 3.50.

### 2.1.13 Innovation proneness

Patel (1991) found that majority (63.81%) of the farmers of WDP having medium innovation proneness followed by 20.35 per cent and 15.24 per cent farmers had high and low innovation proneness, respectively.

Thakrar (1998) reported that 50.50 per cent of the respondents were fall under medium innovation proneness category followed by high (26.50%) and low (23.00%) innovation proneness category.

### 2.1.14 Farm mechanization

Patel (1995) indicated that the mean farm mechanization index of demonstrator and non-demonstrator groundnut growers was 62.93 per cent and 60.97 per cent, respectively.

Verma (2000) revealed that majority (76.56%) of the respondents belonged to the category of medium farm mechanization, whereas 12.89 and 10.55 per cent in the category of low and high group, respectively. The mean difference was 6.13.

### 2.1.15 Innovativeness

Kanani (1998) concluded that about half of the respondents had medium innovativeness, while about one third (38.33 per cent) of the respondents had low innovativeness.
Jamatia (1999) revealed that 40.00 per cent of the respondents had medium level of innovativeness followed by 43.30 per cent with low and only 10.70 per cent had high level of innovativeness.

Sravanakumar (2000) reported that farm women in general had high level of innovativeness. About 70.00 per cent of the participants had high level of innovativeness and 19.72 per cent had low level of innovativeness.

Palmurugan (2002) stated that majority (87.80%) of the farm women had medium level of innovativeness followed by 10.80 per cent and 1.40 per cent of the farm women who had low and high levels of innovativeness, respectively.

2.1.16 Progressiveness

Manju (1996) concluded that about one half of the respondents were progressive while about 20.00 per cent of the respondents had low level of progressiveness and 30.00 per cent had high level of progressiveness.

Shahoo (2004) revealed that 45.00 per cent of the respondents belonged to the medium progressive group, whereas 25.00 per cent and 30.00 per cent of them had high and low progressiveness, respectively.

2.1.17 Self-confidence

Krishna (1992) found that empowerment means to develop a capacity to face challenges of modern life by improvement in skills, comprehension and attitude, which in turn will help to inculcate self confidence and value judgment.
Jayalakshmi (1995) stated that nearly one third of the farm women were having low level followed by an equal percentage in medium (36.00%) and high level (36.44%) of self confidence.

2.1.18 Self responsibility

Krishna (1992) opined that empowerment making women generally aware of all facts of life economically independent, courageous enough to do what they think right and be responsible for their own life and living besides running their family.

2.1.19 Market intelligence

Ramaswamy and Namakurari (1980) defined market potential as a quantitative element of the total possible sales by all the firms selling the product in a given market. It indicated of the maximum demand or the ultimate potential for the product assuming that the ideal marketing effort was made.

Prajapati and Patel (2000) revealed that nearly two third of the potato growers (65.00%) were found in medium category of market orientation. Remaining 19.00 per cent and 16.00 per cent of the potato growers were of high and low category of market orientation, respectively.

Javiya (2004) concluded that 62.00 per cent of the groundnut growers were found in medium category of market orientation followed by low (21.00%) and high (17.00%), respectively.

2.1.20 Attitude

Shukla (1985) found that a good majority (80.00%) of beneficiary tribal farmers had favourable attitude, whereas majority
of non beneficiary tribal farmers had neutral attitude towards the utility of agricultural development programme.

Rakholia (1996) observed that majority of the BFIs (66.77%) and NBFIs (68.34%) had favourable attitude towards WDP.

Thakarar (1998) found that 65.50 per cent of the respondents having favourable attitude followed by nearly equal (18.00% and 16.50%) of the respondents having less and highly favourable attitude towards well recharging, respectively.

Desai et al. (2001) reported that the majority (66.86 per cent) of the mango orchard growers had moderately favourable attitude towards drip irrigation system, followed by 18.28 per cent respondents with less favourable attitude.

Bhople and Borkar (2002) revealed that majority of the farmers (83.33%) have neutral feelings about bio fertilizers followed by 24.67 per cent of respondents have favourable and unfavourable attitude towards bio fertilizers.

2.1.21 Knowledge

Nimje et al. (1990) observed that majority (60.00%) of the respondents were having medium knowledge of the different dry land cotton technology. Only 21.00 per cent and 19.00 per cent of the respondents were having high and low level of knowledge, respectively.

Rakhola (1996) reported that majority of the BFIs and NBFIs had medium level of knowledge about soil water conservation measures.
Gakkhar et al. (2003) inferred that majority of beneficiaries (60.00%) had higher level of knowledge, whereas 43.40 per cent of the non-beneficiaries had lower level of knowledge.

Lakhera and Sharma (2003) studied that 1.87, 66.88 and 31.25 per cent of BFs possessed low, medium and high level of knowledge, respectively. Whereas, 21.87, 75.63 and 2.50 per cent of the NBFs possessed low, medium and high level of knowledge, respectively about improved mustard production technology.

Patel et al. (2003) stated that majority (70.87%) of the onion growers possessed medium level of knowledge followed by low (16.50%) and high (12.63%) level of knowledge, respectively.

2.1.22 Adoption

Karkar (1998) observed that 58.89%, 21.11% and 20.00% of the BFs were medium, low and high adopters of rain fed agro technology, respectively. In case of NBFs 71.11%, 15.56% and 13.33% of the NBFs were medium, low and high adopters of rain fed agro technology, respectively.

Ranganathan et al. (2001) found that nearly half (49.00%) of the farmers were medium adopters while 30.00 per cent and 21.00 per cent of the respondents were low and high adopters of organic farming practices in rice cultivation.

Lakhera and Sharma (2003) reported that 6.88, 58.75 and 34.37 per cent of BFs had low, medium and high extent of adoption, respectively. While, among NBFs, 33.75, 61.25 and 5.00 per cent had low, medium and high extent of adoption, respectively about improved mustard production technology.
Prakash et al. (2003) inferred that majority (64.00%) of the respondents belonged to the category of medium adoption index followed by high (20.00%) and low (16.00%) adoption index, respectively about rice production technology.

Singh (2003) observed that 50.00 per cent of farmers belonged to low adoption category, 44.05 per cent had medium adoption and only 5.95 per cent of the farmers belonged to higher adoption category.

2.2 RELATIONAL ANALYSIS OF SELECTED VARIABLES

2.2.1 Age and knowledge

Rakholia (1996) inferred that age of BFs and NBFs of WDP had non-significant association with their level of knowledge.

Karker and Munshi (2003) reported that there was a non-significant association between age and level of knowledge of BFs and NBFs.

2.2.2 Education and knowledge

Nandvana (1993) stated that there was no relationship between the well recharge adopters’ extent of knowledge of water conserving practices and education.

Rakholia (1996) reported that in case of BFs the increasing education had influence on the level of knowledge about soil water conservation, while in case of NBFs the increasing education had no influence on knowledge about soil water conservation.
Karker and Munshi (2003) observed that there was positive and significant association between level of knowledge of BFs and NBFs about rainfed agro technology and their education.

Patel et al. (2003) reported that there was a positive and significant association between the knowledge of the respondents about onion cultivation and their education.

### 2.2.3 Occupation and knowledge

Murthy (1990) reported that occupation did not show significant relationship with the level of knowledge of cotton growers about cotton cultivation technology.

Gajera (1991) inferred that there was a positive and highly significant association between respondents’ extent of knowledge about improved animal husbandry practices and occupation.

Rakholia (1996) pointed out that the occupation of BFs and NBFs had non-significant association with their level of knowledge.

### 2.2.4 Size of land holding and knowledge

Nandvana (1993) concluded that there was no relationship between extent of knowledge of respondents about water conserving practices and their land holding.

Rakholia (1996) inferred that the size of land holding of BFs and NBFs of WDP had non significant association with their level of knowledge.

Jadav et al. (2003) stated that there was no relationship between extent of knowledge of respondents about onion cultivation and their land holding.
2.2.5 Yield index and knowledge

Mayani (1987) summarized that the extent of knowledge of large groundnut growers and their groundnut yield index were positively and significantly associated.

Gorfad (1993) stated that the association of extent of knowledge of mango growers with their mango yield index was non-significant.

Dangar (1996) concluded that there was no association between chiku growers’ extent of knowledge and their yield index.

2.2.6 Annual income and knowledge

Gosai (1997) opined that there was a positive and significant relationship between annual income of the trained and un-trained respondents and their knowledge about groundnut production technology.

Patil et al. (1998) reported that there was a positive and significant correlation between annual income with their knowledge about kagji lime production technology.

Bhatt (2002) concluded that there was a positive and significant association between annual income and knowledge level of farm women.

2.2.7 Social participation and knowledge

Nandvana (1993) concluded that there was no relationship between extent of knowledge of respondents about water conserving practices and their social participation.
Rakholia (1996) observed that there was positive and significant association between level of knowledge of BF's and their social participation.

Patil et al. (1998) reported that there was a positive and significant correlation between social participation with their knowledge about kagji lime production technology.

2.2.8 Extension participation and knowledge

Karkar (1998) concluded that there was a positive and significant correlation between knowledge level of BF's and NBF's and their extension participation index.

Patel et al. (2003) reported that there was a positive and significant association between the knowledge of the respondents about onion cultivation and their extension participation.

2.2.9 Mass media exposure and knowledge

Patel et al. (2003) reported that there was a positive and significant association between the knowledge of the respondents about onion cultivation and their mass media exposure.

2.2.10 Opinion leadership and knowledge

Rakholia (1996) found that the level of knowledge of BF's and NBF's had positive and significantly associated with their opinion leadership.
2.2.11 Overall modernity and knowledge

Rakholia (1996) concluded that the level of knowledge of BFś and NBFś had positive and significant correlation with their overall modernity.

Karker and Munshi (2003) reported that there was a non-significant association between the overall modernity and level of knowledge of BFś and NBFś about rainfed agro technology.

2.2.12 Innovativeness and knowledge

Patil et al. (1998) reported that there was a positive and significant correlation between innovativeness with their knowledge about kagji lime production technology.

2.2.13 Attitude and knowledge

Karkar (1998) found that there was positive and significant correlation between attitude and level of knowledge of BFś.

2.2.14 Adoption index and knowledge

Karkar (1998) revealed that there was a positive and highly significant correlation between knowledge level of BFś and NBFś and their adoption index.

Kalasker et al. (1999) revealed that there was a significant correlation of adoption of IPM practices by the farmers with the knowledge level.

Prakash et al. (2003) revealed that the knowledge was found highly significant and positively correlated with extent of adoption of rice production technology.
Patel et al. (2003) reported that there was a positive and significant association between the knowledge of the respondents about onion cultivation and their attitude towards farm practices.

**2.2.15 Age and adoption**

Kher (1992) reported that there was no relationship between age and adoption of improved wheat cultivation technology.

Ranganathan et al. (2001) opined that there was a non-significant correlation between age and the adoption level of farmers about organic farming in rice cultivation.

**2.2.16 Education and adoption**

Patel (1995) inferred that there was a positive and significant association between education of respondents and their extent of adoption of watershed management technology.

Chaudhary et al. (2001) highlighted the positive and significant association between education of respondents and adoption of improved rice cultivation technology.

Singh (2002) reported that education had positive and significant relationship with adoption of pulse crops in arid zone.

Singh (2003) revealed that there was a positive and significant correlation between education of respondents and adoption of bajra production technology.
2.2.17 Occupation and adoption

Christain *et al.* (2003) concluded that there was a positive and significant correlation between occupation of respondents and adoption of IPM by cotton growers.

2.2.18 Size of land holding and adoption

Balavatti and Sunderaswami (1990) reported that there was a positive and significant relationship between farm size and their adoption.

Kalasker *et al.* (1999) revealed that there was a significant correlation of size of land holding with the adoption of IPM practices by the farmers.

Ranganathan *et al.* (2001) opined that there was a non-significant correlation between size of land holding and the adoption level of farmers about organic farming in rice cultivation.

2.2.19 Area under orchard and adoption

Waghmare (1989) concluded that farm size was significantly associated with the adoption of banana cultivation technology.

Pandya and Vekaria (1994) reported that the land holding was significantly associated with adoption of banana cultivation technology.

Dangar (1996) stated that there was no association between chiku growers’ extent of adoption and their area under orchard.
2.2.20 Yield and adoption

Gosai (1997) revealed that there was a positive and significant association between yield of groundnut crop by trained and untrained respondents and their extent of adoption.

Bhatt (2002) found that there was a positive and significant association between yield of wheat crop by trained and untrained respondents and their extent of adoption about wheat production technology.

2.2.21 Annual income and adoption

Chaudhary et al. (2001) highlighted the positive and significant association between annual income of respondents and adoption of improved rice cultivation technology.

Christain et al. (2003) concluded that there was a positive and significant correlation between annual income of respondents and adoption of IPM by cotton growers.

Singh (2003) revealed that there was a positive and significant correlation between annual income of respondents and adoption of bajra production technology.

2.2.22 Social participation and adoption

Chaudhari et al. (1996) observed that the social participation was positively and significantly correlated with the adoption of soil analysis practices by farmers.

Bhatt (2002) inferred that social participation was associated significantly with the adoption of improved wheat production technology in case of trained respondents. While in case of
untrained respondents, social participation was not associated with their extent of adoption.

2.2.23 Extension participation and adoption

Pandya (1991) inferred that the respondents’ extent of adoption of farm technology was positively and significantly associated with their extension participation.

Ranganathan et al. (2001) opined that there was a positive and significant correlation of extension participation with the adoption level of farmers about organic farming in rice cultivation.

Bhatt (2002) indicated that extent of adoption of trained respondents was significantly associated with their extension participation. While non-significant but positive association was observed in case of untrained respondents.

2.2.24 Mass media exposure and adoption

Singh (2002) reported that mass media exposure of respondents had positive and significant relationship with adoption of pulse crops in arid zone.

Christain et al. (2003) concluded that there was a positive and significant correlation between mass media exposure of respondents and adoption of IPM by cotton growers.

Singh (2003) revealed that there was a positive and significant correlation between mass media exposure of respondents and adoption of bajra production technology.
2.2.25 Overall modernity and adoption

Patel (1991) reported that there was no significant relationship between overall modernity of the farmers with their extent of adoption of improved farm technology.

2.2.26 Innovation proneness and adoption

Ranganathan et al. (2001) opined that there was a positive and significant correlation of innovation proneness with the adoption level of farmers about organic farming in rice cultivation.

2.2.27 Innovativeness and adoption

Kalasker et al. (1999) revealed that there was a significant correlation of innovativeness with the adoption of IPM practices by the farmers.

2.2.28 Level of attitude and adoption

Patel (1995) stated that farmers’ attitude towards WDP was found to be positively and significantly related with their extent of adoption of new agricultural technology.

2.2.29 Extent of variation in level of knowledge of farmers caused by selected independent variables

The information about association of independent variables with level of knowledge will not provide the extent of variation caused by them. The information about the extent of variation is useful for predicting the relative contribution of the independent variables.
Sakaria (1991) reported that the six out of twelve independent variables jointly contributed towards 16.98 per cent ($R^2 = 0.1698$) of the variation in the knowledge level of the respondents. The six variables were: age, training received, size of family, ratio of female to the total number of family members, size of land holding and social participation.

Vanparia (1994) indicated that eight out of thirteen independent variables jointly contributed towards 76.83 per cent ($R^2 = 0.7683$) of the variation in the information gap with respect to groundnut production technology. The adoption index occupied first rank followed by yield index, locality-cosmopolite value orientation, innovation proneness, education, operational size of land holding and communication behaviour.

Rakholia (1996) stated that eleven out of fifteen independent variables jointly contributed towards 62.98 per cent ($R^2 = 0.6298$) of the variation in the knowledge level of BF's. The locality-cosmopolite value orientation, adoption index occupied first rank followed by extension participation, extension contact, social participation, education, attitude, cropping intensity, opinion leadership, overall modernity, technological gap and employment status.

### 2.2.30 Extent of variation in level of adoption of farmers caused by selected independent variables

Nikhade et al. (1992) concluded that fifteen independent variables jointly contributed towards the adoption of improved practices of soybean to the extent of 28.65 per cent ($R^2 = 0.2865$). Among these variables, socio-economic status, risk preference, and extension contact exhibit higher adoption behaviour of the improved practices of soybean.
Patel (1995) reported that seven out of total thirteen independent variables jointly contributed towards 90.91 per cent ($R^2 = 0.9091$) of the variation in the extent of adoption of DGGs about GPT. The variation in order was: knowledge index, extension participation index, social participation, education, yield index, risk preference and farm mechanization index.

Karkar (1998) reported that nine out of total fourteen independent variables jointly contributed towards 76.21 per cent ($R^2 = 0.7621$) of the variation in the extent of adoption of BFIs about RAT. The variation in order were: knowledge index, irrigation potentiality, cropping intensity, social participation, production, training received, extension participation index, level of attitude and education.
CHAPTER - 3

THEORETICAL ORIENTATION

This chapter is devoted to the development of theoretical orientation for the study. The review of literature related to the problem of this study given in the preceding chapter helped in formulating theoretical orientation and guidance for selection of variables for the study and operationalization of the concepts. The chapter has been divided and presented in the following sections:

3.1 Conceptual framework

3.2 The paradigm

3.3 Definitions of some common terms

3.4 Derivation of hypotheses

3.1 CONCEPTUAL FRAMEWORK OF THE STUDY

Gujarat is one of the fruit producing states in country and Junagadh district ranks second in the area under fruit crops in Gujarat state. To increase the area and production of horticultural crops and ultimately to improve the socio-economic status of the peasantry and to fulfill the nutritional requirement of the rural people, the government of Gujarat has started the scheme “Integrated Horticultural Development Programme (IHDP)”. Under this programme, efforts are being made to increase the area and production of horticultural crops such as mango, ber, custard apple, guava, coconut, etc. As mango is the major fruit crop in Junagadh district, efforts are being made to educate the farmers about improved mango production technology under this
programme. Through this motivation it would be assumed that knowledge of the beneficiary farmers about improved mango production technology can be increased and extent of adoption of beneficiary farmers with respect to improved mango production technology can be increased. It is also assumed that attitude can be changed from unfavourable to favourable towards IHDP. The various factor especially the personal, socio-economic, extension communication and psychological factors have great influence on the knowledge and adoption of beneficiary farmers towards IHDP.

In present study an attempt has been made to assess the impact of IHDP on knowledge and adoption of improved mango production technology and attitude towards IHDP.

**Knowledge**

The knowledge is the cognitive behaviour of an individual. The body of knowledge is the product of learning process. Once the knowledge is acquired, it produces changes in the thinking process of an individual, which would lead to further changes in the mental aptitude. Theoretically speaking, there were many types of knowledge a farmer needs if he is to apply agricultural technology. In the words of bloom et al (1955) knowledge is defined as those behaviours and test situation which emphasize the remembering either by recognition or recall of ideas, material or phenomenon,

Rogers and Shoemaker (1971) considered knowledge as a function of an innovation decision process when the individual is exposed to an innovations existence and gains some understanding of its functions. They categorized knowledge under three components.
(1) “Awareness knowledge” which refers to the information about the innovations exist.

(2) “How to knowledge” which refers to the information needed to use an innovation properly.

(3) “Principle knowledge” which comprises the functioning principles underlying the innovations.

Many researchers have studied knowledge as a factor affecting adoption behaviour of farmers and they have found relationship between the two. It is therefore; assumed in this study that the higher level of knowledge about improved mango production technology, the higher would be the adoption of mango production technology in the area under study.

**Adoption**

Adoption refers to both mental acceptance and also covers use of new agricultural technology. Ramsey *et al* (1959) conceived adoption as cognitive adoption and behavioural adoption. Cognitive adoption involves complex decision and changes including knowledge critically evaluating practices in terms of the individual situation. Behavioural adoption consists of actual use of the practices. In the present study, behavioural adoption is defined as use of recommended new agricultural technology on a continuing basis. Thus adoption is a kind of social action and it is conceptualized as behavioural pre-deposition manifest in the acceptance of new agricultural technology, known to increase productivity and income. In the present study, it is attempted to understand the extent to which farmers adopted the new agricultural technology per unit area and to know the factors which influence the adoption behaviour, so as to be able to predict the
behaviour of the farmers and to control the known factors in a desired manner and channelised the course of farmers’ action in a desirable direction.

Since adoption is an action, it involves the use of means for its attainment. In this case, both means and ends concretely identifiable object or states and are also clearly distinguishable. For example, the agricultural technology consist of high yielding varieties of crops, fertilizers, plant protection chemicals, etc. are some of the known means to attain the objective of increasing agricultural production per unit area.

Beneficiary farmers were superior in knowledge than non-beneficiary farmers (Gakkhar et al, 2003). Majority of the farmers had medium level of knowledge about dry land cotton production technology (Nimje et al, 1990), medium level of knowledge about soil water conservation measures (Rakholia, 1996), medium level of knowledge about improved mustard production technology (Lakhera and Sharma, 2003) and medium level of knowledge about onion production technology (Patel et al, 2003).

Karkar (1998) stated that majority of the BFs and NBFs had medium level of adoption about rain fed agro technology. The same result was observed by Lakhera and Sharma (2003). Majority of the respondents were in medium adoption group with respect to improved farm technology (Ranganathan et al, 2001; Patel et al, 2003 and Singh, 2003).

There was no significant difference between the age of demonstrator and non-demonstrator farmers (Chothe, 1983). Same results were also observed by Mayani (1987) and Gakkhar (2003).
between large and small groundnut growers and BFs and NBFs, respectively.

There was no significant difference between education of trained and untrained farmers (Patel, 1981). There was a significant difference between educational level of BFs and NBFs (Rakholia, 1996).

There was a significant difference between extension participation of BFs and NBFs of WDP (Rakholia, 1996). Mayani (1987) also depicted the same result.

There was a positive significant difference between opinion leadership, overall modernity, knowledge index and attitude of BFs and NBFs (Rakholia, 1996).

There was a positive significant difference between the adoption level of BFs and NBFs (Karkar, 1998 and Gakkhar et al, 2003).

Age of BFs and NBFs was not significantly associated with knowledge (Rakholia, 1996; Karkar and Munshi, 2003).

Education was not significantly associated with the knowledge of farmers (Nandvana, 1993). Education was significantly associated with the knowledge of BFs but non-significantly associated with knowledge of NBFs (Rakholia, 1996). Education was significantly associated with the knowledge of farmers (Karkar and Munshi, 2003).

Occupation was not significantly associated with the knowledge of farmers (Murthy, 1990 and Rakholia, 1996). Occupation was significantly associated with the knowledge of farmers (Gajera, 1991).
Size of land holding was not significantly associated with the knowledge of farmers (Nandvana, 1993; Rakholia, 1996 and Jadav et al, 2003).

Yield index was significantly associated with the knowledge of farmers (Mayani, 1987). Yield index was not significantly associated with the knowledge of farmers (Gorfad, 1993 and Dangar, 1996).

Annual income was positively and significantly associated with the knowledge of farmers (Gosai, 1997 and Bhatt, 2002).

Social participation was not significantly associated with the knowledge of farmers (Nandvana, 1993). Social participation was significantly associated with the knowledge of farmers (Rakholia, 1996).

Opinion leadership of the farmers was significantly associated with their knowledge (Rakholia, 1996).

Extension participation of the farmers was significantly associated with their knowledge (Karkar, 1998 and Patel et al 2003).

Overall modernity was positively and significantly associated with the knowledge of farmers (Rakholia, 1996). Overall modernity was not significantly associated with the knowledge of farmers (Karkar and Munshi, 2003).

Mass media exposure was positively and significantly associated with the knowledge of farmers (Patel et al, 2003).

Attitude was positively and significantly associated with the knowledge of farmers (Karkar, 1998 and Prakash et al, 2003).
Adoption index was significantly associated with the knowledge of farmers (Karkar, 1998 and Patel *et al*, 2003).

Age was not significantly associated with the Adoption index of farmers (Kher, 1992; Pandya and Vekaria, 1994 and Dangar, 1996).

Education of the farmers was positively and significantly associated with their adoption (Patel, 1995; Chaudhari *et al*, 2001; Singh, 2002 and Singh, 2003).

Size of land holding of the farmers was significantly associated with their level of adoption (Balavatti and Sundaraswami, 1990).

Area under orchard was significantly associated with the adoption index of farmers (Waghmare, 1989; Pandya and Vekaria, 1994). Area under orchard was not significantly associated with the adoption index of farmers (Dangar, 1996).

Yield index was significantly associated with the adoption index of farmers (Gosai, 1997 and Bhatt, 2002).

Social participation was significantly associated with the adoption index of farmers (Chaudhari *et al*, 1996). Social participation was not significantly associated with the adoption index of farmers (Gosai, 1997). Social participation was significantly associated with the adoption index of trained farmers, while non-significantly associated with adoption index of untrained farmers (Bhatt, 2002).

Extension participation was significantly associated with the adoption index of farmers (Pandya, 1991 and Gosai, 1997).
Extension participation was significantly associated with the adoption index of trained farmers, while non-significantly associated with adoption index of untrained farmers (Bhatt, 2002).

Overall modernity was not significantly associated with the adoption index of farmers (Patel, 1991).

Mass media exposure was positively and significantly associated with the adoption index of farmers (Singh, 2002 and Singh, 2003).

Attitude was positively and significantly associated with the extent of adoption of farmers (Patel, 1995).

The six independent variables viz., age, training received, size of family, ratio of female to the total number of family members, size of land holding and social participation were jointly contributed towards 16.98 per cent ($R^2 = 0.1698$) of the variation in the knowledge level of the respondents (Sakaria, 1991).

The adoption index, yield index, locality-cosmopolite value orientation, innovation proneness, education, operational size of land holding and communication behaviour the eight independent variables jointly contributed towards 76.83 per cent ($R^2 = 0.7683$) of the variation in the information gap of contact groundnut growers (Vanparia, 1994).

The eleven independent variables viz., adoption index, extension participation, extension contact, social participation, education, attitude, cropping intensity, opinion leadership, overall modernity, technological gap and employment status were jointly
contributed towards 62.98 per cent ($R^2 = 0.6298$) of the variation in the knowledge level of BFs (Rakhola, 1996).

Fifteen independent variables jointly contributed towards the adoption of improved practices of soybean to the extent of 28.65 per cent ($R^2 = 0.2865$). Among these variables, socio-economic status, risk preference, and extension contact exhibit higher adoption behaviour of the improved practices of soybean (Nikhade et al, 1992).

The seven independent variables jointly contributed towards 90.91 per cent ($R^2 = 0.9091$) of the variation in the extent of adoption of DGGs about GPT. The variation in order was: knowledge index, extension participation index, social participation, education, yield index, risk preference and farm mechanization index. (Patel, 1995).

The nine independent variables jointly contributed towards 76.21 per cent ($R^2 = 0.7621$) of the variation in the extent of adoption of BFs about RAT. The variation in order were: knowledge index, irrigation potentiality, cropping intensity, social participation, production, training received, extension participation index, level of attitude and education (Karkar, 1998).

### 3.2 THE PARADIGM

The conceptual framework given in the preceding section may be presented diagrammatically in fig.-1 and 2. These are the tentative and generalized one.
FIG. 1: CHARACTERISTICS OF RESPONDENTS IN RELATION TO KNOWLEDGE LEVEL (THE CONCEPTUAL MODEL)
FIG 2: CHARACTERISTICS OF RESPONDENTS IN RELATION TO ADOPTION INDEX (THE CONCEPTUAL MODEL)
There are 22 characteristics of BFs and NBFs in tentative models, which may be differed.

3.3 DEFINITIONS OF SOME COMMON TERMS

The various terms used in this study need to be defined so as to clarify the concept in the particular context, in which they have been used. They are as follows:

3.3.1 Impact

Influence of IHDP in terms of increase in the level of knowledge and extent of adoption of mango growers with respect to mango production technology.

3.3.2 Knowledge

Knowledge is the body of understood information possessed by the mango growers in respect of package of practices of mango cultivation given under IHDP.

3.3.3 Adoption

This is a mental process in which an individual passes from awareness knowledge to continued use of an idea or practice in his farming situation. In this study, the adoption defined as actual trying of the improved mango production technology as recommended by the State Department of Horticulture and Junagadh Agricultural University.
3.3.4 Attitude

It is the degree of positive (favourable) or negative (unfavourable) affect towards any object or idea or person or organization of the mango growers towards IHDP.

3.3.5 Age

It refers to the years of the respondents on the date of interview rounded off to the nearest years.

3.3.6 Education

It is the ability of respondents to read and write or formal education received up to a certain standard. It is the level of literacy of the farmers.

3.3.7 Occupation

A calling or possession of respondents is called occupation.

3.3.8 Size of land holding

It is the total land in hectares possessed by the respondents. (With addition of rented in and substraction of rented out).

3.3.9 Mango yield index

It is the average mango yield per hectare of an orchard growers compared with the average mango yield of total respondents in terms of percentage.
3.3.10 Annual income

It is the money received per annum from different sources by all the family members of the respondents.

3.3.11 Social participation

It refers to the participation of respondents in local organizations (formal or informal).

3.3.12 Opinion leadership

It is the degree to which a respondent is able to influence informally other farmers’ attitude or alter behaviour in a desired way with frequency.

3.3.13 Extension participation

It is the degree to which the respondents participate in various non-formal education activities including individual, group and mass method to obtain new information, knowledge and skill related to mango production technology.

3.3.14 Overall modernity

Modernization is a process by which individuals change from a traditional way of life to a more complex, technologically advanced and rapidly changing style of life.

3.3.15 Innovation proneness

It refers to the observation of one’s own behaviour and the resulting picture of the self (Mc.Clelland, 1951).
3.3.16 Farm mechanization index

It is the numerical value of time and labour saving efficient working device (human and bullock) for farm operation possessed by mango growers.

3.3.17 Innovativeness

It is operationally defined as the degree to which a farmer is relatively earlier in adopting new ideas.

