MANAGERIAL EFFICIENCY OF COCONUT PLANTATION GROWERS IN COASTAL AREA OF SAURASHTRA REGION

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IN
EXTENSION EDUCATION

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OCTOBER - 2011
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Affectionately Dedicated
to
my beloved late
"PARENTS"
who
always dreamed of me
As I am Today
ABSTRACT
The coconut palm (*Cocos nucifera* Linn.) is the most useful palm in the world. Every part of the tree is useful. It is much attached to the emotions of the people in the South East Asia that it forms a part of the mythology and culture and is auspicious in various ceremonies. Coconut tree is ranked among one of the 10 most useful trees of the world and is often termed as 'kalpavriksha', the "tree of life".

Copra obtained by drying the kernel of coconut is the richest source of vegetable oil containing 65 to 70 per cent oil. Several other products are derived from coconut palm and they too are used in many applications. Copra is used to extract coconut oil and coconut meal in the ratio of 3:2. The products like hair oil, soaps, shampoos and medicines require coconut oil as an important ingredient. Also the kernel is quite popular in a vast number of cuisines.
Coconut occupies prime position in the cultural, social and economic lives of millions of people across the world. The crop husbandry and allied activities provide livelihood and food security to more than 10 million people in India. Coconut oil, the main commercial product, determines prices of coconut and its products. The increasing trend in area and production of coconut in the country with the regress in the consumption of coconut oil in both edible and non-edible sector on account of cheap substitutes necessitated development of broad based processing and cultivation technologies for sustainable growth of the industry.

Traditionally coconut industry in India has concentrated on copra making, extraction of coconut oil and coir manufacturing. Economic globalization has added integrated various regional markets into a world market. As a result, various new coconut products from elsewhere in the world have found a prominent place in the product profile of the food chain markets in the country.

To make the industry competitive, significant changes have to be made in domestic market in terms of product developments and deep market integration. Emphasis has to be given for value addition in coconut through product diversification and by-product utilization and for evolving technologies for development of new value added products in tune with those of other leading countries.

Management may in short be called a science of decision-making or a science of choice. A farmer has to make judicious decisions on the use of scarce resources, having alternative uses to obtain the maximum profit and family satisfaction on a continuous basis from the farm as a whole. In other words, management seeks to help the farmer in deciding problems like what to produce, how much to produce and when to buy and sell and in organization and managerial problems relating to these decisions.

Management plays an impressive role on the performance of four key tasks, namely, achieving economic performance, creating
productive work, managing the social impact and responsibility of a business and managing the time dimension.

The agriculture being an enterprise is not an exception to this. The coconut plantation growers as the manager of the enterprise are expected to bring about maximum profit with available resources. Coconut plantation growers perform many functions in carrying out the better production such as: preparing a plan of work, giving clear instructions, integrating the work, taking proper decision at right time, implementing the decision etc. in carrying out the management activity in coconut plantation. All the above functions involve in one or the other way, many management components viz. planning, organizing, directing, controlling, human relation, leading, coordinating and decision making. Today farming enterprise is becoming more complex and complicated and therefore, management is a key to face these problems. To make coconut plantation more productive, proper management of scientific coconut plantation practices should be adopted by coconut plantation growers. Therefore, the present study was designed to measure managerial efficiency of coconut plantation growers about scientific cultivation of coconut plantation and find out the effect of selected variables on managerial efficiency with the following objectives:

1. To study the personal, socio-economic, psychological and extension communication profile of coconut plantation growers.
2. To develop and standardize a scale to measure the managerial efficiency of coconut plantation growers in coconut cultivation.
3. To ascertain managerial efficiency of coconut plantation growers.
4. To assess the perception of coconut plantation growers about quality and damage caused by eriophyid mite on coconut.
5. To ascertain the relationship between managerial efficiency of coconut plantation growers and their selected characteristics.
6. To know the extent of variation caused by selected independent variables in the managerial efficiency of coconut plantation growers.

7. To elicit the constraints faced by coconut plantation growers in adoption of improved coconut cultivation technology and their suggestions to overcome the constraints.

The study was conducted in the coastal areas of Saurashtra where coconut is a major crop. Total five talukas i.e. 3 talukas of Junagadh, 1 taluka of Porbandar and 1 taluka of Bhavnagar district were selected purposively which is having the highest coconut growing area. Three villages from each taluka and 10 respondents from each village i.e. total 15 villages and 150 respondents were included in the sample. The dependent variable undertaken in this study was managerial efficiency. The independent variables were age, educational status, farm size, area under coconut cultivation, herd size, annual income, social participation, access to market facilities, innovativeness, risk orientation, perception, symbolic adoption, attitude towards coconut cultivation, information seeking behaviour, extension participation and participation in training programme. To measure managerial efficiency of coconut plantation growers, a scale was developed using Normalised Rank Approach. Other variables were measured using different scales and indices. The data of this study were collected through personal interview. The data so collected were classified, tabulated, analyzed and interpreted in terms of objectives. The findings of the study are summarized as below:

1. In detail analysis of major indicators of managerial efficiency scale, the judges gave first rank to knowledge followed by planning, rational marketing, rational decision, budgeting, communication and human relationship, organizing, value addition, controlling and coordinating. Among the each main indicators, coconut plantation growers gave first position to intercropping and quality of coconut products in knowledge,
planning about the inputs in ability to planning, technical competency in making decision in ability to make rational decision, coconut plantation growers gave importance to teamwork to achieve the goal in organizing the activities, consulting the extension worker when they heard about the incidences of insect-pests and eriophyid mite in epidemic condition or disease attack on the coconut plantation for coordinate activities, consultation with family members about source of credit for budgeting, well aware about co-operation with co-workers which produce better results in form of desirable work hours in communication and human relationship, supply of coconut fruits to the market when high price of produce in ability to make rational marketing, ability to sell the coconut produce after grading process which increase value addition and supervising the working of people while different agricultural operation in ability to controlling activities.

2. The managerial efficiency of coconut plantation growers under study was found predominantly medium (51.33 per cent).

3. More than three fourth (77.33 per cent) of the respondents were in middle and old age group and more than one third (34.00 per cent) of them were educated up to primary and middle level education.

4. Majority (86.00 per cent) of the coconut plantation growers were under the category of small and medium farmers, up to 5.00 acres of area under coconut cultivation (50.67 per cent), having small size of herd size (up to 3 animals) (47.33 per cent), majority of them had their earning of more than fifty thousand rupees per year (89.33 per cent), medium social participation (66.67 per cent) and 57.33 per cent of them had high access to market facilities.

5. Majority (37.33 per cent) of coconut plantation growers reported that they had adopted the innovation immediately after they had
seen it, medium risk orientation (56.67 per cent), medium perception level about quality and damaged caused by eriophyid mite in coconut (63.33 per cent), medium symbolic adoption (60.00 per cent) and moderately to highly favourable attitude towards the cultivation of coconut (84.00 per cent).

6. Majority (60.67 per cent) of the coconut plantation growers were in the category of average and above average level in case of information seeking behaviour, medium level of extension participation (54.67 per cent) and 78.67 per cent coconut plantation growers were either medium trained or untrained.

7. Coconut plantation growers’ characteristics such as education, farm size, area under coconut plantation cultivation, annual income, access to market facilities, innovativeness, risk orientation, perception about quality and damaged cause by eriophyid mite, symbolic adoption, attitude toward coconut cultivation, information seeking behaviour and extension participation had significant relationship with managerial efficiency of coconut plantation growers.

8. Among 16 selected characteristics of coconut plantation growers, eleven variables viz.; age, educational status, farm size, area under coconut cultivation, annual income, social participation, access to market facilities, innovativeness, risk orientation and participation in training programme were contributing significantly to managerial efficiency of coconut plantation growers. All the 16 independent variables together explained total variation in managerial efficiency to the extent of 69.90 per cent. Access to market facilitates had great influence of 43.48 per cent.

9. Lack of awareness about control measure to eriophyid mite, serious problems of eriophyid mites, lack of modern spraying equipment to control the eriophyid mite, high cost of insecticides and pesticides, unremunerative price for tender nuts and mature
nuts, neighboring farmers do not spray insecticides to control eriophyid mite so difficult to get good result, complicated method and delay / insufficient facilities of loan and subsidies, lack of timely availability of fertilizers, lack of emphasis on value addition training, problem of spraying insecticide while taking intercrop, intercropping increase weed problem and lack of knowledge about coconut based industry were the important constraints faced by the coconut plantation growers.

10. The most important suggestions offered by majority of the coconut plantation growers were; creating awareness about damaged and deteriorated quality of coconut caused by eriophyid mite, specific pest effective insecticide should be recommended, establishment of market facilities at local level, price of pesticides and fertilizers should be reasonable, government should provide subsidy for chemical fertilizer and short term training programme should be conducted on use of herbicide and plant protection measures.
This is to certify that the thesis entitled "MANAGERIAL EFFICIENCY OF COCONUT PLANTATION GROWERS IN COASTAL AREA OF SAURASHTRA REGION" submitted by Mr. KALSARIYA BAVBHAI NAYABHAI in partial fulfillment of the requirements for the award of the degree of Doctor of Philosophy (Agriculture) in the subject of EXTENSION EDUCATION to the Junagadh Agricultural University is a record of bonafide research work carried out by him under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma or other similar title.

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This is to certify that the KALSARIIYA BAVBHAI NAYABHAI student of Ph.D. in the subject of EXTENSION EDUCATION has made all correction/modification in the thesis entitled "MANAGERIAL EFFICIENCY OF COCONUT PLANTATION GROWERS IN COASTAL AREA OF SAURASHTRA REGION" as suggested by the external examiner and the advisory committee in the oral examination held on 4th January, 2012. The final copies of the thesis duly bound and corrected have been submitted on January, 2012.

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This is to declare that the whole of research work reported here in the thesis for partial fulfillment of the requirements for the degree of Doctor of Philosophy in the subject of Extension Education by the undersigned is a result of investigation done by me under direct guidance and supervision of Dr. M. N. Popat, Associate Director of Extension Education, Junagadh Agricultural University, Junagadh-362001 and no part of work had been submitted for any other degree so far.

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Date: 12th October, 2011

Place: Junagadh (B. N. Kalsariya)

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KALPAVRIKSH
“Coconut is the king of vegetables with its sap, fruits, leaves, stem, root and all parts to feed, appease, shelter, cure and carry mankind”
- Joes Maria de Silva

Coconut (Cocos nucifera Linn.) is one of the important perennial crops belonging to family Arecaceae (palm family). In religious, it is the legendary ‘Devavrikshas’ in all the tree of Indian classics. Coconut is unique among horticultural crops grown in India, as a source of food, drink, shelter and a variety of raw materials for industrial exploitation. The inhabitants therefore, affectionately eulogized the coconut plant with reverence as “Kalpavriksha”, because of its manifold virtues. The crop assumes considerable significance in the national economy in view of rural employment and income generation. Its fruit is called “Lakshmi Phal” and is used in social and religious functions in India irrespective of whether palm is locally grown or not.

The coconut palm, with its tall, slender and uniformly thick stem and massive crown with a large number of leaves, bearing bunches of nuts in their axils, is one of the most beautiful and useful trees in the world. It perhaps yields more products of use to mankind than any other tree. Each and every part of the coconut palm is useful to man in one way or the other.

In India, coconut is consumed in the form of tender nuts, raw kernel, copra, coconut oil and desiccated coconut. Since dishes made from coconuts are rich in fat, protein and some vitamins, they counterbalance some of the deficiencies inherent in the predominantly starchy foods consumed in the countries concerned. Some of the countries derive substantial revenue from the coconut industry. In India, export of coir products earns the much-needed foreign exchange.

A large number of coconut products are manufactured in the country which have both domestic and export market. Vinegar and soft
drink are manufactured from coconut water. Tender coconut water concentrate is another product which is manufactured and marketed successfully.

Coconut leaves are plaited and used for thatching houses, covering retting pits, making baskets and partition walls in separating different lots of husks retted in linear trenches, etc. Plaited leaves are also made into several types of headgear and worn by poor men and women while out in the field. Unplaited coconut leaves are used for shading seedlings, mulching nursery beds and fencing, etc. The dry leaflets are tied into small bundles and used in villages as torch at night.

The midribs of leaves are utilized for making brooms, baskets, fish traps. Petioles, bunch stalks, spathes, stipules etc. are mostly used as fuel.

The trunks of old coconut trees are utilized as timber for house-construction. The quality of the timber improves if it is soaked in saline water for some time. The apple or cotyledon developed during germination and the tender bud are delicacies. The tender husks of some varieties are edible and sometimes pickled. Several coconut products and parts of the palm are used for medicinal purposes.

Copa is produced in two grades, the edible grade and the milling grade. The edible grade copra is consumed as raw nut (which is used as offering to Gods, grated to produce copra powder for use in sweets, chutneys and other dishes) and the milling grade for the extraction of coconut oil.

The extracted oil is used for cooking purpose as well as industrial purpose such as hair oils, toilet soaps, splitting into fatty acids for manufacturing chemicals used in shampoos, and in ayurvedic and pharmaceutical industries, etc. The multiproduct aspect of coconut is
its biggest asset. Its products are eco-friendly. The health and nutritional benefits of coconut oil are being increasingly recognized. Recent studies show that coconut can also be used as an antiviral agent.

A sizeable quantity of coconut and coconut products are exported from the country with registration from various Export Promotion Councils through Coconut Development Board (CDB). Coconut products such as tender coconuts, tender coconut water, packed tender coconut water, nata-de-coco, coconut water based vinegar, coconut water based soft drinks/beverages, raw coconuts, partially dehusked coconuts, desiccated coconut powder, skimmed milk powder, coconut milk/cream, coconut oil, dry coconuts, ball copra, cut copra coconut flakes, coconut chips, coconut gratings, coconut parings, coconut chutney powder, medicated coconut oil, coconut oil based hair/massage oils, virgin coconut oil, coconut based convenience foods, coconut shell, coconut shell powder, coconut shell charcoal, coconut shell based activated carbon, handicrafts made out of coconut shell and parts of coconut tree, coconut wood furniture etc. fall within the jurisdiction of the Coconut Development Board which has now been notified as an Export Promotion Council.

During independence, India ranked third in the world with a production of three billion nuts. By seventies, however, the position of India dropped to fifth. But the situation improved rapidly after formation of the Coconut Development Board (CDB). India climbed to the third position again by mid eighties. In 1995-96, it became the largest producer of coconut in the world.

Manufacturing of coir and coir products is one of the major agro based cottage industry in the country, which supports more than half a million people belonging to economically weaker sections of the rural population. About 80 per cent of the workers in the coir industry are
women. Apart from these, leaves and stem are also used for various purposes.

The coconut provides a nutritious source of meat, juice, milk, and oil that has fed and nourished populations around the world for generations. On many islands, coconut is a staple in the diet and provides the majority of the food eaten. Nearly one third of the world’s population depends on coconut to some degree for their food and their economy. Among these cultures the coconut has a long and respected history.

The thrust areas included creation of permanent production potential, stepping up productivity, developing processing technologies for product diversification and improving market situation. Coconut Development Board is a statutory body established by the Government of India for the integrated development of coconut production and utilization in the country with focus on productivity increase and product diversification. The Board which came into existence on 12th January 1981, functions under the administrative control of the Ministry of Agriculture, Government of India, with its headquarters at Kochi in Kerala.

Along with traditional southern states, CDB has extended its activities to the semi-traditional (Orissa, Assam, Bhopal, Tripura, Andamans, Goa etc.) and eco-coconut (Manipur, Nagaland, Bihar, Gujarat, Madhya Pradesh, Rajasthan etc.) areas. Out of the total coconut production in the country, approximately 48 per cent is used for edible purposes, 31 per cent for production of milling copra (which is crushed for extraction of oil), 8 per cent for conversion into ball copra, 11 per cent for tender coconut and the remaining for manufacture of non-traditional products and cultural and social purposes.
Coconut is grown in 92 countries in the world. Global production of coconut during the year 2006-07 was around 54,865 million nuts from an area of 10.83 million hectares as shown in Table 1. The four major players; Philippines, Indonesia, India and Srilanka contribute about 78 per cent of the world production. In 2007-08, India contributed 27.86 per cent of world coconut production from only 15.82 per cent of world’s share in area. Nearly three fourth (73.3 per cent) of the world production is from India, Indonesia and the Philippines. Sri Lanka with about 4.97 per cent of the production occupies fourth position. Taking 1991 as the base year, growth rate over the period 1991-2006 has been 136.7 per cent in area and 108.7 per cent in production (Kumar Bijay, 2011).

Among major producing countries, Thailand and India have recorded excellent growth in production during the last few decades. In the early nineties, India ranked third in the world in area and production among 86 coconut growing countries.