3.3.18 Progressiveness

Progressiveness refers to the relative receptivity of a farmer towards modern values and practices.

3.3.19 Self confidence

It refers to the feeling of an individual about the ability, initiative and zeal to achieve his goal or aim.

3.3.20 Self responsibility

It refers to that ability of an individual respondent to do any thing at his or her own level and should not depend on any one (Srinath, 1992). Self-responsibility level referred to the extent to which a respondent was self-responsible in terms of capital, labour, inputs and information on horticulture.

3.3.21 Market intelligence

Market intelligence can be operationalized as the degree to which a farmer know or understand the market trend and behaviour that helps an individual to take decision regarding buying of inputs and selling of produce.
3.3.22 Constraints

This refers to the items of difficulty faced by the farmers in taking benefit of IHDP. The difficulties faced by the respondents in taking benefit of IHDP are considered as the constraints.

3.3.23 Suggestions

The ways and means or options as suggested by the respondents to make the IHDP more effective are considered as the suggestions in this study.

3.4 DERIVATION OF HYPOTHESES

Based on the objectives of the study and theoretical framework, the following hypotheses were formulated as per the procedure given by Kerlinger (1976).

General hypotheses:

4.1 There is difference between the selected characteristics of beneficiary farmers (BFs) and non-beneficiary farmers (NBFs).

4.2 There is association between the level of knowledge of BFs and NBFs with respect to improved mango production technology and their selected characteristics.

4.3 There is association between the extent of adoption of BFs and NBFs with respect to improved mango production technology and their selected characteristics.
CHAPTER - 4

RESEARCH METHODOLOGY

This chapter deals with the research design, tools and techniques of scientific investigation employed in the light of objectives of the study. It describes and clarifies methods used for measuring the dependent and independent variables. It includes sampling procedure followed for data collection and the statistical techniques used for analysis of the data. The methodology is described under following heads:

1. Identification of the problem
2. Locale of the study
3. Research design
4. Method of sampling
5. Selection and measurement of variables

5.1 Measurement of independent variables

5.2 Measurement of dependent variables.

6. Constraints faced by the farmers in taking benefit of IHDP.
7. Suggestions offered by the respondents for making IHDP more effective.
8. Methods used for data collection.
9. Analysis of the data.
10. Research hypotheses (in null form)

4.1. IDENTIFICATION OF THE PROBLEM

India has a wide variety of climate and soil on which a large number of horticultural crops are grown. After independence, the
Government of India has attempted for achieving self-sufficiency in food production. The development of horticulture, for which Indian topography and agro climate are well suited, is an ideal method of achieving sustainability for small holdings.

In order to achieve the twin objective of ecological security with economic and nutrition security, horticultural crops must form a major component of vegetation because horticultural crops are adaptable to the extreme conditions of the waste land areas; yield nutritionally rich fruits and vegetables and other products; ensures sustainable income to the people; once established, require little maintenance care; generate employment not only from their produce but also by developing ancillary industries based on them.

During the eighth plan period, Government of Gujarat has started Integrated Horticultural Development Programme in all the districts of Gujarat state to increase area and production of fruit crops. In Junagadh district, the scheme is running successfully since 1991 and has developed a large area under horticultural crops. The development of mango orchards in new area of the district have took rapid step under Integrated Horticultural Development Programme. Now it is time to study the impact of Integrated Horticultural Development Programme particularly by measuring the knowledge and adoption of mango production technology by the farmers and attitude of farmers towards Integrated Horticultural Development Programme. Keeping this in view, it was thought to plan and conduct the research study entitled “Impact of Integrated Horticultural Development Programme in Junagadh District of Gujarat State”.


4.2. LOCALE OF STUDY

The study was conducted in Junagadh district of Gujarat state for the following reasons:

1. The scheme Integrated Horticultural Development Programme has been successfully working in Junagadh district.
2. Being native of Junagadh district, the researcher is familiar with the farming condition of the area.
3. The head quarter of Junagadh Agricultural University is located in the area of the study.

4.3. RESEARCH DESIGN

This study was conducted by adopting an ex-post-facto research design. It is systematic empirical enquiry in which the scientist does not have direct control over the independent variables because of their manipulations have already occurred or they are inherently not manipulated (Kerlinger, 1969).

4.4. METHOD OF SAMPLING

A multistage purposive sampling technique was used for the selection of taluka, villages and beneficiary respondents. The non-beneficiary respondents were selected by random sampling technique for the study.

4.4.1 Selection of taluka

Junagadh district is consisted of twelve talukas having common agro climatic condition. In all the twelve talukas of the district, IHDP is being implemented. Two talukas in the district viz.,
Vanthali and Talala are dominantly mango growing area since generation. Hence, these two talukas were not included in the study. Remaining ten talukas were arranged according to the number of beneficiary farmers in ascending order and five talukas were selected which have more number of beneficiaries. The taluka wise beneficiaries from 1994-95 to 1996-97 are given in table-2.

Table- 2: Taluka-wise beneficiary farmers of IHDP from the year 1994-95 to 1996-97

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of taluka</th>
<th>Number of beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mendarda</td>
<td>24 18 23 65</td>
</tr>
<tr>
<td>2</td>
<td>Una</td>
<td>24 8 13 45</td>
</tr>
<tr>
<td>3</td>
<td>Malia Hatina</td>
<td>21 6 14 41</td>
</tr>
<tr>
<td>4</td>
<td>Visavadar</td>
<td>18 9 8 35</td>
</tr>
<tr>
<td>5</td>
<td>Junagadh</td>
<td>5 7 3 15</td>
</tr>
<tr>
<td>6</td>
<td>Veraval</td>
<td>6 5 3 14</td>
</tr>
<tr>
<td>7</td>
<td>Keshod</td>
<td>5 5 3 13</td>
</tr>
<tr>
<td>8</td>
<td>Bhesan</td>
<td>2 1 0 3</td>
</tr>
<tr>
<td>9</td>
<td>Mnavadar</td>
<td>1 0 1 2</td>
</tr>
<tr>
<td>10</td>
<td>Mangarol</td>
<td>1 0 0 1</td>
</tr>
</tbody>
</table>

4.4.2 Selection of villages

Villages which have minimum three beneficiaries, were selected purposively from the selected five talukas. The selected talukas and villages are shown in the map given in fig.-3.

4.4.3 Selection of respondents

The list of beneficiaries of IHDP was obtained from the records of the State Department of Horticulture, Junagadh. Total 128 beneficiaries were selected purposively from the selected villages. The same number of non-beneficiaries from each village were
selected randomly by obtaining the list of farmers from the record of gram Panchayat of respective villages. The details about selection of respondents are given in table-3.

Table- 3: Selected villages and respondents

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Selected Taluka</th>
<th>Sr. No.</th>
<th>Selected Villages</th>
<th>Number of selected BF's</th>
<th>Number of selected NBF's</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Visavadar</td>
<td>1</td>
<td>Lalpur</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Sarsai</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Moti Monpari</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Liliya</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Junagadh</td>
<td>1</td>
<td>Taliadhar</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Mendarda</td>
<td>1</td>
<td>Gundala</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Mendarda</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Ambala</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Dedakiala</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>Rajesar</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>Amargadh</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>Kenedipur</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>Zinzuda</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Malihatina</td>
<td>1</td>
<td>Devgam</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Khorasa</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Ambalgadh</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Amarapur</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Una</td>
<td>1</td>
<td>Gangada</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Motisar</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Amodra</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Thordi</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>Vadli</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>Bhacha</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>128</strong></td>
<td><strong>128</strong></td>
</tr>
</tbody>
</table>

4.5. SELECTION AND MEASUREMENT OF VARIABLES

The variables included in the study were selected on the basis of the extensive review of literature and through discussion with the extension experts. Only those variables, which had relevance with the study, were finally selected for the study.
Junagadh
1. Taladhar

Visawader
1. Lalpur
2. Sarsai
3. Moti Monpari
4. Liliya

Una
1. Gir Gandada
2. Motisar
3. Amodra
4. Thordi
5. Vadli
6. Bhacha

Mendarda
1. Gundula
2. Mendarda
3. Ambala
4. Dedakiala
5. Rajesar
6. Amergadh
7. Kenedipur
8. Zinjuda

Malia Hatina
1. Devgam
2. Amarapur
3. Khorasa
4. Ambalgadh

FIG. 3: MAP OF JUNAGADH DISTRICT SHOWING SELECTED TALUKAS AND VILLAGES
### 4.5.1 Measurement of independent variables

The list of variables along with the techniques used for their measurement is presented in table-4.

**Table-4: Measurement of independent variables**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Variables</th>
<th>Measurement technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Personal</strong></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Age</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>3.</td>
<td>Occupation</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Socio-economic</strong></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Size of land holding</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>2.</td>
<td>Area under mango</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>3.</td>
<td>Yield Index</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>4.</td>
<td>Annual income</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>5.</td>
<td>Social participation</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>3.</td>
<td><strong>Extension communication</strong></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Mass media exposure</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>4.</td>
<td><strong>Psychological</strong></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Opinion leadership</td>
<td>Scale developed by Rogers (1962)</td>
</tr>
<tr>
<td>2.</td>
<td>Overall modernity</td>
<td>Scale developed by Mehta (1975)</td>
</tr>
<tr>
<td>3.</td>
<td>Innovation proneness</td>
<td>Innovation proneness scale developed by Moulik (1965)</td>
</tr>
<tr>
<td>4.</td>
<td>Farm mechanization</td>
<td>Farm mechanization index by Singh and Singh (1970)</td>
</tr>
<tr>
<td>5.</td>
<td>Innovativeness</td>
<td>Scale developed by Singh (1971)</td>
</tr>
<tr>
<td>7.</td>
<td>Self confidence</td>
<td>Scale developed by Basavanna (1974)</td>
</tr>
<tr>
<td>9.</td>
<td>Marketing intelligence</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>10.</td>
<td>Attitude</td>
<td>A standardized attitude scale was developed by the researcher</td>
</tr>
</tbody>
</table>
4.5.1.1 Personal

4.5.1.1.1 Age

Age of the respondents was calculated as per the years completed on the date of interview and rounded off to the nearest year.

4.5.1.1.2 Education

The education of the respondents was measured as the level of literacy in terms of educational standard that respondents had passed.

4.5.1.1.3 Occupation

IHDP beneficiaries and non-beneficiaries were asked to indicate their occupation. The information given by them was grouped in to four categories and they were measured with the score assigned as under:

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Occupation</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fruit orchard</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Fruit orchard + Farming</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Fruit orchard + Farming +Business</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Fruit orchard + Service</td>
<td>4</td>
</tr>
</tbody>
</table>

4.5.1.2 Socio-Economic

4.5.1.2.1 Size of land holding

Size of land holding was measured on the basis of total land possessed and operated by the respondents.
4.5.1.2.2 Area under mango

The land holding under mango was measured with the help of structured schedule. The respondents were asked to indicate their area under mango orchard.

4.5.1.2.3 Mango yield index

The mango yield index is an average fruit yield of mango growers compared with average fruit yield of total number of respondents (q/ha) in terms of percentage as under.

\[
\text{Yield Index} = \frac{\text{Average yield of mango of individual respondent}}{\text{Average yield of Mango crop of 128 respondent}} \times 100
\]

4.5.1.2.4 Annual income

Annual income includes quantum of money obtained or earned by all family members during the year from farm and non-farm sources. It was measured with the help of structured schedule.

4.5.1.2.5 Social participation

The respondents were asked about their association with organization within and outside their village. Different scores were assigned for membership in each organization according to the importance of that organization in a particular set up by consulting the farmers and experts in the field. One more score was assigned for holding position in an organization.
4.5.1.3 Extension- Communication

4.5.1.3.1 Extension participation

Extension participation is defined as the degree to which an individual participates in various non-formal educational activities including individual contact, group contact and mass contact methods with a view to obtain new information, knowledge and skills related to agriculture.

It was measured with the help of the scale developed by Siddaramaiah and Jalihal (1983). The scale consisted of eight items having different scale value was administered to the respondents and obtained the information on the participation of respondents in different extension activities. The extension participation score of an individual respondent was the sum total of the scale value of the items in which respondent has participated.

\[
\text{Extension participation index} = \frac{\text{Actual total score value}}{\text{Possible total score value}} \times 100
\]

According to extension participation index of respondents, the mean and extension participation index was worked out.

4.5.1.3.2 Mass media exposure

To measure the mass media exposure of respondents, the scores were assigned to respondents on the basis of frequency of their use of various sources of information. The scores assigned to various frequencies of uses were regularly, frequently in week, once in a week and not at all was given scores 3, 2, 1 and 0, respectively. The scores, thus assigned to each type of information sources of
each respondent were summed up. The total score, thus obtained was considered as an index of respondents’ mass media exposure.

4.5.1.4 Psychological

4.5.1.4.1 Opinion leadership

The scale developed by Rogers (1962) was used to measure the opinion leadership of the respondents.

The scale consisted of six items, all with equal weightage. The respondents were asked to give their answer in ‘yes’ or ‘no’ for each statement.

One score was given for answer ‘yes’ and zero score for answer ‘no’, where as for other statements there was choice between two answers. The respondents who have chosen answer ‘a’ were given one score and zero score for choice of ‘b’ answer (Appendix-IV).

4.5.1.4.2 Overall modernity

The overall modernity of the respondents was measured with the help of overall modernity scale of Mehta et al (1974) which was an adoption of the scale originally developed by Inkless and Smith (1966) for a cross cultural study in six developing countries. The scale consisted of 13 items. The item of the scale and the scoring has been given in the schedule. (Appendix-IV).

4.5.1.4.3 Innovation proneness

The degree of innovation proneness was measured with the help of the scale developed by Moulik and Rao (1965). The scale consisted of 9 short statements having different weights (Appendix-IV). The “forced choice” method of rating was followed to overcome
the familiar problems of personal bias and lack of objectivity in self evaluation scores. This method forces the respondents to choose from a group of three short statements describing particular personality characteristics. The one which most accurately describes the respondent himself and also one which least accurately portrayed the respondents. After obtaining the respondents’ “most-least” choice each of the three sets of statements describe the innovation proneness traits. The scoring was done by summing up the ratio of the weight of the most like statement to the least like statement. As there were three sets of statements for innovation proneness trait, the sum of ratio for three set describing a particular personality trait was obtained. Each set of statements with weight 3, 2 and 1 indicating high, medium and low degree of innovation proneness, respectively.

Thus individual’s self-rating scores for innovation proneness was obtained. Maximum and minimum theoretical scores ranged from 9 to 1 depending upon the weights of the most like and least like statements indicated by the respondents.

4.5.1.4.4 Farm mechanization index

To measure the farm mechanization index of the respondents, the index developed by Singh and Singh (1970) was used with slight modification.

\[
FMI = \sum_{i=1}^{n} W_i \times n_i \times t_i
\]

Where,

FMI = Farm Mechanization Index

\(n_i\) = Number of the i th item possessed by an individual
ti = Total period in years, the ith item has been possessed
n = Total number of items selected
∑ = Summation

The score obtained by each respondent was calculated by above-mentioned formula.

4.5.1.4.5 Innovativeness

Innovativeness is operationally defined as the degree to which a farmer is relatively earlier in adopting new ideas. The procedure developed by Singh (1977) was used to measure the innovativeness of farmers. Three responses were given with scoring procedure as follow:

1. As soon as it is brought to my knowledge 3
2. After I have seen other farmers using it successfully 2
3. Prefer to wait and take my own time 1

4.5.1.4.6 Progressiveness

The degree to which farmers were receptive to modern values and practices was conceived as progressiveness. For measuring progressiveness of the respondents, the scale published by Pareek and Rao (1974) was adopted. The scale consisted of 11 statements for which the respondents had to answer ‘yes’ or ‘no’. The positive response was assigned with one score while the negative response received zero score. The progressiveness score was obtained by summing up the response for the items. (Appendix).
4.5.1.4.7 Self confidence

It refers to the feeling of an individual about the ability, initiative and zeal to achieve his goal or aim. This variable was measured by the scale developed by Basavanna (1974). The scale consists of eight statements to be related on a five point continuum viz., Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree with the weightage of 5,4,3,2 and 1 for positive statements and 1,2,3,4 and 5 for negative statements. Self-confidence score of a respondent was calculated by adding the score of all the statements. Thus 40 and 8 were the maximum and minimum scores obtainable, respectively for each respondent. High score indicates more self-confident nature of the respondent. Cumulative frequency distribution method was used for the categorization of the respondents.

4.5.1.4.8 Self responsibility

It refers to that ability of an individual respondent to do any thing at their own level and should not depend on any one (Srinath, 1992). Self-responsibility level referred to the extent to which a respondent was self responsible in terms of capital, labour, inputs and information on horticulture. The self responsibility level was assessed on a three point continuum as completely self responsibility, partially self responsibility and completely dependent with score of 3, 2 and 1, respectively. According to score obtained by each respondent, they were classified as high, medium and low using cumulative frequency test. The scoring procedure was adopted as followed by Theodore (1999).
4.5.1.4.9 Marketing intelligence

Market intelligence can be operationalized as the degree to which a farmer knows or understand the market trend and behaviour that helps an individual to take decision regarding buying of inputs and selling of produce. To arrive the score for market intelligence, the responses was collected in two category as ‘Yes’ and ‘No’ with the score of 2 and 1, respectively. The maximum score obtainable by an individual would be 24 and minimum would be 12. Based on this score of market intelligence, Market intelligence index was calculated.

Market intelligence index was assessed using the following formula:

\[
\text{MII} = \frac{\text{AMI Xi}}{\text{TMI Yi}} \times 100
\]

Where,

\begin{align*}
\text{MII} & = \text{Market Intelligence Index} \\
\text{AMI Xi} & = \text{Actual score obtained by an individual for market intelligence} \\
\text{TMI Yi} & = \text{Total possible maximum score of an individual for market intelligence}
\end{align*}

4.5.1.4.10 Attitude

Development and standardization of attitude scale to measure attitude of farmers towards IHDP

A researcher has standardized an attitude scale to measure attitude of the respondents towards IHDP in Junagadh district of Gujarat state. While constructing a scale, the researcher has
resorted to methodology suggested by Likert (1932) and Edward (1957) with slight modification in the procedure. The method of summated rating was used in this study for scale construction.

**Collection of statements**

The items of the attitude were called statements. A large number of statements covering the entire universe of context were collected by referring literature related to horticultural development programme from the campus library, Junagadh Agricultural University, Junagadh and from the state department of horticulture, Junagadh. The experts including major advisor and scientists in this matter were consulted. These statements were then edited according to the fourteen criteria laid down by Edward (1957). In all 41 statements were selected as they were found to be non-ambiguous and non-factual.

**Item analysis**

Total 60 slips of these statements were handed over to the extension experts of all the four Agricultural Universities of Gujarat state, post graduate students of extension education of Junagadh Agricultural University, Horticulture experts of Junagadh Agriculture University, extension personnel of State Department of Horticulture and of State Department of Agriculture. Out of these 60 experts 40 experts had returned the statements after dully recording their judgments. Thus, finally the opinion of 40 experts was considered for calculation of the scale. These judges were asked to respond to each statement in terms of their agreement or disagreement with the statements. Their responses on a draft scale for each statement on a five point continuum from strongly agree to strongly disagree were obtained by summing up the scores for each
respondent for all the items. Total 41 statements 22 positive and 19 negative statements were included in the scale. The responses given to the statements were strongly agree, agree, undecided, disagree and strongly disagree with the weightage of 5, 4, 3, 2 and 1, respectively to positive statements and 1, 2, 3, 4 and 5 for negative statement. Frequency distribution of the score of judges was then prepared. The statements were then arranged in descending order on the total scores obtained by them. For the purpose of item analysis, 25 per cent (i.e. 10 judge each) of the subject with the highest score and 25 per cent of the subject with the lowest scores were selected.

These two groups provided the criterion groups in terms of which item analysis was conducted. The responses of the high and low groups of each statement were then analyzed by working out the “t” value. The thumb rule of rejecting item with “t” value less than 1.75 was followed (Edward, 1957). As per the thumb rule, 24 attitude statements were selected giving due consideration to include both favourable and unfavourable statements in more or less equal proportion. The final attitude scale is given in appendix-I.

Validity of the attitude scale

The validity of the scale was confirmed by two types of validity test viz., content validity and criterion validity.

Content validity

According to Kerlinger (1976), the content validity is representativeness of sampling adequacy, of the content, the substance, the matter and the topics of measuring instrument. In the present study, indicators and sub indicators included in the
scale were arrived at only after wide and critical validation by panel of judges.

**Criterion validity**

A criterion may be an object measure of performance or quality (Garrett, 1985). In the present study, criterion validity was measured by using criteria of mass media exposure of the mango growers. Comparison was made between the attitude score of 20 non-sampled respondents with their mass media exposure. Pearson’s co-efficient of correlation was used for appraising correlation between these two sets of scores. The ‘r’ value was 0.53, indicating the scale was valid.

**Reliability of the attitude test**

To know the reliability of the attitude scale, the split halves method was employed.

**Split halves method**

The 24 items were divided into two equal halve, with odd number in one half and even number in the other. These were administered to 20 respondents separately which were not included in the final sample. Having obtained the two sets of scores for each of the 20 respondents, co-efficient of correlation (reliability co-efficient) between the two sets of scores was calculated which was found to be highly significant \(r = 0.82\). The reliability co-efficient thus obtained, indicated that internal consistency of the attitude scale developed for the study was very high. The reliability coefficient was calculated with the help of Rulon formula used by Guilford (1965).
**Administering the attitude scale**

The final attitude scale was administered on the sample farmers who were asked to express their reaction in terms of their agreement or disagreement with each item by selecting any of the five response categories viz., strongly agree, agree, undecided, disagree and strongly disagree. The scores given for the positive statements were 5, 4, 3, 2 and 1 while 1, 2, 3, 4 and 5 for the negative statements. The total attitude score for each respondent was obtained by adding the weight of his responses made to the individual scale items.

The respondents were grouped in to three categories on the basis of their attitude towards IHDP by using mean ± S.D.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Category</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Less favourable attitude</td>
<td>= &lt; Mean – S.D.</td>
</tr>
<tr>
<td>2.</td>
<td>Favourable attitude</td>
<td>= Mean ± S.D.</td>
</tr>
<tr>
<td>3.</td>
<td>Highly favourable attitude</td>
<td>= &gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

**4.5.2 Measurement of dependent variables**

**4.5.2.1 Development and standardization of knowledge test**

In the present study, an attempt has been made to develop a standardized test, which can help in measuring the level of mango growers’ knowledge about improved mango production technology in a scientific manner. A standardized test as defined by Noll (1957) is one that has been carefully constructed by experts in light of the acceptable objectives, procedures for administering, scoring and interpreting score are specified in details so that, the results should be comparable and norms of average for different age or status have
been predetermined. In a view of this definition, a standardized knowledge test on improved mango production technology was constructed with the help of following procedure.

**Item selection**

The content of the test was composed of questions called items. The important factor considered in collecting items for knowledge test was to determine and classify the object to be measured by it. Relevant recommendations about improved mango production technology from Agricultural University and state department of agriculture for the area of the study were collected through the published literature. Care was taken to ensure that no crucial practice or item was omitted. The collected items were discussed with research scientists (Horticulture) of Junagadh Agricultural University, Junagadh, for adding and alteration of the items. Keeping in view the following three criteria, the items were selected for the test.

1) The item should provide thinking rather than simply rote memorization.
2) The item should differentiate the well informed farmers from the poorly informed farmers and should have certain difficulty value (Jha and Singh, 1970).
3) The items included should cover all the area of knowledge about improved mango production technology.

With these criteria in view, 54 items were selected for the development of the knowledge test. To control bias, if any, these items were framed in the objective form of questions. In this form, the questions were completely controlled by having alternative, multiple choice, yes or no and right or wrong
questions and therefore, the assessment was objective and impersonal (Initial format appears in Appendix-II).

In selecting the items, the procedures were followed the lines laid down by Lindquist (1951), Jaiswal (1965), Moulik (1965) and Ray (1967).

**Item analysis**

The item analysis used by Jha and Singh (1970) was carried out so as to yield three kinds of information viz., “index of item difficulty”, index of item discrimination: and “index of item validity”. The index of item difficulty indicated the extent to which an item was difficult, while the index of item discrimination was to find out whether an item really discriminated a well informed mango growers from a poorly informed one. The index of item validity provided the information on how well an item measures or discriminates in agreement with rest of the test.

The collected items were numbered from 1 to 54 and administered to the 42 respondents selected at random from the villages of the area of the study, resembling the sample mango growers selected for the final study. Each respondent was given the score 1 or 0 for the dichotomized response of correct or incorrect, right or wrong and yes or no answers, respectively. Thus, the total score secured by an individual respondent of 54 items for correct answer was the knowledge score. The scores obtained by the 42 respondents were arranged separately from highest to the lowest in magnitude. These 42 respondents were divided in to six equal groups each of seven and were arranged in descending order of the total scores obtained by them. Each group was made of seven respondents and the groups were named G1, G2, G3, G4, G5, and
G6, respectively. The range of scores obtained by the respondents of six groups is as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Respondents</th>
<th>Score range</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>7</td>
<td>45 - 39</td>
</tr>
<tr>
<td>G2</td>
<td>7</td>
<td>38 - 36</td>
</tr>
<tr>
<td>G3</td>
<td>7</td>
<td>35 - 34</td>
</tr>
<tr>
<td>G4</td>
<td>7</td>
<td>33 - 32</td>
</tr>
<tr>
<td>G5</td>
<td>7</td>
<td>32 - 28</td>
</tr>
<tr>
<td>G6</td>
<td>7</td>
<td>28 - 24</td>
</tr>
</tbody>
</table>

For the purpose of item analysis, the middle two groups G3 and G4 were eliminated. Four extreme groups with high and low scores were kept.

**Selection of item for final test**

The selection of items for knowledge test about improved mango production technology was made on the following criteria:

**Item difficulty index**

The index of difficulty (P) was worked out as the percentage of the respondents answering an item correctly. The assumption in this index of difficulty was that the difficulty is linearly related to the level of respondent’s knowledge about improved mango production technology. When a respondent answers an item, it was assumed that the item was less difficult than his ability to cope with it. In this study, with the assumption, the item with P values ranging from 15 to 85 were considered for the final selection of the knowledge test battery.
**Item discrimination index**

The second criterion for item selection was discrimination index indicated by $E^{1/3}$. Mehta in using $E^{1/3}$, emphasized that this method was analogous to, and hence, a convenient substitute for the phi-co-efficient as formulated by Perry and Michael. The estimation of phi-co-efficient for an entire criteria group from a phi-co-efficient calculated from the use of the Extreme Tails of a normal distribution of criteria. For this study, the item with $E^{1/3}$ values above 0.20 and below 0.80 were considered for final selection (Jha and Singh, 1970).

**Biserial correlation**

It was used for the test of item validation when the criterion of validity is regarded as internal consistency that is, the relationship of total scores to a dichotomized response to any given item. Keeping this in view, with the help of formula used by Guilford (1965), the biserial correlation for each of the items was calculated. The significance of the biserial correlation for each of the items was calculated and tested by using the formula given by Guilford (1965). The item found significant at 5 per cent level of significance was retained in the final format of the knowledge test battery.

**Representativeness of the data**

Though, the aforesaid criteria were the main considerations for the final selection of the knowledge items, care was taken not to eliminate the important aspects, if any.

Thus in lights of the four criteria, described above 35 items were finally selected, which formed actual (final) format of the knowledge test (Appendix-III).
Reliability of the knowledge test

To know the reliability of the knowledge test developed, the split halves method was employed.

Split halves method

The 35 items were divided into two equal halves, with odd number in one half and even number in the other. These were administered to 20 respondents separately, which were not included in the final sample. Having obtained the two sets of scores for each of the 20 respondents, co-efficient of correlation (reliability co-efficient) between the two sets of scores was calculated which was found to be highly significant (r = 0.91). The reliability co-efficient thus obtained, indicated that internal consistency of the knowledge test developed for the study was very high. the reliability coefficient was calculated with the help of Rulon formula used by Guilford (1965).

Validity of the knowledge test

The validity of the scale was confirmed by two types of validity test viz., content validity and criterion validity.

Content validity

According to Kerlinger (1976), the content validity is representative ness of sampling adequacy, of the content, the substance, the matter and the topics of measuring instrument. In the present study, indicators and sub indicators included in the scale were arrived at only after wide and critical validation by panel of judges.
Criterion validity

A criterion may be an object measure of performance or quality (Garrett, 1985). In the present study, criterion validity was measured by using criteria of mass media exposure of the mango growers. Comparison was made between the knowledge score of 20 non-sampled respondents with their mass media exposure. Pearson’s co-efficient of correlation was used for appraising correlation between these two sets of scores. The ‘r’ value was 0.43, indicating the scale was valid.

Measurement of knowledge

For measuring the extent of knowledge of mango growers, the test developed for the purpose was used. The scale consisted of 35 items concerning improved mango production technology. The respondents were asked to answer correct or incorrect, right or wrong and yes or no, against each item. The knowledge scores were calculated as sum of the scores of correct responses converted to percentage. The respondents were classified on the basis of mean and S.D. as below:

- High knowledge = Mean + S.D.
- Medium knowledge = Mean ± S.D.
- Low knowledge = Mean - S.D.

4.5.2.2 Measurement of extent of adoption of mango production technology

For the measurement of adoption of improved mango production technology by the farmers, improved mango cultivation practices were divided into 10 practices by consulting the experts in
the field. The weightage of the particular practice was determined by seeking the opinion of the 20 experts working in the field. The weightage of the particular practice assigned by each expert was summed up and with the help of arithmetic mean, the practice wise weightage was determined as under:

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Practice</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tillage</td>
<td>12</td>
</tr>
<tr>
<td>2.</td>
<td>Variety</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Planting distance</td>
<td>7</td>
</tr>
<tr>
<td>4.</td>
<td>Organic manure</td>
<td>11</td>
</tr>
<tr>
<td>5.</td>
<td>Chemical fertilizers</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>Irrigation</td>
<td>16</td>
</tr>
<tr>
<td>7.</td>
<td>Insect/pest control</td>
<td>14</td>
</tr>
<tr>
<td>8.</td>
<td>Disease control</td>
<td>15</td>
</tr>
<tr>
<td>9.</td>
<td>Intercropping</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>Hormones</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The adoption quotient developed by Chattopadhyay (1974) was used with slight modifications.

\[
AI = \frac{1}{\sum_{i=1}^{k} W_i} \times \frac{1}{n \sum_{i=1}^{S} W_i} \times L_i \times A_i \times 100
\]
Where,

\[ AI = \text{Adoption index} \]
\[ S = \text{No. of subheads} \]
\[ k \]
\[ \sum_{i=1}^{k} Wi = \text{sum of weightage all the practices where } k \text{ is the no. of selected practices} \]
\[ n \]
\[ \sum_{i=1}^{n} wi = \text{sum of weightage of all the practices where } k \text{ is the no. of the total practices} \]
\[ L_i = \text{Proportion of years since when the respondent is following the } i\text{th practice(value ranging from zero to one with 15 years as limit).} \]
\[ A_i = \text{Proportion of area in which the respondent is following } i\text{th practice} \]

For the measurement of adoption, respondents were grouped in to three categories on the basis of mean and standard deviation.

1. Low \(<\text{Mean }-\text{ S.D.}\)
2. Medium \(=\text{Mean }\pm\text{ S.D.}\)
3. High \(>\text{Mean }+\text{ S.D.}\)

4.6 CONSTRAINTS FACED BY THE BENEFICIARY FARMERS IN TAKING BENEFIT OF IHDP

The constraints faced by the BF\(\text{s}\) were recorded on the schedule. The ranks were assigned on the basis of frequency and percentage of each constraint.

4.7 SUGGESTIONS OFFERED BY THE RESPONDENTS TO MAKE THE IHDP MORE EFFECTIVE

The open-ended questions were asked to seek the suggestions of the BF\(\text{s}\). The percentage was worked out on the basis of
frequency for interpretation and the ranks were assigned on percentage basis.

4.8 METHODS USED FOR DATA COLLECTION

The basic method used in collecting data was a field survey. The interview schedule was used as a tool for collection of requisite information. In all 256 respondents from 22 villages were interviewed personally.

4.8.1 Construction of interview schedule

A special interview schedule was designed for collecting the data. Firstly the interview schedule was prepared in English. Keeping in view the objectives of the study and respondents’ background, the developed schedule was then translated in Gujarati language. In preparing schedule, investigator secured guidance from the concerned research scientists, teachers of the university and technical staff of the state department of horticulture, Junagadh. The suggestions given by them were incorporated in the schedule by the investigator.

First part of the interview schedule was developed to study the selected characteristics of the respondents.

Second part of the interview schedule was developed to ascertain the level of knowledge of respondents about improved mango production technology.

Third part of the interview schedule was developed to ascertain extent of adoption of improved mango production technology.
Fourth part of interview schedule was developed to measure the attitude of respondents towards IHDP.

Fifth part of the interview schedule was developed to study various constraints faced by the respondents in taking benefit of IHDP and suggestions of the respondents to make the IHDP more effective.

**4.8.2 Pre-testing of interview schedule**

The interview schedule was pre-tested in the field on a separate 30 non sample respondents. The investigator explained the purpose of the present study to the farmers and clarified ambiguity to understand different items included in the interview schedule. On the basis of information provided and experience gained by the investigator, necessary modifications were made in the final format.

**4.8.3 Collection of data**

The basic information regarding the study was gathered from the records of State Department of Horticulture, Junagadh. Primary data for the study were collected by personal interview from the respondents with the help of constructed interview schedule. The investigator personally interviewed all the respondents during the month of August, 2005. The aims and the objectives of the study were explained to the respondents, so as to facilitate free response from them. The respondents were interviewed either in the field or at the place of their residence. The investigator tried to remove the suspicion from the mind of the respondents about himself as an outsider. The good rapport thus established with the respondents
to secure full co-operation for gathering reliable and valid information.

Secondary data and other relevant information of the study were gathered from the reference books, paper published by different authors and post graduate theses pertaining to the topic.

4.9. ANALYSIS OF DATA

The raw data obtained through interview schedule was transferred on the master sheet and tally sheet. They were processed, tabulated, classified and analyzed to give statistical treatment in such a way that they could give proper answer to the specific objective of the study. The following statistical techniques were applied.

4.9.1 Frequency and percentage

Simple interpretations were made on the basis of frequency and percentage.

4.9.2 Indices

The information pertaining to the variables was collected against items included in different indices. Numerical score was assigned to each item. These items had different ranges and units of measurement. The row scores were converted into indices.

4.9.3 Mean score

Mean score was calculated for assigning the ranks. The mean score was obtained by total scores of an item divided by the total number of respondents.
4.9.4 Standard deviation

Standard deviation was worked out from the total score obtained by each respondent as per the following formula.

\[
\text{S.D.} = \frac{(X_i - X)^{1/2}}{n - 1}
\]

Where,
- \(X_i\) = Individual score
- \(X\) = mean score
- \(n\) = total number of respondents

The maximum and minimum score limits were obtained by the following formula.

\[X_i = \text{Mean} \pm \text{S.D.}\]

4.9.5 Co-efficient of Correlation (r)

Simple correlation co-efficient (r-value) was computed to find out the relationship between dependent and independent variables. The following formula was used:

\[
r = \frac{\text{SP}(XY)}{\sqrt{\text{ss}(x).\text{ss}(y)}}
\]

Where,
- \(r\) = Co-efficient of correlation
- \(x\) and \(y\) = Represents the value of the two variables under study
- \(\text{sp}(xy)\) = Sum of the product of the deviations on \(X\) and \(Y\) from their means
\[ ss (x) = \text{Sum of the squares due to ‘X’ variable} \]
\[ ss (y) = \text{Sum of the squares due to ‘Y’ variables} \]

For testing the significance of ‘r’, ‘t’ value was calculated by using the following formula.

\[ t = r \frac{\sqrt{n-2}}{\sqrt{1-r}} \]

Where,
\[ t = \text{‘t’ value} \]
\[ r = \text{Co-efficient of correlation} \]
\[ n = \text{Total number of observation} \]

4.9.6 Co-efficient of variation

This was used for comparing the variability present in the level of knowledge and extent of adoption of BFs and NBFs with respect to improved mango production technology. It is a percentage and has therefore, no unit. The following formula was used for calculation:

\[ \text{C.V.} = \frac{\sigma}{\bar{X}} \times 100 \]

Where,
\[ \text{C.V.} = \text{Co-efficient of variation} \]
\[ \sigma = \text{Standard deviation} \]
\[ \bar{X} = \text{Mean} \]
4.9.7 ‘Z’ Test

In order to test the significance in average for different variables of both the categories the respondents under study, Z-test was used. The formula used for computing Z-value for equal size of group is as follows:

\[ Z = \frac{\bar{X} - \bar{Y}}{\sqrt{\frac{S^2_1 + S^2_2}{n}}} \]

Where,

\( \bar{X} = \text{Average of the group of BFs} \)

\( \bar{Z} = \text{Calculated value} \)

\( \bar{Y} = \text{Average of the group of NBFs} \)

\( S^2_1 = \text{Variance of BFs} \)

\( S^2_2 = \text{Variance of NBFs} \)

4.9.8 Regression co-efficient

In order to study the cause and effect relationship between variables under study, regression analysis is necessary. Regression co-efficient (b) is an efficient tool for this study. The multiple regression equation model for the study is as under:

\[ Y = a + b_1X_1 + b_2X_2 + \ldots \ldots + b_nX_n \]

Where, \( Y = \text{Dependent variable} \)

\( a = \text{The intercept} \)

\( b's = \text{Partial regression coefficient} \)

\( X's = \text{Characteristics of respondents} \)
4.9.9 Standard partial regression co-efficient

The various independent variables had their own unit of measurement which did not permit a comparison of the partial ‘b’ values. To facilitate comparison, the partial ‘b’ values were converted into standard partial ‘b’ values which were free from the unit of measurement. A standardized or adjusted partial ‘b’ is called beta weight.

\[
\text{Beta weight} = \frac{\text{S.D. of independent variable}}{\text{S.D. of dependent variable}} \times \text{Partial ‘b’}
\]

A comparison of any two beta weight in a set of multiple regression equation indicates the relative importance of the independent variables involved in predicting the rational behaviour.

4.9.10 Path coefficient analysis

The path coefficient analysis described direct and indirect effect of each independent variable on the dependent variable. So, it gives clear picture of variables, which can become an important direction to do work on knowledge and adoption level in extension education. Therefore it is essential to identify the variables which influences directly as well as indirectly on the knowledge level and extent of adoption of BFVs and NBFVs with respect to IMPT.

Path co-efficient analysis helps to identify the effect of different independent variables on the dependent variables directly as well as indirectly. It gives the path in which an independent variable is affecting the dependent variable in a given set of independent variables.
To know the direct and indirect effect of various variables on knowledge level and extent of adoption of BF's and NBF's with respect to IMPT, the method of path co-efficient analysis (Wright, 1921) was employed.

The following relations were used to workout the path co-efficient.

Let be the dependent variable \( y_1 \) and independent variables \( x_1, x_2, x_3, \ldots, x_n \).

Then,

\[
\text{Py}_1 = \text{Path co-efficient of } y_1 \text{ on } x_1 \\
\text{Sy} = \text{Standard deviation of } y_1 \\
\text{S}_1 = \text{Standard deviation of } x_1 \\
\text{Sy}_{12} = \text{standard deviation of } y_1 \text{ and when all other variables except } x_1 \text{ are held constant} \\
\text{S}_{1.2} = \text{standard deviation of } x_1 \text{ and when all other variables except } x_2 \text{ are held constant}
\]

The correlation between two variables, \( y_1 \) and \( x_1 \) is equal to the sum of the chain of the path co-efficient along all the paths by which they are connected symbolically.

\[
ry_1 = \text{Py}_1 + \text{Py}_2 \text{ r}_{12} + \ldots + \text{P}_n \text{ r}_{1n} \\
ry_2 = \text{Py}_1 \text{r}_{n1} + \text{Py}_2 + \ldots + \text{P}_n \text{ r}_{2n} \\
ryn = \text{Py}_1 \text{r}_{n1} + \text{Py}_2 \text{ r}_{n2} + \ldots + \text{P}_n
\]

In general

\[
ry_1 = \sum_{j=1}^{n} \text{Py}_j \text{ r}_{ij}
\]
Path co-efficient were worked out by solving the above normal equations. The path co-efficient analysis was done through computer.

### 4.10. RESEARCH HYPOTHESES

General hypotheses (Stated in null form)

**H.1** There is no difference between the selected characteristics of beneficiary farmers (BFs) and non-beneficiary farmers (NBFs).

**H.2** There is no association between the knowledge level of BFs and NBFs about improved mango production technology and their personal characteristics viz., age, education and occupation.

**H.3** There is no association between the knowledge level of BFs and NBFs about improved mango production technology and their socio-economic characteristics viz., size of land holding, area under orchard, yield index, annual income and social participation.

**H.4** There is no association between the knowledge level of BFs and NBFs about improved mango production technology and their extension communication characteristics viz., extension participation and mass media exposure.

**H.5** There is no association between the knowledge level of BFs and NBFs about improved mango production technology and their psychological characteristics viz., opinion leadership, overall modernity, innovation proneness, farm mechanization, innovativeness, progressiveness, self confidence, self responsibility, marketing intelligence, attitude extent of adoption.
H.6 There is no association between the adoption index of BFs and NBFs about improved mango production technology and their personal characteristics viz., age, education and occupation.

H.7 There is no association between the adoption index of BFs and NBFs about improved mango production technology and their socio-economic characteristics viz., size of land holding, area under orchard, yield index, annual income and social participation.

H.8 There is no association between the adoption index of BFs and NBFs about improved mango production technology and their extension communication characteristics viz., extension participation and mass media exposure.

H.9 There is no association between the adoption index of BFs and NBFs about improved mango production technology and their psychological characteristics viz., opinion leadership, overall modernity, innovation proneness, farm mechanization, innovativeness, progressiveness, self-confidence, self-responsibility, marketing intelligence, attitude and level of knowledge.
CHAPTER - 5

FINDINGS AND DISCUSSION

The data were collected from the farmers by personal interview with the help of structured schedule. The collected data were classified, tabulated and analyzed in the light of objectives of the study. The facts and findings derived after analyzing the information have been presented under the following main heads:

5.1 Characteristics of BFs and NBFs.

5.2 Level of knowledge of BFs and NBFs with respect to improved mango production technology.

5.3 Extent of adoption of BFs and NBFs with respect to improved mango production technology.

5.4 Level of attitude of BFs and NBFs towards IHDP.

5.5 Relational analysis between the selected variables.

5.6 Constraints faced by the BFs in taking benefit of IHDP.

5.7 Suggestions offered by the BFs and NBFs for making the IHDP more effective.

5.1 CHARACTERISTICS OF THE BFS AND NBFS

The impact of IHDP is influenced by different characteristics of BFs and NBFs. It was not possible to consider all the characteristics of the respondents for this study. However, some of the important characteristics were selected.
The responses obtained from the respondents were subjected to statistical tests to find out the difference between the two groups of the farmers with respect to 22 selected characteristics. For this purpose ‘Z’ test was applied. The details in these regards are presented in Table-5.

5.1.1 Personal characteristics

5.1.1.1 Age

The data presented in Table-5 (1) indicated that the mean year of age of BFs and NBFs was 44.49 and 43.05 years, respectively. The mean difference was 1.44.

The hypothesis (H₁) stated that there is no difference between the age of BFs and NBFs. The calculated ‘Z’ value (1.493) was non significant at 0.05 level of probability. Hence, null hypothesis was accepted. It can be concluded that the BFs and NBFs were found similar in their age.

This finding was in line with those of Mayani (1987) and Gakkhar et al (2003).

5.1.1.2 Education

The data in Table-5 (2) stated that the mean educational level of BFs and NBFs was 8.46 and 8.84, respectively. The mean difference was – 0.38.

The hypothesis (H₁) stated that there is no difference between the educational level of BFs and NBFs. The calculated ‘Z’ value (-0.888) was non significant at 0.05 level of probability.
Table-5: Comparison between the characteristics of the BFs and NBFs

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Variables</th>
<th>Unit</th>
<th>Mean value BF (N=128)</th>
<th>Mean value NBFs (N=128)</th>
<th>Mean difference</th>
<th>“z” value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>Years</td>
<td>44.49</td>
<td>43.05</td>
<td>1.44</td>
<td>1.4927**</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>Std.</td>
<td>8.46</td>
<td>8.84</td>
<td>-0.38</td>
<td>-0.8883 NS</td>
</tr>
<tr>
<td>3.</td>
<td>Occupation</td>
<td>Score</td>
<td>1.75</td>
<td>1.68</td>
<td>0.07</td>
<td>0.9908 NS</td>
</tr>
<tr>
<td>4.</td>
<td>Size of land holding</td>
<td>Ha.</td>
<td>1.91</td>
<td>1.95</td>
<td>-0.04</td>
<td>-0.7770 NS</td>
</tr>
<tr>
<td>5.</td>
<td>Area under orchard</td>
<td>Ha.</td>
<td>0.88</td>
<td>1.39</td>
<td>-0.51</td>
<td>-5.5276**</td>
</tr>
<tr>
<td>6.</td>
<td>Yield index</td>
<td>Score</td>
<td>39.07</td>
<td>30.98</td>
<td>8.09</td>
<td>14.2249**</td>
</tr>
<tr>
<td>7.</td>
<td>Annual income</td>
<td>Rs.in lakh</td>
<td>0.40</td>
<td>0.33</td>
<td>0.07</td>
<td>2.6047**</td>
</tr>
<tr>
<td>8.</td>
<td>Social participation</td>
<td>Score</td>
<td>1.67</td>
<td>0.69</td>
<td>0.98</td>
<td>9.0174**</td>
</tr>
<tr>
<td>9.</td>
<td>Extension participation</td>
<td>Per cent</td>
<td>4.38</td>
<td>2.59</td>
<td>1.79</td>
<td>12.6897**</td>
</tr>
<tr>
<td>10.</td>
<td>Mass media exposure</td>
<td>Score</td>
<td>62.31</td>
<td>31.65</td>
<td>30.66</td>
<td>11.1927**</td>
</tr>
<tr>
<td>12.</td>
<td>Overall modernity</td>
<td>Score</td>
<td>6.34</td>
<td>3.19</td>
<td>6.15</td>
<td>14.7961**</td>
</tr>
<tr>
<td>13.</td>
<td>Innovation proneness</td>
<td>Score</td>
<td>16.38</td>
<td>7.69</td>
<td>8.69</td>
<td>24.3924**</td>
</tr>
<tr>
<td>14.</td>
<td>Farm mechanization</td>
<td>Score</td>
<td>295.79</td>
<td>229.85</td>
<td>65.94</td>
<td>7.1431**</td>
</tr>
<tr>
<td>15.</td>
<td>Innovativeness</td>
<td>Score</td>
<td>2.48</td>
<td>1.55</td>
<td>0.93</td>
<td>9.9491**</td>
</tr>
<tr>
<td>16.</td>
<td>Progressiveness</td>
<td>Score</td>
<td>8.66</td>
<td>5.76</td>
<td>2.90</td>
<td>13.7197**</td>
</tr>
<tr>
<td>17.</td>
<td>Self-confidence</td>
<td>Score</td>
<td>27.51</td>
<td>18.00</td>
<td>9.51</td>
<td>14.8253**</td>
</tr>
<tr>
<td>19.</td>
<td>Marketing intelligence</td>
<td>Per cent</td>
<td>72.21</td>
<td>58.79</td>
<td>13.42</td>
<td>12.3282**</td>
</tr>
<tr>
<td>20.</td>
<td>Level of attitude</td>
<td>Score</td>
<td>86.20</td>
<td>56.20</td>
<td>30.00</td>
<td>25.4786**</td>
</tr>
<tr>
<td>22.</td>
<td>Adoption index</td>
<td>Per cent</td>
<td>81.10</td>
<td>44.41</td>
<td>36.69</td>
<td>30.3581**</td>
</tr>
</tbody>
</table>

* = Significant at 0.05 level of probability (Table value =1.96)
** = Significant at 0.01 level of probability (Table value =2.58)
NS = Non-significant
Hence, null hypothesis was accepted. It can be concluded that the BFs and NBFs were found similar in their level of education.

This finding was in line with that of Patel (1981).

5.1.1.3 Occupation

The data presented in Table-5 (3) stated that the mean score of occupation on BFs and NBFs was 1.75 and 1.68, respectively. The mean difference was 0.07.

The hypothesis (H₁) stated that there is no difference between the occupation of BFs and NBFs. The calculated ‘Z’ value (0.991) was non significant at 0.05 level of probability. Hence, null hypothesis was accepted. It can be concluded that the BFs and NBFs were found similar in their occupation.

5.1.2 Socio-economic characteristics

5.1.2.1 Size of land holding

It is evident from the Table-5 (4) that the mean size of land holding of BFs and NBFs was 1.91 and 1.95 hectares, respectively. The mean difference was -0.04.

The hypothesis (H₁) stated that there is no difference between the size of land holding of BFs and NBFs. The calculated ‘Z’ value (-0.3777) was non significant at 0.05 level of probability. Hence, null hypothesis was accepted. It can be concluded that the BFs and NBFs were found similar in the size of land holding.
5.1.2.2 Area under orchard

The data presented in Table-5 (5) stated that the mean size of area under orchard of BFs and NBFs was 0.88 and 1.39 hectares, respectively. The mean difference was 0.51.

The hypothesis (H₁) stated that there is no difference between the size of area under orchard of BFs and NBFs. The calculated ‘Z’ value (-5.5276) was negatively significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that there was a significant difference between the size of area under orchard of BFs and NBFs.

This might be due to the fact that BFs of the IHDP were motivated by the implementing department to grow new orchard and they have adopted mango orchard growing on small area. That’s why BFs possess less area under orchard as compared to NBFs.

The farm diversification for BFs was 46.07 per cent. It can be concluded that the scheme IHDP had introduced new area under orchard. This farm diversification from traditional crop growing to orchard growing was only due to the efforts of the State Department of Horticulture under the scheme IHDP.

5.1.2.3 Yield index

It is evident from the data in Table-5 (6) that the mean yield index of the BFs and NBFs was 39.07 and 30.98, respectively. The mean difference was 8.09.

The hypothesis (H₁) stated that there is no difference between the yield index of BFs and NBFs. The calculated ‘Z’ value
was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that there was a significant difference between the yield index of BFs and NBFs.

The probable reason for this might be that the BFs of IHDP are mostly new growers of mango orchard and implementing department gives better attention towards them to provide timely guidance about Improved Mango Production Technology (IMPT), which led them to better yield as compared to NBFs.

5.1.2.4 Annual income

From the data presented in Table-5 (7) it is observed that the mean annual income of BFs and NBFs was Rs. 0.40 and Rs. 0.33, respectively. The mean difference was 0.07.

The hypothesis \( H_1 \) stated that there is no difference between the annual income of BFs and NBFs. The calculated ‘Z’ value (2.605) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be inferred that BFs and NBFs differed significantly with respect to their annual income.

It might be due to the fact that BFs obtain higher yield due to better attention of implementing department and other extension agencies to provide timely guidance about IMPT which led them to more annual income.

5.1.2.5 Social participation

From the data presented in Table-5 (8) it is observed that the mean social participation score of BFs and NBFs was 1.67 and 0.69, respectively. The mean difference was 0.98.
The hypothesis (H₁) stated that there is no difference between the social participation of BFs and NBFs. The calculated ‘Z’ value (9.017) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be inferred that BFs and NBFs differed significantly with respect to their social participation.

This might be due to the fact that BFs are in frequent contact with implementing department of IHDP, which motivate them to participate in various social organizations.

5.1.3 Extension and communication characteristics

5.1.3.1 Extension participation

It is evident from the data presented in Table-5 (9) that the mean extension participation index of BFs and NBFs was 62.31 and 31.65, respectively. The mean difference was 30.66.

The hypothesis (H₁) stated that there is no difference between the extension participation index of BFs and NBFs. The calculated ‘Z’ value (11.193) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be inferred that there was a significant difference between the extension participation index of BFs and NBFs.

This might be due to the fact that BFs notably brings themselves more in contact with implementing department and other extension agencies. Naturally BFs are new growers of mango orchard and needs frequent guidance about IMPT which led them to participate more in different extension activities.

This finding was in line with the finding of Rakholia (1996).
5.1.3.2 Mass media exposure

It is apparent from the data in Table-5 (10) that the mean score about mass media exposure of BFs and NBFs was 16.38 and 7.69, respectively. The mean difference was 8.69.

The hypothesis (H₁) stated that there is no difference between the mass media exposure of BFs and NBFs. The calculated ‘Z’ value (24.392) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs differed significantly from each other in case of their mass media exposure.

This might be due to the fact that more social participation and frequent contact with extension personnel by BFs encourage them to expose themselves towards various information sources to seek detailed information, experience and conviction about improved production technology.

5.1.4 Psychological characteristics

5.1.4.1 Opinion leadership

The data presented in Table-5 (11) stated that the mean score of opinion leadership of BFs and NBFs was 4.38 and 2.59, respectively. The mean difference was 1.79.

The hypothesis (H₁) stated that there is no difference between the opinion leadership of BFs and NBFs. The calculated ‘Z’ value (12.689) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs differed significantly from each other in case of their opinion leadership.
The probable reason might be that the BF s have to participate in different extension activities organized by the implementing department and other extension organizations, which developed them as opinion leader.

This finding was in line with the finding of Rakholia (1996).

### 5.1.4.2 Overall modernity

The data presented in Table 5 (12) expressed that the mean score of overall modernity of BF s and NBF s was 23.53 and 16.91, respectively. The mean difference was 6.62.

The hypothesis ($H_1$) stated that there is no difference between the overall modernity of BF s and NBF s. The computed ‘$Z$’ value (11.092) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BF s and NBF s differed significantly from each other in case of their overall modernity.

This might be due to the fact that the majority of BF s were generally aware of modern thinking and open minded to new ideas and practices. Therefore their overall modernity was higher as compared to NBF s.

This finding was in line with the finding of Rakholia (1996) and Karkar (1998).

### 5.1.4.3 Innovation proneness

It is apparent from the data in Table-5 (13) that the mean score of innovation proneness of BF s and NBF s was 6.34 and 3.19, respectively. The mean difference was 3.15.
The hypothesis \( (H_1) \) stated that there is no difference between the innovation proneness of BFs and NBFs. The computed ‘Z’ value (14.796) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs differed significantly from each other in case of their innovation proneness.

It might be due to the more extension participation, modern thinking and trust in recent research among BFs.

5.1.4.4 Farm mechanization index

The data in Table-5 (14) revealed that the mean farm mechanization index of BFs and NBFs was 295.79 and 229.85, respectively. The mean difference was 65.94.

The hypothesis \( (H_1) \) stated that there is no difference between the farm mechanization index of BFs and NBFs. The calculated ‘Z’ value (7.143) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that there was a significant difference between the farm mechanization index of BFs and NBFs.

The probable reason for this might be that the innovative nature and modern thinking of BFs led them to utilize modern farm implements to make orchard operations easy. It is also might be due to the fact that the more extension participation, mass media exposure and extension workers’ contact guided BFs to utilize modern technological accessories. Thus, farm mechanization index of BFs was high as compared to NBFs.

This finding was in line with the finding of Patel (1995) and Verma (2000).
5.1.4.5 Innovativeness

The data in Table-5 (15) revealed that the mean score of innovativeness of BFs and NBFs was 2.45 and 1.55, respectively. The mean difference was 0.93.

The hypothesis (H₁) stated that there is no difference between the innovativeness of BFs and NBFs. The computed ‘Z’ value (9.949) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs differed significantly from each other in case of their innovativeness.

The probable reason for this might be that the modern thinking, better participation in social organizations and good exposure to mass media by BFs led them towards higher innovativeness.

5.1.4.6 Progressiveness

It is evident from the data presented in Table-5 (16) that the mean score of progressiveness of BFs and NBFs was 8.66 and 5.76, respectively. The mean difference was 2.9.

The hypothesis (H₁) stated that there is no difference between the progressiveness of BFs and NBFs. The computed ‘Z’ value (13.719) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that there was a significant difference between the progressiveness of BFs and NBFs.

From the results, it may be inferred that BFs possess high level of overall modernity, high innovation proneness, higher innovativeness and more participation in social and extension
activities as compared to NBFs, which might be led them towards higher progressiveness.

5.1.4.7 Self confidence

The data presented in Table-5 (17) stated that the mean score about self-confidence of BFs and NBFs was 27.51 and 18.00, respectively. The mean difference was 9.51.

The hypothesis (H₁) stated that there is no difference between the self-confidence of BFs and NBFs. The computed ‘Z’ value (14.825) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs differed significantly from each other with respect to their self-confidence.

The high level of self-confidence among BFs might be due to the higher level of economic condition, better progressiveness and high exposure to different mass medias. The level of knowledge and extent of adoption may also increase the self-confidence among BFs as compared to NBFs.

5.1.4.8 Self responsibility

The relevant data presented in Table-5 (18) revealed that the mean score about self-responsibility of BFs and NBFs was 19.32 and 15.69, respectively. The mean difference was 3.63.

The hypothesis (H₁) stated that there is no difference between the self-responsibility of BFs and NBFs. The calculated ‘Z’ value (11.753) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs
differed significantly from each other in case of their self-responsibility.

It may be due to the fact that the BFs have morale binding to behave as responsible person as they had taken the benefits of IHDP. Hence, they are more self-responsible as compared to NBFs.

### 5.1.4.9 Market intelligence

The data presented in Table 5 (19) expressed that the mean score of market intelligence of BFs and NBFs was 72.21 and 58.79, respectively. The mean difference was 13.42.

The hypothesis ($H_1$) stated that there is no difference between the market intelligence of BFs and NBFs. The calculated ‘Z’ value (12.328) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs differed significantly from each other in case of their market intelligence.

The probable reason for this finding might be that the implementing department may continuously guiding to BFs regarding the market trend and behaviour that helps BFs to make them clear about market intelligence. Further it may also due to high participation of BFs in extension activities, which make them intelligent in market trend and behaviour.

### 5.1.4.10 Level of attitude

It is evident from the data presented in Table-5 (20) that the mean score of level of attitude of BFs and NBFs was 86.20 and 56.20, respectively. The mean difference was 30.00.
The hypothesis ($H_1$) stated that there is no difference between the level of attitude of BFs and NBFs. The calculated 'Z' value (25.479) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that there was a highly significant difference between the level of attitude of BFs and NBFs.

This might be due to the fact that the IHDP might have provided sufficient opportunity for BFs to expose themselves to the extension activities to be carried out by different organizations and also to utilize different mass media sources of information, which form the positive attitude. It also might be due to that this programme had involved BFs in different activities of IHDP in the area and provided good learning experience.

This finding was in line with the finding of Rakholia (1996) but differ from the finding of Shukla (1985).

5.1.4.11 Level of knowledge

It is evident from the data presented in Table-5 (21) that the mean score of level of knowledge of BFs and NBFs was 28.51 and 19.23, respectively. The mean difference was 9.28.

The hypothesis ($H_1$) stated that there is no difference between the level of knowledge of BFs and NBFs. The calculated ‘Z’ value (17.162) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that there was a highly significant difference between the level of knowledge of BFs and NBFs.

This might be due to the fact that the BFs mostly covered under all the extension activities regarding the IMPT organized by
the State Department of Horticulture. So IHDP had an influence in increasing the knowledge level of BFs. Moreover, they could get the special benefits of experts of state department of horticulture, which culminated in increasing the knowledge level of BFs. So they might have more knowledge about IMPT as compared to NBFs.