Globally, coconut is the 7th most important source of vegetable oil. Since the coconut oil is rich in lauric acid (45-50 per cent), it is the major source of lauric oil for industrial purposes. Philippines and Indonesia are the major exporters of coconut oil and coconut meal (copra) accounting for around 80 per cent of global exports.

### Table 1: Country-wise Area, Production and Productivity of Coconut in 2006-07

<table>
<thead>
<tr>
<th>Country</th>
<th>Area (hectares)</th>
<th>Production (million nuts)</th>
<th>Productivity (nuts / ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>2,200</td>
<td>2,973,700</td>
<td>10,813</td>
</tr>
<tr>
<td>China</td>
<td>28,200</td>
<td>289,000</td>
<td>10,248</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>38,000</td>
<td>181,533</td>
<td>4,777</td>
</tr>
<tr>
<td>Country</td>
<td>Production</td>
<td>Area Under Cultivation</td>
<td>Productivity</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Ghana</td>
<td>55,000</td>
<td>315,000</td>
<td>5,727</td>
</tr>
<tr>
<td>India</td>
<td>1,940,000</td>
<td>15,840,000</td>
<td>8,165</td>
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<tr>
<td>Indonesia</td>
<td>2,660,000</td>
<td>16,289,000</td>
<td>6,123</td>
</tr>
<tr>
<td>Mozambique</td>
<td>70,000</td>
<td>265,000</td>
<td>3,785</td>
</tr>
<tr>
<td>Myanmar</td>
<td>41,000</td>
<td>350,000</td>
<td>8,536</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>200,000</td>
<td>650,000</td>
<td>3,250</td>
</tr>
<tr>
<td>Philippines</td>
<td>3,253,927</td>
<td>14,344,920</td>
<td>4,408</td>
</tr>
<tr>
<td>Srilanka</td>
<td>447,000</td>
<td>1,950,000</td>
<td>4,362</td>
</tr>
<tr>
<td>Tanzania</td>
<td>310,000</td>
<td>370,000</td>
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</tr>
<tr>
<td>Thailand</td>
<td>337,000</td>
<td>1,450,000</td>
<td>4,302</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>132,800</td>
<td>930,600</td>
<td>7,007</td>
</tr>
<tr>
<td>World</td>
<td>10,830,738</td>
<td>54,864,517</td>
<td>412,319</td>
</tr>
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</table>

*Source: FAO Statistics Citation (www.fao.in)*

In India, this crop is grown in a wide range of agro-climatic conditions. Coconut is cultivated under varying soil and climatic conditions in 18 states and three Union Territories. This geographical area has 3000 years’ tradition in coconut cultivation. There are millions of farmers linked with this sector directly or indirectly. Large numbers of farmer's co-operative societies are in primary processing and marketing different coconut products. The coconut production, area under cultivation and productivity in India are shown in Table 2. It is clear that, the cultivation area under coconut has increased over the years.
In 1995-96 it was 1830.9 thousand hectares, which increased to 1895.2 thousand hectares in 2009-10. The production of coconut increased from 12,952.3 million nuts to 15,730 million nuts. The productivity of coconut showed a fluctuating trend, but steadily increased from 6298 nuts per hectares in 2003-04 to 8303 nuts per hectares in 2009-10 as shown in Table 2 and figure 1.

The four southern states viz., Kerala, Tamil Nadu, Karnataka and Andhra Pradesh account for 89.75 per cent of total area and production. Kerala tops the list with 41.58 per cent (0.89 million ha) of area and 37 per cent (5801 million nuts) of production in India. Area wise, Karnataka is second with 0.42 million ha (22.11 per cent) followed by Tamil Nadu 0.39 million ha (20.58 per cent) and Andhra Pradesh 0.10 million ha (5.59 per cent). Coconut is also grown in Assam, Goa, Maharashtra, Gujarat, Orissa, Tripura, West Bengal, Andaman and Nicobar Islands, Lakshadweep and Pondicherry.

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (In 000' Ha)</th>
<th>Production (In Million Nuts)</th>
<th>Productivity (In Million Tonnes)*</th>
<th>Productivity (In Nuts / Ha)</th>
</tr>
</thead>
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<td>1529</td>
<td>10080</td>
<td>6.9</td>
<td>6593</td>
</tr>
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<td>1995-96</td>
<td>1831</td>
<td>12952</td>
<td>8.9</td>
<td>7074</td>
</tr>
<tr>
<td>2001-02</td>
<td>1893</td>
<td>12822</td>
<td>8.8</td>
<td>6775</td>
</tr>
<tr>
<td>2002-03</td>
<td>1893</td>
<td>12822</td>
<td>8.8</td>
<td>6775</td>
</tr>
<tr>
<td>2003-04</td>
<td>1934</td>
<td>12178</td>
<td>8.4</td>
<td>6298</td>
</tr>
<tr>
<td>Year</td>
<td>A</td>
<td>P</td>
<td>2007-08</td>
<td>2008-09</td>
</tr>
<tr>
<td>--------</td>
<td>----</td>
<td>----</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>2004-05</td>
<td>1935</td>
<td>8829</td>
<td>6.1</td>
<td>4563</td>
</tr>
<tr>
<td>2005-06</td>
<td>2029</td>
<td>14809</td>
<td>10.2</td>
<td>7299</td>
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<td>2006-07</td>
<td>1940</td>
<td>15831</td>
<td>10.9</td>
<td>8161</td>
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<tr>
<td>2007-08</td>
<td>1903</td>
<td>14748</td>
<td>10.1</td>
<td>7749</td>
</tr>
<tr>
<td>2008-09</td>
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</tr>
<tr>
<td>2009-10</td>
<td>1895</td>
<td>15730</td>
<td>10.8</td>
<td>8303</td>
</tr>
</tbody>
</table>

* Conversion Formula = Number of 1453.24 Nuts/Tonnes

Source: National Horticulture Board, data base, 2010-11

* Production in 000’ MT

**Fig. 1**: Production Trends of Coconut in India

**Table 3**: State wise area and production of coconut plantation crop

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>State/UTs</th>
<th>2007-08</th>
<th>2008-09</th>
<th>2009-010</th>
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<tr>
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<td>Andaman &amp;</td>
<td>21.600</td>
<td>21.600</td>
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<td>55.471</td>
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</tr>
<tr>
<td>Nicobar</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>101.3</td>
<td>770.3</td>
<td>101.3</td>
<td>770.3</td>
</tr>
<tr>
<td>Assam</td>
<td>19.0</td>
<td>93.6</td>
<td>18.8</td>
<td>101.0</td>
</tr>
<tr>
<td>Goa</td>
<td>25.5</td>
<td>87.8</td>
<td>25.6</td>
<td>88.0</td>
</tr>
<tr>
<td>Gujarat</td>
<td><strong>16.4</strong></td>
<td><strong>95</strong></td>
<td><strong>16.4</strong></td>
<td><strong>95.2</strong></td>
</tr>
<tr>
<td>Karnataka</td>
<td>405.0</td>
<td>1125.9</td>
<td>419.0</td>
<td>1497.0</td>
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<tr>
<td>Kerala</td>
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<td>3882.3</td>
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<td>3992.0</td>
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<td>Lakshadweep</td>
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<td>36</td>
<td>2.700</td>
<td>36.476</td>
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<tr>
<td>Maharashtra</td>
<td>21.0</td>
<td>120.5</td>
<td>21.0</td>
<td>120.0</td>
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<tr>
<td>Nagaland</td>
<td>0.900</td>
<td>0.138</td>
<td>0.9</td>
<td>0.3</td>
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<tr>
<td>Orissa</td>
<td>51.0</td>
<td>189.8</td>
<td>51.0</td>
<td>190.0</td>
</tr>
<tr>
<td>Pondicherry</td>
<td>2.200</td>
<td>18</td>
<td>2.200</td>
<td>18.307</td>
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<tr>
<td>Tamilnadu</td>
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<td>3419.3</td>
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<td>Tripura</td>
<td>5.800</td>
<td>7.846</td>
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<td>8.0</td>
</tr>
<tr>
<td>West Bengal</td>
<td>28.6</td>
<td>245</td>
<td>28.6</td>
<td>245.0</td>
</tr>
<tr>
<td>Total</td>
<td>1903.2</td>
<td>10148.3</td>
<td>1895.2</td>
<td>10824.3</td>
</tr>
<tr>
<td>Productivity of India in MT/ha</td>
<td>5.3</td>
<td>5.3</td>
<td>5.7</td>
<td>5.7</td>
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</tbody>
</table>

*Area in 000' ha

**Production in 000' MT

Source: Coconut Statistics, Coconut Development Board, Ministry of Agriculture, Govt. of India.

Production wise, Tamil Nadu is second with 5365 million nuts (34.11 per cent of national production) followed by Karnataka (13.83 per cent) and Andhra Pradesh (6.16 per cent). Even though national productivity is only 8303 nuts per hectare, wide variation exists in productivity among the states (Indian Horticulture Database, NHB,
2010). Table 3 shows state-wise area, production and productivity of coconut in India. Highest productivity is reported from Maharashtra (15,000 nuts per hectare) followed by West Bengal (13,000), Tamil Nadu (10,500), Andhra Pradesh (10,300), Gujarat (7000), Kerala (5747) and Karnataka (5210) (Rajgopal et al, 2006).

Though Gujarat is traditional coconut growing state, its contribution in area, production and productivity of coconut has been insignificant compared to other major coconut producing states in the country. It contributes only 0.88 per cent area and 0.98 per cent in production at all India level. Gujarat is having about 1600 Km. long coastal areas. The climate is favorable for development of coconut cultivation in coastal area of Saurashtra and South Gujarat.

In Gujarat, 16,674 hectares area and 250.63 million nuts productions with productivity 8433 nuts per hectare are recorded (Anonymous, 2010-11). Average productivity per tree is 40 nuts in irrigated area in Gujarat, whereas, average productivity of India is 44 nuts per tree (Kapadiya, 2006).

The adoption of research based farming practices in the cultivation of coconut plays a crucial role in giving remunerative returns to improve farmers' economy. Although, a research station of coconut is located in Mahuva and Mangrol and four varieties viz., Tall, Dwarf, D x T, T x D are released from these stations, it is a fact that, even today farming of coconut plantation is done by many farmers in traditional way. Therefore, there is a wide gap between the present practices adopted by the

Table 4: District wise area and production of coconut plantation crop in Gujarat

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of District</th>
<th>Area*</th>
<th>Prod**</th>
<th>Area</th>
<th>Prod</th>
<th>Area</th>
<th>Prod</th>
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<td>2009-10</td>
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farmers and recommendations of practices made by the research stations of agricultural universities. The available recent research technologies have established their superiority over the old ones. It is believed that the changes in such technologies can lead to socio-economic development of the coconut growers. The farm level changes resulted into adoption of new technology and improved the ability of farmers to develop the farm such as supply input and better management of storing, processing and distributing coconut fruit. Thus, by adopting holistic approach of different agricultural operations in
coconut cultivation, the farmers can get maximum return (Kikani and Khimani, 2007).

The cultivation of horticultural crops requires many skills and exceptional thoughtfulness among the farmers. Among various affecting factors in the production of most important plantation crop like coconut, the management factor is very important for an individual as it makes him capable to make best use of available natural and other resources to generate higher income. Thus, management is the responsible factor to presume and answer, why some coconut growers obtain higher yields and income than others within the same level of resources available to them.

In the current era of information, technology and science, scientific management has been considered as a great potential aspect for increasing production of the agricultural, horticultural and plantation crops; coconut production is one of them. Therefore, elevating management efficiency among the coconut producing farmers is of prevailing importance. This is needed to open up new foundation to achieve substantial gains in income of coconut growers. The promotion of the management efficiency is a complex process, which needs to be strengthened among the under privileged coconut cultivators.

The management is a course of action taken by an individual that includes planning, organizing, actuating, controlling, and performing actions to determine and accomplish predetermined objectives through the use of available human and other resources (Terry and Franklin, 1984). While, according to Bora and Ray (1986), farm management is the practice by which the person becomes able to enhance return from the farm on a sustained basis for the attainment of a family goal.
Management, for the purpose of the present study, has been defined as the process by which the farmer is able to enhance return from the farm on a sustained basis for the attainment of family goals. Effective management is crucial for obtaining high return from a production system on a sustained basis. It is essential that the farmers and extension workers are made aware of the need for developing the managerial efficiency of the farmers.

The probable reasons for low production of coconut in this area are many but the adverse effects of climate, as well as less scientific management in coconut plantation are the major concerns which affect quality as well as productivity. World Trade Organization (WTO) opened the vistas for the marketing at the global level. If the quality is compromised then there is limited scope to survive in the market. Today farming enterprise is becoming more complex and complicated and therefore, management is a key to face these problems.

In broader sense, management means effective use of man, money, equipment, materials and methods (Belshaw, 1974). Coconut growers as the manager of the coconut cultivation enterprise are expected to bring about maximum output with available resources. How the farmers fulfill this expectation is the test of their managerial efficiency.

The recent advancements in coconut production technology have demonstrated that scientific managerial efficiency of coconut growers has great potential for increasing the coconut production. Consequently, raising managerial efficiency is of dominant importance for coconut producers. This can open new vistas and make possible for coconut growers to achieve substantial gain in income. Raising managerial efficiency is the challenging and fundamental task. This problem needs to be carefully tackled for long run solution of under developed coconut growers. Therefore, the present investigation on
"Managerial Efficiency of Coconut Plantation Growers in Coastal Area of Saurashtra Region" is thought to be undertaken.

1.1 STATEMENT OF PROBLEM

Coconut is highly nutritious and rich in fiber, vitamins, and minerals. It is classified as a "functional food" because it provides many health benefits beyond its nutritional content. Coconut oil is of special important because it possesses healing properties far beyond that of any other dietary oil and is extensively used in traditional medicine, so it is considered coconut oil to be the cure for all illness. The coconut palm is so highly valued by them as both a source of food and medicine that it is called "The Tree of Life". Recently modern medical science has unlocked the secrets to coconut's amazing healing powers.

As mentioned earlier, the area under this crop is increasing steadily, thus, the scientists of State Agricultural Universities of Gujarat in collaboration with State Department of Horticulture have been continuously investigating of new high yielding varieties, new agronomical practices, tools and techniques to produce better yield of coconut. The packages of practices based on scientific investigation are recommended to achieve greater production. Coconut crops are susceptible to various diseases and pests attack. Among various pests, the eriophyid mite (*Aceria guerreronis*) is damages immature nuts/tender nuts which cause infested and deshaped nuts, resulting in the nuts to drop off or survive deformed. The desired target of production can only be achieved, when majorities of farmers are motivated for adoption of modern science based agricultural techniques. This becomes easy if the technologies developed are demand driven and need based (Parthasarathy *et al*, 2005 and Kapadia *et al*, 2007).

With more than ten million people in India depending on coconut cultivation, processing, marketing and trade related activities for their
livelhood, the sustainability of the coconut industry possesses a big question. The dominant position held by coconut is falling on account of the major problems like low farm productivity, post-harvest losses, price instability, relative unremunrnativeness of coconut farming, tenurial arrangement and decline in coconut acreage.

In addition to above listed factors, the management factors are also important which affect the coconut production. Management input is neither investment nor profit or material resources, but it is an active factor of an individual, which helps him to be able to exploit available resources to earn higher income. In the field of coconut production too, there has been a growing awareness that, only small part of differences in income and efficiency can be explained by observing the differences in quality and quantity of resources. The rest of the variation has been explained mainly by management factor. Thus, it is observed that, some coconut growers obtained higher yields and income than others from the same level of resources available with them.

Considering the importance of coconut cultivation among farmers and gradual increase in the area under coconut cultivation in Saurashtra, a study of "Managerial Efficiency of Coconut Plantation Growers in Coastal Area of Saurashtra Region" is felt necessary to establish a base for a research and development programme. Hence, this investigation is undertaken with following objectives, so that we can focus and target in future investigation and development of this highly recognized horticultural crop.

1.2 OBJECTIVES OF THE STUDY

The overall objective of this investigation is to study the managerial efficiency of coconut plantation growers in coastal area of Saurashtra region. Considering the main objective, the specific objectives are formulated as under.
Specific objectives:

1. To study the personal, socio-economic, psychological and extension communication profile of coconut plantation growers.

2. To develop and standardize a scale to measure the managerial efficiency of coconut plantation growers in coconut cultivation.

3. To ascertain managerial efficiency of coconut plantation growers.

4. To assess the perception of coconut plantation growers about quality and damage caused by eriophyid mite on coconut.

5. To ascertain the relationship between managerial efficiency of coconut plantation growers and their selected characteristics.

6. To know the extent of variation caused by selected independent variables in the managerial efficiency of coconut plantation growers.

7. To elicit the constraints faced by coconut plantation growers in adoption of improved coconut cultivation technology and their suggestions to overcome the constraints.

1.3 SIGNIFICANCE OF THE PROBLEM

Coconut has been an economically significant crop for India. It is a small holder’s crop and more than 90 per cent of the five million coconut holdings in the country are less than one hectare in size. This small holding coconut farms often does not provide adequate income to the dependent families. In the recent times, the importance of coconut had been undermined owing to pest of epidemic nature i.e. "Coconut Eriophyid Mite" and poor marketing and less price of their product to the farmers. Because of this facts, the quality of nuts are damaged drastically which resulted to fetch low price of nuts. Hence, majority of the coconut plantation growers worried about the future scope of coconut cultivation as most of them are totally dependent on coconut plantation for their livelihood.
It is expected that the findings of this study will be useful to the extension agencies in modifying and streamline their ways of educating the farmers by knowing the important factors that are affecting managerial efficiency of coconut growers.

The outcome of the study will help the planners, administrators and research workers to formulate suitable programme and use appropriate methods to increase the managerial level as well as economic level of coconut growers. Also efficient managers can be identified and their success stories can be exercised by the extension workers to motivate, influence and educate other coconut plantation growers to achieve better economic profit.

### 1.4 ASSUMPTIONS OF THE STUDY

The study was based on the following assumptions:

1. All the coconut plantation growers of the Saurashtra region had an equal opportunity to possess the knowledge of management in coconut plantation about scientific cultivation of coconut plantation. The scientific cultivation practices were fully dispersed in the study area.

2. The scientific cultivation practices of coconut crop were sustainable and compatible with coconut plantation growers of the area under study.

### 1.5 LIMITATIONS OF THE STUDY

In accordance with time and resources available, the study was conducted subject to following limitations:

1. Though all the possible precautions are taken to make the study precise, specific and reliable.
2. The study is restricted to coastal area of Junagadh, Porbandar and Bhavnagar districts of the Saurashtra region.

3. The study is based on individuals’ perceptions and expressed opinion of the respondents.

4. The study is based on only verbal responses of the respondents.

5. As the research is carried out by single investigator, few characteristics of farmers were selected.

6. The data collections are confined to only 5 Talukas and 150 coconut growers.

7. Inspite of sincere efforts, the data might have personal biases and prejudices of the respondents.
CHAPTER II

REVIEW OF LITERATURE
A widespread review of literature is an important part of any scientific investigation. The review of literature leads to the researcher to conclude his findings with reference to past studies. It is also necessary in developing conceptual framework and selection of appropriate design for the study. As the literature reviewed so far has clearly revealed that a few studies on some of the aspects under present investigation are available and the literature having direct bearing on different aspects of the present study is limited, the references having indirect bearing are also reviewed. A brief account of such literature reviewed has been presented under the following heads:

2.1 Managerial efficiency – A concept
2.2 Characteristics of farmers
2.3 Relational analysis of selected variables
2.4 Extent of variation in managerial efficiency
2.5 Constraints faced by the farmers
2.6 Suggestions offered by the farmers

2.1 MANAGERIAL EFFICIENCY – A CONCEPT

England et al (1971) observed that successful managers are more pragmatic and less idealistic than less successful managers.

Monappa and Saiyaddain (1976) defined an effective manager as one who is properly developed in terms of basic intellectual abilities and the predispositions necessary for carrying out the task smoothly.

Rannorey (1979) found that farmers with higher management orientation adopted more number of practices and higher adoption led to higher economic performance.
Bora (1986) recommended that for effective management is crucial for obtaining high return from a production system on a sustained basis. It is essential that the farmers and extension workers are made aware of the need for developing the managerial ability of the farmers.

Narayana and Ramchandra (1986) suggested a model for modern technology promotion programme at local level. It caters management services to the needs of seven operational activities for farmers. i.e. help in proving technical advice, help in getting production inputs, help in getting marketing services, assistance in getting access to credit etc.

Chari and Nandapurkar (1987) developed and standardized an objective scale to measure the managerial ability of farmers and suggested that planning, organizing, human relationship; communication, co-ordination and control were the main component for the development of scale.

Bhatia et al (1990) stated that the successful integration of agriculture, industries and service/supportive sector in the integrated rural development programme depends on the proper planning, organizing, controlling and directing the various activities. The help /cooperation of target groups and implementing agencies are also highly needed/required. The coordination of above the sectors and the various agencies is a very difficult and challenging task. Only the management knowledge and practice may help in this task.

Sartorius van bach et al (1993) revealed that both problem consciousness and managerial ability were closely associated with financial success over the short term and economic survival over the long term.

Bhople and Palaspager (1996) concluded that farm supervisor characteristics; labour force, live stock number, education status, length of service, experience are six component of managerial ability.
Ajobo et al (1998) reported that principal component was used to examine certain socio-economic characteristics of 72 coca farmers in an old coca growing area near Ibadan in SW Nigeria. Sixteen principal categories were identified and these accounted for about 85 per cent of the total variance in the data. The first component accounted for about one-fifth of the total variation while, the first 5 components explained about half of the total variance. Three-fifth of the 45 variables specified were associated (20 positively and 7 otherwise) with respondent managerial ability, while the remaining 18 were not associated. With an index of 0.80, all the variables taken together were not too different from one another and they reasonably accounted for the entire identified component.

Everybody wants to be the ‘Best’ and ‘Have Best’. But the sources in terms of man, money, machine and material are limited. Thus, arouse the need for management that would result in efficient and effective utilization of various resources to fulfill the objectives (Anon. 1998)

Nuthall (2001) concluded that psychology of decision making from farm management perspective, outlines what psychology efforts for changing a person’ attributes, and consider the structures of a research programme aimed at developing methods for improving individual managerial ability.

Trip et al (2002) revealed that managerial decision-making process has been given new attention, both in theoretical study as well as empirical research explaining difference in farm results.

Alvorez and Arias (2003) suggested that managerial ability has important implication for farm growth.

Toppo et al. (2004) concluded that the majority (63.38 per cent) of the respondents had medium to high level of management efficiency by
their regular to recurrent participation in management of preparing compost. While, 36.37 per cent of the respondents had low level of management efficiency.

Jadav (2005) revealed that majority of respondents (60.00 per cent) were observed in the medium managerial ability category, while, 21.50 per cent respondents fall under the category of low managerial ability. The remaining 18.50 per cent respondents possessed high managerial ability. Thus, the managerial ability of the respondents was predominantly medium.

Patel (2005a) found that more than two-third (72.50 per cent and 70.00 per cent) of marginal and medium banana growers while, slightly more than three-fifth (61.25 per cent) of small banana growers had medium management efficiency. Whereas, one-fourth (25.00 per cent) of marginal, slightly more than one-fifth (22.50 per cent) of small and slightly more than one-tenth (12.50 per cent) of medium banana growers had low management efficiency while, 2.50, 10.25 and 12.50 per cent marginal, small and medium banana growers had high management efficiency respectively.

Patel (2006) revealed that majority (65.50 per cent) of the aonla growers had medium level of overall management efficiency, while, slightly less than two fifth (18.00 per cent) of the aonla growers had low level of managerial efficiency and 16.50 per cent of the aonla growers had high level of managerial efficiency, respectively.

2.2 CHARACTERISTICS OF FARMERS

2.2.1 Personal characteristics

2.2.1.1 Age

Gorfad (1993) concluded that more than one-half (56.00 per cent) of the mango growers were from middle age group, whereas 21.00 and
23.00 per cent of the mango growers were from old and young age, respectively.

Chothani (1999) inferred that majority (58 per cent) of the mango growers were from middle age group (31 to 41 years).

Yadav et al (2007) revealed that most of the orchardist (33.51 per cent) were found old age group.

Ashok Kumar et al (2007) revealed that maximum of the banana growers were middle aged (28.58 per cent) followed by young (27.62 per cent) and advance (23.80 per cent).

Anandaraja et al (2008) revealed that nearly two fifth (39.40 per cent) of the coconut growers were found to be between 34 and 43 years of age, followed by 27.30 per cent with the class intervals of 24 to 34 years. One fourth (25.30 per cent of them belonged to the age category of 44 to 53 years. Least per cent (8.00 per cent) of the farmers were of the age between 54 and 63 years of age.

Dhakane et al. (2009) reported that the majority of grape growers were from young age group.

Basanayak (2009) revealed that the majority of the papaya growers were middle aged.

Dhandhukia (2009) reported that majority of the pomegranate growers (50.84 per cent) were middle aged.

Khodifad (2010) revealed that majority (61.88 per cent) of the respondents were in the middle age group followed by old age group (21.87 per cent). Less than one-fifth (16.25 per cent) of the respondents were young.

Patel (2011a) reported that majority (52.50 per cent) farmers were found in the old age group followed by 39.17 per cent in middle age group and 8.33 per cent in young age group.
Patel (2011b) stated that majority (48.57 per cent) of farmers were found in old age group.

### 2.2.1.2 Education

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

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

Patel (2006) revealed that none of the aonla grower was found as illiterate, slightly more than one third (36.50 per cent) of aonla growers were educated upto higher secondary education level, followed by 32.00 per cent, 24.50 per cent, and 7.00 per cent with college, secondary and primary level of formal education, respectively.

Goyal and Solanki (2007) indicated that 49.00 per cent Aonla growers were illiterate, 33.00 per cent just read and write, only 17.00 per cent respondents was educated up to secondary level and one woman was graduate.

Yadav et al. (2007) revealed that the maximum numbers of respondents (29.79 per cent) were having the educational status up to high school followed by 16.49 per cent mango growers having the educational status up to intermediate school.

Ashok Kumar et al (2007) indicated that 33.34 per cent of the banana growers had high school level of education and only 11.42 per cent had illiterate. Whereas, 15.24 per cent of them were graduation
and above followed by 19.05, 4.76 and 0.92 were primary, can write and can read only, respectively.

Anandaraja et al (2008) revealed that 97.00 per cent of the coconut growers were literate. Nearly two-fifth (38.40 per cent) of the farmers was educated up to secondary school level. One-fifth (25.30 per cent) farmers possessed higher secondary school level of education. The high level of education, namely collegiate education was found among 15.20 per cent of the respondents. Least percentage (4.00 per cent) possessed primary level of education and each 3 per cent of them were functionally literate and illiterate.

Basanayak (2009) revealed that the only 25.00 per cent of the papaya growers studied up to middle school.

Dhakane et al. (2009) reported that majority of grape growers were educated up to primary school level.

Dhandhukia (2009) reported that majority of the pomegranate growers (54.17 per cent) were educated up to primary level.

Khodifad (2010) indicated that more than half (52.50 per cent) respondents had secondary level education followed by 27.50 per cent of them educated up to primary level only. Few respondents (8.13 per cent) had education beyond the secondary level, whereas, nearly one-tenth (11.87 per cent) of total respondents were illiterate.

Patel (2011a) studied that majority (35.83 per cent) of the farmers having secondary level of education followed by primary education (25.00 per cent).

2.2.2 Socio - economical characteristics

2.2.2.1 Farm size

Thakur et al. (1991) observed that majority of the mango growers have planted mangoes on 0.51 to 1.0 hectare area of their land.
Gorfad (1993) revealed that majority (71.00 per cent) of the mango growers having large size of farm holding, whereas 11.00 per cent and 18.00 per cent of the respondents possessed small and medium size of farm holding, respectively.

Raghavendra (1997) in his study on knowledge and adoption behaviour of arecanut farmers of South Canara district Karnataka state revealed that 30 per cent of the arecanut growers belong to the category of big farmers, 35 per cent of them belong to the category of small farmers and remaining 35 per cent of them belong to the category of marginal farmers.

Chothani (1999) reported that 43.00 per cent of mango orchard growers were having medium size of land holding followed by large (37.00 per cent) and small (20.00 per cent) size of land holding.

Vedamurthy (2002) in his study on the management of arecanut gardens and marketing pattern preferred by the arecanut farmers of Shimoga district in Karnataka reported that equal per cent (28.66%) of the arecanut growers were large and small arecanut farmers. Twenty four per cent of the respondents were medium land holding farmers and 18.66 per cent of the farmers were marginal land holders.

Jadav (2005) showed that 43.00 per cent respondents were having 2 to 4 ha of land holding and 39.50 per cent having more than 4 ha of land holding while, only 17.50 per cent of mango growers having up to 2 ha of land.

Patel (2006) showed that majority (71.00 per cent) of the aonla growers had 1 to 2 hectares of land holding followed by 13.50 per cent, who had 1 hectare and 15.00 per cent who had more than 2 hectares of land holding.
Goyal and Solanki (2007) revealed that more than 50.00 per cent ofonla growers had land holding above 2 hectares, whereas, nearly 40 per cent had 1 to 2 hectares of land holding.

Bharad (2007) showed that 60.50 per cent of the mango growers had a medium size of land holding. Remaining 31.00 per cent and 8.50 per cent had small and big size of land holding, respectively.

Yadav et al (2007) revealed that most of the respondents (97.87 per cent) possessed the size of land holding more than one acre. Out of total, 28.19 per cent mango growers reported to have more than 10 acre of land.

Ashok Kumar et al (2007) showed that a maximum of 45.71 per cent of banana growers had small land holding but none of them found to have large land holding. Whereas, 48.58 per cent and 5.71 per cent had marginal and medium size of land holding, respectively.

Anandaraja et al (2008) indicated that nearly half (46.66 per cent) of the coconut growers were medium farmers, followed by one-third (33.33 per cent) of big farmers, 11.10 per cent of small farmers and 9.00 per cent of marginal farmers.

Joshi (2009) revealed that majority of the farmers belonged to small to marginal category of the land holding.

Kansara (2009) found that majority (58.89 per cent) of the trained farmers possessed small size of land holding while 64.45 per cent untrained farmers possessed small size of land holding.

Jat (2010) reported that half of the wheat growers (52.78 per cent) were having small landholding followed by 40.97 per cent with marginal size of land holding and 6.25 per cent with semi-medium of land holding.
Patel (2011a) studied that one-third of the respondents (33.3 per cent) were having medium land holding followed by 28.33 and 22.50 per cent who had small and large holding, respectively. Only 15.84 per cent farmers were found having marginal land holding.

Patel (2011b) found that 36.19 and 30.48 per cent of the farmers were small and marginal farmers, respectively.

2.2.2.2 Area under horticulture crops cultivation

Kalathiya et. al. (2000) observed that 46 per cent respondents had small size of coconut garden holding and 14 per cent belonged to marginal size of coconut garden holding while 20 per cent respondents were observed equally as well as large size of coconut holding.

Joshi (2004) revealed that 57.27 per cent of the respondents were found to have up to 1.00 hectare of land under banana cultivation, while 32.67 per cent of the respondents had 1.01 to 2.00 hectares of land under banana cultivation.

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

Makwan (2005) revealed that more than two fifth (42.00 per cent) of the banana growers were found to have up to 1.00 hectare of land under banana cultivation, whereas, 32.67 per cent of the respondents had 1.01 to 2.00 hectares of land under banana cultivation.

Patel (2006) indicated that nearly half (49.00 percent) of the aonla growers had up to 2.0 Bigha (0 to 0.48 ha.) of area under aonla cultivation, followed by 21.50 per cent who had 2.1 to 4.0 Bigha (0.49 to 0.96 ha.) of area under aonla cultivation. It was seen that 13.00 per cent each of the aonla growers had 4.1 to 6.0 Bigha (0.97 to 1.44 ha.) and above 8.0 Bigha (above 1.92 ha.) of area under aonla cultivation,
only 3.50 percent of them had 6.1 to 8.0 Bigha (1.45 to 1.92 ha.) of area under aonla cultivation.

Bharad (2007) revealed that more than half of the (57.00 per cent) respondents possessed, more than 75.00 per cent land under mango cultivation, whereas 23.50 per cent had land ranging from 25.00 to 50.00 per cent out of total land possession, while only 10.50 per cent and 9.00 per cent of mango growers were fall in the category up to 25.00 per cent and 50.00 to 75.00 per cent of land possession, respectively.

Ashok Kumar et al (2007) indicate that maximum of them (65.72 per cent) had high per cent area under banana cultivation followed by high-medium had 22.86 per cent and low-medium had 11.42 per cent area under banana cultivation of respondents.

Anandaraja et al (2008) indicated that one third (33.30 per cent) of the coconut growers were holding coconut farm up to 2.5 acres. More or less equal per cent of the farmers owing 2.51 to 5 acres (26.30 per cent) and 5.01 to 10.00 acres (25.20 per cent) of coconut farm. Next to that 16.20 per cent of farmers possessed more than 10 acres of coconut farm.

2.2.2.3 Herd Size

Temkar (2000) revealed that 43.33 per cent of farmers managing milk production activity had medium level of herd size, followed by 40.0 per cent with low and 16.67 per cent with large herd size. Majority of farmers managing milk production activity (83.33 per cent) had medium to small herd size because respondents were not fully dependent only on dairying but preferred to have a low to medium size of herd along with agricultural occupation in Anand district of Gujarat state.