This finding was in line with the findings of Rakholia (1996) and Lakhera and Sharma (2003) but differ from the finding of Gakkhar et al (2003).

5.1.4.12 Adoption index

From the data in Table-5 (22) obviously indicated that the adoption index of BFs and NBFs was 81.10 per cent and 44.41 per cent, respectively. The mean difference was 36.69.

The hypothesis (H₁) stated that there is no difference between the adoption index of BFs and NBFs. The calculated ‘Z’ value (17.162) was significant at 0.01 level of probability. Hence, null hypothesis was rejected. It can be concluded that BFs and NBFs differed significantly from each other in case of their adoption index.

This might be due to the fact that the knowledge is a pre-requisite for adoption and the BFs were superior in knowledge of IMPT than NBFs naturally led them to high adoption. Moreover, the BFs were also involved in different activities of IHDP, which inspired them to adopt IMPT better than NBFs.

The findings reported by Lakhera and Sharma (2003) were in line with this finding but differ from the finding of Karkar (1998).
5.2 LEVEL OF KNOWLEDGE OF BFS AND NBFS ABOUT IMPROVED MANGO PRODUCTION TECHNOLOGY (IMPT)

A standardized knowledge test to measure the level of knowledge of respondents about IMPT was developed and used for the purpose. The knowledge scores of the respondents for IMPT were calculated as sum of the correct responses and then converted into percentage. The respondents were classified based on mean and standard deviation as low, medium and high.

The collected data on level of knowledge of respondents about IMPT are presented in Table-6 and depicted diagrammatically in Fig.-4.

It is evident from the result presented in Table-6 that 70.31 per cent of BFS had medium level of knowledge, whereas 15.63 per cent and 14.06 per cent had high and low level of knowledge about IMPT, respectively. The expected range of score was 0 to 35 and the observed score ranged between 16 to 35 with a mean score of 28.51 and standard deviation 4.37. The co-efficient of variation was 15.33 per cent in case of BFS. Hence, it can be concluded that majority of the BFS had medium level of knowledge.

In case of NBFS, 68.75 per cent had medium level of knowledge, whereas 18.75 per cent and 12.50 per cent had high and low level of knowledge about IMPT, respectively.
### Table-6: Level of knowledge of BFs and NBFs about IMPT

<table>
<thead>
<tr>
<th>Category of farmer</th>
<th>Level of knowledge</th>
<th>No.</th>
<th>Percent</th>
<th>Observed score</th>
<th>Mean score</th>
<th>S.D.</th>
<th>C.V. %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BFs (N=128)</strong></td>
<td>Low (&lt; 24.14)</td>
<td>18</td>
<td>14.06</td>
<td>16.00 to 35.00</td>
<td>28.51</td>
<td>4.37</td>
<td>15.33</td>
</tr>
<tr>
<td></td>
<td>Medium (24.14 to 32.88)</td>
<td>90</td>
<td>70.31</td>
<td></td>
<td>30.75</td>
<td>4.37</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (&gt; 32.88)</td>
<td>20</td>
<td>15.63</td>
<td></td>
<td>25.00</td>
<td>4.27</td>
<td>17.00</td>
</tr>
<tr>
<td><strong>NBFs (N=128)</strong></td>
<td>Low (&lt; 14.96)</td>
<td>24</td>
<td>18.75</td>
<td>12.00 to 30.00</td>
<td>19.23</td>
<td>4.27</td>
<td>22.20</td>
</tr>
<tr>
<td></td>
<td>Medium (424.96 to 23.50)</td>
<td>88</td>
<td>68.75</td>
<td></td>
<td>25.00</td>
<td>4.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (&gt; 23.50)</td>
<td>16</td>
<td>12.50</td>
<td></td>
<td>20.00</td>
<td>4.27</td>
<td></td>
</tr>
</tbody>
</table>

Mean difference  

“z” value = 17.162**  
** = Significant at 1.00 per cent  
NB: Expected score for both the categories (BFs and NBFs) ranged between 0 to 35

The expected range of score was 0 to 35 and the observed score ranged between 12 to 30 with a mean score of 19.23 and standard deviation 4.27. The co-efficient of variation was 22.20 per cent. Hence, it can be concluded that majority of the NBFs had medium level of knowledge about IMPT.

The comparison of mean knowledge score of BFs and NBFs indicated that BFs had higher knowledge of IMPT as compared to NBFs (Z= 17.162**).
FIG.: 4 Level of knowledge of BFs and NBFs about Improved Mango Production Technology
This might be due to the good social participation, significant extension participation and mass media exposure, progressive nature and frequent guidance provided by experts might have helped BFs in increasing their knowledge about IMPT.

This finding was in line with those of Rakholia (1996) and Lakhera and Sharma (2003).

5.3 EXTENT OF ADOPTION OF BFS AND NBFS ABOUT IMPROVED MANGO PRODUCTION TECHNOLOGY (IMPT)

For the measurement of adoption, the data were collected and analyzed in two parts:

5.3.1 Practice wise extent of adoption of BFs and NBFs about improved mango production technology (IMPT)

To assess the practice wise extent of adoption of BFs and NBFs about IMPT, ten improved practices scrutinized by the experts in the field were considered. The practice wise scores (as standardized mean score) were assigned to each adopted practice making a total of 100. On the basis of practice wise scores obtained by the respondents adopting particular practices, the mean scores were worked out for all the 10 practices. The mean score further converted in to percentage for all the practices. The ranks were assigned to each practice for BFs and NBFs. The overall mean percentage of 10 practices were 81.10 per cent and 44.41 per cent of BFs and NBFs, respectively. These mean percentage were considered for distinguishing more or less adopted practices. The results in this regard are presented in Table-7.

The table-7 shows that ten practices of IMPT adopted by BFs were arranged according to their ranks in descending order. The
adoption of varieties occupied first rank. This was followed by chemical fertilizers (rank second); planting distance (rank third); irrigation (rank fourth); disease control (rank fifth); tillage (rank sixth); organic manure (rank seventh); insect-pest control (rank eighth); use of hormones (rank ninth) and inter cropping (rank tenth), respectively.

Table-7: Practice wise adoption of BF{s and NBF{s about IMPT

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of practice</th>
<th>Possible score</th>
<th>Category of farmer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>BF{s</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>1.</td>
<td>Tillage</td>
<td>12</td>
<td>10.00</td>
</tr>
<tr>
<td>2.</td>
<td>Variety</td>
<td>2</td>
<td>2.00</td>
</tr>
<tr>
<td>3.</td>
<td>Planting distance</td>
<td>7</td>
<td>6.05</td>
</tr>
<tr>
<td>4.</td>
<td>Organic manure</td>
<td>11</td>
<td>9.00</td>
</tr>
<tr>
<td>5.</td>
<td>Chemical fertilizers</td>
<td>12</td>
<td>10.50</td>
</tr>
<tr>
<td>6.</td>
<td>Irrigation</td>
<td>16</td>
<td>13.55</td>
</tr>
<tr>
<td>7.</td>
<td>Insect-pest control</td>
<td>14</td>
<td>10.10</td>
</tr>
<tr>
<td>8.</td>
<td>Disease control</td>
<td>15</td>
<td>12.50</td>
</tr>
<tr>
<td>9.</td>
<td>Inter cropping</td>
<td>3</td>
<td>1.70</td>
</tr>
<tr>
<td>10.</td>
<td>Use of hormones</td>
<td>8</td>
<td>5.70</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>81.10</td>
</tr>
</tbody>
</table>

“t” value = 2.499**
Table value of ‘t’ at 0.05 level is 2.306

In case of NBF{s, it was observed that the first rank was occupied by adoption of chemical fertilizers followed by variety (second); planting distance (third); tillage (fourth); organic manure (fifth); inter cropping (sixth); insect-pest control (seventh); irrigation
(eighth); use of hormones(ninth) and disease control(tenth), respectively.

From the above discussion it can be inferred that the mean adoption index in case of BFs was high as compared to NBFs. The calculated “t” value was found significant at 0.05 level of probability indicating thereby that the mean adoption index of IMPT by BFs was found significantly higher than NBFs,

It can be summarized that the practices viz; variety, chemical fertilizers and planting distance were highly adopted by BFs. While practices viz; insect-pest control, disease control and use of hormones occupied almost last position in adoption. It is worth to note that in case of both the categories of respondents the plant protection measures were stood almost least adopted even though it is important practice. This may be due to the fact that the plant protection measures in mango orchard are difficult.

5.3.2 Extent of adoption of BFs and NBFs about improved mango production technology (IMPT)

The data regarding the extent of adoption of BFs and NBFs about IMPT and their potentiality of adoption were analyzed. The adoption index developed for the study was used. The adoption quotient developed by Chittopadhyay (1974) was used with slight modifications.

Adoption index for each respondent was calculated on the basis of maximum score obtained by him. The BFs and NBFs were classified in to three categories on the basis of mean and standard deviation as low, medium and high.
The data in this regard are presented in Table- 8 and diagrammatically depicted in Fig.-5.

Table-8: Extent of adoption of BFs and NBFs about IMPT

<table>
<thead>
<tr>
<th>Category of farmer</th>
<th>Extent of adoption</th>
<th>No.</th>
<th>Percent</th>
<th>Observed index</th>
<th>Mean index</th>
<th>S.D.</th>
<th>C.V. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFs (N=128)</td>
<td>Low (&lt; 71.43)</td>
<td>18</td>
<td>14.06</td>
<td>45.00 to 96.00</td>
<td>81.10</td>
<td>9.67</td>
<td>11.93</td>
</tr>
<tr>
<td></td>
<td>Medium (71.43 to 90.77)</td>
<td>87</td>
<td>67.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (&gt; 90.77)</td>
<td>23</td>
<td>17.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBFs (N=128)</td>
<td>Low (&lt; 34.78)</td>
<td>30</td>
<td>23.45</td>
<td>23.00 to 72.00</td>
<td>44.41</td>
<td>9.63</td>
<td>21.68</td>
</tr>
<tr>
<td></td>
<td>Medium (34.78 to 54.04)</td>
<td>82</td>
<td>64.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (&gt; 54.04)</td>
<td>16</td>
<td>12.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean difference: 36.67

“z” value = 30.358**
** = Significant at 1.00 per cent

NB: Expected score for both the categories (BFs and NBFs) ranged between 0 to 100

From the data presented in Table- 8 it was observed that 67.97 per cent, 17.97 per cent and 14.06 per cent of the BFs were medium, high and low adopters of IMPT, respectively. The expected range of adoption index was 0 to 100 and obtained range was between 45 to 96 with mean index of 81.10 and standard deviation 9.67. The co-efficient of variation was 11.93 per cent. It indicated that the mean index of BFs was found to be more than 50.00 per cent and maximum index obtained was
FIG.: 5 Extent of adoption of BFs and NBFs about Improved Mango Production Technology
96.00 per cent and the variation within the group was 11.93 per cent. Thus, majority of the BFs were found to be medium adopters of IMPT and the trend of adoption was medium to high.

In case of NBFs, 64.05 per cent, 23.45 per cent and 12.50 per cent of the NBFs were medium, low and high adopters of IMPT, respectively. The minimum and maximum index achieved between 23 to 72 with a mean index of 44.41 and standard deviation 9.63. The co-efficient of variation was 21.68 per cent. It indicated that the mean index of NBFs was found to be less than 50.00 per cent and maximum index obtained was 72.00 per cent and the variation within the group was 21.68 per cent. Thus, majority of the NBFs were found to be medium adopters of IMPT and the trend of adoption was medium to low.

The BFs and NBFs differed significantly (Z = 30.358**) in extent of adoption indicated that the BFs had adopted more IMPT as compared to NBFs.

This might be due to the fact that BFs had higher level of knowledge, more social participation and extension participation and higher exposure to mass medias, which led them towards higher adoption of IMPT.

This finding was in conformity with those of Karkar (1998) and Lakhera and Sharma (2003).

5.4 LEVEL OF ATTITUDE OF BFS AND NBFS TOWARDS INTEGRATED HORTICULTURAL DEVELOPMENT PROGRAMME (IHDP)

As discussed in the methodology, the standardized attitude scale was developed. It was used to measure the level of attitude of
the respondent farmers towards IHDP. The data in this regard were collected from the respondents and they were categorized by using the mean and standard deviation as less favourable, favourable and highly favourable.

The data collected for this are presented in Table- 9 and depicted diagrammatically in Fig.-6.

Table-9: Level of attitude of BFs and NBFs towards IHDP

<table>
<thead>
<tr>
<th>Category of farmer</th>
<th>Level of attitude</th>
<th>No.</th>
<th>Percent</th>
<th>Observed score</th>
<th>Mean score</th>
<th>S.D.</th>
<th>C.V. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFs (N=128)</td>
<td>Less favourable (&lt; 71.10)</td>
<td>11</td>
<td>8.59</td>
<td>65 to 110</td>
<td>86.20</td>
<td>9.10</td>
<td>10.56</td>
</tr>
<tr>
<td></td>
<td>Favourable (71.10 to 95.30)</td>
<td>94</td>
<td>73.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Highly favourable (&gt; 95.30)</td>
<td>23</td>
<td>17.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBFs (N=128)</td>
<td>Less favourable (&lt; 46.48)</td>
<td>25</td>
<td>19.53</td>
<td>40 to 82</td>
<td>56.20</td>
<td>9.72</td>
<td>17.30</td>
</tr>
<tr>
<td></td>
<td>Favourable (46.48 to 65.92)</td>
<td>83</td>
<td>64.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Highly favourable (&gt; 65.92)</td>
<td>20</td>
<td>15.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean difference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“z” value = 25.479**
** = Significant at 1.00 per cent
NB: Expected score for both the categories (BFs and NBFs) ranged between 24 to 10

The perusal of the data in Table-9 indicates that 73.44 per cent of the BFs had favourable attitude towards IHDP whereas, 17.97 per cent and 8.59 per cent had highly favourable and less favourable attitude towards IHDP, respectively. The expected
FIG.: 6 Level of attitude of BFs and NBFs towards Integrated Horticultural Development Programme
range of score was 24 to 120. The observed score ranged between 65 to 110 with a mean score of 86.20 and standard deviation 9.10. The co-efficient of variation was 10.56 per cent in case of BFs. Hence, it can be concluded that majority of the BFs had favourable attitude towards IHDP.

In case of NBFs, 64.84 per cent had favourable attitude towards IHDP whereas, 19.53 per cent and 15.63 per cent had less favourable and highly favourable attitude, respectively. The observed score ranged between 40 to 82 with a mean score of 56.20 and standard deviation 9.72. The co-efficient of variation was 17.30 per cent. Hence, it can be concluded that majority of the NBFs had favourable attitude towards IHDP.

The comparison of mean score of BFs and NBFs indicated that BFs had highly favourable attitude towards IHDP as compared to NBFs \((Z= 25.479**)\).

This might be due to the fact that all the BFs were benefited under the IHDP regarding the IMPT and also other related activities without paying any charges, which might have played major role in building up favourable attitude of BFs towards IHDP.

This finding was supported by the finding of Rakholia (1996).

### 5.5 RELATIONAL ANALYSIS BETWEEN THE SELECTED VARIABLES

**5.5.1 Correlation analysis**

**5.5.1.1 Association between the level of knowledge about IMPT and independent variables of BFs and NBFs**
With a view to find out the association between the level of knowledge (dependent variable) of BFs and NBFs and their selected characteristics as shown in Table-10, the correlation co-efficient (r-value) was used. The association was found for BFs and NBFs separately for comparison on the basis of operational measures used for the variables. Research hypotheses in null form were derived for testing the association and their significance on zero order correlation. The zero order correlation (‘r’ values) are given in Table-10 and its characteristic wise association is discussed in subsequent pages.

5.5.1.1.1 Age and level of knowledge

From the data in Table 10(1), it can be said that the calculated correlation co-efficient value of $r = -0.4287$ was significant at 0.01 level of probability in case of BFs. While, the value of $r = -0.0705$ was non-significant at 0.05 level of probability in case of NBFs. Hence, the null hypothesis ($H_2$) was rejected in case of BFs and accepted in case of NBFs. It indicated that as age is more the level of knowledge is low.

It can be concluded that in case of BFs, the increasing age had influence on the level of knowledge about IMPT, while in case of NBFs the age had no correlation with the level of knowledge.

The probable reason for this might be that the BFs are very enthusiastic to learn more about IMPT as compared to NBFs.

This finding was not in line with the finding of Rakholia (1996) and Karkar and Munshi (2003).
5.5.1.1.2 Education and level of knowledge

It can be seen from Table 10(2) that the calculated correlation coefficient value of $r = 0.4445$ was significant at 0.01 level of probability in case of BFs. While, the value of $r = -0.0563$ was non-significant at 0.05 level of probability in case of NBFs. Hence, the null hypothesis ($H_2$) was rejected in case of BFs and accepted for NBFs. It indicated that the level of knowledge increased with increase in education of BFs.

It can be concluded that in case of BFs, the increasing education had influence on the level of knowledge about IMPT, while in case of NBFs the increasing education had no influence on the level of knowledge.

It might be due to the fact that the BFs were constant in contact with the implementing department and have to participate various extension activities organized by different extension agencies. Thus, they get a wide exposure which provide them an opportunity to learn more about IMPT.

This finding was in line with the finding of Rakholia (1996).

5.5.1.1.3 Occupation and level of knowledge

The data presented in Table 10(3) revealed that the calculated correlation coefficient values $r = 0.0393$ and $r = -0.0788$ were found non-significant at 0.05 level of probability, for BFs and NBFs, respectively. Hence, the null hypothesis ($H_2$) was accepted.
Table-10: Association between the level of knowledge of BF\textsc{s} and NBF\textsc{s} and their selected characteristics about IMPT

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Characteristics</th>
<th>“r” values</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Personal</td>
<td>BF\textsc{s} (N= 128)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NBF\textsc{s} (N=128)</td>
</tr>
<tr>
<td>1.</td>
<td>X\textsubscript{1} Age</td>
<td>-0.4287**</td>
</tr>
<tr>
<td>2.</td>
<td>X\textsubscript{2} Education</td>
<td>0.4445**</td>
</tr>
<tr>
<td>3.</td>
<td>X\textsubscript{3} Occupation</td>
<td>0.0393 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.0788 NS</td>
</tr>
<tr>
<td>II</td>
<td>Socio-economic</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>X\textsubscript{4} Size of land holding</td>
<td>0.1038 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.1255 NS</td>
</tr>
<tr>
<td>5.</td>
<td>X\textsubscript{5} Area under orchard</td>
<td>-0.0866 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.0214 NS</td>
</tr>
<tr>
<td>6.</td>
<td>X\textsubscript{6} Yield index</td>
<td>0.1941*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1033 NS</td>
</tr>
<tr>
<td>7.</td>
<td>X\textsubscript{7} Annual income</td>
<td>-0.0385 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.0399 NS</td>
</tr>
<tr>
<td>8.</td>
<td>X\textsubscript{8} Social participation</td>
<td>0.0748 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.0050 NS</td>
</tr>
<tr>
<td>III</td>
<td>Extension-communication</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>X\textsubscript{9} Extension participation</td>
<td>0.2554**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3417**</td>
</tr>
<tr>
<td>10.</td>
<td>X\textsubscript{10} Mass media exposure</td>
<td>0.2014*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0573 NS</td>
</tr>
<tr>
<td>IV</td>
<td>Psychological</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>X\textsubscript{11} Opinion leadership</td>
<td>0.1473 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1309 NS</td>
</tr>
<tr>
<td>12.</td>
<td>X\textsubscript{12} Overall modernity</td>
<td>0.0487 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.1088 NS</td>
</tr>
<tr>
<td>13.</td>
<td>X\textsubscript{13} Innovation proneness</td>
<td>0.1954*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3870**</td>
</tr>
<tr>
<td>14.</td>
<td>X\textsubscript{14} Farm mechanization</td>
<td>0.0588 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.1158 NS</td>
</tr>
<tr>
<td>15.</td>
<td>X\textsubscript{15} Innovativeness</td>
<td>0.0206 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0413 NS</td>
</tr>
<tr>
<td>16.</td>
<td>X\textsubscript{16} Progressiveness</td>
<td>0.0683 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1282 NS</td>
</tr>
<tr>
<td>17.</td>
<td>X\textsubscript{17} Self-confidence</td>
<td>0.2189*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0424 NS</td>
</tr>
<tr>
<td>18.</td>
<td>X\textsubscript{18} Self-responsibility</td>
<td>-0.0850 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0411 NS</td>
</tr>
<tr>
<td>19.</td>
<td>X\textsubscript{19} Market intelligence</td>
<td>0.0900 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0187 NS</td>
</tr>
<tr>
<td>20.</td>
<td>X\textsubscript{20} Level of attitude</td>
<td>0.1750*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.1032 NS</td>
</tr>
<tr>
<td>21.</td>
<td>X\textsubscript{22} Adoption index</td>
<td>0.6927**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.6290**</td>
</tr>
</tbody>
</table>

* = Significant at 0.05 level of probability (Tab.value =± 0.17357)
** = Significant at 0.01 level of probability (Table value =± 0.228)
NS = Non-significant
It can be inferred that the occupation of the BFs and NBFs had non-significant association with their level of knowledge.

The finding was supported by the findings of Murthy (1990) and Rakholia (1996).

**5.5.1.1.4 Size of land holding and level of knowledge**

It is apparent from the data presented in Table 10(4) that the values of calculated correlation co-efficient \( r = 0.1038 \) and \( r = -0.1255 \) were found non-significant at 0.05 level of probability, for BFs and NBFs, respectively. Hence, the null hypothesis (\( H_3 \)) was accepted.

It can be inferred that the size of land holding of the BFs and NBFs had non significant association with their level of knowledge.

The finding was in conformity with the finding of Nandvana (1993), Rakholia (1996) and Jadav et al (2003).

**5.5.1.1.5 Area under orchard and level of knowledge**

From the data in Table 10(5), it can be said that the computed correlation co-efficient values of \( r = -0.0866 \) and \( r = -0.0214 \) were found non-significant at 0.05 level of probability, for BFs and NBFs, respectively. Hence, the null hypothesis (\( H_3 \)) was accepted.

It can be concluded that there was no relationship found between area under orchard and level on knowledge of respondents about IMPT. It means the knowledge level of mango growers did not relate with their area under orchard.
5.5.1.1.6 Mango yield index and level of knowledge

Table 10(6) shows that the computed correlation coefficient value of $r = 0.1941$ was significant at 0.05 level of probability in case of BFs. While, the value of $r = 0.1034$ was non-significant at 0.05 level of probability in case of NBFs. Hence, the null hypothesis ($H_3$) was rejected in case of BFs and accepted for NBFs.

It can be concluded that the positive and significant relationship was observed between the level of knowledge and mango yield index of BFs. It indicated that the level of knowledge increased with increase in yield index. While in case of NBFs, no significant association was observed between the knowledge level and yield index.

The probable reason might be that BFs having high mean value of knowledge which help them to adopt IMPT in meaningful way which increase the yield index. Further, BFs follows IMPT learned during exposure to different sources of information regarding the IMPT, which led them to higher yield index.

5.5.1.1.7 Annual income and level of knowledge

The data presented in Table 10(7) revealed that the calculated correlation coefficient values $r = -0.0385$ and $r = -0.0399$ were found non-significant at 0.05 level of probability, for BFs and NBFs, respectively. Hence, the null hypothesis ($H_3$) was accepted.

It can be inferred that the annual income of the BFs and NBFs had non-significant association with their level of knowledge about IMPT. It means knowledge level of BFs and NBFs did not relate with their annual income.
The finding was not in conformity with the finding of Gosai (1997) and Bhatt (2002).

5.5.1.1.8 Social participation and level of knowledge

It is evident from the data presented in Table 10(8) that the calculated correlation coefficient values $r = 0.0748$ and $r = -0.0500$ were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_3$) was accepted.

It can be concluded that the social participation of the BFs and NBFs had non-significant association with their level of knowledge about IMPT.

The finding was differ from the findings of Nandvana (1993) and Rakholia (1996).

5.5.1.1.9 Extension participation and level of knowledge

The perusal of data in Table 10(9) states that the calculated correlation coefficient values $r = 0.2554$ and $r = 0.3417$ were found significant at 0.01 level of probability, for BFs and NBFs, respectively. Hence, the null hypothesis ($H_4$) was rejected.

It can be summarized that the knowledge level of BFs and NBFs was positively and significantly associated with their extension participation index. It indicated that the knowledge level increased with the increase in extension participation index of BFs and NBFs.

This might be due to the fact that the respondents of both the categories had more extension participation to provide them
opportunities to interact with extension workers working in various capacities and engaged in implementing IHDP, which led them to increase their level of knowledge.

The finding was supported by the findings of Karkar (1998) and Patel et al (2003).

5.5.1.1.10 Mass media exposure and level of knowledge

The data in Table 10 reveal that the computed correlation coefficient value of $r = 0.2014$ was found significant at 0.05 level of probability for BFs. Whereas, $r = 0.0573$ was non significant at 0.05 level of significance. Hence, the null hypothesis ($H_4$) was rejected in case of BFs and accepted in case of NBFs.

It can be concluded that there was a positive and significant relationship between level of knowledge of BFs and their mass media exposure. It implies that an increase in mass media exposure was responsible for increasing level of knowledge. While in case of NBFs, mass media exposure had non-significant association with their level of knowledge.

This might be due to the fact that BFs with high exposure to mass media will always have more chance to collect useful information and proper guidance about IMPT which resulted in higher level of knowledge.

5.5.1.1.11 Opinion leadership and level of knowledge

The examination of the data presented in Table 10 shows that the calculated correlation coefficient values $r = 0.1473$ and $r = 0.1309$ were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_5$) was
accepted. It indicated that there was no relationship between the level of knowledge of BFs and NBFs and their opinion leadership.

It can be concluded that the opinion leadership of the BFs and NBFs had non-significant association with their level of knowledge about IMPT.

The finding was differing the finding of Rakholia (1996).

5.5.1.12 Overall modernity and level of knowledge

The observation of data presented in Table 10(12) indicate that the calculated correlation coefficient values $r= 0.0487$ and $r= -0.1086$ were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_5$) was accepted.

It can be inferred that there was a non-significant correlation between the level of knowledge of BFs and NBFs and their overall modernity. It means the level of knowledge and overall modernity of BFs and NBFs are independent from each other.

The finding was differing the finding of Rakholia (1996).

5.5.1.13 Innovation proneness and level of knowledge

It is evident from the data presented in Table 10(13) revealed that the calculated correlation coefficient values $r= 0.1954$ and $r= 0.3870$ were found significant at 0.05 and 0.01 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_5$) was rejected.
It can be concluded that the knowledge level of BFs and NBFs was positively and significantly associated with their innovation proneness. It indicated that the increase in innovation proneness of BFs and NBFs led to increase in their level of knowledge.

It might be due to the fact that the respondents of both the categories are eager to adopt the IMPT earlier than others. Though, the BFs had new experience of mango growing so they are more prone to adopt the IMPT. The yield index of BFs with their level of knowledge is significant which may prove to their enthusiasm to use of IMPT. In case of NBFs, the yield index was non-significant with their level of knowledge. Though they are prone to use the IMPT because of getting remunerative mango yield.

5.5.1.1.14 Farm mechanization index and level of knowledge

The data presented in Table 10(14) revealed that the calculated correlation coefficient values $r=0.0588$ and $r=-0.1158$ were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_5$) was accepted. This indicated that the level of knowledge and farm mechanization index is independent from each other in both the categories of respondents.

5.5.1.1.15 Innovativeness and level of knowledge

Table 10(15) shows that the values of calculated correlation coefficient $r=0.0206$ and $r=0.0413$ were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_5$) was accepted. This indicated that the level of knowledge and innovativeness of BFs and NBFs are independent of each other. The direction of association was positive and non-
significant for both the categories of respondents, which indicated that the level of knowledge of the BFs and NBFs could be increased with an increase in their innovativeness.

The finding differ from the finding of Patil *et al*(1998).

### 5.5.1.1.16 Progressiveness and level of knowledge

The observation data presented in Table 10(16) reveal that the values of calculated correlation coefficient $r= 0.0683$ and $r= 0.1282$ were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_5$) was accepted.

It can be concluded that there was no any association between the level of knowledge of BFs and NBFs and their progressiveness. The direction of association was positive and non-significant for both the categories of respondents. That means the level of knowledge of the BFs and NBFs may be increased with an increase in their progressiveness.

### 5.5.1.1.17 Self confidence and level of knowledge

The data in Table 10(17) state that the computed correlation coefficient value of $r= 0.2189$ was found significant at 0.05 level of probability for BFs. Whereas, $r= 0.0424$ was non-significant at 0.05 level of significance in case of NBFs. Hence, the null hypothesis ($H_5$) was rejected in case of BFs and accepted in case of NBFs.

It can be concluded that a positive and significant relationship was observed between level of knowledge of BFs and their self-confidence. While in case of NBFs, non-significant association was observed between the level of knowledge and their self-confidence.
It is because of the fact that BF's have feelings about the ability, initiative and zeal to achieve their goal or aim which compel them to get knowledge to fulfill the same. Further they can expose themselves to the various sources of information, which led them to increased level of knowledge.

5.5.1.1.18 Self responsibility and level of knowledge

The data presented in Table 10(18) stated that the values of calculated correlation coefficient $r = -0.0850$ and $r = 0.0411$ were found non-significant at 0.05 level of probability for BF's and NBF's, respectively. Hence, the null hypothesis ($H_5$) was accepted.

It can be inferred that the knowledge level of both the categories of respondents and their self-responsibility are independent from each other. It means knowledge level of BF's and NBF's did not relate with their self-responsibility.

5.5.1.1.19 Market intelligence and level of knowledge

It is clearly shown from the data presented in Table 10(19) that the values of calculated correlation coefficient $r = 0.0903$ and $r = 0.0187$ were found non-significant at 0.05 level of probability for BF's and NBF's, respectively. Hence, the null hypothesis ($H_5$) was accepted.