Patel (2005a) concluded that above half of marginal, small and medium farmers (58.75, 51.50 and 53.75 per cent, respectively)
managing banana cultivation had medium herd size. In nut shell, a
great majority (92.50 per cent) of the banana growers had medium to
low herd size.

Patel (2006) said that a majority (86.50 per cent) of the aonla
growers had medium size of herd.

Patel (2007) found that 70.00 per cent of the tribal respondents
had medium sized herd, followed by 16.00 per cent and 14.00 per cent
of the respondents with large and small size herd, respectively.

### 2.2.2.4 Annual income

Chothani (1999) revealed that more than one half (53.00 per cent)
of the mango orchard growers fall under higher annual income group,
while 24.00 per cent and 13.00 per cent fall under medium and lower
annual income group respectively.

Resmy (1998) in her study sustainability of coconut and banana
intercropping in Kerala – an analysis revealed that 23.3 per cent of the
small farmers and 38.3 per cent of the big farmers had high annual
income. Where, 11.7 per cent of small farmers and 35 per cent of the
big farmers possessed medium level of annual income. Majority of the
small farmers i.e., 65 per cent of them belonged to low annual income
category, whereas, only 26.7 per cent of big farmers belonged to low
annual income category.

Babanna (2002) in his study on arecanut growers in Shimoga
district (Karnataka) reported that majority (61.6 per cent) of arecanut
growing respondents were in medium level of annual income group. A
little lesser than the one-fourth (23.4 per cent) of the respondents were
in high level of annual income group followed by low level of annual
income group (15 per cent).
Vedamurthy (2002) in his study on management of arecanut gardens and marketing pattern preferred by the arecanut farmers of Shimoga district in Karnataka stated that 48.66 per cent of the arecanut growers have high annual income, 34.00 per cent of the farmers belonged to middle annual income category and 17.33 per cent of the arecanut growing farmers belonged to below poverty line category.

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

Jadav (2005) revealed that 41.00 per cent mango orchard growers were from the medium annual income group, while 33.50 per cent and 25.50 per cent mango orchard growers fall under high and low annual income group respectively.

Bharad (2007) observed that 51.50 per cent of the mango growers had the medium level of income ranging from ` 1.00 to 3.00 lacs followed by 26.00 per cent and 22.50 per cent of the respondents had the income up to ` 1.00 lac and above ` 3.00 lacs, respectively.

Yadav et al (2007) revealed that slightly less than half (49.46 per cent) of mango growers' family income was above ` 18,000/- per annum.

Ashok Kumar et al (2007) indicate that 8.57 per cent of banana growers had more than ` 1,00,000 followed by high–medium (` 50,000 – 1,00,000), low-medium ( `10,000 – 50,000) and low (up to ` 10,000).

Anandaraja et al (2008) indicated that about one-third (36.40 per cent) of the coconut growers were at the income range of ` 25,000 to 75,000 annual income. About one fifth (20.20 per cent) of farmers were under the income range between ` 75,000 and ` 1, 12,500. Least
percentage (13.10 per cent) of the farmers had obtained above 1.25 lakhs as an annual income from farming and allied activities.

Athwale (2009) reported that half of the pigeon pea growers (50.83 per cent) had medium annual income (₹ 40,000 to ₹ 88,000) followed by low annual income (30.00 per cent) and high annual income (19.17 per cent).

Deshpande (2009) stated that great majority (70.84 per cent) of the members of Gram Panchayat had medium annual income followed by low level (17.50 per cent) and high level (11.66 per cent) of annual income.

Suthar (2010) reported that more than two-third (69.00 per cent) of respondent had medium annual income i.e. ₹ 50,001 to ₹ 2,50,000.

2.2.2.5 Social Participation

Yogananda (1992) in his study on coconut growers of Tumkur district in Karnataka indicated that 15 per cent of small coconut growers were in the category of high social participation whereas, 50 per cent of big coconut growers were in same category.

Babanna (2002) in his study on arecanut growers in Shimoga district reported that 32.5 per cent of the arecanut growers had high social participation followed by 40 per cent of the growers having medium level and only 27.5 per cent of the growers had low social participation level.

Jadav (2005) revealed that more than one half (56.50 per cent) of the respondents had medium social participation followed by low (23.50 per cent) and high (20.00 per cent) social participation.

Kachhiapatel (2006) reported that the majority (48.00 per cent) of the tissue cultured banana plant growers had membership in the social organization.
Bharad (2007) revealed that more than four fifth (84.50 per cent) of the respondents had medium social participation followed by high (8.50 per cent) and low (7.00 per cent) social participation.

Yadav et al (2007) revealed that more than one third (71.81 per cent) of respondents were not having any type of membership of any formal or informal organization.

Ashok Kumar et al (2007) noted that maximum of the banana growers (50.48 per cent) were members of one organization but none of them was office bearers. Whereas, 39.05 per cent of them had member of more than one organization and 10.47 per cent were not member of any organization.

Anandaraja et al (2008) observed that about two third (42.30 per cent) of the farmers were found below normal level of social participation with the score range of 1 to 5, followed by one third (32.30 per cent) of them with normal level and the remaining one fourth (25.40 per cent) of them with above normal level of social participation.

Chauhan (2008) found that majority of the trained organic farmers (63.27 per cent) had medium level of social participation. Whereas, only 18.87 per cent trained organic farmers had high social participation. In case of organic untrained farmers, 53.28 per cent had low social participation.

Dhandhukia (2009) found that majority of pomegranate growers (47.50 per cent) were having participation in one organization.

Kansara (2009) showed that nearly two-third (72.22 per cent) trained farmers and 32.22 per cent untrained farmers had membership in one organization.

Khodifad (2010) indicated that the large majority (70.00 per cent) of the respondents had medium level social participation, whereas only 11.25 per cent of them had high-level social participation. Remaining
18.75 per cent of respondents were found taking part occasionally in social matters.

Patel (2011a) reported that majority (52.50 per cent) of the respondents having no membership in organization.

### 2.2.2.6 Access to market facilities

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 per cent) and high (17.00 per cent), respectively.

Patel (2005c) reported that 50 per cent of organic farmers had low level of marketing orientation, followed by 40.00 per cent and 10.00 per cent who had medium and low level of marketing orientation, respectively.

The results of the study carried out by Kotadiya (2006) revealed that 72.21 per cent beneficiary and 58.79 per cent non beneficiary farmers of horticultural development programme have medium level of market intelligence.

Ashok Kumar et al (2007) noted that maximum of the banana growers found to have either poor (46.67 per cent) or very poor (39.05 per cent) marketing facility. Whereas, only 5.71 and 8.57 per cent had good and fair marketing facility.

Chauhan (2008) reported that trained (64.38 per cent) and untrained (54.39 per cent) organic farmers had medium and high market orientation, respectively.

Shukla and Gupta (2010) revealed that 18.33 per cent of respondents practices self marketing while, 81.66 per cent of the farmers sold their product through commission agents.

Khodifad (2010) realized that large majority (73.75 per cent) of respondents were fairly intelligent about market followed by poorly
intelligent (15.00 per cent). Only 11.25 per cent of respondents were extremely intelligent regarding market.

### 2.2.3 Psychological characteristics

#### 2.2.3.1 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.

Jadhav *et al.* (2003) reported that majority of farmers of Mehshana district of Gujarat state had medium level of innovativeness.

Shashidhar (2004) reported that higher percentage 47.50 per cent of the respondents were in medium innovativeness category followed by low 31.66 per cent and high 20.83 per cent innovativeness category.

Patel (2005c) observed that nearly half (48.00 per cent) of the organic farmers were found to have high innovativeness, whereas, one third (34.00 per cent) organic farmers had medium innovativeness.

Bharad (2007) revealed that the majority (55.00 per cent) of mango growers had best level of innovativeness followed by average (29.00 per cent) and poor (16.00 per cent) level of innovativeness of mango growers.

Anandaraja *et al.* (2008) observed that about half (53.50 per cent) of coconut growers reported to adopt an innovation ‘after he had seen their farmers done successfully on their farm’ followed by 20.20 per cent with ‘As soon as it was brought to his knowledge’ and the remaining 26.20 per cent with ‘preferred to wait and take his own time’.

Khodifad (2010) revealed that 28.75 per cent of the respondents were early majority followed by 21.88 per cent early adopter and 18.12
per cent late majority. Only 14.37 per cent respondents were innovator and remaining 16.88 per cent respondents were laggards.

Gohil (2010) observed that 43.00 per cent of the respondents were found to have medium innovativeness, followed by 34.00 per cent and 23.00 per cent of them had low and high innovativeness, respectively.

### 2.2.3.2 Risk orientation

Babanna (2002) conducted a study on arecanut growers of Shimoga district in Karnataka and pointed out that 37.50 per cent of arecanut growers belonged to medium category followed by 31.66 per cent of them had high risk orientation. The remaining 30.80 per cent of them were having low risk orientation.

Vedamurthy (2002) in his study on arecanut growers of Shimoga district in Karnataka reported that 45.33 per cent of areca growers belonged to medium category followed by 38.00 per cent of them had high risk orientation and 16.66 per cent possessed low risk orientation.

Jadav (2005) indicated that more than two thirds (69.50 per cent) of the respondents were from medium risk orientation group, whereas, 16.00 and 14.50 per cent of them had low and high level of risk orientation, respectively.

Patel (2005a) observed that majority of marginal (75.00 per cent), small (71.25 per cent) and medium (80.00 per cent) farmers managing banana cultivation had medium to high risk orientation. In nutshell, it can be said that majority (76.67 per cent) of the banana growers had medium to high risk orientation.

Patel (2006) indicated that slightly less than half (45.50 per cent) of aonla growers had medium risk orientation while, 31.50 per cent and
23.00 per cent of aonla growers had high and low level of risk orientation, respectively.

Khodifad (2010) observed that nearly three fourth (73.75 per cent) of the respondents were found moderately risk taker whereas, small proportion of them were highly risk taker (18.12 per cent). Only 8.13 per cent of respondents found to take slight risk.

Gohil (2010) indicated that majority (63.00 per cent) of the respondents were from the category of medium risk orientation followed by low (20.50 per cent) and high (16.50 per cent) category.

2.2.3.3 Perception

Chakravarthy (1982) concluded that there was significant difference in the perception towards the cost of indigenous farm practices between small, medium and large farmers.

Dudhani and Hullatti (1989) reported that majority of non-participants’ (42.70 per cent) perception was less useful followed by 38.70 per cent more useful and 18.6 per cent most useful while, majority of participants” (61.40 per cent) perception was more useful followed by 25.30 per cent and 13.3 per cent as most useful and less useful, respectively.

Manju (1996) revealed that majority of respondents (farmers, research personnel and extension personnel) fell under medium perception category. Only 10.00 per cent each of farmers and research personnel had higher perception about indigenous practices of coconut cultivation.

Khare et al (1998) reported that majority of farmers (52.44 per cent) had medium role perception followed by 34.15 per cent and 13.41 per cent with high and low role perception, respectively.
Kulkarni (1998) noticed that perception of drudgery by 25.71 per cent women was low, 47.14 per cent and 27.15 per cent of women perceived medium and high level of drudgery, respectively.

Ingle et al (1999) indicated that majority of the farmers surveyed perceived the Israeli cotton cultivation technology as relatively costly but productive and practicable.

Chopde and Ingle (2002) reported that more than half of the respondents (55.11 per cent) perceived Integrated Weed Management as highly profitable.

Shah et al (2002) revealed that majority of the sampled men (70.84 per cent) and women (63.33 per cent) had average perception about improved dairy breeding practices.

Devi and Hall (2005) found that the perceptions of farmers across the villages and across wealth categories were found to be similar with regard to the quality of produce.

Satish Kumar (2006) indicated that majority of farmers (70 per cent) were in medium perception category followed by high (20.56 per cent) and low (9.44 per cent) perception categories.

### 2.2.3.4 Symbolic adoption

Selvaraj (1997) found that the treatment with instructor controlled interactive video had the highest symbolic adoption score obtained by the respondents.

Ahmed (1998) identified that majority of the trainees of mushroom had medium level of symbolic adoption followed by low and high levels of symbolic adoption.

Sriram (2000) emphasized that lecture with slide show + demonstration + discussion forum and lecture + video + discussion
forum were found to be effective and superior one in terms of influencing symbolic adoption among the cotton growers.

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.

Jadav (2005) revealed that 58.00 per cent of the mango growers were medium adopters. Whereas, 17.50 per cent were low and 24.50 per cent were high adopters of the scientific mango cultivation practices.

Rao et al (2008) revealed that 51.70 per cent of the small farmers were found in medium adoption level followed by low adoption (28.30 per cent) and high adoption level (20.00 per cent). Further, it was found that 53.33 per cent of big farmers had high level of adoption, whereas, 26.7 per cent and 20.00 per cent had low and medium adoption level of sustainable practices in coconut and banana intercropping.

Shivamurthy et al (2008) reported that 46 per cent of big farmers belonged to high adoption category, when compared to 35 per cent of small farmers. But in case of small farmers, majority of (36 per cent) the respondents were medium adopters, when compared to 30 per cent of the big farmers. Further, 28.3 per cent of small farmers belonged to low adoption category when compared to 23.3 per cent of big farmers in recommended cultivation practices of mango.

Nagaraja et al (2008) revealed that cent percent of the sugarcane growers adopted the use of weedicide and 80 per cent used the recommended sowing time. Nearly 50 per cent of the respondents adopted Co-671 and Co-7804 variety and use of Azotobacter, biofertilizer as per recommendation.

2.2.3.6 Attitude towards horticulture crops cultivation
Joshi (2004) reported that more than half (53.64 per cent) of the respondents had medium level of favourable attitude towards modern practices of cotton cultivation followed by 24.54 per cent and 21.84 per cent with high and low level of favourable attitude towards modern practices of cotton cultivation, respectively.

Rani (2005) found that majority (63.00 per cent) of the respondents showed the favourable attitude towards fruit and vegetable preservation training while 20.00 per cent and 17.00 per cent of the respondents had highly favourable and unfavourable attitude towards fruit and vegetable preservation training respectively.

Jadav (2005) reveal that little less than two-thirds (64.00 per cent) of the respondents had favourable attitude towards the modern agriculture. The 17.50 and 18.50 per cent respondents observed the less favourable and highly favourable attitude towards modern agriculture respectively.

Patel (2006) reported that three fourth (75.00 per cent) of the aonla growers had moderately favourable attitude towards the cultivation of aonla as one of the major crops, followed by 19.50 per cent with highly favourable while 5.50 per cent with less favourable attitude towards the cultivation of aonla as one of the major crops, respectively.

Kansara (2009) concluded that majority (88.89 per cent) of the trained farmers had favourable attitude toward Sardar Smruti Kendra.

Khodifad (2010) indicated that nearly three fifth (58.12 per cent) respondents had moderately favourable attitude towards the modern farming and 22.50 per cent of the respondents possess less favourable attitude. Only small proportions (19.38 per cent) of the respondents were from highly favourable attitude towards modern farming.

2.2.4 Extension - communication characteristics
2.2.4.1 Information seeking behaviour

Makwan (2005) reported that majority (70.67 per cent) of the respondents had medium level of extension contact, while 16.67 per cent and 12.66 per cent had high and low level of extension contact, respectively.

Patel (2005a) reported that 78.75 per cent of marginal, 40.00 per cent of small and 72.50 per cent of medium farmers managing banana cultivation were found to have medium contact with extension agency whereas, one fifth (20.00 per cent) of marginal, 27.50 per cent of small and 15.00 per cent of medium farmers managing banana cultivation were found to have low contact with extension agency while, negligible percent (1.25 per cent) of marginal, 32.50 per cent of small and 12.50 per cent of medium farmers managing banana cultivation were found to have high contact with extension agency. In general, 63.75 per cent of farmers managing banana cultivation were found to have medium contact with extension agency.

Patel (2005b) revealed that more than half (53.85 per cent) of the chilli growers had medium contact with the extension personnel followed by 28.46 per cent had low and 17.69 per cent of them had high level of extension contact with extension personals.

Thorat (2005) found that majority (69.10 per cent) of the respondents had medium extension contact followed by equal number (15.45 percent) of the respondents had low and high extension contact.

Anandaraja et al (2008) indicated that 37.40 per cent of coconut growers seek the average level of information with a score of 37 to 46, followed by one third (32.30 per cent) of the farmers with above average level of information seeking behaviour and the remaining 30.30 per cent with below average level of information seekers.
Athwale (2009) studied that majority (60.00 per cent) of the pigeon pea growers had medium level of source of information followed by low level (20.83 per cent) and high level (19.17 per cent) of source of information.

### 2.2.4.2 Extension participation

Chothani (1999) revealed that majority (72.00 per cent) of the mango orchard growers had medium extension participation followed by low (15.00 per cent) and high (13.00 per cent) participation in various extension activities.

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

Patel (2005c) observed that majority (75.00 per cent) of the organic farmers were from medium extension participation group.

Jadav (2005) revealed that 72.50 per cent of the mango growers had medium extension participation, whereas, 20.00 per cent and 7.50 per cent of them had low and high extension participation, respectively.

Bharad (2007) revealed that 50.00 per cent of the mango growers had medium extension participation, whereas, 33.50 per cent and 16.50 per cent of them had high and low extension participation, respectively.

Jadeja (2008) revealed that 58.00 per cent of farmers had medium level of extension participation followed by 23.00 per cent and 19.00 per cent of them had high and low level of extension participation, respectively.

Gohil (2010) showed that more than three-fourth (79.50 per cent) of the respondents had medium extension participation; whereas, 11.50 and 9.00 per cent of the respondents had high and low extension participation, respectively.
2.2.4.3 Participation in training programme

Chothani (1999) concluded that a great majority (91.00 per cent) of the mango orchard growers need medium training in relation to mango crop production.

Jadav (2005) found that 47.00 per cent mango orchard growers were less trained followed by 29.50 per cent of mango grower were untrained. The slight less than one fourth (23.50 per cent) of the mango orchard growers had more training regarding the management of mango orchard.

Patel (2005a) pointed out that majority of marginal, small and medium farmers (97.50 per cent, 90.00 per cent and 96.25 per cent respectively) managing banana cultivation had low to medium participation in training programme. In pooled sample, great majority (94.58 per cent) of the farmers managing banana cultivation had low to medium participation in training programme.

Patel (2006) reported that nearly half (48.00 per cent) of the aonla growers had medium level of participation in training programme, whereas, one third (33.50 per cent) had low and 18.50 per cent had high level of participation in training programme.

Goyal and Solanki (2007) revealed that nearly forty one per cent of aonla growers received 2 - 3 training of 3 - 6 days duration related to aonla cultivation organized by Agriculture Department, Jodhpur.

2.3 RELATIONSHIP OF PERSONAL, SOCIO-ECONOMICAL, PSYCHOLOGICAL AND EXTENSION COMMUNICATIONAL CHARACTERISTICS WITH MANAGERIAL EFFICIENCY OF RESPONDENTS

2.3.1 Personal characteristics

2.3.1.1 Age and managerial efficiency
Patel (2005a) concluded that there was negative and significant relationship between age of the farmers and their management efficiency in banana cultivation.

Jadav (2005) concluded that there was negative and significant association between managerial ability of mango orchard growers and their age.

Patel (2006) revealed that the aonla growers’ managerial efficiency had negative and significant relationship with their age.

Gohil (2010) concluded that there was negative and significant association between adoption of crisis management practices of cotton growers and their age.

Khodifad (2010) indicated that the negative and non-significant correlation coefficient value of r indicated that sustainability of groundnut based cropping system was not linearly related to age of the groundnut growers.

2.3.1.2 Educational status and managerial efficiency

Rao (1985) found significant and positive correlation between management of farm and the farmers’ level of education.

Bora and Ray (1986) pointed out that a return to the farmers’ management was significantly correlated with their level of education.

Sumathi (1987) found significant relationship between management orientation of farmers and their education.

Nagaraja (1989) revealed that education was positively and significantly related with management efficiency of sericulture farmers.

Ramegowda (1991) observed positive and significant relationship of education with crisis management of farmers.
Vyas (1995) found positive and significant relationship of education with the management efficiency of milk producers.

Patel (2005a) concluded that there was positive and significant relationship between education of the farmers managing banana cultivation and their management efficiency.

Jadav (2005) concluded that the education had positive and significant relationship with managerial ability. It means farmers having higher level of education had higher level of managerial ability.

Patel (2006) revealed that education of aonla growers had positive and significant relationship with managerial efficiency. The correlation coefficient value was found to be significant at 0.01 level of probability.

Gohil (2010) inferred that there was positive and highly significant association between the crisis management practices and their education.

Khodifad (2010) indicated that revealed that the calculated correlation coefficient (r) between education and sustainability of groundnut based cropping system was 0.385, which was positive and significant at 0.01 level of probability.

### 2.3.2 Socio-economical characteristics

#### 2.3.2.1 Farm size and managerial efficiency

Rao (1985) found significant and positive correlation between management of farm and the farmers’ farm size.

Bora and Ray (1986) pointed out that a return to the farmers’ management was significantly correlated with their farm size.
Nagaraja (1989) revealed that size of land holding was positively and significantly related with management efficiency of sericulture farmers.

Ramegowda (1991) observed positive and significant relationship of land holding with crisis management of farmers.

Vyas (1995) found positive and significant relationship of land holding with the management efficiency of milk producers.

Jadav (2005) indicated that there is no association between mango growers' managerial ability about scientific cultivation of mango orchard and their size of land holding.

Patel (2006) revealed that farm size of the aonla growers had positive and significant relationship with their managerial efficiency as 'r' value was found to be significant.

Gohil (2010) inferred that there was non significant association between the crisis management practices and their size of land holding.

2.3.2.2 Area under horticulture crops cultivation and managerial efficiency

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.

Kotadia (2006) reported that concluded that there was no relationship found between area under orchard and level on knowledge of respondents about IMPT.

2.3.2.3 Herd size and managerial efficiency
Patel (2005a) concluded that there was positive and non-significant relationship between herd size of farmers managing banana cultivation and their management efficiency.

Patel (2006) revealed that herd size did not establish significant relationship with managerial efficiency of aonla growers towards aonla cultivation.

Temkar (2000) conducted a study in Anand taluka of Gujarat state and concluded that herd size of farmers managing milk production activity was positively and significantly correlated with their knowledge regarding artificial insemination.

Patel et al. (2000) reported that there was positive and non-significant relationship between herd size of tribal farmwomen and their indigenous resource management activities. But they observed that there was negative and non-significant relationship between herd size of tribal farmwomen and her attitude towards participation in indigenous resource management activities.

2.3.2.4 Annual income and managerial efficiency

Jadav (2001) stated that the annual income exhibit significant relationship with knowledge of recommended onion production technology.

Singh (2005) revealed that knowledge level of cumin growers did not relate with their annual income.

Jadav (2005) concluded that there is association between managerial ability of mango growers and their annual income. The positive relationship indicated that with increase in annual income the managerial ability also increased.

2.3.2.5 Social participation and managerial efficiency
Jadav (2005) concluded that there was non significant association between social participation and managerial ability of mango growers.

Gohil (2010) revealed that the adoption of crisis management practices by cotton growers was associated with their social participation.

Khodifad (2010) indicated that regarding the correlation coefficient (r) between social participation and sustainability of groundnut based cropping system was 0.051, which was positive but non-significant.

2.3.2.6 Access to market facilities and managerial efficiency

Satish Kumar (2006) reported that market orientation was positive and significant correlated with perception of quality of groundnut.

Khodifad (2010) indicated that that the sustainability of groundnut based cropping system was non-significantly correlated with market orientation of groundnut growers.

2.3.3 Psychological characteristics

2.3.3.1 Innovativeness and managerial efficiency

Patil et al. (1999) reported that there was a positive and significant correlation between innovativeness with their knowledge about kagji lime production technology.

Kalasker et al. (1999) revealed that there was a significant correlation of innovativeness with the adoption of IPM practices by the farmers.
Kotadia (2006) concluded that the level of knowledge and innovativeness of BFVs and NBFVs are independent of each other.

Gohil (2010) indicated that the adoption of crisis management practices by cotton growers was highly associated with their innovativeness.

Khodifad (2010) indicated that the positive and significant r value indicated that sustainability of groundnut based cropping system was associated with innovativeness of the groundnut growers.

2.3.3.2 Risk orientation and managerial efficiency

Badachikar (1985) reported that economic motivation was positively and significantly correlated with their management orientation.

Bora and Ray (1986) pointed out that a return to the farmers’ management was significantly correlated with their economic motivation.

Nagaraja (1989) revealed that economic motivation was positively and significantly related with management efficiency of sericulture farmers.

Vyas (1995) found positive and significant relationship of economic motivation with the management efficiency of milk producers.

Patel (2005a) concluded that there was positive and significant relationship between risk orientation of the farmers managing banana cultivation and their management efficiency.

Jadav (2005) concluded that managerial ability and risk orientation was significantly correlated. The positive direction of
relationship indicated that the managerial ability increased with increase in risk orientation.

Patel (2006) revealed that the relationship between risk orientation of aonla growers and their managerial efficiency was positive and significant.

Gohil (2010) indicated that with increases in risk bearing ability there was increases in adoption of crisis management practices.

Khodifad (2010) interpreted that sustainability of groundnut based cropping system and risk orientation was not correlated.

2.3.3.3 Perception and managerial efficiency

Satish Kumar (2006) revealed that there was positive and highly significant association between perception of quality aspects and extent of adoption of aflatoxin management practices.

Daniel, et al. (2007) found that there was a significant correlation between the perception of sustainable agriculture and the use of IPM practices by sweet corn growers.

2.3.3.4 Symbolic adoption and managerial efficiency

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.
Kotadia (2006) concluded that the knowledge level of BFs and NBFs was positively and significantly associated with their adoption index.

2.3.3.5 **Attitude towards horticulture crops cultivation and managerial efficiency**

Thakkar and Joshi (2003) reported that attitude was correlated with water management efficiency of sugarcane growers in south Gujarat.

Jadav (2005) concluded that positive and significant relationship of mango growers' managerial ability about scientific cultivation of mango orchard and their attitude towards modern agriculture.

Patel (2006) showed that positive and significant relationship of attitude towards aonla cultivation of aonla growers with their managerial efficiency.

Khodifad (2010) interpreted that the positive and significant r-value indicated that the sustainability of groundnut based cropping system was associated with attitude of the groundnut growers towards modern farming.

2.3.4 **Extension - communicational characteristics**

2.3.4.1 **Information seeking behaviour and managerial efficiency**

Vyas (1995) found positive and significant relationship of extension contact with the management efficiency of milk producers.

Patel (2005a) concluded that there was positive significant relationship between contact with extension agency of the farmers managing banana cultivation activity and their management efficiency.

2.3.4.2 **Extension participation and managerial ability**
Sumathi (1987) found significant relationship between management orientation of farmers and their participation in programmes of extension.

Jadav (2005) concluded that there was no relationship exists between extension participation and managerial ability of the respondents about scientific cultivation of mango orchard.

Kotadia (2006) inferred that there was a significant difference between the extension participation index of BFs and NBFs.

Gohil (2010) concluded that the extension participation index of respondents was highly and significantly correlated with their adoption of crisis management practices.

2.3.4.2 Participation in training programme and managerial efficiency

Rao (1985) found significant and positive correlation between management of farm and the training received by farmers.

Jadav (2005) concluded that training improves the managerial ability of mango orchard growers about scientific cultivation of mango orchard.

Patel (2005a) concluded that there was positive and significant relationship between participation in training programme of the farmers managing banana cultivation activity and their management efficiency.

Patel (2006) revealed that participation in training programme by aonla growers established positive and highly significant relationship with managerial efficiency.

2.4 EXTENT OF VARIATION IN MANAGERIAL EFFICIENCY 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.

Jadav (2005) interpreted that 63.70 per cent ($R^2 = 0.6370$) total variation in managerial ability was explained by set of 23 independent variables together. Out of 23 variables, seven variables viz; adoption index, age, education, experience as a mango growers, mass media exposure, level of aspiration and risk orientation had significant contribution in managerial ability. This result provides evidence about the overwhelmingly important role of seven significant variables in achieving managerial ability.

Khodifad (2010) inferred that all 15 selected characteristics of the groundnut growers were influence on sustainability of groundnut based cropping system. Among them six variables viz; innovativeness, self responsibility, management orientation, scientific orientation, attitude toward modern farming and opinion leadership were significantly contributed to sustainability of groundnut based cropping system.

### 2.5 CONSTRAINTS FACED BY THE FARMERS IN ADOPTION OF FARM TECHNOLOGY
Yogananda (1992) reported that lack of knowledge and guidance were the major constraints in the adoption of recommended practices of coconut cultivation. Other factors like high cost of inputs, no water, lack of rainfall, no transportation and lack of equipment were the constraints which came in the way of adoption of the recommended practices.

Lakshmisha (2000) noticed that the commonly observed constraints in the adoption of the improved cashew production practices were; severity of pest incidence, non-availability of quality grafts, high cost of labour and poor nutrient status of soil. The other farmers expressed in addition to above, the lack of technical guidance as the major constraints in adoption of improved cashew production practices.

Sivanarayana (2000) observed that the major constraints in adopting arecanut production technology were; lack of available labour in time; power problem; pest and disease problems; high labour charges; lack of available machinery for spraying, harvesting and peeling of arecanut; lack of knowledge; unawareness of the practice; and high costs of fertilizers and pesticides.

Vedamurthy (2002) reported that the main constraints faced by the arecanut growers were price fluctuation, non-availability of labour, lack of finance and lack of knowledge.

Shivalingaiah et al. (2002) observed that complex and costly practices viz., fertilizer application, plant protection measures and use of herbicides were the major constraints hindered the low adoption. Lack of adequate knowledge and skill, costliness and unavailability of inputs lead to medium level of adoption of improved coconut cultivation practices.
Jadav (2005) concluded that more number of mango orchard growers faced the constraints of irregular and insufficient electric power supply (rank first), lack of modern spraying equipment (rank second) and lack of awareness about recommendations (rank third).

Patel (2006) revealed that the major constraints faced by majority of the aonla growers in adoption and management of aonla production technology were; high cost of chemical fertilizers (93.50 per cent), high cost of insecticides and pesticides (92.50 per cent), lack knowledge about other markets (89.00 per cent), marketing of aonla is mainly dependent on particular community (86.50 per cent), high rate of tube well irrigation (86.00 per cent), unavailability of tube well (85.00 per cent), lack of local market for selling (84.50 per cent), high cost of aonla graft (82.50 per cent), high cost of flood irrigation (82.50 per cent) and difficult to spray insecticide on tall plants (81.50 per cent).

Pise (2006) reported that fluctuation in market price (80.00 per cent), high cost of input (76.00 per cent), irregular supply of electricity (72.66 per cent), lack of market facilities (64.66 per cent) and lack of finance (62.33 per cent) were the major constraints faced by the banana grower in adoption of banana cultivation technology.

Satish Kumar (2006) revealed that the most important constraints for aflatoxin management practices were lack of premium price for aflatoxin free groundnut followed by lack of awareness on ill affects of consumption of aflatoxin contaminated groundnut, non availability of sufficient quantity of quality seed, lack of irrigation facilities, lack of awareness on aflatoxin contamination, inadequate knowledge on the use of biological control methods.

Bharad (2007) concluded that more number of mango growers faced the constraints of irregular and insufficient electric power supply (rank first), high price of insecticides and pesticides, unaware about
export system, lack of remunerative price of mango and insufficient training and demonstration (rank second).

Nagaraja et al (2008) showed that most of the sugarcane growers (92.48 per cent) faced the problems of high cost of fertilizers followed by delayed release of crop loan by bank and financial institutions (91.65 per cent), high rate of interest (88.20 per cent), delayed in transport of harvested cane from field by the factory (76.23 per cent), no proper timely technical guidance from the extension workers (72.90 per cent) were major constraints faced by the sugarcane growers.

Shivamurthy et al (2008) indicated that lack of knowledge about identifying disease, lack of irrigation facilities, lack of knowledge about chemical application, lack of knowledge about fertilizer application, lack of knowledge about timely irrigation and lack of knowledge about identifying pests were the major constraints faced by a majority (over 60 per cent) of both big and small mango growers in the production of mango crop.

Rao et al. (2008) identified conformity constraint in adoption of sustainable coconut and banana intercropping practices. Among them, lack of knowledge, lack of technical guidance, lack of proper information sources, disease and pest attack, high cost of fertilizers, inadequate loan, small holding, lack of irrigation facilities, non availability of organic manures, high labour charges, labour scarcity, irregular supply of electricity, non availability of bio-fertilizers and low profit and high transportation charges were the important constraints.

Barse et al. (2010) revealed that the majority of orange growers faced constraints like load shading of electricity for too long interval (10-14 hrs\day) expressed by 100 per cent of orange growers, damage due to rodents (85.00 per cent), choking of micro tubes and drippers (81.66 per cent), non-availability of repair services (85.00 per cent) and lack of
technical knowledge and lack of knowledge about application of fertilizer (fertigation) (70.00 per cent).

Gohil (2010) concluded that major constraints experienced by the cotton growers were; non-remunerative price, unavailability of certified seeds, high price of input like improved seeds, insecticides /pesticides & fungicides and lack of knowledge to diagnose the pests and diseases in the crop.