It can be concluded that there was no significant relationship between the level of knowledge of BF's and NBF's and their market intelligence. It means knowledge level of BF's and NBF's and their market intelligence are quite independent of each other.
5.5.1.1.20 Level of attitude and level of knowledge

The data presented in Table 10(20) stated that the calculated correlation coefficient value \( r = 0.1750 \) was found significant at 0.05 level of probability for BFs whereas, \( r = -0.1032 \) was non-significant at 0.05 level of probability in case of NBFs. Hence, the null hypothesis \((H_5)\) was rejected for BFs and accepted for NBFs.

It can be concluded that the level of knowledge of the BFs was significantly associated with their level of attitude towards IHDP. While in case of NBFs, there was not a significant association between level of knowledge and their attitude towards IHDP. It implies that increase of favourable attitude towards IHDP led to increase the knowledge level of BFs.

This might be due to the fact that both the level of attitude and level of knowledge are component of behaviour and they are inter-correlated. The favourable attitude among BFs produce changes in the thinking process which would led to increase their knowledge level. Another reason might be that the benefit of IHDP acquired by BFs, which led to significant increase in their level of knowledge.

The finding was in line with the finding of Karkar (1998).

5.5.1.1.21 Extent of adoption and level of knowledge

The perusal of the data presented in Table 10(21) reveal that the calculated correlation coefficient values \( r = 0.6927 \) and \( r = 0.6290 \) were found significant at 0.01 level of probability, for BFs and NBFs, respectively. Hence, the null hypothesis \((H_5)\) was rejected. It can be concluded that the knowledge level of BFs and NBFs was positively and significantly associated with their adoption
index. It indicated that the knowledge level increased with the increase in adoption index of both the categories of respondents.

This might be due to the fact that the adoption of IMPT helped not only in increasing the yield but also provided new practical experience to the mango orchardists, which helped them to improve their knowledge and skills. Hence, an increase in adoption index led towards the increased level of knowledge of both the categories of respondents.


5.5.1.2 Association between the extent of adoption of IMPT and independent variables of BF's and NBF's

With a view to find out the association between the extent of adoption (dependent variable) of BF’s and NBF’s and their selected characteristics as shown in Table-11, the correlation coefficient (r-value) was used. The association was found for BF’s and NBF’s separately for comparison on the basis of operational measures used for the variables. Research hypotheses in null form were derived for testing the association and their significance on zero order correlation. The zero order correlation (‘r’ values) is given in Table-11 and its characteristic wise association is discussed in subsequent pages.
5.5.1.2.1 Age and extent of adoption

From the data in Table 11(1), it can be said that the calculated correlation co-efficient value of $r= -0.3287$ was negative and significant at 0.01 level of probability in case of BFs. While, the value of $r= -0.0993$ was non-significant at 0.05 level of probability in case of NBFs. Hence, the null hypothesis ($H_0$) was rejected in case of BFs and accepted in case of NBFs.

It can be concluded that there was a negative and significant association between the extent of adoption of BFs and their age. While in case of NBFs, there was a negative and non-significant association between the extent of adoption and their age. It indicated that the extent of adoption was increased with decrease in age of BFs.

This might have happened because of farmers of beneficiary group having higher level of knowledge due to
Table-11: Association between the extent of adoption of BF$s and NBF$s and their selected characteristics about IMPT

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Characteristics</th>
<th>“ r” values</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BF$s (N= 128)</td>
<td>NBF$s (N=128)</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Personal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Age</td>
<td>-0.3287**</td>
<td>-0.0993 NS</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>0.2752**</td>
<td>-0.0457 NS</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Occupation</td>
<td>0.0469 NS</td>
<td>-0.0233 NS</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Socio-economic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Size of land holding</td>
<td>0.0901 NS</td>
<td>0.0175 NS</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Area under orchard</td>
<td>-0.0411 NS</td>
<td>0.0651 NS</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Yield index</td>
<td>0.1865*</td>
<td>0.1370 NS</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Annual income</td>
<td>-0.0618 NS</td>
<td>0.1032 NS</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Social participation</td>
<td>0.1318 NS</td>
<td>0.0473 NS</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Extension-communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Extension participation</td>
<td>0.2881**</td>
<td>0.1865*</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Mass media exposure</td>
<td>-0.1484 NS</td>
<td>0.0249 NS</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Psychological</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Opinion leadership</td>
<td>0.0956 NS</td>
<td>0.0497 NS</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Overall modernity</td>
<td>0.0465 NS</td>
<td>-0.0946 NS</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Innovation proneness</td>
<td>0.1851*</td>
<td>0.2659**</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Farm mechanization</td>
<td>0.1785*</td>
<td>0.2099*</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Innovativeness</td>
<td>0.1113 NS</td>
<td>-0.0278 NS</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Progressiveness</td>
<td>0.0754 NS</td>
<td>0.0974 NS</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Self-confidence</td>
<td>0.0874 NS</td>
<td>0.0660 NS</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Self-responsibility</td>
<td>-0.1183 NS</td>
<td>0.0410 NS</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Market intelligence</td>
<td>-0.0496 NS</td>
<td>0.1706 NS</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Level of attitude</td>
<td>0.2922**</td>
<td>-0.1199 NS</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Level of knowledge</td>
<td>0.6927**</td>
<td>0.6291**</td>
<td></td>
</tr>
</tbody>
</table>

* = Significant at 0.05 level of probability (Tab.value =± 0.17357)
** = Significant at 0.01 level of probability (Table value =± 0.228)
NS = Non-significant

exposure to information sources, which led them to better adoption. Moreover, having trust in recent technology, which may increase the adoption index.
5.5.1.2.2 Education and extent of adoption

It can be seen from the Table 11(2) that the computed correlation coefficient value $r = 0.2753$ was significant at 0.01 level of probability for BFs. While, the value $r = -0.0457$ was non-significant at 0.05 level of probability in case of NBFs. Hence, null hypothesis ($H_0$) was rejected in case of BFs and accepted for NBFs.

It can be concluded that there was a positive and significant correlation between the extent of adoption of BFs and their level of education. It indicated that the extent of adoption increased with increase in education of BFs. While for NBFs, there was a negative and non-significant correlation between the extent of adoption and their education. That means in case of BFs, the increasing education had influence on the extent of adoption of IMPT. While, in case of NBFs the adoption index and education are quite independent from each other.

The probable reason for this finding might be that the majority of the educated BFs might have learned more and understood the IMPT easily to adopt due to their higher mental capability.

5.5.1.2.3 Occupation and extent of adoption

The data presented in Table 11(3) revealed that the calculated correlation coefficient values $r = 0.0469$ and $r = -0.0233$ were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis ($H_0$) was accepted.

It can be inferred that the occupation of the BFs and NBFs had non-significant association with their extent of adoption.
5.5.1.2.4 Size of land holding and extent of adoption

It is apparent from the data presented in Table 11(4) that the values of calculated correlation co-efficient $r= 0.0901$ and $r= 0.0175$ were found non-significant at 0.05 level of probability for BF and NBF, respectively. Hence, the null hypothesis ($H_7$) was accepted.

It can be summarized that the size of land holding of the BF and NBF had non-significant association with their extent of adoption about IMPT. It means extent of adoption of IMPT did not increase significantly with increase in size of land holding.

5.5.1.2.5 Area under orchard and extent of adoption

From the data in Table 11(5), it can be said that the computed correlation co-efficient values of $r= -0.0411$ and $r= 0.0651$ were found non-significant at 0.05 level of probability for BF and NBF, respectively. Hence, the null hypothesis ($H_7$) was accepted.

It can be concluded that there was no relationship found between the area under orchard and extent of adoption of respondents about IMPT. It means adoption index of BF and NBF and their area under orchard are quite independent from each other.

This finding was in line with the finding of Dangar (1996) but differ from the finding of Pandya and Vekaria (1994).

5.5.1.2.6 Mango yield index and extent of adoption

The data in Table 11(6) stated that the computed correlation coefficient value of $r= 0.1865$ was significant at 0.05 level of probability in case of BF. While, the value of $r= 0.1370$ was non-
significant at 0.05 level of probability in case of NBFs. Hence, the null hypothesis \((H_7)\) was rejected in case of BFs and accepted for NBFs.

It can be concluded that the extent of adoption of IMPT was positively and significantly associated with the yield index of BFs. whereas, positively and non-significantly associated with the yield index of NBFs. It shows that adoption of IMPT was increased with increase in the yield index of BFs.

The probable reason might be that being BFs they are better interested in knowing the recent technology about mango orcharding and which make them sound in IMPT ultimately increases the yield index.

This finding was not in line with the findings of Gosai (1997) and Bhatt (2002).

5.5.1.2.7 Annual income and extent of adoption

The data presented in Table 11(7) revealed that the calculated correlation coefficient values \( r= -0.0618 \) and \( r= 0.1032 \) were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis \((H_7)\) was accepted.

It can be inferred that the annual income of the BFs and NBFs had non significant association with their extent of adoption about IMPT. It means adoption index of BFs and NBFs did not relate with their annual income.

This finding was not in conformation with the findings of Christain et al (2003) and Shigh (2003).
5.5.1.2.8 Social participation and extent of adoption

The persual of the data in Table 11(8) revealed that the calculated correlation coefficient values \( r = 0.1318 \) and \( r = 0.0473 \) were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis \( (H_7) \) was accepted.

It can be concluded that the social participation of the BFs and NBFs had non-significant association with their extent of adoption about IMPT.

This finding was differing from the findings of Chaudhari et al (1996) and Bhatt (2002).

5.5.1.2.9 Extension participation and extent of adoption

It is evident from the data presented in Table 11(9) revealed that the computed correlation coefficient values \( r = 0.2881 \) and \( r = 0.1865 \) were found non-significant at 0.01 and 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis \( (H_8) \) was rejected.

It can be concluded that the adoption index of BFs and NBFs was positively and significantly associated with their extension participation index. It indicated that the extent of adoption increased with the increase in extension participation index of BFs and NBFs.

This might be due to the fact that the BFs and NBFs had a good participation in extension activities organized by different extension agencies, which make them aware about IMPT and motivate to adopt the same.
This finding was in line with the finding of Pandya (1991) and Ranganathan et al (2001).

5.5.1.2.10 Mass media exposure and extent of adoption

The data in Table 11(10) stated that the computed correlation coefficient value of \( r = -0.1484 \) and \( r = 0.0249 \) were non significant at 0.05 level of significance for BFs and NBFs, respectively. Hence, the null hypothesis \((H_8)\) was accepted.

It can be concluded that there was a non-significant relationship between extent of adoption of BFs and NBFs and their mass media exposure. It implies that the adoption index and mass media exposure of BFs and NBFs are quite independent from each other.

5.5.1.2.11 Opinion leadership and extent of adoption

It is evident from the data presented in Table 11(11) revealed that the calculated correlation coefficient values \( r = 0.0956 \) and \( r = 0.0497 \) were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis \((H_9)\) was accepted. It indicated that there was no relationship between the extent of adoption of BFs and NBFs and their opinion leadership.

It can be inferred that the opinion leadership of the BFs and NBFs had non-significant association with their extent of adoption about IMPT.

5.5.1.2.12 Overall modernity and extent of adoption

The data presented in Table 11(12) revealed that the calculated correlation coefficient values \( r = 0.0465 \) and \( r = -0.0946 \)
were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis (H₀) was accepted.

It can be inferred that there was a non-significant correlation between the adoption index of BFs and NBFs and their overall modernity. It means the extent of adoption and overall modernity are independent from each other for both the categories of respondents.

5.5.1.2.13 Innovation proneness and extent of adoption

It is evident from the data presented in Table 11(13) revealed that the calculated correlation coefficient values r= 0.1851 and r= 0.2659 were found significant at 0.05 and 0.01 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis (H₀) was rejected.

It can be concluded that the extent of adoption of BFs and NBFs was positively and significantly associated with their innovation proneness. It indicated that the increase in innovation proneness of BFs and NBFs led to increase in their adoption index.

The level of knowledge of BFs and NBFs was significantly correlated with their extent of innovation proneness naturally increase the level of adoption of IMPT might be the probable reason for this finding.

This finding was supported by Ranganathan et al. 2001.

5.5.1.2.14 Farm mechanization index and extent of adoption

The data presented in Table 11(14) revealed that the calculated correlation coefficient values r= 0.1785 and r= 0.2099
were found significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis \((H_9)\) was rejected.

It can be summarized that there is association between the extent of adoption of BFs and NBFs and their farm mechanization index. It can be said that with increase in farm mechanization the adoption index can also increased.

The probable reason might be that farm implements are useful to reduce the drudgery load and gear up the working capacity of orchard operations. The higher level of farm mechanization encouraged the respondents to adopt IMPT. Hence, a significant result was observed between farm mechanization index and extent of adoption.

**5.5.1.2.15 Innovativeness and extent of adoption**

The table 11(15) shows that the values of calculated correlation coefficient \(r= 0.1113\) and \(r=-0.0278\) were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis \((H_9)\) was accepted. This indicated that there was a non-significant association between the adoption index of BFs and NBFs and their innovativeness.

It can be inferred that the adoption index of BFs and NBFs and their innovativeness are independent from each other.

**5.5.1.2.16 Progressiveness and extent of adoption**

The data presented in Table 11(16) stated that the values of calculated correlation coefficient \(r= 0.0754\) and \(r= 0.0974\) were found non-significant at 0.05 level of probability in case of BFs and NBFs, respectively. Hence, the null hypothesis \((H_9)\) was accepted.
It can be concluded that there was no any association between the adoption index of BFs and NBFs and their progressiveness. The direction of association was positive and non-significant for both the categories of respondents. That means the extent of adoption of the BFs and NBFs may be increased with an increase in their progressiveness.

### 5.5.1.2.17 Self confidence and extent of adoption

The data in Table 11(17) stated that the computed correlation coefficient value of \( r = 0.0874 \) and \( r = 0.0661 \) were non-significant at 0.05 level of significance in case of BFs and NBFs, respectively. Hence, the null hypothesis \((H_9)\) was accepted.

It can be concluded that the adoption index of BFs and NBFs and their self-confidence are totally independent of each other. It means adoption index of BFs and NBFs did not relate with their self-confidence. However, direction of association was positive. That means there may be increase in extent of adoption of BFs and NBFs with increased self-confidence.

### 5.5.1.2.18 Self responsibility and extent of adoption

The data presented in Table 11(18) stated that the values of calculated correlation coefficient \( r = -0.1183 \) and \( r = 0.0410 \) were found non-significant at 0.05 level of probability for BFs and NBFs, respectively. Hence, the null hypothesis \((H_9)\) was accepted.

It can be inferred that the adoption index of both the categories of respondents and their self-responsibility are independent of each other. It means adoption index of BFs and NBFs did not relate with their self-responsibility.
5.5.1.2.19 Market intelligence and extent of adoption

It is clearly observed from the data presented in Table 11(19) that the values of calculated correlation coefficient \( r = -0.0496 \) and \( r = 0.1706 \) were found non-significant at 0.05 level of probability for BF\( s \) and NBF\( s \), respectively. Hence, the null hypothesis (\( H_0 \)) was accepted.

It can be concluded that there was a non-significant relationship between the adoption index of BF\( s \) and NBF\( s \) and their market intelligence. It means adoption index of BF\( s \) and NBF\( s \) and their market intelligence are quite independent from each other.

5.5.1.2.20 Level of attitude and extent of adoption

The data presented in Table 11(20) stated that the calculated correlation coefficient value \( r = 0.2922 \) was found significant at 0.01 level of probability for BF\( s \). Whereas, \( r = -0.1199 \) was non-significant at 0.05 level of probability in case of NBF\( s \). Hence, the null hypothesis (\( H_0 \)) was rejected for BF\( s \) and accepted for NBF\( s \).

It can be concluded that the adoption index of the BF\( s \) was significantly associated with their level of attitude towards IHDP. While in case of NBF\( s \), there was not a significant association between extent of adoption and their attitude towards IHDP. It implies that increase of favourable attitude towards IHDP led to increase the extent of adoption of IMPT among BF\( s \).
This might be due to the fact that BFs might have been motivated by the implementing department to take benefit of IHDP which in turn have helped in forming favourable attitude and resulted in increasing extent of adoption of IMPT.

5.5.1.2.21 Level of knowledge and extent of adoption

The data presented in Table 11(21) stated that the calculated correlation coefficient values \( r = 0.6927 \) and \( r = 0.6291 \) were positive and significant at 0.01 level of probability in case of BFs and NBFs, respectively. Hence, the null hypothesis (H\(_0\)) was rejected.

It can be concluded that the adoption index of the BFs and NBFs was positive and highly significantly associated with their level of knowledge about IMPT. It indicates that the adoption of IMPT by the respondents increased with increase in their level of knowledge.

This might be due to the fact that the good participation of the respondents in various extension activities increased their mental capabilities and learning experience ultimately increase the level of knowledge which led towards increased adoption index.

5.5.2 Extent of variation

5.5.2.1 Multiple regression analysis

The association between dependent and selected independent variables was ascertained (in this chapter under part 5.5 and 5.6) by computing correlation coefficient (r-value) for the two categories (BFs and NBFs) of the respondents. The ‘r’ value only gives the strength and direction of association but does not focus on the
predictive ability of independent variables on the dependent variables. Hence, the multiple regression was worked out with regard to BFs and NBFs separately to trace the predictive abilities of independent variables on the dependent variables of BFs and NBFs about IHDP. The regression equation models were derived accordingly. The independent variables, which indicated significant contribution in zero order correlation analysis for BFs and NBFs, were analyzed further by multiple regression technique to determine their relative contribution and to predict the extent of variation. The predictive power of each multiple regression was estimated with the help of the coefficient of multiple determinations ($R^2$).

The various independent variables had their own unit of measurement, which did not permit a comparison of partial ‘b’ values. To facilitate comparison the partial ‘b’ values were converted into standard partial ‘b’ which were free from the unit of measurement as per the method suggested by Ezekiel and Fox.

The independent variables then ranked on the basis of standard partial ‘b’ values to find out their relative importance in predicting the dependent variable. The significance of partial regression coefficient was worked out by finding ‘t’ values. Accordingly, the multiple regression analysis was done and the results are presented as follows.

**5.5.2.1.1 Multiple regression of the independent variables on the level of knowledge of BFs**

Out of 21 independent variables, 9 had shown significant association with the knowledge level of BFs in zero order correlation
analysis. They were taken in the multiple regression analysis and the following regression model was obtained:

\[ Y_1 = a + b_1 x_1 + b_2 x_2 + b_6 x_6 + b_9 x_9 + b_{10} x_{10} + b_{13} x_{13} + B_{17} x_{17} + b_{20} x_{20} + b_{22} x_{22} \]

Where,

- \( Y_1 \) = Response on knowledge level of BF
- \( a \) = Intercept
- \( b_1 \) = Coefficient of partial regression of \( y_1 \) on \( x_1 \)
- \( b_2 \) = Coefficient of partial regression of \( y_1 \) on \( x_2 \)
- \( b_6 \) = Coefficient of partial regression of \( y_1 \) on \( x_6 \)
- \( b_9 \) = Coefficient of partial regression of \( y_1 \) on \( x_9 \)
- \( b_{10} \) = Coefficient of partial regression of \( y_1 \) on \( x_{10} \)
- \( b_{13} \) = Coefficient of partial regression of \( y_1 \) on \( x_{13} \)
- \( b_{17} \) = Coefficient of partial regression of \( y_1 \) on \( x_{17} \)
- \( b_{20} \) = Coefficient of partial regression of \( y_1 \) on \( x_{20} \)
- \( b_{22} \) = Coefficient of partial regression of \( y_1 \) on \( x_{22} \)
- \( x_1 \) = Age
- \( x_2 \) = Education
- \( x_6 \) = Yield index
- \( x_9 \) = Extension participation
- \( x_{10} \) = Mass media exposure
- \( x_{13} \) = Innovation proneness
- \( x_{17} \) = Self confidence
- \( x_{20} \) = Level of attitude
x_{22} = \text{Extent of adoption}

The $R^2$ value (0.6132) in Table-12 indicated that 9 independent variables contributed towards 61.32 per cent of variation in the level of knowledge of BFs about IMPT. $R^2$ was significant at 0.01 level of probability.

The calculated ‘t’ value for partial regression coefficient was significant at 0.01 level in case of adoption index ($t=8.230^{**}$) and at 0.05 level of probability in case of variable education ($t=2.098^*$). On the basis of standard partial ‘b’ values in Table-12 it can be said that the order of contribution of these nine variables from highest to lowest was $X_{22}$ (adoption index), $X_2$ (education), $X_{17}$ (self confidence), $X_{10}$ (mass media exposure), $X_1$ (age), $X_{20}$ (level of attitude), $X_{13}$ (innovation proneness), $X_9$ (extension participation) and $X_6$ (yield index).
Table-12: Multiple regression between the level of knowledge of BFs and their independent variables

<table>
<thead>
<tr>
<th>Sr. NO.</th>
<th>Variable</th>
<th>Regression coefficient (bi)</th>
<th>“t” value DF = 106</th>
<th>Std.partial regression coefficient</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age(X₁)</td>
<td>-0.0579</td>
<td>-0.996 NS</td>
<td>0.0093</td>
<td>V</td>
</tr>
<tr>
<td>2.</td>
<td>Education (X₂)</td>
<td>0.2328</td>
<td>2.098*</td>
<td>0.0399</td>
<td>II</td>
</tr>
<tr>
<td>3.</td>
<td>Yield index (X₆)</td>
<td>0.0378</td>
<td>0.962 NS</td>
<td>0.0037</td>
<td>IX</td>
</tr>
<tr>
<td>4.</td>
<td>Extension participation (X₉)</td>
<td>-0.0184</td>
<td>-0.842 NS</td>
<td>0.0066</td>
<td>VIII</td>
</tr>
<tr>
<td>5.</td>
<td>Mass media exposure (X₁₀)</td>
<td>-0.1029</td>
<td>-1.212 NS</td>
<td>0.0137</td>
<td>IV</td>
</tr>
<tr>
<td>6.</td>
<td>Innovation proneness (X₁₃)</td>
<td>0.2548</td>
<td>0.894 NS</td>
<td>0.0075</td>
<td>VII</td>
</tr>
<tr>
<td>7.</td>
<td>Self confidence (X₁₇)</td>
<td>0.0727</td>
<td>1.377 NS</td>
<td>0.0176</td>
<td>III</td>
</tr>
<tr>
<td>8.</td>
<td>Level of attitude (X₂₀)</td>
<td>-0.0340</td>
<td>-0.955 NS</td>
<td>0.0085</td>
<td>VI</td>
</tr>
<tr>
<td>9.</td>
<td>Adoption index (X₂₂)</td>
<td>0.2715</td>
<td>8.230**</td>
<td>0.3899</td>
<td>I</td>
</tr>
</tbody>
</table>

R² = 0.6132
* = Significant at 0.05 level of probability (Tab. value =± 1.99)
** = Significant at 0.01 level of probability (Table value =± 2.63)
NS = Non-significant

From the above discussion it might be concluded that respondents who possess higher level of education, having high extent of adoption, greater self confidence, good exposure to mass media and favourable attitude towards IHDP, higher innovation proneness, good extension participation and higher yield index have facilitated to raise their level of knowledge.

This result was in line with Rakholia (1996).
5.5.2.1.2 Multiple regression of the independent variables on the level of knowledge of NBFs

Out of 21 independent variables, only 3 had shown significant association with the knowledge level of NBFs in zero order correlation analysis. They were considered in the multiple regression analysis and the following regression model was obtained:

\[ Y_1 = a + b_9x_9 + b_{13}x_{13} + b_{22}x_{22} \]

Where,

- \( Y_1 \) = Response on knowledge level of NBFs
- \( a \) = Intercept
- \( b_9 \) = Coefficient of partial regression of \( y_1 \) on \( x_9 \)
- \( b_{13} \) = Coefficient of partial regression of \( y_1 \) on \( x_{13} \)
- \( b_{22} \) = Coefficient of partial regression of \( y_1 \) on \( x_{22} \)
- \( x_9 \) = Extension participation
- \( x_{13} \) = Innovation proneness
- \( x_{22} \) = Extent of adoption

The \( R^2 \) value (0.5477) in Table-13 expressed that 3 independent variables jointly contributed towards 54.77 per cent of variation in the level of knowledge of NBFs about IMPT. \( R^2 \) was significant at 0.01 level of probability.

The calculated ‘t’ value for partial regression coefficient was significant at 0.01 level in case of adoption index \((t=7.154**)\) only. Further it is revealed that on the basis of standard partial ‘b’ values these three variables were arranged in order of contribution from
highest to lowest as $X_{22}$ (adoption index), $X_{13}$ (innovation proneness) and $X_9$ (extension participation).

Table-13: Multiple regression between the level of knowledge of NBFs and their independent variables

<table>
<thead>
<tr>
<th>Sr. NO.</th>
<th>Variable</th>
<th>Regression coefficient ($b_i$)</th>
<th>“t” value (DF=106)</th>
<th>Std.partial regression coefficient</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Extension participation ($X_9$)</td>
<td>0.0314</td>
<td>1.008 NS</td>
<td>0.0095</td>
<td>III</td>
</tr>
<tr>
<td>2.</td>
<td>Innovation proneness ($X_{13}$)</td>
<td>0.5483</td>
<td>1.473 NS</td>
<td>0.0201</td>
<td>II</td>
</tr>
<tr>
<td>3.</td>
<td>Adoption index ($X_{22}$)</td>
<td>0.2449</td>
<td>7.154**</td>
<td>0.3256</td>
<td>I</td>
</tr>
</tbody>
</table>

$R^2 = 0.5477$

* = Significant at 0.05 level of probability (Tab.value =± 1.99)

** = Significant at 0.01 level of probability (Table value =± 2.63)

NS = Non-significant

From the above discussion it might be concluded that NBFs having high extent of adoption, higher innovation proneness and good extension participation have facilitated to raise their level of knowledge.

5.5.2.1.3 Multiple regression of the independent variables on the extent of adoption of BF

Out of 21 independent variables, 8 had shown significant association with the adoption index of BFs in zero order correlation analysis. They were entered in the multiple regression analysis and the following regression model was obtained:

$$Y_2 = a + b_1x_1 + b_2x_2 + b_6x_6 + b_9x_9 + b_{13}x_{13} + b_{14}x_{14} +$$

$$B_{20}x_{20} + b_{21}x_{21}$$

Where,
$Y_2 =$ Response on knowledge level of BFs
$a$ = Intercept
$b_1=$ Coefficient of partial regression of $y_2$ on $x_1$
$b_2=$ Coefficient of partial regression of $y_2$ on $x_2$
$b_6=$ Coefficient of partial regression of $y_2$ on $x_6$
$b_9=$ Coefficient of partial regression of $y_2$ on $x_9$
$b_{13}=$ Coefficient of partial regression of $y_2$ on $x_{13}$
$b_{14}=$ Coefficient of partial regression of $y_2$ on $x_{14}$
$b_{20}=$ Coefficient of partial regression of $y_2$ on $x_{20}$
$b_{21}=$ Coefficient of partial regression of $y_2$ on $x_{21}$
$x_1$ = Age
$x_2$ = Education
$x_6$ = Yield index
$x_9$ = Extension participation
$x_{13}$= Innovation proneness
$x_{14}$ = Farm mechanization
$x_{20}$ = Level of attitude
$x_{21}$= Level of knowledge

The $R^2$ value (0.5856) in Table-14 indicated that 8 independent variables jointly contributed towards 58.56 per cent of variation in the extent of adoption of BFs about IMPT. $R^2$ was significant at 0.01 level of probability.
Table-14: Multiple regression between the extent of adoption of BFs and their independent variables

<table>
<thead>
<tr>
<th>Sr. NO.</th>
<th>Variable</th>
<th>Regression coefficient (bi)</th>
<th>“t” value (DF = 106)</th>
<th>Std. partial regression coefficient</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age (X₁)</td>
<td>-0.1285</td>
<td>-0.962 NS</td>
<td>0.0086</td>
<td>VIII</td>
</tr>
<tr>
<td>2.</td>
<td>Education (X₂)</td>
<td>-0.2669</td>
<td>-01.030 NS</td>
<td>0.0099</td>
<td>VII</td>
</tr>
<tr>
<td>3.</td>
<td>Yield index (X₆)</td>
<td>-0.2034</td>
<td>-1.482 NS</td>
<td>0.0203</td>
<td>IV</td>
</tr>
<tr>
<td>4.</td>
<td>Extension participation (X₉)</td>
<td>0.1222</td>
<td>2.490*</td>
<td>0.0553</td>
<td>III</td>
</tr>
<tr>
<td>5.</td>
<td>Innovation proneness (X₁₃)</td>
<td>-0.9442</td>
<td>-1.449 NS</td>
<td>0.0194</td>
<td>V</td>
</tr>
<tr>
<td>6.</td>
<td>Farm mechanization (X₁₄)</td>
<td>0.0110</td>
<td>1.351 NS</td>
<td>0.0169</td>
<td>VI</td>
</tr>
<tr>
<td>7.</td>
<td>Level of attitude (X₂₀)</td>
<td>0.2070</td>
<td>2.599*</td>
<td>0.0599</td>
<td>II</td>
</tr>
<tr>
<td>8.</td>
<td>Level of knowledge (X₂₁)</td>
<td>1.4360</td>
<td>8.230**</td>
<td>0.3899</td>
<td>I</td>
</tr>
</tbody>
</table>

R² = 0.5856

* = Significant at 0.05 level of probability (Tab. value =± 1.99)

** = Significant at 0.01 level of probability (Table value =± 2.63)

NS = Non-significant

The calculated ‘t’ value for partial regression coefficient were significant at 0.01 level in case of level of knowledge (t=8.230**) and at 0.05 level of probability in case of variable level of attitude (t=2.599*) and extension participation (t=2.490*). On the basis of standard partial ‘b’ values in Table-14 it can be said that the order of relative importance of these variables from highest to lowest was X₂₁ (level of knowledge), X₂₀ (level of attitude), X₉ (extension participation), X₆ (yield index), X₁₃ (innovation proneness), X₁₄ (farm mechanization index), X₂ (education) and X₁ (age).