2.6 **SUGGESTIONS OFFERED BY THE FARMERS**

Raghavendra (1997) in his study on knowledge ad adoption behaviour of arecanut farmers of South Canara district, Karnataka state suggested that irrigation is very necessary for the improvement of arecanut crop. Hence, programmes relating to providing loans and subsidies to the farmers especially the small and marginal group of develop the sources of irrigation need to be strengthened.

Babanna (2002) in his study on arecanut growers in Shimoga district (Karnataka) suggested that the major problems faced by respondents were; identification and control of pests and diseases, getting proper remunerative price and availability, in time labour these problems should be have in mind to including in the development activities for improving the situation to encourage the farmers to adopt the production technologies in arecanut cultivation.

Vedamurthy (2002) in his study on the management of arecanut gardens and marketing pattern preferred by the arecanut farmers of Shimoga district in Karnataka suggested that a majority of the arecanut growers had low or partial knowledge regarding improved variety, scientific ways of selecting palms for seed purpose, scientific ways of choosing the seedlings for transplanting, pest and diseases, recommended fertilizers dose and irrigation interval.
Jadav (2005) concluded that important suggestions offered by majority of the mango orchard growers were; regular electric power supply should be made available (rank first), crop insurance scheme should be introduce in mango (rank second), effective control measures of pests and diseases should be evolved (rank third).

Satish Kumar (2006) revealed that the most important suggestions offered by farmers were; provision of sufficient quantity of quality seed in time followed by premium price for aflatoxin free groundnut, education of farmers regarding the ill effects of consumption of aflatoxin contaminated groundnut, creating awareness on aflatoxin problem, provision of timely and adequate credit.

Bharad (2007) concluded that important suggestions offered by majority of mango growers were; need for establishment of cold storage and mango processing plant and price of insecticides pesticides should be low (rank first), more information about storage and value addition and subsidies for agricultural inputs (rank second)

Barse et al. (2010) revealed that the major suggestions by orange growers to overcome constraints were; provide regular supply of electricity, increase the subsidy and facility on drip irrigation by government and training should be given to the farmers regarding operation, maintenance, repairing and application of water soluble fertilizers.

Gohil (2010) reported the suggestions offered by cotton growers were; quality seed supply should be ensured (91.00 per cent), remunerative price of farm produce (89 per cent), input should be supplied at subsidized rate (83 per cent), effective insect-pest control methods should be developed (78, 00 per cent), sufficient electricity should be provided (77.00 per cent) and crop insurance should be made available for all the farmers at cheaper rate (69.00 per cent).
KALPAVRIKSH
THEORETICAL ORIENTATION

GODS GIFT TO MANKIND
The chapter is devoted to the development of theoretical orientation for the study. The review of literature related to this study given in the preceding chapter helped in formulating theoretical orientation. The chapter has been sub-divided into major heads as under:

3.1 Conceptual frame work of the study
3.2 Identification of variables
3.3 Definition of some common terms
3.4 The conceptual model
3.5 Derivation of hypotheses

3.1 CONCEPTUAL FRAME WORK OF THE STUDY

Gujarat has made a fairly good progress on the plantation map of the India with a total annual production of the coconut crop touching over 250.63 million nuts. Gujarat has been bestowed with wide range of climate and physio-geographical conditions and as such is most suitable for growing plantation crops i.e. coconut. In Gujarat, average productivity per tree in irrigated area is low as compared to average productivity per tree of India. There is wide scope to increase the productivity of coconut in Gujarat.

Gujarat has great potential belts to increasing the production potential of coconut plantation crop. Farmers are made aware and given incentive assistance for new planting of coconut and its further maintenance. Coconut grower youth are given training on scientific cultivation, plant protection, harvesting, post harvest processing, manufacture of coconut based handicrafts/industries and also conducting seminars and workshops. Coconut growers are participation more in exhibitions and fairs.
Coconut is consumed by the people in the form like tender nuts, raw kernel, copra, coconut oil and desiccated coconut. Coconuts are rich in fat, protein and some vitamins. Vinegar and soft drink are manufactured from coconut water. Tender coconut water concentrate is another product which is manufactured and marketed successfully. Some of the countries derive substantial revenue from the coconut industry. In India, export of coir products earns the much-needed foreign exchange. A large number of coconut products are manufactured in the country which have both domestic and export market.

The coconut provides a nutritious source of meat, juice, milk, and oil that has fed and nourished populations around the world for generations. On many islands, coconut is a staple in the diet and provides the majority of the food eaten. Nearly one third of the world’s population depends on coconut to some degree for their food and their economy. Among these cultures the coconut has a long and respected history.

3.1.1 Managerial efficiency

From the review of literature, it is revealed that improvement in palm crops productivity and income would be achieved in India only, if the right decisions are made as to the most appropriate and profitable plantation crops to produce. The cultivation of plantation crops requires many skills and exceptional thoughtfulness among the farmers. There are several factors affecting the productivity of plantation crops. Management is one of the important factors for fruit production for better achievement in the enterprise.

Terry and Franklin (1984) stated that management is a distinct process consisting of activities of planning, organizing, actuating and
controlling, performed to determine and accomplishment of stated objectives with the use of human beings and other resources.

Management is the process by which the farmer is able to enhance return from the farm on a sustained basis for the attainment of family goals (Bora and Ray, 1986).

Congruity theory (Brown, 1965) also helps in understanding the phenomenon of management efficiency. This theory suggests that the motivation for self directed change comes from the dissonance between one’s current self-image and ones ideal self-image. Better management efficient coconut producers think about goals in a way that allow them to experience this dissonance and they may strive to reduce it. In addition, the identity diffusion of better management efficient coconut producers produces good clarity about the self and at the same time, which would increase, felt dissonance.

The phenomenon of management efficiency has been viewed and explained by different social scientists in different ways. Managerial efficiency in present study has been defined as ‘the degree or ability to which an individual acquires and adopts effective factors in an enterprise to reach higher levels of performance’.

As far as scientific management is concerned Taylor (1911), stated that scientific management in its essence consists of combination of four great principles of management viz. the development of true science, scientific selection of workers, intimate and friendly cooperation between the management and their workmen. Thus, it can be said that while applying scientific management, not only scientific and technical aspects should be considered but adequate consideration should also be given to profit and economy.

The situational approach of managements says that different situations demand different solutions. There cannot be universal
principles of management appropriate to all the situations. This contingency or situational approach helps the management in finding solutions to the problems in specific situations.

On the basis of the different theories, it could be inferred that the various functions, principles or practices of management for any person along with certain socio-economic forces operative at a given time provide a frame to work effectively. The processes or practices of management and socio-economic forces may either enhance or restrict or at least lower the pace of the individual to work as a manager of coconut cultivation. The socio-economic dynamics enables a person to be more able in management or restricts him to less management ability level.

3.1.2 **Main indicator of managerial efficiency**

These theories further lead to identify certain elements of management ability. These factors could be analyzed at various levels *viz.*, management functions / skills / practices, psychological aspects, motivational aspects, social system aspects, human relation aspects and many other related aspects. This can be appropriate to understand management efficiency of the farmers. Accordingly, the phenomenon of management efficiency has been viewed and explained by different social scientists in different ways. Understanding this, in the present study management efficiency has been defined as the degree to which an individual coconut plantation grower acquires and adopts effective factors in coconut cultivation to reach higher levels of performance and returns. The important indicators to understand management efficiency derived on the basis of different theories were as under.

3.1.2.1 **Knowledge**

It is an understood information possessed by an coconut grower about coconut plantation cultivation technology recommended by the agricultural
universities / state department of agriculture for better and profitable economic achievement.

3.1.2.2 Ability in planning

It is the degree to which coconut plantation grower is capable of stating the activities that he intends to do by a systemic procedure in coconut cultivation.

3.1.2.3 Ability to make rational decision

It is the degree of desirability and likelihood of weighing the available alternatives and choosing the most appropriate one for achieving maximum profit from the coconut cultivation by the coconut plantation growers.

3.1.2.4 Ability to organizing the activities

The coconut plantation grower is to determine the activities to accomplish a job, arrange the distribution of activities among the people and to work most effectively together.

3.1.2.5 Ability to co-ordinate the activities

It is the degree to which coconut plantation grower is capable of linking two or more functions for harmonious accomplishment of desired activity in coconut cultivation.

3.1.2.6 Budgeting

It is a financial and/or quantitative statement prepared prior to a definite period of time, of the policy to be pursued during that period for the purpose of attaining a given objective by the coconut plantation growers.

3.1.2.7 Communication and human relationship

It is a process of social interaction that is in a communication situation two or more individual interact. Human relationship is an individual as a participant in a particular social relation. e.g. as coconut plantation grower who performs a certain social role in his group or occupies a particular social determined position etc.

3.1.2.8 Ability to rational marketing
It is the capacity of coconut plantation grower to get maximum returns for his produce from coconut cultivation.

### 3.1.2.9 Value addition in coconut

It is the process or style of marketing adopted by the coconut growers to add the value to the coconut for better economic returns.

### 3.1.2.10 Ability to controlling the activities

It is the integral part of managerial process. It is a monitoring function of ascertaining whether coconut plantation grower efforts are heading towards the stated objectives or not.

### 3.2 IDENTIFICATION OF VARIABLES

The function of situation or environment is very important in understanding human action. Behaviour takes place in a situation and it has therefore, profound influence on the individual’s action. Sometimes, situations present the actor with certain goal to pursue; Rogers (1962) therefore confirmed the role of situation on determining an action of individuals. Thus, it can be viewed that the social system, in which individuals are members, has dominant effect on his or her behaviour. It has been widely accepted generalization that the members of social system characterized by traditional norms resist change.

Human action is dependent upon many factors. As conceptualized by Pearsons (1954), the action takes place in a situation consisting of social, physical and cultural factors and socio-economic dynamics operative at a given time. What action an actor performed depends on how he orients to and evaluates the given situations i.e. the alternatives available and the expected gratification to be derived. The orientation and evaluation processes in turn depend on the personality and
cultural systems. To be precise, the action process is dependent upon personal, economic, social and psychological factors possessed by individual. Hence, the analysis of action involves the concept and theories of various disciplines. Other social scientists have also mentioned that the selection of goals as well as means depends on such factors as cultural norms and values i.e. social, biological capacities and accessibility to the physical and social environment.

3.2.1 Dependent variable

Managerial efficiency is a composite factor involving several components. Among them knowledge (Chatterjee, 1983), ability in planning (Oslo, 1988), ability to make rational decisions (Duft, 1979), ability to organizing activities (Chatterjee, 1983), Budgeting (Terry and Franklin, 1984), Communication and human relationship (Ray, 2004), ability in rational marketing (Duft, 1979), and ability to coordinate activities (Desai, 1983) are important. In the present study, considering frequency of use of these components by the past researchers and by seeking experts’ judgment, ten components were selected to measure the managerial efficiency of coconut growers. These indicators were knowledge, ability in planning, ability to make rational decision, ability in organizing activities, ability to co-ordinate activities, budgeting, communication and human relationship, ability in rational marketing, value addition in coconut and ability to coordinate activities.

After reviewing extensive literature and pre-assumption, sixteen factors were selected in this study to ascertain their relationship with managerial efficiency of coconut growers. These factors were considered as independent variables, whereas management efficiency was considered as dependent variables. On the basis of the studies conducted in past, it was observed that managerial efficiency of individuals is associated with personal, socio-economic, psychological and extension-communication factors.
A successful manager is more pragmatic and less idealistic than less successful managers (England et al 1971). Effective manager as one who is properly developed in terms of basic intellectual abilities and the predispositions necessary for carrying out the task smoothly (Monappa and Saiyaddain 1976). The farmers with higher management orientation adopted more number of practices and higher adoption led to higher economic performance (Rannorey 1979).

The main component of managerial ability scale are planning, organizing, human relationship; communication, co-ordination and control (Chari and Nandapurkar 1987). Economies of scale and optimal farm size were functions of management (Sartorius van bach et al 1993). Farm supervisor characteristics; labour force, live stock number, education status, length of service, experience are six component of managerial ability (Bhople and Palaspagar 1996). Managerial ability in decision-making process has been given new attention, both in theoretical study as well as empirical research explaining difference in farm results (Trip et al 2002) and it has important implication for farm growth (Alvorez and Arias 2003). Majority of respondents were observed in the medium managerial ability category (Jadav, 2005), more than two-third of marginal and medium banana growers had high management efficiency (Patel, 2005a) and majority of respondents possessed medium level of managerial efficiency (Patel, 2006).

### 3.2.2 Independent variables

Majority of the respondents were from middle age group (Gorfad 1993, Chothani 1999, Ashok Kumar et al 2007, Anandaraja et al 2008 and Basanayak 2009) and majority of them had old age group (Yadav et al 2007, Patel 2011a, and Patel 2011b) and younger age group (Dhakane et al 2009). Majority of respondents were educated up to primary level (Chothani 1999, Dhakane et al. (2009) and Dhandhukia (2009), educated up to secondary level (Gorfad 1993, Yadav et al. 2007,
Ashok Kumar et al 2007, Anandaraja et al 2008 and Basanayak 2009) and having higher secondary level (Patel 2006).


Majority of the respondents were found to be in medium category of market orientation (Javiya 2004, Kotadiya 2006, Chauhan 2008 and Khodifad 2010) and low level of marketing orientation (Patel 2005c and Ashok Kumar et al 2007).

Majority of the respondents had high level of innovativeness (Sravanakumar 2000, Patel 2005c, Bharad 2007 and Khodifad 2010)


### 3.2.3 Perception about quality and damaged caused by eriophyid mite on coconut

According to Ray (2004), perception is an activity through which an individual become aware of objects and of events taking place around him. Perception of the same situation may differ from individual to individual due to differences in their experiences and cognitive styles. The expectations, needs and ways of thinking influence how an individual interprets what he observes. Perception is selective and people perceive what they want to perceive. Perceptions are organized
and people tend to structure their sensory experience in ways, which make sense to them. Perception in this study was defined as the meaningful sensation of the quality and damaged caused by eriophyid mite on coconut by the respondents.

The outbreak of nut infesting eriophyid mite, a serious pest of coconut in other parts of the world, was reported from Tamil Nadu and the level of incidence varied from 10 to 70 per cent (Ramaraju et al., 2000). The symptom of the pest are reduction in nut size, presence of warts and fissures of the husk, reduction in fibers and difficulty in dehusking and making it unfit for sale (Sreekumar, 2000).


3.2.4 Relationship between dependent and independent variables

As regard to the association between selected characteristics of the farmers and their managerial efficiency, it was observed that age was negative and significantly associated with managerial efficiency (Patel 2005a, Jadav 2005, Patel 2006 and Gohil 2010) and non significantly associated with managerial efficiency (Khodifad 2010). The significant relationship with management orientation of farmers and their education was observed by Rao (1985), Bora and Ray (1986), Sumathi (1987), Nagaraja (1989), Ramegowda (1991), Vyas (1995), Patel (2005a), Jadav (2005), Patel (2006), Gohil (2010) and Khodifad (2010).

The farm size was positive and significantly related with the managerial efficiency of the respondents (Rao 1985, Bora and Ray 1986, Nagaraja 1989, Ramegowda 1991, Vyas 1995 and Patel 2006) and same was non significant as observed by Jadav (2005) and Gohil (2010). There was non-significant relationship between herd size of farmers and
their management efficiency (Patel 2005a, Patel 2006 and Patel et al. 2000) and significantly associated with herd size (Temkar 2000). There is association between knowledge /managerial ability and annual income (Jadav 2001 and Jadav 2005). Singh (2005) observed that knowledge level of cumin growers did not relate with their annual income. Social participation was non-significantly associated with managerial ability (Jadav 2005 and Khodifad 2010). Satish Kumar (2006) reported that market orientation was positively and significantly correlated with perception of quality of groundnut. The opposite was observed by Khodifad (2010).


The information seeking behaviour was having positive and significant relationship with the managerial efficiency as reported by Vyas (1995) and Patel (2005a), extension participation was significantly associated with managerial efficiency (Sumathi 1987, Kotadia 2006 and Gohil 2010) and same was non significant as observed by Jadav (2005). Training was positively and significantly associated with managerial efficiency (Rao 1985, Jadav 2005, Patel 2005a and Patel 2006).
3.2.5 **Extent of variation**

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).

Out of 23 variables ($R^2 = 0.6370$), seven variables viz; adoption index, age, education, experience as a mango grower, mass media exposure, level of aspiration and risk orientation had significant contribution in managerial ability. This result provides evidence about the overwhelmingly important role of seven significant variables in achieving managerial ability (Jadav 2005).

All 15 selected characteristics of the groundnut growers were having influence on sustainability of groundnut based cropping system. Among them, six variables viz; innovativeness, self responsibility, management orientation, scientific orientation, attitude toward modern farming and opinion leadership were significantly contributing to sustainability of groundnut based cropping system (Khodifad 2010).

3.2.6 **Constraints**

The difficulties or problems faced by the coconut plantation growers in adoption of coconut cultivation technologies were considered as constraints.

The constraints faced by the respondents were; lack of knowledge and guidance, high cost of inputs, severity of pest incidence, non-availability of quality grafts, lack of available labour in time, pest and disease problems, fluctuation in market price, fertilizer application, plant protection measures and use of herbicides, irregular and

3.2.7 Suggestions

The ways and means or opinions as suggested by the respondents to overcome the constraints in coconut cultivation technology were considered as the suggestions in this study.

The suggestions to overcome the constraints were: irrigation is very necessary for the improvement of arecanut crop, identification and control of pests and diseases, getting proper remunerative price and availability, low or partial knowledge regarding improved variety, scientific ways of selecting palms for seed purpose, regular electric power supply should be made available, price of insecticides pesticides should be low, provide regular supply of electricity, increase the subsidy and facility on drip irrigation by government, training should be given to the farmers and quality seed supply should be ensured (Raghavendra 1997, Babanna 2002, Vedamurthy 2002, Jadav 2005, Satish Kumar 2006, Bharad 2007, Barse et al. 2010 and Gohil 2010).

3.3 DEFINITION 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:

1 Management
Management is a process consisting of activities of planning, organizing, actuating and controlling, performed to determine and accomplish stated objectives with the use of available resources.

2 **Managerial efficiency**

The managerial efficiency has been defined as 'the degree or efficiency to which an individual acquires and adopts effective factors in an enterprise to reach higher level of performance.

3 **Knowledge**

Knowledge is the body of understood information possessed by the coconut plantation growers in respect of package of practices of coconut cultivation.

4 **Age**

It is a number of chronological years completed by the coconut plantation growers on the date of interview.

5 **Education**

It is a level of formal education completed by the coconut plantation growers on the date of interview.

6 **Farm size**

It is size of land possessed by the coconut plantation growers for coconut cultivation on the date of interview.

7 **Herd size**

It is a number of animals possessed by the coconut plantation growers on the date of interview.

8 **Annual income**
Annual income is the total income expressed in rupees earned by the respondents and family members per annum from both farm and non farm enterprises put together.

9  **Social participation**

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

10 **Access to market facilities**

Access to market facilities was operationally defined as the respondents access to sell his produce to get remunerative price.

11 **Innovativeness**

Innovativeness is a degree of an individual's interest and desire to seek change in forming his own operation as and when found practicable and feasible.

12 **Risk orientation**

It is a degree to which coconut plantation grower is oriented towards encountering risk and uncertainty in adoption of coconut crop cultivation technology.

13 **Perception**

Perception in psychology is mental organization and interpretation of sensory information.

Perception was operationally defined as the meaningful sensation of the quality and damaged caused by eriophyid mite on coconut by the respondents.

14 **Symbolic adoption**
Symbolic adoption is operationalised as the positive decision taken by an individual to adopt an innovation in portion or entire of the farm in stipulated time.

15 **Attitude towards coconut cultivation**

It refers to the degree of positive or negative feelings of the coconut plantation growers associated with adoption of coconut crop production as one of the major crops on their farm.

16 **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 coconut production technology.

17 **Participation in training programme**

It is number and duration of various kinds of training taken by the coconut plantation growers to improve their skill and performance as coconut growers.

18 **Constraints**

It refers to the items of difficulties faced by the coconut plantation growers in the adoption and effective management of coconut cultivation technology to achieve desired results.

19 **Suggestions**

The ways and means of opinions as suggested by the coconut plantation growers to make the coconut cultivation more effective are considered as the suggestions in this study.

20 **Null hypothesis**
According to Fisher (1955), null hypothesis are the hypothesis, which is tested for possible rejection under the assumption that is true.

3.4 THE CONCEPTUAL MODEL

In the light of the above theoretical frame and the hypotheses derived there upon, a conceptual model delineating the relationship between independent variables and dependent variable has been proposed. The variables namely, age, education, farm size, area under coconut cultivation, herd size, annual income, social participation, access to market facilities, innovativeness, risk orientation, perception about quality and damaged caused by eriophyid mite on coconut, symbolic adoption, attitude towards coconut cultivation, information seeking behaviour, extension participation, participation in training programme were taken as independent variables, the managerial efficiency was considered as dependent variable.

In the tentative model presented in figure 3, there were sixteen variables of coconut plantation growers, which may be associated with their level of managerial efficiency. In the model presented in figure 4, it was assumed that each independent variable equally and directly contributed to managerial efficiency.

3.5 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).

H₁ There is no significant relationship between personal characteristics and managerial efficiency of coconut plantation growers.

H₂ There is no significant relationship between socio-economical characteristics and managerial efficiency of coconut plantation growers.
$H_3$ There is no significant relationship between psychological characteristics and managerial efficiency of coconut plantation growers.

$H_4$ There is no significant relationship between extension communicational characteristics and managerial efficiency of coconut plantation growers.
Where,

- $X_1$: Age
- $X_2$: Educational status
- $X_3$: Farm size
- $X_4$: Area under coconut cultivation
- $X_5$: Herd size
- $X_6$: Annual income
- $X_7$: Social participation
- $X_8$: Access to market facilities
- $X_9$: Innovativeness
- $X_{10}$: Risk orientation
- $X_{11}$: Perception
- $X_{12}$: Symbolic adoption
- $X_{13}$: Attitude towards coconut cultivation
- $X_{14}$: Information seeking behaviour
- $X_{15}$: Extension participation
- $X_{16}$: Participation in training programme

**Fig. 3:** Relationship between coconut plantation growers’ characteristics and managerial efficiency (The tentative paradigm)
MANAGERIAL EFFICIENCY

( Y )

R² = 0.100
(100.00 %)

Fig.4: Extent of variation accounted in the managerial efficiency by independents variables

(The tentative paradigm)

KALPAVRIKSHA
CHAPTER IV

NATURES SUPER MARKET

RESEARCH METHODOLOGY
This chapter deals with the research design, tools and techniques of scientific investigation employed in the light of objectives of the study. Scientific study of any problem requires an investigation to adopt appropriate method and procedures in order to arrive at reliable, unbiased and practical conclusions. It describes and clarifies methods used for measuring the dependent and independent variables and techniques followed for collection and analysis of data. The methodology is described under the following sections.

4.1 Identification of the problem.

4.2 Sources of data.

4.3 Locale of the study

4.4 Research design

4.5 Method of sampling

4.6 Selection and measurement of variables

4.6.1 Measurement of dependent variable

(Managerial efficiency)

4.6.2 Measurement of independent variables

4.7 Constraints faced by the farmers in adoption of improved coconut cultivation technology

4.8 Suggestions offered by the coconut plantation growers to overcome the constraints faced by them

4.9 Construction of interview schedule

4.10 Tools and techniques used for the data collection

4.11 Method of data collection
4.12 Statistical methods used for analysis of data

4.13 Research hypotheses (stated in null form)

4.1 IDENTIFICATION OF THE PROBLEM

Coconut is one of the most important plantation crops of Saurashtra region of Gujarat state. Coconut is a typical case of under exploitation of a plant of high economic potential. The plant is unique in the sense that it is capable of meeting all the basic needs of food, fibre, fuel, timber and even animal feed. Still the growers are getting disenchanted with it. As a result, while overall coconut production has been stagnating at around 12 billion nuts a year since the early 1990s, the country’s average productivity has not gone beyond about 7,000 nuts per hectare harvested way back in the early 1950s. And this is despite the existence of the Coconut Development Board since 1981 and the Technology Mission on Coconut (TMC) launched in 2001-02 (Rajgopal et al, 2006).

This apart, there are other factors as well that have plagued coconut cultivation. One of the most significant among them is the emergence of dreaded pests and diseases. However, the efforts of the scientists have succeeded in curbing the menace of another equally destructive pest, eriophyd mite, to a significant extent. In the 1990s, this pest used to cause formidable losses by deteriorating the quality and quantity of the husk fibre, besides lowering copra yield by causing the nuts to shrink. In Gujarat, 16,674 hectares area and 250.63 million nuts production with productivity 8433 nuts per hectare are recorded in the year 2010-11. (Anonymous, 2011).

Coconut cultivation particularly in Junagadh, Bhavnagar and Porbandar district are 7309, 3800 and 655 hectares area and 106.21, 55.22 and 9.51 million nuts production, respectively. The Junagadh has the first rank in Gujarat. Whereas, Bhavnagar, Valsad, Kutch and
Porbandar have second, third, fourth and fifth rank in area and production in the state, respectively (Table 5). Management is an integral function of any enterprise, which is working for the betterment of community at large. This function provides an opportunity to the farmers of a given enterprise to exert as much as they can to show their worth. Such an activity also calls for good level of efficiency of different levels of managers involved in the process of management of coconut plantation. Cultivation of plantation crops is a specialized field where efficient management will help a lot to yield results, which are anticipated. Therefore, management is a pivotal component in a scientific cultivation of coconut.

In Saurashtra, only coastal area of Bhavnagar, Junagadh and Porbandar are famous for cultivation of coconut.

The coconut palm is grown throughout the tropical world, for decoration as well as for its many culinary and non-culinary uses; virtually every part of the coconut palm has some human uses.

The coconut production in the Saurashtra is carried out by the farmers in coastal area of Saurashtra region. The coconut growers also have to perform a role of manager to get maximum production from limited available resources. Thus, the managerial efficiency of the coconut growers is directly affecting the coconut production.

Few studies have been conducted on managerial efficiency of farmers in cultivation of various crops, but the study on managerial efficiency of coconut growers is lacking. The idea of the research problem was discussed with the members of the advisory committee as well with some leading scientists and it was considered that the study of this nature would be fruitful and will provide new direction in the field of plantation crops. It was, therefore, decided to undertake a study on
"Managerial Efficiency of Coconut Plantation Growers in Coastal Area of Saurashtra Region".

4.2 SOURCE OF DATA

The basic information regarding the study was gathered from the records of Gram, Taluka and District panchayat. After the primary survey, an interview schedule was prepared in light of objectives and the coconut plantation growers were personally interviewed by the investigator.

The secondary data and other relevant information for the study were collected from the following sources:

1. Published reports, papers and other information from different horticultural agencies.

2. Reference books, reports, bulletins and periodicals related to the subject published by different authors, organizations, institutes and agencies.

3. The information regarding recommended coconut cultivation practices and control measure of eriophyid mites was compiled after discussion with the scientist of Coconut Research Plantation, Junagadh Agricultural University (JAU), Mahuva, Department of Entomology and Department of Horticulture, JAU, Junagadh.

4. Post graduate theses pertaining to the subject.

4.3 LOCALE OF THE STUDY

It was decided to conduct this study in only coastal area of Saurashtra region with following considerations.

1. Coastal area of Saurashtra region had the largest coconut growing area of Gujarat state.
2. Proportionately more number of coconut plantation and had ideal conditions for the successful cultivation.

3. Among all the fruit and plantation crops particular in coastal area, coconut is the main palm crop in the area under study.

4. In Saurashtra region, coastal area is famous for coconut cultivation in India.

5. The head quarters of Junagadh Agricultural University is located at Junagadh in Junagadh district of Saurashtra region.

6. The Mahuva taluka of Bhavnagar district of Saurashtra is a native of investigator. He is familiar with agro-climatic and agricultural situation of the area under study.

7. No research study of this nature had been conducted in the study area earlier.

4.4 RESEARCH DESIGN

This study was confined to “Ex-post facto” research design. The literal meaning of ex-post facto is ‘from what is done afterwards’. It means something done or securing after an event with a retrospective effect on the event. It is used in contradistinction to experimental. It is systematic empirical inquiry in which investigator does not have direct control on independent variables because their manifestations have already been occurred or they are inherently not manipulable. (Kerlinger, 1976).

4.5 METHOD OF SAMPLING

A multistage purposive sampling technique was used for the selection of districts, talukas, villages and respondents.

At first stage, three districts viz. Junagadh, Bhavnagar and Porbandar from the coastal area of Saurashtra region were selected. In the second stage, five talukas were selected which had the highest coconut growing area from the districts as shown in Table 6. The third
stage consisted of selecting 15 villages from each selected talukas. The final stage consisted of selecting 150 respondents from the selected villages. The selection of district, talukas, villages and respondents was based on the highest area under coconut plantation. The selected districts are shown in the map given in figure 5.

4.5.1 Selection of taluka

Out of 15 talukas of Junagadh district, Mangrol, Maliya Hatina, Veraval, Sutrapada, Kodinar and Una talukas are situated on coastal area. In Bhavnagar district, Mahuva, Talaja, Bhavnagar and Botad are situated on coastal area. In case of Porbandar district, only Porbandar taluka is located on coastal area. In all 21 talukas of Junagadh, Bhavnagar and Porbandar districts are having the area under coconut plantation. Among all 21 talukas, Mangrol, Veraval, Una, Mahuva and Porbandar talukas were purposively selected as these five talukas occupied more area under coconut plantation cultivation as compared to other talukas in selected districts (Table 5).
Fig. 5: Map of Gujarat State showing selected districts of Saurashtra region.
Table 5: Taluka wise coconut area in Junagadh, Bhavnagar and Porbandar districts during the year 2010-11
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Talukas</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Junagadh district</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Junagadh</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>2 Mangrol</td>
<td>1327</td>
</tr>
<tr>
<td></td>
<td>3 Veraval</td>
<td>1762</td>
</tr>
<tr>
<td></td>
<td>4 Sutrapada</td>
<td>183</td>
</tr>
<tr>
<td></td>
<td>5 Talala</td>
<td>336</td>
</tr>
<tr>
<td></td>
<td>6 Kodinar</td>
<td>251</td>
</tr>
<tr>
<td></td>
<td>7 Una</td>
<td>1849</td>
</tr>
<tr>
<td></td>
<td>8 Maliya Hatina</td>
<td>1317</td>
</tr>
<tr>
<td></td>
<td>9 Vanthali</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>10 Manavadar</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>11 Bhesan</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>12 Keshod</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>13 Mendrada</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>14 Visavadar</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Bhavnagar district</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Bhavnagar</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td>2 Talaja</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>3 Mahuva</td>
<td>3575</td>
</tr>
<tr>
<td></td>
<td>Taluka</td>
<td>Area (hectares)</td>
</tr>
<tr>
<td>---</td>
<td>--------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1</td>
<td>Botad</td>
<td>00</td>
</tr>
<tr>
<td>2</td>
<td>Gadhada</td>
<td>00</td>
</tr>
<tr>
<td>3</td>
<td>Gariyadhar</td>
<td>00</td>
</tr>
<tr>
<td>4</td>
<td>Ghogha</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Palitana</td>
<td>00</td>
</tr>
<tr>
<td>6</td>
<td>Shihor</td>
<td>00</td>
</tr>
<tr>
<td>7</td>
<td>Umrala</td>
<td>00</td>
</tr>
<tr>
<td>8</td>
<td>Vallabhipur</td>
<td>00</td>
</tr>
</tbody>
</table>

**3 Porbandar district**

<table>
<thead>
<tr>
<th></th>
<th>Taluka</th>
<th>Area (hectares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Porbandar</td>
<td>480</td>
</tr>
<tr>
<td>2</td>
<td>Kutiyana</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>Ranavav</td>
<td>130</td>
</tr>
</tbody>
</table>

Source: Deputy Director of Horticulture, Junagadh, Bhavnagar and Porbandar.

**Table 6: Selected taluka wise area and production of coconut plantation crop of Junagadh, Bhavnagar and Porbandar districts**
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Taluka</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A*</td>
<td>P**</td>
<td>A</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td><strong>Junagadh district</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mangrol</td>
<td>1260</td>
<td>13860</td>
<td>1308</td>
</tr>
<tr>
<td>2</td>
<td>Veraval</td>
<td>1400</td>
<td>15400</td>
<td>1622</td>
</tr>
<tr>
<td>3</td>
<td>Una</td>
<td>1685</td>
<td>18535</td>
<td>1824</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td><strong>Bhavnagar district</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mahuva</td>
<td>3570</td>
<td>41127</td>
<td>3572</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td><strong>Porbandar district</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Porbandar</td>
<td>430</td>
<td>4085</td>
<td>445</td>
</tr>
</tbody>
</table>

*Area in ha

**Production in MT

Source: Deputy Dir. of Hort., Junagadh, Bhavnagar and Porbandar.

**4.5.2 Selection of villages**

From each selected taluka, three villages having highest number of coconut growers were selected purposively. Thus, total numbers of 15 villages were selected for the study as shown in Table 7. The selected talukas and villages are shown in the map given in figure 6.

**4.5.3 Selection of respondents**

All the coconut plantation growers of these 15 villages constitute the population. A separate list of coconut plantation growers of all the 15 selected villages was prepared with the help of Gram Panchayat and
VLWs. From each of the list, the coconut growers who were involved in this farming and having minimum one acre of coconut plantation were selected. Ten coconut growers from each selected village were selected as respondents, making sample of 150 respondents. Thus, total numbers of 150 respondents were selected purposively from the selected villages. The details of selected villages and the respondents for the study are given in Table 7. The same can be understood with the help of the figure 7.