This might be due to the fact that the BFs have good extension participation and more innovation proneness, made them
aware to acquire higher level of knowledge, which developed the favourable attitude towards IHDP and ultimately increased the extent of adoption of IMPT.

This finding was in line with the finding of Karkar (1998).

5.5.2.1.4 Multiple regression of the independent variables on the extent of adoption of NBFs

Out of 21 independent variables, only 4 had shown significant association with the adoption index of NBFs in zero order correlation analysis. They were entered in the multiple regression analysis and the following regression model was obtained:

\[ Y_2 = a + b_9x_9 + b_{13}x_{13} + b_{14}x_{14} + b_{21}x_{21} \]

Where,

\( Y_2 \) = Response on knowledge level of NBFs

\( a \) = Intercept

\( b_9 \) = Coefficient of partial regression of \( y_2 \) on \( x_9 \)

\( b_{13} \) = Coefficient of partial regression of \( y_2 \) on \( x_{13} \)

\( b_{14} \) = Coefficient of partial regression of \( y_2 \) on \( x_{14} \)

\( b_{21} \) = Coefficient of partial regression of \( y_2 \) on \( x_{21} \)

\( x_9 \) = Extension participation

\( x_{13} \) = Innovation proneness

\( x_{14} \) = Farm mechanization

\( x_{21} \) = Level of knowledge
Table-15: Multiple regression between the extent of adoption of NBFs and their independent variables

<table>
<thead>
<tr>
<th>Sr.NO.</th>
<th>Variable</th>
<th>Regression coefficient (bi)</th>
<th>“t” value (DF = 106)</th>
<th>Std.partial regression coefficient</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Extension participation (X_9)</td>
<td>-0.1071</td>
<td>-1.484 NS</td>
<td>0.0204 (II)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Innovation proneness (X_{13})</td>
<td>1.2681</td>
<td>1.462 NS</td>
<td>0.0198 (IV)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Farm mechanization(X_{14})</td>
<td>-0.1750</td>
<td>-1.473 NS</td>
<td>0.0201 (III)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Level of knowledge(X_{21})</td>
<td>1.3297</td>
<td>7.154**</td>
<td>0.3256 (I)</td>
<td></td>
</tr>
</tbody>
</table>

R² = 0.5153

* = Significant at 0.05 level of probability (Tab.value =± 1.99)

** = Significant at 0.01 level of probability (Table value =± 2.63)

NS = Non-significant

The R² value (0.5153) in Table-15 indicated that 4 independent variables jointly contributed towards 51.53 per cent of variation in the extent of adoption of NBFs about IMPT. R² was significant at 0.01 level of probability.

The calculated ‘t’ value for partial regression coefficient was significant at 0.01 level of probability in case of level of knowledge (t=7.154**) only. From the values in Table-15 it is revealed on the basis of standard partial ‘b; values that the order of contribution of these four variables from highest to lowest was X_{21}(level of knowledge), X_{9} (extension participation), X_{14} (farm mechanization index) and X_{13} (innovation proneness).

It can be concluded that variables viz., knowledge level, extension participation, farm mechanization and innovation proneness had contributed considerably towards adoption index of NBFs.
5.5.3 Path coefficient analysis

The multiple regression analysis was carried out with regards to BFs and NBFs separately to trace the predictive ability of independent variables on the dependent variables and then path analysis was followed in order to have better understanding of how changes in dependent variables of the respondents was influenced by the set of independent variables directly as well as indirectly through other variables. The data therefore were subjected to the path analysis for the level of knowledge and extent of adoption of BFs and NBFs about IMPT.

5.5.3.1 Path analysis of knowledge level of BFs

All the 21 independent variables were considered for path analysis. The results are presented in Table-16.

**Direct effect**

The data given in Table-16 revealed that the variable adoption index had exerted highest direct positive effect on the level of knowledge of BFs as the path coefficient being 0.6032 followed by the size of land holding (0.2204), education (0.1929) and innovation proneness (0.1033). Remaining variables did not exhibit considerable direct effect on the level of knowledge of BFs.

**Total indirect effect**

The data in Table-16 indicated that extension participation possessed highest total indirect positive effect (0.3499) on the knowledge level of BFs followed by mass media exposure (0.2834), education (0.2517), level of attitude (0.2261),
Table-16: Direct and indirect effect of selected independent variables on the level of knowledge of BF

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Variables</th>
<th>Direct effect</th>
<th>Total indirect effect</th>
<th>Substantial indirect effect (First)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>-0.0962</td>
<td>-0.3324</td>
<td>0.1983(X_{22})</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>0.1929</td>
<td>0.2517</td>
<td>0.1660(X_{22})</td>
</tr>
<tr>
<td>3.</td>
<td>Occupation</td>
<td>-0.1630</td>
<td>0.2023</td>
<td>0.1231(X_4)</td>
</tr>
<tr>
<td>4.</td>
<td>Size of land holding</td>
<td>0.2204</td>
<td>-0.1663</td>
<td>0.0910(X_3)</td>
</tr>
<tr>
<td>5.</td>
<td>Area under orchard</td>
<td>-0.1053</td>
<td>0.0187</td>
<td>0.0964(X_4)</td>
</tr>
<tr>
<td>6.</td>
<td>Yield index</td>
<td>0.0043</td>
<td>0.1898</td>
<td>0.0381(X_4)</td>
</tr>
<tr>
<td>7.</td>
<td>Annual income</td>
<td>-0.0149</td>
<td>0.0232</td>
<td>0.1158(X_4)</td>
</tr>
<tr>
<td>8.</td>
<td>Social participation</td>
<td>0.0320</td>
<td>0.0429</td>
<td>0.0795(X_{22})</td>
</tr>
<tr>
<td>9.</td>
<td>Extension participation</td>
<td>-0.1044</td>
<td>0.3499</td>
<td>0.1739(X_{22})</td>
</tr>
<tr>
<td>10.</td>
<td>Mass media exposure</td>
<td>-0.0819</td>
<td>0.2834</td>
<td>0.0895(X_{22})</td>
</tr>
<tr>
<td>11.</td>
<td>Opinion leadership</td>
<td>0.0552</td>
<td>0.0920</td>
<td>0.0576(X_{22})</td>
</tr>
<tr>
<td>12.</td>
<td>Overall modernity</td>
<td>0.0116</td>
<td>0.0368</td>
<td>0.0280(X_{22})</td>
</tr>
<tr>
<td>13.</td>
<td>Innovation proneness</td>
<td>0.1033</td>
<td>0.0920</td>
<td>0.1116(X_{22})</td>
</tr>
<tr>
<td>14.</td>
<td>Farm mechanization</td>
<td>-0.0498</td>
<td>0.1084</td>
<td>0.1016(X_{22})</td>
</tr>
<tr>
<td>15.</td>
<td>Innovativeness</td>
<td>-0.0758</td>
<td>0.0964</td>
<td>0.0671(X_{22})</td>
</tr>
<tr>
<td>16.</td>
<td>Progressiveness</td>
<td>0.0520</td>
<td>0.0163</td>
<td>0.0455(X_{22})</td>
</tr>
<tr>
<td>17.</td>
<td>Self-confidence</td>
<td>0.0981</td>
<td>0.1201</td>
<td>0.0527(X_{22})</td>
</tr>
<tr>
<td>18.</td>
<td>Self-responsibility</td>
<td>-0.0370</td>
<td>-0.0480</td>
<td>-0.0714(X_{22})</td>
</tr>
<tr>
<td>19.</td>
<td>Market intelligence</td>
<td>0.0733</td>
<td>0.0181</td>
<td>0.0299(X_{22})</td>
</tr>
<tr>
<td>20.</td>
<td>Level of attitude</td>
<td>-0.0707</td>
<td>0.2261</td>
<td>0.1763(X_{22})</td>
</tr>
<tr>
<td>21.</td>
<td>Adoption index</td>
<td>0.6032</td>
<td>0.0895</td>
<td>0.0531(X_2)</td>
</tr>
</tbody>
</table>

Residual = 0.3868
occupation (0.2023), yield index (0.1898) and self-confidence (0.1201). Whereas, age had exerted highest total indirect negative effect (-0.3324) on the knowledge level of BFs followed by size of land holding (-0.1633). Remaining variables did not exhibit considerable total indirect effect on the level of knowledge on BFs.

Substantial indirect effect (First)

Table-16 also shows that attitude was seen to have positive substantial indirect effect (0.1763) on the level of knowledge through the variable adoption index. The second important variable exerting first substantial positive indirect effect was extension participation (0.1739) through the variable adoption index. The third important variable exerting first substantial positive indirect effect was education (0.1660) through the variable adoption index. Fourth important variable exerting first substantial positive indirect effect was occupation (0.1231) through the variable size of land holding.

While, the age was seen to have highest negative first substantial indirect effect (-0.1983) on the knowledge level of BFs through the variable adoption index. Remaining variables did not exhibit considerable substantial indirect effect on the knowledge level of BFs.

It can be concluded from the above path result that the adoption index, size of land holding and education were the most important variables affecting directly and positively on the knowledge level of BFs. In respect to total indirect effect, the key variables were extension participation, mass media exposure, education and level of attitude. While age and land holding were important variables for negative effect. These were also important in
In respect to first substantial indirect effect through variable adoption index. The important variables in these regards are shown in Fig.-7.

Fig. 7: Important variables in path analysis of level of knowledge of BF about IPMT

- \( X_1 \) = Age
- \( X_2 \) = Education
- \( X_3 \) = Occupation
- \( X_4 \) = Size of land holding
- \( X_9 \) = Extension participation
- \( X_{10} \) = Mass media exposure
- \( X_{13} \) = Innovation proneness
- \( X_{20} \) = Level of attitude
- \( X_{22} \) = Adoption index
5.5.3.2 Path analysis of knowledge level of NBFs

All the 21 independent variables were considered for path analysis. The results are presented in Table-17.

Direct effect

The data given in Table-17 revealed that the variable adoption index had exerted highest direct positive effect on the level of knowledge of NBFs as the path coefficient being 0.5512 followed by the area under orchard (0.2756), innovation proneness (0.2089) and extension participation (0.1368). Remaining variables did not exhibit considerable direct effect on the level of knowledge of NBFs.

Total indirect effect

The data in Table-17 indicate that social participation possessed highest total indirect positive effect (0.2352) on the knowledge level of NBFs followed by extension participation (0.2048), innovation proneness (0.1818), yield index (0.1464), education (0.1115) and market intelligence (0.1063). Whereas, area under orchard had exerted highest total indirect negative effect (-0.2968) on the knowledge level of NBFs followed by farm mechanization index (-0.1472), self-confidence (-0.0453), level of attitude (-0.0427) and innovativeness (-0.0317). Remaining Variables did not exhibit considerable total indirect effect on the level of knowledge on NBFs.
Table-17: Direct and indirect effect of selected independent variables on the level of knowledge of NBFs

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Variables</th>
<th>Direct effect</th>
<th>Total indirect effect</th>
<th>Substantial indirect effect (First)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>-0.0632</td>
<td>-0.0073</td>
<td>0.1059(X_2)</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>-0.1680</td>
<td>0.1115</td>
<td>0.0453(X_{12})</td>
</tr>
<tr>
<td>3.</td>
<td>Occupation</td>
<td>-0.1175</td>
<td>0.0386</td>
<td>-0.1364(X_5)</td>
</tr>
<tr>
<td>4.</td>
<td>Size of land holding</td>
<td>-0.1622</td>
<td>0.0367</td>
<td>0.2011(X_5)</td>
</tr>
<tr>
<td>5.</td>
<td>Area under orchard</td>
<td>0.2756</td>
<td>-0.2968</td>
<td>0.2571(X_7)</td>
</tr>
<tr>
<td>6.</td>
<td>Yield index</td>
<td>-0.0432</td>
<td>0.1464</td>
<td>0.0755 (X_{22})</td>
</tr>
<tr>
<td>7.</td>
<td>Annual income</td>
<td>-0.2753</td>
<td>0.0537</td>
<td>0.0261 (X_{22})</td>
</tr>
<tr>
<td>8.</td>
<td>Social participation</td>
<td>-0.0586</td>
<td>0.2352</td>
<td>0.2574 (X_5)</td>
</tr>
<tr>
<td>9.</td>
<td>Extension participation</td>
<td>0.1368</td>
<td>0.2048</td>
<td>0.1792 (X_{12})</td>
</tr>
<tr>
<td>10.</td>
<td>Mass media exposure</td>
<td>-0.0364</td>
<td>0.0.0936</td>
<td>0.0605 (X_{12})</td>
</tr>
<tr>
<td>11.</td>
<td>Opinion leadership</td>
<td>0.0551</td>
<td>0.0756</td>
<td>0.0274 (X_{22})</td>
</tr>
<tr>
<td>12.</td>
<td>Overall modernity</td>
<td>-0.0379</td>
<td>-0.0240</td>
<td>0.0522 (X_{22})</td>
</tr>
<tr>
<td>13.</td>
<td>Innovation proneness</td>
<td>0.2089</td>
<td>0.1818</td>
<td>0.1466 (X_{22})</td>
</tr>
<tr>
<td>14.</td>
<td>Farm mechanization</td>
<td>0.0314</td>
<td>-0.1472</td>
<td>-0.1158 (X_{22})</td>
</tr>
<tr>
<td>15.</td>
<td>Innovativeness</td>
<td>0.0732</td>
<td>-0.0317</td>
<td>0.0208 (X_5)</td>
</tr>
<tr>
<td>16.</td>
<td>Progressiveness</td>
<td>0.0556</td>
<td>0.0728</td>
<td>0.0537 (X_{22})</td>
</tr>
<tr>
<td>17.</td>
<td>Self-confidence</td>
<td>0.0876</td>
<td>-0.0453</td>
<td>-0.0452 (X_7)</td>
</tr>
<tr>
<td>18.</td>
<td>Self-responsibility</td>
<td>-0.0645</td>
<td>0.0427</td>
<td>-0.0473 (X_5)</td>
</tr>
<tr>
<td>19.</td>
<td>Market intelligence</td>
<td>-0.0849</td>
<td>0.1063</td>
<td>0.0941 (X_{22})</td>
</tr>
<tr>
<td>20.</td>
<td>Level of attitude</td>
<td>-0.0933</td>
<td>-0.0427</td>
<td>-0.0661 (X_{22})</td>
</tr>
<tr>
<td>21.</td>
<td>Adoption index</td>
<td>0.5512</td>
<td>0.0774</td>
<td>0.0555 (X_{12})</td>
</tr>
</tbody>
</table>

Residual = 0.4523
Substantial indirect effect (First)

Table-17 also shows that social participation was seen to have positive substantial indirect effect (0.2574) on the level of knowledge through the variable area under orchard. The second important variable exerting first substantial positive indirect effect was area under orchard (0.2571) through the variable social participation. The third important variable exerting first substantial positive indirect effect was size of land holding (0.2011) through the variable area under orchard. Fourth important variable exerting first substantial positive indirect effect was extension participation (0.1792) through the variable overall modernity. While, the occupation was seen to have highest negative first substantial indirect effect (-0.1364) on the knowledge level of NBFs through the variable area under orchard followed by farm mechanization (-0.1158) through the adoption index. Remaining variables did not show considerable substantial indirect effect on the knowledge level of NBFs.

It can be concluded from the above path result that the adoption index, area under orchard, innovation proneness and extension participation were the most important variables affecting directly and positively on the knowledge level of NBFs. In respect to total indirect effect, the key variables were social participation, extension participation, and innovation proneness, yield index, education and market intelligence. While area under orchard, farm mechanization index, self confidence and level of attitude were important for negative effect on the level of knowledge of NBFs. The important variables in this regards are shown in Fig.-8.
Important variables in path analysis of level of knowledge of NBFs about IPMT

**HIGHEST DIRECT EFFECT**
- $X_{22}$ = 0.5512
- $X_5$ = 0.2756
- $X_{13}$ = 0.2089
- $X_9$ = 0.1368

**HIGHEST TOTAL INDIRECT EFFECT**
- $X_8$ = 0.2352
- $X_9$ = 0.2048
- $X_{13}$ = 0.1818
- $X_6$ = 0.1464
- $X_5$ = -0.2968
- $X_{14}$ = -0.1472

**HIGHEST SUBSTANTIAL INDIRECT EFFECT (FIRST)**
- $X_8$ = 0.2574
- $X_5$ = 0.2571
- $X_4$ = 0.2100
- $X_9$ = 0.1792
- $X_3$ = -0.1364
- $X_{14}$ = -0.1158

$X_4$ = Size of land holding
$X_5$ = Area under orchard
$X_6$ = Yield index
$X_8$ = Social participation
$X_9$ = Extension participation
$X_{12}$ = Overall modernity
$X_{13}$ = Innovation proneness
$X_{14}$ = Farm mechanization
$X_{22}$ = Adoption index

**Fig. 8**: Important variables in path analysis of level of knowledge of NBFs about IPMT
5.5.3.3 Path analysis of extent of adoption of BFs

All the 21 independent variables were considered for path analysis. The results are presented in Table-18.

**Direct effect**

The data given in Table-18 reveal that the variable level of knowledge had exerted highest direct positive effect on the extent of adoption of BFs as the path coefficient being 0.6463 followed by extension participation (0.3117), level of attitude (0.1940) and occupation (0.1037). Remaining variables did not exhibit considerable direct effect on the extent of adoption of BFs.

**Total indirect effect**

The data in Table-18 indicated that education possessed highest total indirect positive effect (0.3748) on the adoption index of BFs followed by innovation proneness (0.3573), yield index (0.2981), size of land holding (0.1871), farm mechanization (0.1660), self confidence (0.1459) and progressiveness (0.1400). Whereas, age had exerted highest total indirect negative effect (-0.2326) on the adoption index of BFs followed by area under orchard (-0.1278). Remaining variables did not exhibit considerable total indirect effect on the adoption index of BFs.

**Substantial indirect effect (First)**

Table-16 also shows that education was seen to have positive substantial indirect effect (0.2873) on the extent of adoption through the variable level of knowledge. The second important variable exerting first substantial positive indirect
Table-18: Direct and indirect effect of selected independent variables on the extent of adoption of BF's

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Variables</th>
<th>Direct effect</th>
<th>Total indirect effect</th>
<th>Substantial indirect effect (First)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>-0.0961</td>
<td>-0.2326</td>
<td>-0.2771(X_{21})</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>-0.0995</td>
<td>0.3748</td>
<td>0.2873(X_{21})</td>
</tr>
<tr>
<td>3.</td>
<td>Occupation</td>
<td>0.1037</td>
<td>-0.0568</td>
<td>-0.0542(X_{4})</td>
</tr>
<tr>
<td>4.</td>
<td>Size of land holding</td>
<td>-0.0971</td>
<td>0.1871</td>
<td>0.0874(X_{10})</td>
</tr>
<tr>
<td>5.</td>
<td>Area under orchard</td>
<td>0.0866</td>
<td>-0.1278</td>
<td>0.0727(X_{10})</td>
</tr>
<tr>
<td>6.</td>
<td>Yield index</td>
<td>-0.1112</td>
<td>0.2981</td>
<td>0.0541(X_{20})</td>
</tr>
<tr>
<td>7.</td>
<td>Annual income</td>
<td>-0.0799</td>
<td>0.0181</td>
<td>0.1158(X_{10})</td>
</tr>
<tr>
<td>8.</td>
<td>Social participation</td>
<td>0.0210</td>
<td>0.1180</td>
<td>0.0595(X_{10})</td>
</tr>
<tr>
<td>9.</td>
<td>Extension participation</td>
<td>0.3117</td>
<td>-0.0235</td>
<td>-0.1401(X_{12})</td>
</tr>
<tr>
<td>10.</td>
<td>Mass media exposure</td>
<td>-0.0376</td>
<td>-0.1111</td>
<td>-0.1302(X_{21})</td>
</tr>
<tr>
<td>11.</td>
<td>Opinion leadership</td>
<td>-0.0277</td>
<td>0.1230</td>
<td>0.0952(X_{21})</td>
</tr>
<tr>
<td>12.</td>
<td>Overall modernity</td>
<td>0.0421</td>
<td>0.0044</td>
<td>-0.0394(X_{10})</td>
</tr>
<tr>
<td>13.</td>
<td>Innovation proneness</td>
<td>-0.1722</td>
<td>0.3573</td>
<td>0.2535(X_{10})</td>
</tr>
<tr>
<td>14.</td>
<td>Farm mechanization</td>
<td>0.0975</td>
<td>0.1660</td>
<td>0.0380(X_{21})</td>
</tr>
<tr>
<td>15.</td>
<td>Innovativeness</td>
<td>0.0549</td>
<td>0.0595</td>
<td>0.0616(X_{10})</td>
</tr>
<tr>
<td>16.</td>
<td>Progressiveness</td>
<td>-0.0646</td>
<td>0.1400</td>
<td>0.0579(X_{10})</td>
</tr>
<tr>
<td>17.</td>
<td>Self-confidence</td>
<td>-0.0584</td>
<td>0.1459</td>
<td>0.1414(X_{21})</td>
</tr>
<tr>
<td>18.</td>
<td>Self-responsibility</td>
<td>0.0146</td>
<td>0.1290</td>
<td>-0.0549(X_{21})</td>
</tr>
<tr>
<td>19.</td>
<td>Market intelligence</td>
<td>-0.0799</td>
<td>0.0304</td>
<td>0.0582(X_{21})</td>
</tr>
<tr>
<td>20.</td>
<td>Level of attitude</td>
<td>0.1940</td>
<td>0.0982</td>
<td>0.1131(X_{21})</td>
</tr>
<tr>
<td>21.</td>
<td>Level of knowledge</td>
<td>0.6463</td>
<td>0.0895</td>
<td>0.0765(X_{10})</td>
</tr>
</tbody>
</table>

Residual = 0.4144

effect was innovation proneness (0.2535) through the variable mass media exposure. The third important variable exerting first
substantial positive indirect effect was self confidence (0.1414) through the variable level of knowledge. Fourth important variable exerting first substantial positive indirect effect was attitude (0.1131) through the variable level of knowledge.

While, the age was seen to have highest negative first substantial indirect effect (-0.2771) on the adoption index of BF's through the variable level of knowledge followed by extension participation (-0.1401) through overall modernity. Remaining variables did not exhibit considerable substantial indirect effect on the adoption index of BF's.

It can be concluded from the above path result that the level of knowledge, extension participation, level of attitude and occupation were the most important variables affecting directly and positively on the adoption index of BF's. In respect to total indirect effect, the key variables were education, innovation proneness, yield index land holding, farm mechanization, self confidence and progressiveness while, age and area under orchard were important for negative effect. The important variables in these regards are shown in Fig.-9.

5.5.3.4 Path analysis of extent of adoption of NBFs

All the 21 independent variables were considered for path analysis. The results are presented in Table-19.

Direct effect

The data given in Table-19 revealed that the variable level of knowledge had exerted highest direct positive effect on the extent of adoption of BF's as the path coefficient being 0.5907 followed by social participation (0.3680), innovation proneness
Fig. 9: Important variables in path analysis of extent of adoption of BFAs about IPMT

X_1 = Age  
X_2 = Education  
X_3 = Occupation  
X_4 = Size of land holding  
X_5 = Area under orchard  
X_6 = Yield index  
X_9 = Extension participation  
X_10 = Mass media exposure  
X_13 = Innovation proneness  
X_14 = Farm mechanization  
X_20 = Level of attitude  
X_21 = Level of knowledge
Table-19: Direct and indirect effect of selected independent variables on the extent of adoption of NBFs

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Variables</th>
<th>Direct effect</th>
<th>Total indirect Effect</th>
<th>Substantial indirect effect (First)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>-0.0899</td>
<td>-0.0094</td>
<td>0.0426(X_{10})</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>-0.1115</td>
<td>0.0659</td>
<td>0.0567(X_{1})</td>
</tr>
<tr>
<td>3.</td>
<td>Occupation</td>
<td>0.0784</td>
<td>-0.1017</td>
<td>-0.1769(X_{8})</td>
</tr>
<tr>
<td>4.</td>
<td>Size of land holding</td>
<td>0.0282</td>
<td>-0.0107</td>
<td>0.2632(X_{7})</td>
</tr>
<tr>
<td>5.</td>
<td>Area under orchard</td>
<td>-0.2547</td>
<td>0.3197</td>
<td>0.3436(X_{7})</td>
</tr>
<tr>
<td>6.</td>
<td>Yield index</td>
<td>0.0629</td>
<td>0.0742</td>
<td>0.0610(X_{21})</td>
</tr>
<tr>
<td>7.</td>
<td>Annual income</td>
<td>0.0620</td>
<td>-0.0146</td>
<td>-0.2379(X_{5})</td>
</tr>
<tr>
<td>8.</td>
<td>Social participation</td>
<td>0.3680</td>
<td>-0.2701</td>
<td>-0.0235(X_{10})</td>
</tr>
<tr>
<td>9.</td>
<td>Extension participation</td>
<td>-0.2074</td>
<td>0.3937</td>
<td>0.2018(X_{21})</td>
</tr>
<tr>
<td>10.</td>
<td>Mass media exposure</td>
<td>0.0062</td>
<td>0.0189</td>
<td>0.0622(X_{12})</td>
</tr>
<tr>
<td>11.</td>
<td>Opinion leadership</td>
<td>-0.0389</td>
<td>0.0886</td>
<td>0.0773(X_{21})</td>
</tr>
<tr>
<td>12.</td>
<td>Overall modernity</td>
<td>-0.0450</td>
<td>-0.0496</td>
<td>-0.0643(X_{21})</td>
</tr>
<tr>
<td>13.</td>
<td>Innovation proneness</td>
<td>0.2146</td>
<td>0.0514</td>
<td>0.2286(X_{21})</td>
</tr>
<tr>
<td>14.</td>
<td>Farm mechanization</td>
<td>0.1065</td>
<td>0.1038</td>
<td>-0.0684(X_{21})</td>
</tr>
<tr>
<td>15.</td>
<td>Innovativeness</td>
<td>-0.0553</td>
<td>0.0277</td>
<td>0.0244(X_{21})</td>
</tr>
<tr>
<td>16.</td>
<td>Progressiveness</td>
<td>0.0099</td>
<td>0.0884</td>
<td>0.0757(X_{21})</td>
</tr>
<tr>
<td>17.</td>
<td>Self-confidence</td>
<td>0.0056</td>
<td>0.0605</td>
<td>0.0604(X_{7})</td>
</tr>
<tr>
<td>18.</td>
<td>Self-responsibility</td>
<td>0.0725</td>
<td>-0.0314</td>
<td>-0.0475(X_{7})</td>
</tr>
<tr>
<td>19.</td>
<td>Market intelligence</td>
<td>0.2037</td>
<td>0.0278</td>
<td>0.0302(X_{7})</td>
</tr>
<tr>
<td>20.</td>
<td>Level of attitude</td>
<td>-0.1197</td>
<td>-0.0002</td>
<td>-0.0609(X_{21})</td>
</tr>
<tr>
<td>21.</td>
<td>Level of knowledge</td>
<td>0.5907</td>
<td>0.0383</td>
<td>0.0831(X_{12})</td>
</tr>
</tbody>
</table>

Residual = 0.4847

(0.2146), market intelligence (0.2037) and farm mechanization index (0.1065). Remaining variables did not exhibit considerable direct effect on the extent of adoption of NBFs.
Total indirect effect

The data in Table-19 indicated that extension participation possessed highest total indirect positive effect (0.3937) on the adoption index of NBFs followed by area under orchard (0.3197) and farm mechanization index (0.1038). Whereas, social participation had exerted highest total indirect negative effect (-0.2701) on the adoption index of NBFs followed by occupation (-0.1017). Remaining variables did not exhibit considerable total indirect effect on the adoption index of NBFs.

Substantial indirect effect (First)

Table-19 also shows that area under orchard was seen to have positive substantial indirect effect (0.3436) on the extent of adoption through the variable annual income. The second important variable exerting first substantial positive indirect effect was land holding (0.2632) through the variable annual income. The third important variable exerting first substantial positive indirect effect was innovation proneness (0.2286) through the variable level of knowledge. Fourth important variable exerting first substantial positive indirect effect was extension participation (0.2018) through the variable level of knowledge while, the annual income was seen to have highest negative first substantial indirect effect (-0.2379) on the adoption index of NBFs through the variable area under orchard followed by occupation (-0.1769) through annual income. Remaining variables did not exhibit considerable substantial indirect effect on the adoption index of NBFs.

It can be concluded from the above path result that the level of knowledge, annual income, innovation proneness,
<table>
<thead>
<tr>
<th>Variable</th>
<th>Direct Effect</th>
<th>Total Indirect Effect</th>
<th>Substantial Indirect Effect (First)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X_{21}</td>
<td>0.5907</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X_8</td>
<td>0.6380</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X_{13}</td>
<td>0.2146</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X_{14}</td>
<td>0.1065</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X_9</td>
<td>0.3937</td>
<td>0.3197</td>
<td>0.3436</td>
</tr>
<tr>
<td>X_5</td>
<td>0.1038</td>
<td>0.3197</td>
<td></td>
</tr>
<tr>
<td>X_{14}</td>
<td></td>
<td>0.1038</td>
<td>0.2286</td>
</tr>
<tr>
<td>X_8</td>
<td>-0.2701</td>
<td>-0.2701</td>
<td></td>
</tr>
<tr>
<td>X_3</td>
<td>-0.1017</td>
<td>-0.1017</td>
<td></td>
</tr>
</tbody>
</table>

X_3 = Occupation  
X_4 = Size of land holding  
X_5 = Area under orchard  
X_7 = Annual income  
X_8 = Social participation  
X_9 = Extension participation  
X_{13} = Innovation proneness  
X_{14} = Farm mechanization  
X_{21} = Level of knowledge

**Fig. 10** Important variables in path analysis of extent of adoption of NBFs about IPMT
market intelligence and farm mechanization were the most important variables affecting directly and positively on the adoption index of NBFs. In respect to total indirect effect, the key variables were extension participation, area under orchard and farm mechanization while, annual income and overall modernity were important for negative effect. The important variables in these regards are shown in Fig.-10.

5.6 CONSTRAINTS FACED BY THE BFS IN TAKING BENEFIT OF IHDP

The constraints were kept open ended. The responses were recorded in the schedule itself. The frequency for each constraint was worked out and converted into percentage. A rank was assigned to each constraint based on the percentage. The data are presented in Table-20.

Table-20: Constraints faced by the BFS in taking benefit of IHDP

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Constraints</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lack of awareness about scheme IHDP</td>
<td>32</td>
<td>25.00</td>
<td>VII</td>
</tr>
<tr>
<td>2.</td>
<td>Lack of publicity about IHDP</td>
<td>68</td>
<td>53.12</td>
<td>III</td>
</tr>
<tr>
<td>3.</td>
<td>Insufficient staff of the state department to visit all the BFS</td>
<td>56</td>
<td>43.75</td>
<td>V</td>
</tr>
<tr>
<td>4.</td>
<td>Insufficient guidance about after care of orchard</td>
<td>85</td>
<td>66.40</td>
<td>II</td>
</tr>
<tr>
<td>5.</td>
<td>Difficult process of getting subsidy</td>
<td>40</td>
<td>31.25</td>
<td>VI</td>
</tr>
<tr>
<td>6.</td>
<td>Delaying in providing subsidy which is granted</td>
<td>28</td>
<td>21.88</td>
<td>VIII</td>
</tr>
<tr>
<td>7.</td>
<td>Lack of awareness about recent recommendations of IMPT</td>
<td>112</td>
<td>87.50</td>
<td>I</td>
</tr>
<tr>
<td>8.</td>
<td>Lack of credit facility</td>
<td>64</td>
<td>50.00</td>
<td>IV</td>
</tr>
</tbody>
</table>

N=128
It is obvious from the Table-20 that majority (87.50 %) of the BFs expressed that lack of awareness about recent recommendations of IMPT, insufficient guidance about after care of orchard (66.40%), lack of publicity about scheme IHDP (53.12 %), lack of credit facility (50.00%), insufficient staff of the state department to visit all the BFs (43.75%), difficult process of getting subsidy (31.25%), lack of awareness about the scheme IHDP (25.00%) and delaying in providing subsidy which is granted (21.88%) were the major constraints faced by the BFs in taking benefit of IHDP.

5.7 SUGGESTIONS OFFERED BY THE BENEFICIARY AND NON-BENEFICIARY FARMERS TO MAKE THE IHDP MORE EFFECTIVE

For ascertaining the suggestions to make the IHDP more effective, the suggestions were invited openly from the respondents of both the categories. The frequency for each suggestion was worked out and converted in to percentage. A rank was assigned to each suggestion based on the percentage. The data are exhibited in Table-21.

The most important suggestions offered by the BFs to make IHDP more effective were: need based training programmes and demonstrations should be organized (93.75%), timely guidance about IMPT should be provided (85.90%), there is need to establish market and remunerative minimum support prices for horticultural produces by the government (76.56%), costly horticultural technologies and inputs should be subsidized (50.00%), extension system should be streamlined to disseminate latest production technologies (39.04%), there is need of publicity of scheme IHDP for
farmers (37.50%) and credit facility should be made available for establishment of new mango orchard (27.34%).

Table-21: Suggestion made by the BF’s and NBFs for making the IHDP more effective

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Suggestions</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Timely guidance should be given about IMPT</td>
<td>110</td>
<td>85.90</td>
<td>II</td>
</tr>
<tr>
<td>2.</td>
<td>Need based training programmes and demonstrations should be organized</td>
<td>120</td>
<td>93.75</td>
<td>I</td>
</tr>
<tr>
<td>3.</td>
<td>Costly horticultural technologies and inputs should be subsidized</td>
<td>64</td>
<td>50.00</td>
<td>IV</td>
</tr>
<tr>
<td>4.</td>
<td>Credit facilities should be made available for establishment of new mango orchard</td>
<td>35</td>
<td>27.34</td>
<td>VII</td>
</tr>
<tr>
<td>5.</td>
<td>Extension system should be streamlined to disseminate latest production technologies</td>
<td>50</td>
<td>39.06</td>
<td>V</td>
</tr>
<tr>
<td>6.</td>
<td>There is need of publicity of scheme IHDP for the farmers</td>
<td>48</td>
<td>37.50</td>
<td>VI</td>
</tr>
<tr>
<td>7.</td>
<td>Need for establishment of market facilities and remunerative minimum prices for horticultural produce</td>
<td>98</td>
<td>76.56</td>
<td>III</td>
</tr>
</tbody>
</table>
FIG: 11  The empirical model about level of knowledge of Beneficiary farmers

<table>
<thead>
<tr>
<th>PERSONAL VARIABLES</th>
<th>X₁</th>
<th>Age</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X₂</td>
<td>Education</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOCIO-ECONOMIC VARIABLES</th>
<th>X₄</th>
<th>Size of land holding</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X₆</td>
<td>Yield index</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXTENSION COMMUNICATION VARIABLES</th>
<th>X₉</th>
<th>Extension participation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X₁₀</td>
<td>Mass media exposure</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PSYCHOLOGICAL VARIABLES</th>
<th>X₁₃</th>
<th>Innovation proneness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X₁₇</td>
<td>Self confidence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X₂₀</td>
<td>Level of attitude</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X₂₂</td>
<td>Adoption index</td>
<td></td>
</tr>
</tbody>
</table>

LEGEND:

- **ж** = Significant relationship
- **▲** = Significant contribution in total variation
- **■** = Highest effect in path analysis
FIG: 12 The empirical model about level of knowledge of non-beneficiary farmers
The empirical model about extent of adoption of beneficiary farmers

**PERSONAL VARIABLES**
- $X_1$: Age
- $X_2$: Education
- $X_3$: Occupation

**SOCIO-ECONOMIC VARIABLES**
- $X_4$: Size of land holding
- $X_6$: Yield index

**EXTENSION COMMUNICATION VARIABLES**
- $X_9$: Extension participation

**PSYCHOLOGICAL VARIABLES**
- $X_{13}$: Innovation proneness
- $X_{14}$: Farm mechanization
- $X_{20}$: Level of attitude
- $X_{22}$: Level of knowledge

**LEGEND:**
- Ж = Significant relationship
- ▲ = Significant contribution in total variation
- ■ = Highest effect in path analysis

FIG: 13 The empirical model about extent of adoption of beneficiary farmers
FIG: 14 The empirical model about extent of adoption of non-beneficiary farmers

<table>
<thead>
<tr>
<th>SOCIO-ECONOMIC VARIABLES</th>
<th>X7</th>
<th>Social participation ■</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTENSION COMMUNICATION VARIABLES</td>
<td>X9</td>
<td>Extension participation ж ▲</td>
</tr>
<tr>
<td>PSYCHOLOGICAL VARIABLES</td>
<td>X13</td>
<td>Innovation proneness ж ■</td>
</tr>
<tr>
<td></td>
<td>X14</td>
<td>Farm mechanization ж ■</td>
</tr>
<tr>
<td></td>
<td>X19</td>
<td>Market intelligence ■</td>
</tr>
<tr>
<td></td>
<td>X22</td>
<td>Level of knowledge ж ▲ ■</td>
</tr>
</tbody>
</table>

**LEGEND:**

ж = Significant relationship
▲ = Significant contribution in total variation
■ = Highest effect in path analysis
CHAPTER – 6

SUMMARY AND CONCLUSIONS

This chapter includes in a nutshell the description of summary, conclusions, implications and suggestions for further research. This chapter has been divided into the following major heads:

6.1  Summary
6.2  Major findings and conclusions
6.3  Implication of the study
6.4  Suggestions for further research

6.1 SUMMARY

Horticulture sector covering only 8.00 per cent of the total crop area in the country, contributes 24.50 per cent of GDP and 54.55 per cent to export earnings in the agriculture sector. Horticulture has become an integral part of food and nutritional security and an essential ingredient of economic security. Adoption of horticulture by small and marginal farmers has brought prosperity in many regions of the country.

Now a days many states have separate department of horticulture. The horticulture department at centre implements the programme through department of horticulture in all the states.

Gujarat is one of the fruit producing states in the country. Taking in to consideration the importance of horticultural crops and for its rapid development, Government of Gujarat has started separate department of horticulture in 1991. Also the state government had launched a programme named “Integrated
Horticultural Development Programme” in eighth five year plan. The main theme behind the programme was to increase the area and production of horticultural crops.

In Junagadh district of Gujarat state Horticultural Development Programme is running successfully since 1991 to increase area and production of horticultural crops. But Junagadh district has major area under mango crop and farmers are interested to develop mango orchards and due to this, the scheme has introduced a new area for mango orchard development in Junagadh district.

The consequences impact of Integrated Horticultural Development Programme is reflected in terms of the level of knowledge and extent of adoption of mango production technology and attitude of beneficiaries towards Integrated Horticultural Development Programme. Therefore, it is felt worthwhile to investigate the “Impact of Integrated Horticultural Development Programme” with respect to level of knowledge and extent of adoption of respondents about IMPT. Keeping these points in view, this investigation was undertaken with the following specific objectives:

21. To study the personal, socio-economic, psychological and extension communication characteristics of the respondents.
22. To develop a standardized knowledge test to measure the knowledge of respondents about mango production technology.
23. To assess the level of knowledge of the beneficiaries and non-beneficiaries of Integrated Horticultural Development
Programme with respect to recommended mango production technology.

24. To develop a standardized adoption index to measure the adoption of respondents about mango production technology.

25. To determine the extent of adoption of the beneficiaries and non-beneficiaries of Integrated Horticultural Development Programme with respect to recommended mango production technology.

26. To develop a standardized attitude scale to measure the attitude of respondents towards Integrated Horticultural Development Programme.

27. To determine the attitude of beneficiaries and non-beneficiaries towards Integrated Horticultural Development Programme.

28. To explore the relational analysis of the selected variables of beneficiaries and non-beneficiaries of the Integrated Horticultural Development Programme.

29. To determine the constraints faced by the beneficiary farmers in taking benefit of Integrated Horticultural Development Programme.

30. To seek the suggestions offered by the beneficiaries and non-beneficiaries for making the Integrated Horticultural Development Programme more effective.

Based on the objectives of the study and theoretical framework, the statistical hypotheses were formulated.

The list of beneficiaries of IHDP was obtained from the records of the state department of horticulture, Junagadh. Total 128 beneficiary farmers were selected purposively from 22 villages of
five selected talukas viz., Visavadar, Junagadh, Mendarda, Malihatina and Una. The same number of non-beneficiary farmers were selected randomly from the respective villages. In order to measure the level of knowledge and extent of adoption of respondents, the standardized scales developed for the purpose were used. The selected independent variables were measured either with the help of developed scale or by developing schedules and indices.

An interview schedule was prepared containing five major parts. The first part containing the information about independent variables, second part contains details of knowledge test, third part contains details about adoption index, fourth part consists of information about attitude scale and fifth part of the schedule contains information about the constraints faced by the BFIs in taking benefit of IHDP and suggestions to make IHDP more effective. The data were collected by personal interview either at home or at farm. The data so collected were coded, classified, tabulated and analyzed in order to make the findings meaningful. The findings of the study and conclusions are summarized as below:

6.2 MAJOR FINDINGS AND CONCLUSIONS

6.2.1 Development of scale to measure attitude of respondents towards IHDP

In order to measure attitude of respondents towards IHDP, an attitude scale was developed following the methodology suggested by Likert (1932) and Edward (1957), called the method of summated rating was used in this study for scale construction. The final scale can be seen at Appendix-I. The “content validity” as well as “criterion validity” was measured to conform the validity and
“split halves” method of reliability was applied for determining the reliability of the scale.

6.2.2 Development of test to measure the level of knowledge of respondents about IMPT

A standardized knowledge test was developed and utilized for measuring the level of knowledge of the respondents about IMPT.

6.2.3 Development of adoption index to measure the extent of adoption of respondents about IMPT

An adoption index was developed by the researcher for the study and utilized for measuring the extent of adoption of the respondents about IMPT.

6.2.4 Characteristics of the respondents

There was a positive and significant difference between the characteristics of BFs and NBFs viz., area under orchard, yield index, annual income, social participation, extension participation, mass media exposure, opinion leadership, overall modernity, innovation proneness, farm mechanization, innovativeness, progressiveness, self confidence, self responsibility, market intelligence, level of attitude, level of knowledge, and adoption index. In case of education and size of land holding, negative and non-significant difference was found between BFs and NBFs. Two characteristics viz., age and occupation were found similar with the BFs and NBFs respondents.

The farm diversification for BFs was 46.07 per cent. It can be concluded that the scheme IHDP had introduced new area under orchard. This farm diversification from traditional crop growing to
orchard growing was only due to the efforts of the State Department of Horticulture under the scheme IHDP.

6.2.5 Level of knowledge of respondents about IMPT

Majority (70.31%) of the BFs had medium level of knowledge about IMPT with 28.51 mean knowledge score. Whereas 68.75 per cent of the NBFs were belonged to medium level of knowledge category with 19.23 mean score about IMPT. Both the groups differed significantly with each other.

6.2.6 Extent of adoption of respondents about IMPT

6.2.6.1 Practice wise extent of adoption of respondents about IMPT

The practices like varieties (ranked first) chemical fertilizers (ranked second); planting distance (ranked third); irrigation (ranked fourth); disease control (ranked fifth); tillage (ranked sixth); organic manure (ranked seventh); insect-pest control (ranked eighth); use of hormones (ranked ninth) were adopted more than 60.00 per cent by BFs. The less than 60.00 per cent adopted practice was inter cropping (ranked tenth).

The higher (more than 60.00%) adopted practices of IMPT by NBFs were: chemical fertilizers (ranked first) and variety (ranked second). The less than 60.00 per cent adopted practices by the NBFs were: planting distance (ranked third); tillage (ranked fourth); organic manure (ranked fifth); inter cropping (ranked sixth); insect-pest control (ranked seventh); irrigation (ranked eighth); use of hormones (ranked ninth) and disease control (ranked tenth).
The adoption index of BFs was found significantly higher than NBFs.

**6.2.6.2 Extent of adoption of respondents about IMPT**

Majority of the BFs (67.97%) and NBFs (64.06%) were medium adopters of IMPT with mean adoption index of 81.10 and 44.41, respectively. Both the groups differed significantly with each other.

**6.2.7 Level of attitude of respondents towards IHDP**

Majority (71.10%) of the BFs had favourable attitude towards IHDP with 86.20 mean attitude score whereas, 64.84% of the NBFs had favourable attitude towards IHDP with 56.20 mean attitude score. Both the groups differed significantly with each other.

**6.2.8 Association between the level of knowledge of respondents about IMPT and their selected characteristics**

There was a positive and significant association between the knowledge level of BFs about IMPT and their education, yield index, extension participation, mass media exposure, innovation proneness, self confidence, level of attitude and adoption index whereas, age of BFs had negative and significant association with their level of knowledge.

In case of NBFs, positive and highly significant association with the level of knowledge about IMPT was observed with extension participation, innovation proneness and adoption index.
6.2.9 Association between the extent of adoption of respondents about IMPT and their selected characteristics

A positive and significant association was observed between the extent of adoption of BFs about IMPT and their characteristics viz., education, yield index, extension participation, innovation proneness, farm mechanization, level of attitude and level of knowledge whereas, age of BFs had negative and significant association with their adoption index.

In case of NBFs, innovation proneness, farm mechanization and level of knowledge were positively and significantly associated with their adoption index.

6.2.10 Extent of variation in dependent variables caused by selected independent variables

6.2.10.1 Extent of variation in level of knowledge of respondents caused by selected independent variables

For BFs, nine independent variables contributed towards 61.32 per cent ($R^2 = 0.6132$) of the variation in the level of knowledge of BFs about IMPT. The calculated “t” values for partial regression coefficient were significant in case of education and adoption index. The order of contribution of these nine variables in descending order was adoption index, education, self confidence, mass media exposure, age, level of attitude, innovation proneness, extension participation and yield index.

In case of NBFs, three independent variables contributed towards 54.77 per cent ($R^2 = 0.5477$) of the variation in the level of knowledge of NBFs about IMPT. The calculated “t” value for partial regression coefficient was significant in case of adoption index. The
order of contribution of these three variables in descending order was adoption index, innovation proneness and extension participation.

**6.2.10.2 Extent of variation in extent of adoption of respondents caused by selected independent variables**

For BFs, eight independent variables contributed towards 58.56 per cent ($R^2 = 0.5856$) of the variation in the extent of adoption of BFs about IMPT. The calculated “t” values for partial regression coefficient were significant in case of level of knowledge and level of attitude. The order of contribution of these eight variables in descending manner was level of knowledge, level of attitude, extension participation and yield index, innovation proneness, farm mechanization, education and age.

In case of NBFs, four independent variables contributed towards 51.53 per cent ($R^2 = 0.5153$) of the variation in the extent of adoption of NBFs about IMPT. The calculated “t” value for partial regression coefficient was significant in case of level of knowledge. The order of contribution of these four variables in descending order was level of knowledge, extension participation, farm mechanization and innovation proneness.

**6.2.10.3 Direct and indirect effect of independent variables on the level of knowledge of respondents**

For BFs, the variable adoption index was the most important in contributing direct effect (0.6032) on the knowledge of BFs about IMPT followed by the size of land holding (0.2204), education (0.1929) and innovation proneness (0.1033). Whereas extension participation had highest total indirect effect (0.3499) followed by
mass media exposure (0.2834), education (0.2517), level of attitude (0.2261), occupation (0.2023), yield index (0.1898) and self-confidence (0.1201). Age had highest total indirect negative effect (-0.3324) on the level of knowledge of BFs about IMPT followed by size of land holding (-0.1103).

For NBFs, variable adoption index was the most important in contributing direct effect (0. 0.5512) on the knowledge of NBFs about IMPT followed by the area under orchard (0.2756), innovation proneness (0.2089) and extension participation (0.1368).

6.2.10.4 Direct and indirect effect of independent variables on the extent of adoption of respondents

For BFs, the variable level of knowledge was the most important in contributing direct effect (0.6463) on the extent of adoption of BFs about IMPT followed by extension participation (0.3117), level of attitude (0.1940), occupation (0.1037).

For NBFs, variable education was the most important in contributing direct effect (0.3748) on the adoption index of NBFs about IMPT followed by innovation proneness (0.3573), yield index (0.2981), size of land holding (0.1871), farm mechanization (0.1660), self confidence (0.1459) and progressiveness (0.1400). the area under orchard (0.2756), innovation proneness (0.2089) and extension participation (0.1368). Whereas, age had highest total indirect negative effect (-0.2326) followed by area under orchard (-0.1278).
6.2.11 Constraints faced by the BFs in taking benefit of IHDP

The important constraints faced by the BFs in taking benefit of IHDP were:

1. Lack of awareness about recent recommendations of IMPT (87.50%).
2. Insufficient guidance about after care of orchard (64.40%).
3. Lack of publicity about IHDP (53.12%).
4. Lack of credit facility (50.00%).
5. Insufficient staff of the state department to visit all the BFs (43.75%).
6. Difficult process of getting subsidy (31.25%).
7. Lack of awareness about scheme IHDP (25.00%).
8. Delaying in providing subsidy, which is granted (21.88%).

6.2.12 Suggestions made by the BFs for making IHDP more effective

The important suggestions made by the BFs for making IHDP more effective were:

1. Lack of awareness about recent recommendations of IMPT (93.75%).
2. Timely guidance should be given about IMPT (85.90%).
3. There is need to establish market and remunerative minimum prices for horticultural produce by the government (76.56%).
4. Costly horticultural technologies and inputs should be subsidized (50.00%).
5. Extension system should be streamlined to disseminate latest production technologies (39.06%).
6. There is need of publicity of scheme IHDP for the farmers (37.50%).
7. Credit facilities should be made available for establishment of new mango orchard (27.34%).

The study provided an excellent mechanism for feedback to scientists, experts of IHDP and implementing authority and also helped in establishing credibility of experts of the state department of horticulture and recommended technology.

Finally it may be concluded that the impact of IHDP was quite impressive on the beneficiary farmers of the Junagadh district and created fruitful results for the farmers.

6.3 IMPLICATIONS

Some measures emerging from this study for increasing the effectiveness of the IHDP are projected as under:

1. The study facilitated in knowing the characteristics of the BFIs and NBFIs, which will serve as a guideline for the planners and extension agencies for planning and implementing the IHDP in other areas.
2. Extension workers and researchers can make use of knowledge test and adoption index constructed in this study to measure the farmers’ level of knowledge and extent of adoption about IMPT particularly while conducting the training programmes in the programme area.
3. The attitude scale developed in this study may be useful to ascertain the degree of attitude of farmers who are engaged in fruit orchards in other districts.
4. The IMPT like variety, use of chemical fertilizers and planting distance were adopted up to high extent by both of the categories of the respondents but other practices such as inter cropping, use of hormones insect-pest control and use of organic manure, though it is important, are adopted least by the respondents. Hence, it is worth to emphasize on these practices for increasing the adoption.

5. The findings with regards to knowledge about IMPT contributed significantly to the prediction of the extent of adoption of BFs and NBFs. Hence, the implementing authority should take note of this while deciding training content of training programme for farmers under the IHDP.

6. The adoption index, size of land holding and education of the respondents emerged with highest direct effect and became main channel for indirect effect of variables in the level of knowledge of respondents. Hence, it is worth to train and educate the farmers by different training and extension approaches through which their knowledge regarding the IMPT may update which lead them to better adoption.

7. The use of IMPT as per the recommendations helps the mango growers for better production. Hence, extension functionaries should concentrate their efforts to educate and convince the mango growers by imparting effective training through latest communication media in adopting the recommended technology.

8. The important constraints faced by most of the beneficiary respondents in taking benefit of IHDP should be taken in to account while ascertaining their level of knowledge and extent of adoption and attitude towards IHDP.
6.4 SUGGESTIONS FOR FURTHER RESEARCH

1. The present study was conducted in one district of Gujarat state. The study may be replicated in other districts of Gujarat state.

2. This study opens possibilities for such studies in other districts with other fruit crops.

3. A study of cost benefit analysis of the programme can be undertaken.

4. A critical study of some characteristics of the respondents other than those considered in this study might be affecting the respondents’ level of knowledge and extent of adoption about IMPT in the programme area may be carried out.

5. Same study can be undertaken after five years of this study to know the impact of IHDP with respect to IMPT.

6. The study was limited to a single scheme IHDP. It may also be conducted to measure the impact of other schemes, projects and training programmes.
REFERENCES


APPENDIX-I

Department of Extension Education
College Of Agriculture,
Junagadh Agricultural University, Junagadh

Dr. M. N. Popat                Phone: (0285) 2672080 PBX 331, 422 (O)
Prof. & Head                   (0285) 2671802 (R)

-----------------------------------------------------------------------------

No. Coll/Ext/PGT/DGK/__________/05
Junagadh, Date: _____________

To,

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Dear Sir/Madam

Daxa G. Kotadiya a Ph.D. student in Extension Education working under my guidance is developing a scale to measure “Attitude of Farmers towards Integrated Horticultural Development Programme in Junagadh District of Gujarat State”.

Attitude towards Integrated Horticultural Development Programme refers to the verbal expression of farmers’ own opinion, feelings, belief and action towards the object ascertained in personal interview situation. It could be positive, negative or neutral.

I am enclosing herewith a set of statements on five-point continuum to judge the suitability for measuring the attitude of farmers towards Integrated Horticultural Development Programme. Kindly see that suitability of statement is to be judged as an instrument for inferring attitude.
Please go through the statements carefully and tick (✓) your response in appropriate column depending upon your agreement as strongly agree, agree, undecided, disagree and strongly disagree as per its utility reasoning for measuring the attitude of farmers towards Integrated Horticultural Development Programme.

Hard pressed of time as you are, the rating procedure may appear a bit laborious one, but once you start doing this, you will find it easy and little time consuming.

Having finished the rating you may kindly return the completed set of annexure to Daxa G. Kotadiya at address appearing on the top of the letter. An early return of the annexure after doing the needful will greatly facilitate this study.

With kind regards

Yours sincerely

(M. N. Popat)
Attitude of Farmers Towards Integrated Horticultural Development Programme In Junagadh District Of Gujarat State

(IHDP: Integrated Horticultural Development Programme)
(SA: Strongly Agree, A: Agree, UD: Undecided, DA: Disagree, SDA: Strongly Disagree)

(Figure in to bracket indicates the “t” value of the statement)

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<tr>
<th>Sr. No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
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<th>DA</th>
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<tr>
<td>1</td>
<td>IHDP is a boon for small and marginal farmers (+) (2.09)</td>
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<td>2</td>
<td>Big farmers only can derive benefit of IHDP (-) (1.86)</td>
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<td>3</td>
<td>Only relatives and friends of the staff of the Horticulture Department can take benefit of IHDP (-) (3.28)</td>
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<td>4</td>
<td>Transformation of dry land agriculture is possible through IHDP (+) (1.92)</td>
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<td>5</td>
<td>Implementation of IHDP uplift the socio-economic condition of the farmers (+) (1.96)</td>
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<td>6</td>
<td>The small scale industries in fruit processing will be enhanced in rural areas due to development of orchards (+) (5.96)</td>
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<td>7</td>
<td>The scheme IHDP is scheduled only to complete the departmental target (-) (2.31)</td>
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<td>8</td>
<td>Farmers takes benefit of IHDP for subsidy purpose only (-) (2.40)</td>
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<td>9</td>
<td>IHDP has awaken farmers to grow fruit crops on barren land (+) (2.11)</td>
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<td>10</td>
<td>Growing fruit crops under IHDP is just a wastage of time, money and man power (-) (2.35)</td>
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<td>11</td>
<td>Horticulturists of the department provides satisfactory guidance to the farmers (+) (2.65)</td>
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<td>12</td>
<td>Marginal/ small farmers can’t afford costly horticultural technology (-) (2.79)</td>
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<td>13</td>
<td>The people’s requirement of fruits is fulfilled through IHDP (+) (2.53)</td>
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<td>14</td>
<td>Farmers are hesitated to adopt IHDP due to long gestation period of fruit trees (-) (5.28)</td>
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<td>15</td>
<td>Due to lack of publicity and awareness majority of the farmers have not received the benefit of IHDP (-) (2.6)</td>
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<td>16</td>
<td>The procedure of getting seedlings for fruit cultivation is complex under IHDP (-) (2.07)</td>
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<td>17</td>
<td>Sufficient seedlings are not provided to the farmers under IHDP (-) (2.52)</td>
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<td>18</td>
<td>People are aware about free supply of seedlings of fruit crops under IHDP (-) (1.98)</td>
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<td>19</td>
<td>One has to visit the Horticulture Department for a number of times to get his subsidy to be sanctioned (-) (3.21)</td>
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<td>20</td>
<td>The introduction of IHDP is a major breakthrough in boosting up the area, production and productivity of fruit crops (+) (2.19)</td>
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<td>21</td>
<td>Processing of horticultural produces will reduce the losses and increase the market price (+) (3.31)</td>
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<td>22</td>
<td>Value added products of horticultural crops through IHDP will uplifts the rural economy (+) (2.86)</td>
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<td>23</td>
<td>Horticultural crops produce higher biomass than field crops per unit area/unit time (+) (2.61)</td>
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<td>24</td>
<td>Adoption of IHDP by the farmers is a difficult and complex process (-) (3.13)</td>
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APPENDIX-II

Initial Format of The Knowledge Test for Measuring The Knowledge of Mango Growers’ about Improved Mango Production Technology

1. Before monsoon, manures should be mixed with soil and pit should be filled with it. (Correct / Incorrect)
2. The planting distance should be decided on the basis of variety of mango, type of soil and climatic conditions. (Correct / Incorrect)
3. What should be the distance between two plants of mango for medium spreading variety on less fertile land? (10 x 10m / 12 x 12m)
4. Which size of pit should be dug on light soil for plantation of mango? (60x60x60cm/100 x 100 x 100cm)
5. Which size of pit should be dug on heavy soil for plantation of mango? (60x60 x 60cm/100x100 x 100cm)
6. Before the occurrence of rainfall, how much quantity of FYM should put in the pits dug out for plantation of mango? (25 kg / 50kg / 100kg)
7. How much quantity of chemical fertilizer should be apply in the pits dug out for plantation of mango? - 2.5kg Super Phosphate and 1.0kg Murate of Potash or - 2.0kg Super Phosphate and 2.5kg Murate of Potash
8. Which pesticide should be added in the pits for protection against termites? (5to10 %BHC powder/ 10gm of Aldrex powder / Both the above)
9. How many plants can be planted at distance of 10 x 10 meter in one hectare of land? (90 / 100 / 110)
10. Which variety of mango is a medium early maturing variety, usually regular in bearing and have medium sized fruits. (Kesar / Jamadar / Rajapuri)

11. Which time during day is suitable for planting of mango?
   - In cloudy atmosphere at evening time or
   - When there is no rain

12. Which is more successful method of grafting?
    (Inarching / Nutan grafting / Wedge grafting)

13. How much graft union should be kept above the ground level while planting?
    (15 to 20cm / 21 to25cm / 26 to30cm)

14. To protect the scion from heavy wind of monsoon, in which direction the branches of scion should remain while planting?
    (North-South direction / South–West direction)

15. Why shoots growing on graft plants should be removed from time to time.
    Ans: ________________

16. What are the benefits of ploughing in mango orchard?
    Ans: ________________

17. Usually how many times inter culturing operations should be done in mango orchard?
    Ans: ________________

18. When inter culturing operations should be done in mango orchard?
    Ans: ________________

19. What are the benefits of pre-monsoon ploughing in mango orchard?
    Ans: ________________
20. Ploughing in November-December is helpful in controlling mealy bugs. (Correct / Incorrect)

21. How much quantity of FYM is to be applied to an adult mango tree? (50kg / 75kg / 100kg 50 kg)

22. How much quantity of chemical fertilizer is to be applied to an adult mango tree?
   - 2.0kg ammonium sulphate, 1.5 kg super phosphate and 1.0kg murate of potash or
   - 3.75kg ammonium sulphate, 1.0 kg super phosphate and 1.25kg murate of potash

23. Whole quantity of phosphatic and potashic fertilizers should be applied in beginning of monsoon in the month on June. (Correct/Incorrect)

24. In how many split nitrogenous fertilizer should be applied?
   Ans:___________

25. When nitrogenous fertilizer should be applied?
   Ans:___________

26. If there is no irrigation facilities, then when nitrogenous fertilizers should be applied?
   Ans:___________

27. When newly planted graft should be irrigated during winter?
   (At an interval of7to10 days/4 to 7 days /10 to 15 days)

28. When newly planted graft should be irrigated during summer?
   (At an interval of7 to 10 days /4 to 7 days /2 to 3 days)

29. Is green manuring beneficial to improve physical condition and soil fertility of mango orchard? (Yes/ No)
30. For how many years newly planted graft should be pruned regularly? (1 year / 3 years / 5 years)
31. When first season of fruit should take from the newly planted grafts
(After 1 to 2 years / After 3 to 4 years / After 6 to 7 years)
32. Are all the fruits can harvest at a time? (Yes / No)
33. Which is the most destructive pest in mango?
   - Mango hopper
   - Fruit fly
   - Mango stem borer
34. For the control of fruit fly, which pesticide is recommended from the following?
   (Fenthion / Monocrotophos)
35. For which insect’s control, spraying of 0.1% Fenthion and 0.1% Methyle Euginol (in 10 lit. of water, 10 ml of each) should be sprayed?
   (Fruit fly / Mango hopper / Mealy bug)
36. Which are the important problems of mango orchard?
   - Alternate bearing
   - Mango malformation
   - Fruit dropping
   - Spongy tissue
   - Post harvest damage
   - Other if any, specify
37. What should be done to solve the problem of alternate bearing in mango?
   - Spray 2% urea solution during the fruit development and after fruit harvesting in the year of heavy flowering.
   - Spray any pesticide during the fruit development
38. What is the cause of mango malformation?
   (Virus / Bacteria / Fungus)
39. Which is the vector responsible for spreading of mango malformation? (Aphid / Mites / Wind)
40. Usually what should be done to control mango malformation?
    Ans: ____________

41. What is the recommendation of spraying of growth regulator to control the mango malformation?
    (2gm NAA in 10 lit. of water / 10gm IBA in 10 lit. of water)

42. During which stage the fruit dropping causes maximum reduction in mango yield?
    (Sorghum sized fruits / Pepper sized / Areca nut sized)

43. What should be done to prevent the fruit dropping in mango?
    Ans: ____________

44. The fruit affected by spongy tissue, having pulp yellowish-orange in colour, sweet in taste and are properly ripened.
    (Correct/Incorrect)

45. What is the recommendation to control spongy tissue in mango fruit?
    (Flourish grass layer in the basin / Apply limited irrigation / Apply daily irrigation)

46. During which period of day, fruits should not be harvested?
    (From 10.00A.M. to 4.00 P.M. / Before 10.00A.M. / After 4.00P.M.)

47. To prevent post harvest damage, which method of fruit harvesting is the best?
    (By net with the stalk / by dropping fruits from the tree)

48. The storage period is extended by dipping the fruits in 7.5 ppm Kinetin + 1000 ppm Bavistin for three minutes.
    (Correct/Incorrect)
49. After harvesting the fruits, what should be done to obtain maximum market price?
   - Put small, medium and large sized fruits separately
   - Mix small, medium and large sized fruits

50. Where fruits should be selling to earn more profit?
    (Loose from home / in local market / in marketing yard)

51. What type of packing is desirable for export of mango for distant market?
    (In gunny bags / in plastic bags / in hard board boxes)

52. What should be done, if mangoes ripen up all together in a large quantity?

53. Do you know about fruit storage and preservation? (Yes / No)

54. What can be prepared for better income from the pulp of ripe mangoes?
    Ans: _________________
APPENDIX-III

Final Format of The Knowledge Test for Measuring The Knowledge of Mango Growers’ About Improved Mango Production Technology

1. What should be the distance between two plants of mango for medium spreading variety on less fertile land? (10 x 10m / 12 x 12m)

2. Which size of pit should be dug on light soil for plantation of mango? (60 x 60 x 60cm / 100 x 10 x 100cm)

3. Before the occurrence of rainfall, how much quantity of FYM should put in the pits dug out for plantation of mango? (25 kg / 50kg / 100kg)

4. How much quantity of chemical fertilizer should be apply in the pits dug out for plantation of mango?
   - 2.5kg Super Phosphate and 1.0kg Murate of Potash or
   - 2.0kg Super Phosphate and 2.5kg Murate of Potash

5. Which pesticide should be added in the pits for protection against termites? (5to10 %BHC powder / 10gm of Aldrex powder / both)

6. How many plants can be planted at distance of 10 x 10 meter in one hectare of land? (90 / 100 / 110)

7. Which time during day is suitable for planting of mango?
   - In cloudy atmosphere at evening time
   - When there is no rain or

8. How much graft union should be kept above the ground level while planting? (15to20cm / 21to25cm / 26 to30cm)

9. To protect the scion from heavy wind of monsoon, in which direction the branches of scion should remain while planting? (North-South direction / South–West direction)
10. Why shoots growing on graft plants should be removed from time to time.
   Ans: ______________

11. Usually how many times inter culturing operations should be done in mango orchard?
   Ans: ________________

12. How much quantity of FYM is to be applied to an adult mango tree? (50kg / 75kg / 100kg 50 kg)

13. How much quantity of chemical fertilizer is to be applied to an adult mango tree?
   - 2.0kg ammonium sulphate, 1.5 kg super phosphate and 1.0kg murate of potash
   - 3.75kg ammonium sulphate, 1.0 kg super phosphate and 1.25kg murate of potash

14. Whole quantity of phosphatic and potashic fertilizers should be applied in beginning of monsoon in the month on June. (Correct/Incorrect)

15. In how many split nitrogenous fertilizer should be applied?
   Ans:__________

16. When nitrogenous fertilizer should be applied?
   Ans:__________

17. If there is no irrigation facilities, then when nitrogenous fertilizers should be applied?
   Ans:__________

18. When newly planted graft should be irrigated during winter? (7to10 days/4 to7days/10 to 15 days interval)

19. When newly planted graft should be irrigated during summer? (7to10days/4to7days/10 to 15 days interval)
20. When first season of fruit should take from the newly planted grafts
   (After 1 to 2 years/3 to 4 years/6 to 7 years)
21. Are all the fruits can harvest at a time?  (Yes / No)
22. Which is the most destructive pest in mango?
   (Mango hopper, Fruit fly, mango stem borer)
23. For the control of fruit fly, which pesticide is recommended from the following?
   (Fenthion / Monocrotophos)
24. For which insect’s control, spraying of 0.1% Fenthion and 0.1% Methyle Euginol (in 10lit. of water, 10ml of each) should be sprayed?
   (Fruit fly / Mango hopper / Mealy bug)
25. Which are the important problems of mango orchard?
   - Alternate bearing -Mango malformation
   - Fruit dropping -Spongy tissue
   - Post harvest damage -Other if any, specify
26. What should be done to solve the problem of alternate bearing in mango?
   - Spray 2% urea solution during the fruit development and after fruit harvesting in the year of heavy flowering.
   - Spray any pesticide during the fruit development
27. Usually what should be done to control mango malformation?
   Ans:_______________
28. What is the recommendation of spraying of growth regulator to control the mango malformation?
   (2gm NAA in 10 lit. of water/10gm IBA in 10 lit. of water)
29. What should be done to prevent the fruit dropping in mango?
30. What is the recommendation to control spongy tissue in mango fruit?
(FLOURISH grass layer in the basin / APPLY limited irrigation / APPLY daily irrigation)
31. During which period of day, fruits should not be harvested?
(10.00A.M.to 4.00P.M. / Before 10.00A.M. / after 4.00P.M.)
32. The storage period is extended by dipping the fruits in 7.5 ppm Kinetin + 1000 ppm Bavistin for three minutes. (Correct/Incorrect)
33. After harvesting the fruits, what should be done to obtain maximum market price?
- Put small, medium and large sized fruits separately
- Mix small, medium and large sized fruits
34. Do you know about fruit storage and preservation? (Yes / No)
35. What can be prepared for better income from the pulp of ripe mangoes?
Ans: ________________
APPENDIX-IV

Interview schedule for the farmers
Impact of Integrated Horticultural Development Programme in Junagadh District of Gujarat State

No. of respondent:..................    Date of interview:...................

-------------------------------------------------------------------------------

1. Name of the farmer: ....................
2. Village:...................., Taluka:...................., District:....................

PART-1

1. Age:   ________ years

2. Education: 0,1,2,3,4,5,6,7,8,9,10.11,12 and above

3. Occupation:
   (a) Fruit orchard .................
   (b) Fruit orchard + Farming ..............
   (c) Fruit orchard + Farming + Business ..............
   (d) Fruit orchard + Service ..............

4. Size of the land holding: .................hectares

5. Area under mango orchard:.............hectares

6. Mango yield index
   (a) What is the yield of mango on your farm during normal year? .................Q/ha.
   (b) What was the maximum yield of mango on your farm?............................Q/ha

7. Annual income:
   (a) Income from mango orchard: .................Rs.
   (b) Income from other sources: .................Rs.
   (c) Total: .......................Rs.
8. Social participation:
Are you a member or occupying any position in following organization? Yes / No, If yes, give details

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Organization</th>
<th>Member score</th>
<th>Position score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Village Panchayat</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Taluka Panchayat</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>District Panchayat</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Primary agricultural/service co operative society</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Khedut charcha mandal</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Youth club</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Any other</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

(Figures in column 3 and 4 indicate score value for the membership and position of the respondents held in the organization)

9. Opinion leadership
Give the response in following items about your opinion leadership.

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Item</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>During the last six months have you told anyone about some new farming practices?</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Compared with your circle of friends</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Are you more or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Are you less likely to be asked for advice about new horticultural practices?</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Thinking back to your last discussion about some new horticultural practices?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Were you asked for your opinion of the new practices or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Did you ask someone else?</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>When you and your friends discuss new idea</td>
<td></td>
</tr>
</tbody>
</table>
about horticultural practices, what part do you play?
   a. Try to convince them of your new ideas or
   b. Mainly listen

5. Which of these happens more often?
   a. Do you tell your neighbour about new horticultural practices?
   b. Do they tell you about new practices?

6. Do you have the feelings that your friends and neighbours generally regard you as a good source of advice about new horticultural practices?

10. Extension participation:

   Did you participate in the following extension programmes during last year? Yes/no, if yes answer the following.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Item</th>
<th>Score</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Conducted demonstration on your farm</td>
<td>9.80</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Discussed with extension workers</td>
<td>6.84</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Participated in extension meeting</td>
<td>6.60</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Visited demonstration plot on your neighbour’s field</td>
<td>6.16</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Participated in agricultural fair</td>
<td>4.84</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Visited exhibition</td>
<td>2.79</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Read extension publications</td>
<td>1.89</td>
<td></td>
</tr>
</tbody>
</table>

   (Scale developed by Siddaramaiah and Jalihal (1983) was used to measure the extension participation)
11. Overall modernity

Please select only one of the alternative responses, which you think most correct

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Have you got highly concerned any times regarding same social problems such as communal riots?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( ) Frequently</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>( ) Some times</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>( ) Never</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>If schooling is freely available how much schooling do you think children of people like yourself should have?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( ) Graduate and above</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>( ) Below graduation</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Two twelve years boys took time out from their work in the agricultural field. They were trying to figure out a way to grow some area of mango orchard with fewer hours of work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( ) The father of one boy said that is good thing to think about. Tell me your thought about how we should change our ways of growing mango orchard</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>( ) The father of the other boy said: the way to grow mango orchard is the way we have always done it. Talk about change will waste the time about not help.</td>
<td>1</td>
</tr>
</tbody>
</table>

Which father said the wise words?
4. What quality should a man have to hold a high office?
   ( ) Coming from a high family background 1
   ( ) Devotion to the old and time-honoured ways 1
   ( ) Being the most popular among the people 2
   ( ) High education and social knowledge 3

5. Which is most important for the future of this country?
   ( ) The hard work of the people 3
   ( ) Good Government scheme 2
   ( ) God’s help 1
   ( ) Good luck 1

6. Scientists in the universities are studying such things as what determines whether a baby is a boy or a girl and how is it that a seed turns into a plant. Do you think that these investigations are
   ( ) All very good 4
   ( ) All somewhat good 3
   ( ) All somewhat harmful 2
   ( ) All very harmful 1

7. Which of these opinions do you agree with more?
   ( ) Some people say that it is necessary for a man and his wife to limit the number of children to be born so that they can take better care of those they have 2
   ( ) Others say that it is wrong for a man and his wife voluntarily to limit the number of children to be born 1
8. Which of this kind of news interest you most?
   ( ) World events 5
   ( ) The nation 4
   ( ) Your home town or village 3
   ( ) Sports 2
   ( ) Religious events or festivals 1

9. If you were to meet a person who live in another country a long way off. Could you like his way of thinking?
   ( ) Yes 2
   ( ) No 1

10. Do you think a man can be good without having any religion at all?
    ( ) Yes 2
    ( ) No 1

11. What are the biggest problem facing the country?
    (a) 1
    (b) 1
    (c) 1

12. Do you belong to any organization, for example, social club, union, religious organization or other groups? If yes, what are the names of these organizations you belong to?
    (a) 1
    (b) 1
    (c) 1
    (d) 1

13. How often do you get news and information from
newspapers?
(   ) Everyday 3
(   ) Few times in a week 3
(   ) Occasionally 2
(   ) Never 1

12. Innovation proneness

Following are the nine statements (in three sets) indicating degree of innovation proneness. Choose from a group of three statements one which “most liked” and also one which “least liked”.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statement</th>
<th>Most like</th>
<th>Least like</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I try to keep myself up to date with information on few farm practices but that does not mean that I try out all the new methods on my farm (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I feel restless till, I tryout a new farm practices I have heard about (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>They talk of many new farm practices these days, but who knows if, they are better than the old ones (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>From time to time, if have heard of several new farm practices and I have tried out most of them in the last few years (3)</td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td>I usually wait to see what results my neighbour obtain before i try out the new farm practices (2)</td>
<td></td>
<td></td>
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<tr>
<td>6.</td>
<td>Somehow, I believe that the traditional ways of farming are the best (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I am cautions about trying a new practice (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>After all, our forefathers were also wise to</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
their farming practices and I do not see any reason for changing these old methods (1)

9. Often, new farm practices are not successful, however, if any are promising, I would surely like to adopt them (3)

13. **Mass media exposure**

How frequently do you use the following mass media for cultivation of mango orchard?

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Mass media exposure</th>
<th>Regularly</th>
<th>Frequently</th>
<th>Once in a week</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Radio</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Television</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Newspaper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Printed literature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Agril. Exhibition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Demonstration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Any other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. **Farm mechanization index**

Do you possess the following assets? Yes /No. If yes, give details

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Assets</th>
<th>Weigh-tage</th>
<th>Number</th>
<th>Since when (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tractor</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Oil engine / Electric motor</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Thresher</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Sheller</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Sprayer / Duster</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Sprinkler/drip irrigation sets</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Bullock cart</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. Local seed drill 1
9. Harrow 1
10. Hoe 1
11. Plough 1
12. Other if any 1

15. Innovativeness
Q. When would you prefer to adopt an important practice in farming/orcharding?

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As soon as it is brought to my knowledge</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>After I have seen some other farmers using it successfully</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Prefer to wait and take my own time</td>
<td>1</td>
</tr>
</tbody>
</table>

16. Progressiveness
Kindly give response to the following questions

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Questions</th>
<th>Response</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A progressive farmer has to know about recently developed scientific</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Do you know about such practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>A progressive farmer has to accept the improved practices, which give</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>more income.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Do you try to follow the improve recommended practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
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<tr>
<td>---</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>when they are recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>When new varieties are recommended a progressive farmer has to help other farmers to adopt them</td>
<td>Yes: 1  No: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Do you tell the other farmers about the benefit of new varieties</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) Do you help other farmers to follow the improved practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>A progressive farmer is one who adopt the improved practices immediately or at least follow ahead of others</td>
<td>Yes: 1  No: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) In your village are you the first person to adopt the improved practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) If no, have you adopted the practices recommended in the last two years</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>iii) If yes specify them</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>The progressive farmer should have contact with extension agents</td>
<td>Yes: 1  No: 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Have you approached the extension workers to get their advice</td>
<td></td>
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<tr>
<td>6.</td>
<td>The progressive farmer should cultivate superior varieties or high yielding varieties</td>
<td>Yes: 1  No: 0</td>
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<tr>
<td></td>
<td>i) Did you cultivate such varieties in the last year</td>
<td></td>
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</tbody>
</table>
7. The progressive farmer should fully follow the plant protection measures
   i) Do you follow seed treatment
   ii) Do you follow plant protection practices

   Yes  1
   No   0

17. Self confidence

Please indicate your extent of agreement / disagreement to the following statements by putting tick (✓) in the appropriate column.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I feel no obstacle can stop me from achieving my final goal</td>
<td></td>
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<tr>
<td>2.</td>
<td>I am generally confident of my own ability</td>
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<tr>
<td>3.</td>
<td>I am bothered by inferiority feelings</td>
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<td>4.</td>
<td>I do not have initiative</td>
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<td>5.</td>
<td>I usually work out things for myself rather than get someone share me</td>
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<tr>
<td>7.</td>
<td>Life is a strain for me is much of time</td>
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<tr>
<td>8.</td>
<td>I find myself working about something (or) other</td>
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</tbody>
</table>

SA- Strongly Agree; A- Agree; UD- Undecided; DA- Disagree; SDA- Strongly Disagree
18. Self responsibility

Kindly response the following

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particulars</th>
<th>Completely self-responsible</th>
<th>Partially self-responsible</th>
<th>Completely dependent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Capital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Labour</td>
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<tr>
<td>3.</td>
<td>Inputs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>Animal power</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii</td>
<td>Machine power</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>iii</td>
<td>Farm implements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv</td>
<td>Manures and fertilizers</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td>Information on agriculture</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>i</td>
<td>Production technology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii</td>
<td>Input availability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii</td>
<td>Market information</td>
<td></td>
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</tbody>
</table>

19. Market intelligence

Here are some statements, Kindly say yes or no for the same

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Statements</th>
<th>Yes (2)</th>
<th>No (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Knowing the better market locale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Avoiding middle man in the marketing channel</td>
<td></td>
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<tr>
<td>3.</td>
<td>Selling produce after converting it in to value added products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Aware of browsing market details from the internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Knowledge on WTO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part-II

Knowledge of the mango growers about improved mango production technology

1. What should be the distance between two plants of mango for medium spreading variety on less fertile land? (10 x 10m / 12 x 12m)
2. Which size of pit should be dug on light soil for plantation of mango? (60 x 60 x 60cm / 100 x 100 x 100cm)
3. Before the occurrence of rainfall, how much quantity of FYM should put in the pits dug out for plantation of mango? (25 kg / 50kg / 100kg)
4. How much quantity of chemical fertilizer should be apply in the pits dug out for plantation of mango?
   - 2.5kg Super Phosphate and 1.0kg Murate of Potash or
   - 2.0kg Super Phosphate and 2.5kg Murate of Potash
5. Which pesticide should be added in the pits for protection against termites? (5to10 %BHC powder / 10gm of Aldrex powder / both the above)
6. How many plants can be planted at distance of 10 x 10 meter in one hectare of land? (90 / 100 / 110)
7. Which time during day is suitable for planting of mango?
   - In cloudy atmosphere at evening time or
   - When there is no rain
8. How much graft union should be kept above the ground level while planting? (15 to 20cm/21 to25cm / 26 to30cm)

9. To protect the scion from heavy wind of monsoon, in which direction the branches of scion should remain while planting?
   (In North-South direction / In South–West direction)

10. Why shoots growing on graft plants should be removed from time to time.
    Ans:____________

11. Usually how many times inter culturing operations should be done in mango orchard?
    Ans:

12. How much quantity of FYM is to be applied to an adult mango tree? (50kg / 75kg / 100kg 50 kg)

13. How much quantity of chemical fertilizer is to be applied to an adult mango tree?
   -2.0kg ammonium sulphate, 1.5 kg super phosphate and 1.0kg murate of potash or
   -3.75kg ammonium sulphate, 1.0 kg super phosphate and 1.25kg murate of potash

14. Whole quantity of phosphatic and potashic fertilizers should be applied in beginning of monsoon in the month on June.
    (Correct/Incorrect)

15. In how many split nitrogenous fertilizer should be applied?
    Ans: __________

16. When nitrogenous fertilizer should be applied?
    Ans:__________

17. If there is no irrigation facilities, then when nitrogenous fertilizers should be applied?
    Ans:__________
18. When newly planted graft should be irrigated during winter?  
   (At an interval of 7 to 10 days/ 4 to 7 days/ 10 to 15 days)
19. When newly planted graft should be irrigated during summer?  
   (At an interval of 7 to 10 days / 4 to 7 days / 2 to 3 days)
20. When first season of fruit should take from the newly planted grafts  
   (After 1 to 2 years / After 3 to 4 years / after 6 to 7 years)
21. Are all the fruits can harvest at a time?   (Yes / No)
22. Which is the most destructive pest in mango?  
   - Mango hopper  
   - Fruit fly  
   - Mango stem borer
23. For the control of fruit fly, which pesticide is recommended from the following?   (Fenthion / Monocrotophos)
24. For which insect’s control, spraying of 0.1% Fenthion and 0.1% Methyle Euginol (in 10lit. of water, 10ml of each) should be sprayed? (Fruit fly / Mango hopper / Mealy bug)
25. Which are the important problems of mango orchard?  
   - Alternate bearing -Mango malformation  
   - Fruit dropping -Spongy tissue  
   - Post harvest damage -Other if any, specify
26. What should be done to solve the problem of alternate bearing in mango?  
   -Spray 2% urea solution during the fruit development and after fruit harvesting in the year of heavy flowering.  
   -Spray any pesticide during the fruit development
27. Usually what should be done to control mango malformation?
28. What is the recommendation of spraying of growth regulator to control the mango malformation?
   (2gm NAA in 10 lit. of water / 10gm IBA in 10 lit. of water)
29. What should be done to prevent the fruit dropping in mango? Ans: _________________
30. What is the recommendation to control spongy tissue in mango fruit?
   (Flourish grass layer in the basin / Apply limited irrigation / Apply daily irrigation)
31. During which period of day, fruits should not be harvested?
   (From 10.00A.M. to 4.00 P.M./ Before 10.00A.M./ After 4.00P.M.)
32. The storage period is extended by dipping the fruits in 7.5 ppm Kinetin + 1000 ppm Bavistin for three minutes.
   (Correct/Incorrect)
33. After harvesting the fruits, what should be done to obtain maximum market price?
   - Put small, medium and large sized fruits separately
   - Mix small, medium and large sized fruits
34. Do you know about fruit storage and preservation? (Yes/No)
35. What can be prepared for better income from the pulp of ripe mangoes?
   Ans: _________________
Part –III

Extent of Adoption of improved mango production technology by the growers

1) How many times have you followed following tillage operations?

<table>
<thead>
<tr>
<th>Tillage operation</th>
<th>No.</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep ploughing</td>
<td></td>
<td></td>
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<tr>
<td>Harrowing</td>
<td></td>
<td></td>
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<tr>
<td>Weeding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2) Which variety of mango have you grown on your orchard? Give details.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Variety</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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</tbody>
</table>

3) What planting distance have you kept between two mango trees?

4) Have you applied organic manure in mango orchard?
   Yes / No. If yes, Quantity ______________Kg/ tree

5) Have you applied chemical fertilizers in mango orchard?
   Yes / No. If yes, give details

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of fertilizer</th>
<th>Quantity (Kg/tree)</th>
<th>Time of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6) Give the details about irrigation

<table>
<thead>
<tr>
<th>Season</th>
<th>No. of irrigation</th>
<th>Interval between two irrigations</th>
<th>Method of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Summer</td>
<td></td>
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<td></td>
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<tr>
<td>Monsoon</td>
<td></td>
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</tr>
</tbody>
</table>

7) Have you taken control measures in your mango orchard against insect – pest? Yes / No. If yes, give details

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of Insect/pest</th>
<th>Name of insecticide</th>
<th>Quantity (Kg or lit/ha,)</th>
<th>Time of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td></td>
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<td>3</td>
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<tr>
<td>4</td>
<td></td>
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</tr>
</tbody>
</table>

8) Have you sprayed the fungicides for controlling the diseases in mango orchard? Yes / No. If yes, give details

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of disease</th>
<th>Name of fungicide</th>
<th>Quantity (Kg or lit/ha,)</th>
<th>Time of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
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</tbody>
</table>

9) Have you grown inter crop with your mango crop?

Yes / No. If yes, give details

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of the inter crop</th>
<th>Sowing time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10) Have you applied hormones? Yes /No. If yes, give details

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of hormones</th>
<th>Quantity (Kg or lit/ha,)</th>
<th>Time of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td></td>
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<td>3</td>
<td></td>
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</tbody>
</table>

**Part-IV**

**Attitude of Farmers Towards Integrated Horticultural Development Programme**

Please indicate your response with following statements:

(IHDP: Integrated Horticultural Development Programme)

(SA: Strongly Agree, A: Agree, UD: Undecided, DA: Disagree, SDA: Strongly Disagree)

(Figure in to bracket indicates the “t” value of the statement)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statement</th>
<th>S</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IHDP is a boon for small and marginal farmers (+) (2.09)</td>
<td></td>
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<tr>
<td>2</td>
<td>Big farmers only can derive benefit of IHDP (-) (1.86)</td>
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<tr>
<td>3</td>
<td>Only relatives and friends of the staff of the Horticulture Department can take benefit of IHDP (-) (3.28)</td>
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<td>4</td>
<td>Transformation of dry land agriculture is possible through IHDP (+) (1.92)</td>
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<tr>
<td>5.</td>
<td>Implementation of IHDP uplift the socio-economic condition of the farmers (+) (1.96)</td>
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<tr>
<td>6.</td>
<td>The small scale industries in fruit processing will be enhanced in rural areas due to development of orchards (+) (5.96)</td>
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<tr>
<td>7.</td>
<td>The scheme IHDP is scheduled only to complete the departmental target (-) (2.31)</td>
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<td>8.</td>
<td>Farmers takes benefit of IHDP for subsidy purpose only (-) (2.40)</td>
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<td>9.</td>
<td>IHDP has awaken farmers to grow fruit crops on barren land (+) (2.11)</td>
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<tr>
<td>10.</td>
<td>Growing fruit crops under IHDP is just a wastage of time, money and man power (-) (2.35)</td>
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<tr>
<td>11.</td>
<td>Horticulturists of the department provides satisfactory guidance to the farmers (+) (2.65)</td>
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<tr>
<td>12.</td>
<td>Marginal/ small farmers can't afford costly horticultural technology (-) (2.79)</td>
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<tr>
<td>13.</td>
<td>The people’s requirement of fruits is fulfilled through IHDP (+) (2.53)</td>
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<tr>
<td>14.</td>
<td>Farmers are hesitated to adopt IHDP due to long gestation period of fruit trees (-) (5.28)</td>
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<tr>
<td>15.</td>
<td>Due to lack of publicity and awareness majority of the farmers have not received the benefit of IHDP (-) (2.6)</td>
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<tr>
<td>16.</td>
<td>The procedure of getting seedlings for fruit cultivation is complex under IHDP (-) (2.07)</td>
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<tr>
<td>17</td>
<td>Sufficient seedlings are not provided to the farmers under IHDP</td>
<td></td>
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<tr>
<td></td>
<td>(-) (2.52)</td>
<td></td>
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<tr>
<td>18</td>
<td>People are aware about free supply of seedlings of fruit crops</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>under IHDP (-) (1.98)</td>
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<tr>
<td>19</td>
<td>One has to visit the Horticulture Department for a number of</td>
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<tr>
<td></td>
<td>times to get his subsidy to be sanctioned (-) (3.21)</td>
<td></td>
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<tr>
<td>20</td>
<td>The introduction of IHDP is a major breakthrough in boosting</td>
<td></td>
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<tr>
<td></td>
<td>up the area, production and productivity of fruit crops (+)</td>
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<td></td>
<td>(2.19)</td>
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<tr>
<td>21</td>
<td>Processing of horticultural produces will reduce the losses</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>and increase the market price (+) (3.31)</td>
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<tr>
<td>22</td>
<td>Value added products of horticultural crops through IHDP will</td>
<td></td>
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<tr>
<td></td>
<td>uplifts the rural economy (+) (2.86)</td>
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<tr>
<td>23</td>
<td>Horticultural crops produce higher biomass than field crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>per unit area/unit time (+) (2.61)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>24</td>
<td>Adoption of IHDP by the farmers is a difficult and complex</td>
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<td>process (-) (3.13)</td>
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</table>
Part- V

1. **Constraints**
Constraints faced by the beneficiary farmers in taking benefit of IHDP
1. 
2. 
3. 
4. 
5....

2. **Suggestions**
Suggestions offered by beneficiary farmers to make the IHDP more effective.
1. 
2. 
3. 
4. 
5....