**Table 7: Selected villages and respondents**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of selected talukas and village</th>
<th>Total number of coconut growers</th>
<th>Number of selected coconut growers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Veraval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Supasi</td>
<td>122</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Chanduvav</td>
<td>86</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Aadri</td>
<td>62</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Magrol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Khodada</td>
<td>84</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Arena</td>
<td>75</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Sheriyaj</td>
<td>58</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Una</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Delvada</td>
<td>145</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Anjar</td>
<td>135</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Simmar</td>
<td>95</td>
<td>10</td>
</tr>
<tr>
<td>4.</td>
<td>Porbandar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Madhavpur</td>
<td>68</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Chingariya</td>
<td>53</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Balej</td>
<td>44</td>
<td>10</td>
</tr>
<tr>
<td>5.</td>
<td>Mahuva</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>1. Mahuva</td>
<td>115</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>2. Vadli</td>
<td>58</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3. Vaghnagar</td>
<td>65</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1265</strong></td>
<td><strong>150</strong></td>
<td></td>
</tr>
</tbody>
</table>
Fig. 7: Selection of coconut plantation growers from each village

4.6 SELECTION AND MEASUREMENT OF VARIABLES
The selection of variables included in the study was done based on an extensive review of literature on management, consultation with experts and from previous studies taken up on the related subjects. Only those variables, which were found most relevant, were finally selected for the study. The list of the selected variables (characteristics) is as under.

(A) Dependent variables

1. Managerial efficiency

(B) Independent variables

I. Personal

1. Age

2. Educational status

II. Socio - Economic

1. Farm size

2. Area under coconut plantation

3. Herd size

4. Annual income

5. Social participation

6. Access to market facilities

III. Psychological

1. Innovativeness
2. Risk orientation
3. Perception about quality and damaged caused by eriophyid mite on coconut
4. Symbolic adoption
5. Attitude towards coconut cultivation

IV. Extension – communication
1. Information seeking behaviour
2. Extension participation
3. Participation in training programme

4.6.1 DEVELOPMENT AND MEASUREMENT OF DEPENDENT VARIABLE

Taylor Fredrick W. is the founder of the scientific management. Its overall goal was high industrial efficiency in terms of either highest productivity or lower unit cost.

Management has been defined in various ways: (1) According to Koontz and O'Donell (1972), “Management is the art of getting things done through and with people in formally organized groups”. It is the art of creating an environment in which people can perform as individuals and yet cooperate towards attainment of group goals. (2) The ability of a person to accomplish the particular activity despite hardship (3) Using the resources what we have to get the most. (4) The ability of a person in using the techniques and skills in planning, decision making, controlling, scheduling, guiding, supervising, coordinating and organizing the resources (man, materials and money).
In the present study, management of plantation has been operationalised as the ability of the coconut growers to apply the basic principles of management in scientific cultivation of coconut plantation. This has been measured with some select components (function) of the management.

4.6.1.1 Development and standardization of scale to measure managerial efficiency of coconut plantation growers

Researchers in this field have used different criteria to measure the performance of the managers. Mitchell (1979) used the teachers rating (perception) for studying principals’ effectiveness in the elementary schools. In the present study, the managerial efficiency of the coconut growers was measured by the indicator performance scale.

4.6.1.1.1 Selection of main indicators and sub indicators

The coconut growers have to perform many management functions. With this in mind, a good number of main indicators and sub- indicators pertaining to managerial efficiency were collected through relevant literature, corresponding with experts and discussing with management specialists. In all, 10 main indicators and 172 sub-indicators reflecting managerial efficiency of coconut growers were selected tentatively as possible indicators and sub-indicators of managerial efficiency of coconut growers.

These main indicators and sub-indicators were mailed to 100 judges comprising of the academicians, administrators and management personnel working in various universities and institutions in India. The judges were requested to indicate whether each of the main indicator and sub indicator sent to them was relevant or not for inclusion in the scale (Appendix- I & III). Simultaneously they were also requested to give weightage out of 100 to main indicators and rank
them according to their relative importance in measurement of managerial efficiency of coconut growers. The judges were also requested to give their opinion regarding sub indicators of all 10 main indicators which are relevant or not for inclusion in the scale battery.

The responses from 67 judges were received out of 100. The responses of all these 67 judges were critically analysed and finally the responses of 60 judges were considered for final analysis.

Using Normalized Rank Approach recommended by Guilford (1954), scale value for each indicator and weightage for each sub-indicator were worked out. The advantage of this method is that it can be used with any number of variables and does not require large number of judges for ranking the variables.

4.6.1.1.2 Determining the scale value

In order to obtain the scale value of each indicator and sub indicator ranked by the judges, the centile position ‘P’ based on the method suggested by Guilford (1954) was computed. The ‘C’ values, ‘Rj’ values and finally scale values i.e. ‘Rc’ value were worked out by using the following formula: (Appendix – II).

\[
R_c = 2.357 \times R_j - 7.01
\]

Ex. Scale value of knowledge (Rc) \[R_j = 7.05\] as Appendix =II

Knowledge of scientific practices / \[R_c = 2.357 \times 7.05 - 7.01\]

\[R_c = 16.61685 - 7.01\]

\[R_c = 9.606\]

4.6.1.1.3 Validity of the scale
Validity of the scale was confirmed by two types of validity tests viz, content validity and criterion validity.

4.6.1.1.3.1 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.

4.6.1.1.3.2 Criterion validity

A criterion may be an objective measure of performance or quality (Garrett, 1985). In the present study, criterion validity was measured by using criteria of education as a coconut grower. Comparison was made between the managerial efficiency score of 20 non-sampled respondents with their respective education as a coconut grower. Pearson’s coefficient of correlation was used for appraising correlation between these two sets of scores. The ‘r’ value was 0.405, indicating that the scale was valid.

4.6.1.1.4 Determining the reliability

In order to measure the reliability of the scale, split half method was used; the scale was administered to 20 non-sampled farmers. The score for the alternative indicators were separated and two sets were prepared. The coefficient of correlation was used for appraising correlation between the two sets of scores. The ‘r’ value was 0.859, indicating that the scale was reliable.

4.6.1.2 Measurement of dependent variable (Managerial Efficiency)
For measuring the managerial efficiency of coconut growers about scientific cultivation of coconut plantation, the scale developed for the purpose was applied. The score assign to these equations according to its important. The formula used for calculating the Managerial Efficiency Index (MEI) was as under.

\[
\text{MEI} = \frac{\sum (\text{Score obtained for indicator } \times \text{Scale value of indicator})}{\sum (\text{Maximum score for indicator } \times \text{Scale value of indicator})} \times 100
\]

Where,

\( \text{OsI}_1 = \text{ Obtained score value of Knowledge} \)
\( \text{OsI}_2 = \text{ Obtained score value of Planning} \)
\( \text{OsI}_3 = \text{ Obtained score value of Rational decision} \)

\( \text{OsI}_{10} = \text{ Obtained score value of Controlling activities} \)

\( \text{MsI}_1 = \text{ Maximum score value of Knowledge} \)
Managerial efficiency index from each coconut growers were calculated. The final managerial efficiency index of coconut growers was determined by averaging the index from respective coconut growers. Then, the coconut growers were classified in to three categories based on Mean and Standard Deviation viz;

Low managerial efficiency = < (Mean – S.D.)
4.6.2 MEASUREMENT OF INDEPENDENT VARIABLES

4.6.2.1 Personal characteristics

4.6.2.1.1 Age

Age of the coconut growers is operationalized as the calendar years rounded off to the nearest, on the date of response. One score was given for each complete year. The coconut growers were classified into three groups viz;

- Young age group = Up to 35 years
- Middle age group = 36 to 50 years
- Old age group = Above 50 years
## MEASUREMENT OF INDEPENDENT VARIABLES

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Variable</th>
<th>Technique / tool of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Independent Variables</strong></td>
<td></td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Personal</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Age</td>
<td>Structured schedule developed</td>
</tr>
<tr>
<td>2</td>
<td>Educational status</td>
<td>Scale developed by Somasunderam (1995) and Anandaraja (1999)</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Socio - Economic</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Farm size</td>
<td>Structured schedules developed</td>
</tr>
<tr>
<td>4</td>
<td>Area under coconut plantation</td>
<td>Structured schedules developed</td>
</tr>
<tr>
<td>5</td>
<td>Herd size</td>
<td>Structured schedules developed</td>
</tr>
<tr>
<td>6</td>
<td>Annual income</td>
<td>Structured schedules developed</td>
</tr>
<tr>
<td>7</td>
<td>Social participation</td>
<td>Scale developed by Subramanium (1986)</td>
</tr>
<tr>
<td>8</td>
<td>Access to market facilities</td>
<td>Structured schedules developed</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Psychological</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Innovativeness</td>
<td>Scale developed by Singh (1977)</td>
</tr>
<tr>
<td>10</td>
<td>Risk orientation</td>
<td>Scale developed by Supe (1969)</td>
</tr>
<tr>
<td>11</td>
<td>Perception</td>
<td>Teacher made scale will be developed</td>
</tr>
<tr>
<td>12</td>
<td>Symbolic adoption</td>
<td>Structured schedules developed</td>
</tr>
<tr>
<td>13</td>
<td>Attitude towards coconut cultivation</td>
<td>Scale developed by Singh (1990)</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Extension - Communication</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Information seeking behaviour</td>
<td>Structured schedules developed</td>
</tr>
<tr>
<td>15</td>
<td>Extension participation</td>
<td>Scale developed by Siddamaiah and Jalihal (1983)</td>
</tr>
<tr>
<td>16</td>
<td>Participation in training programme</td>
<td>Schedule developed by Nagaraja (1989)</td>
</tr>
</tbody>
</table>

### 4.6.2.1.2 Educational Status
Educational Status in the present study is defined as the number of years of formal education received by the respondents as the time of enquiry. The scoring procedure followed by Somasunderam (1995) and Anandaraja (1999) was used with slight modifications.

<table>
<thead>
<tr>
<th>Educational Status</th>
<th>Scored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate (unable to read or write)</td>
<td>1</td>
</tr>
<tr>
<td>Functionally literate (only read and write)</td>
<td>2</td>
</tr>
<tr>
<td>Primary education (1 to 5 standard)</td>
<td>3</td>
</tr>
<tr>
<td>Middle education (6 to 7 standard)</td>
<td>4</td>
</tr>
<tr>
<td>Secondary education (8 to 10 standard)</td>
<td>5</td>
</tr>
<tr>
<td>Higher secondary education (11 to 12 standard)</td>
<td>6</td>
</tr>
<tr>
<td>College and above</td>
<td>7</td>
</tr>
</tbody>
</table>

4.6.2.2 Socio economical characteristics

4.6.2.2.1 Farm size

It was measured with the help of structured schedule on the basis of total land possessed and operated by the respondents. The respondents were grouped into four categories viz;

<table>
<thead>
<tr>
<th>Level of land holder</th>
<th>Farm size</th>
<th>Score used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marginal farmers</td>
<td>Up to 2.5 acres</td>
<td>1</td>
</tr>
<tr>
<td>Small farmers</td>
<td>2.51 to 5.00 acres</td>
<td>2</td>
</tr>
<tr>
<td>Medium farmers</td>
<td>5.01 to 10.00 acres</td>
<td>3</td>
</tr>
<tr>
<td>Big farmers</td>
<td>More than 10.00 acres</td>
<td>4</td>
</tr>
</tbody>
</table>
4.6.2.2 Area under coconut plantation

Farmers grew coconut in part of their land. Percentage of coconut area to the total farm size is more reliable unit for comparison. One score was given to every acre of coconut plantation. The scoring procedure was developed for the study. The respondents can be categorized based on the acreage under coconut cultivation.

4.6.2.2.3 Herd Size

The herd size refers to the animals possessed by the coconut growers. The animals were calculated as total number of adult animals. It was measured by asking the respondents about the animal kept by them for their side income as well as agricultural work through bullock, milk purpose and farm yard manure. The data regarding herd size were collected and categorized into three categories viz., small herd size, medium herd size; and large herd size. One score was assigned for each animal possession to quantify this variable.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Herd size</th>
<th>Score used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small herd size</td>
<td>Up to 3 animals</td>
<td>1</td>
</tr>
<tr>
<td>Medium herd size</td>
<td>From 4 to 6 animals</td>
<td>2</td>
</tr>
<tr>
<td>Large herd size</td>
<td>Above 6 animals</td>
<td>3</td>
</tr>
</tbody>
</table>

4.6.2.2.4 Annual income
The annual income is defined as the total income of a respondent derived from agricultural, allied and other occupation in a year. It was measured with the help of structured schedule.

4.6.2.2.5 Social participation

It was measured by using the scale developed by Subramanium (1986) with slight modifications. The scale consisted of seven statements indicating the respondents association with organizations within and outside their village. The coconut growers were asked about their association with various organizations 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 and one more score was assigned for the holding position in an organization. The coconut growers were grouped into three categories on the basis of mean and standard deviation.

- Low social participation = (Mean – S.D.)
- Medium social participation = (Mean ± S.D.)
- High social participation = (Mean + S.D.)

4.6.2.2.6 Access to market facilities

Access to market facilities was operationally defined as the respondents access to sell his produces to get remunerative price. A schedule has been developed to measure the variable which consisted of the distance of the market, opinion on market facilities, type of market, type of transport, mode of transport, mark up of middleman and term of payment by which a respondent does in the post production process.

A) Distance to which produce is sold (In km)
It was operationalised as the distance in kms to which respondent regularly sells his produce.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Distance (in km)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≤ 5</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>6 to 10</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>11 to 15</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>16 to 20</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>21 to 25</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>26 to 30</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>26 to 30</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>≥ 31</td>
<td>8</td>
</tr>
</tbody>
</table>

**B) Opinion on market facilities**

It is operationalised as the respondent's opinion on the various facilities available in the market.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Opinion</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Satisfactory</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Fair</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Poor</td>
<td>1</td>
</tr>
</tbody>
</table>

**C) Type of market**

It is operationalised as the type of market where respondent sells his produce.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Type of market</th>
<th>Score</th>
</tr>
</thead>
</table>
1 Nearest market/Village market 1
2 Private money lenders 2
3 Middle men 3
4 Govt. fair price shop 4
5 Local private market 5

D) Type of transport

It is operationalised as the type of transport like owned or hired transport for selling the produce in the market.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Type of transport</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Owned</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Hired</td>
<td>2</td>
</tr>
</tbody>
</table>

E) Mode of transport

It is operationalised as the mode of transport used for selling the produce in the market.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Mode of transport</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Railway</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Tractor trolley / Truck</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>RTC Bus (S. T. bus)</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Auto / chhakrda rickshaw</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Bullock cart</td>
<td>1</td>
</tr>
</tbody>
</table>

F) Mark up of middleman (commission)
It is operationalised as the mode of commission paid to middleman for selling the produce in the market.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Rate of commission ( percentage)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≤ 01.00 %</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>01.10 to 02.00 %</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>2.10 to 03.00 %</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>≥ 03.10 %</td>
<td>4</td>
</tr>
</tbody>
</table>

**G) Term of payment**

It is operationalised as the term of payment buyers put while buying your produce after sale.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Term of payment (in days)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Immediate (same day)</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>2 to 7 days</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>8 to 15 days</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>≥ 16 days</td>
<td>1</td>
</tr>
</tbody>
</table>

Score under the items i.e. A, B, C, D, E, F and G was summed up to get the total score for access to market facilities. Then the respondents were grouped into three categories based on score range obtained by class interval method.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Category</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low access to market facilities</td>
<td>7 - 14</td>
</tr>
<tr>
<td>2</td>
<td>Medium access to market facilities</td>
<td>15 - 22</td>
</tr>
</tbody>
</table>
4.6.2.3 Psychological characteristics

4.6.2.3.1 Innovativeness

Rogers and Shoemaker (1971) defined innovativeness as the degree to which an individual is relatively earlier in adopting new ideas than other members of his society. In this study, innovativeness was operationalised as the extent to which an individual had acquired an awareness of the need to be innovative and the person who felt the greatest need to change would be the first to innovator.

Asking the following question, innovativeness of the respondents was assessed. The scale developed by Singh (1977) and used by Senthil Kumar (1994) was followed. Three responses were given with scoring procedure as follow:

Question: When would you prefer to adopt an improved practice?

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Response</th>
<th>Score used</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 it, being adopted by other farmers successfully</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>I prefer to wait and take my own time</td>
<td>1</td>
</tr>
</tbody>
</table>
Based on the response, all the respondents were classified into intervals. The maximum score, one could obtain was three and the minimum score was one. Maximum score denotes high innovativeness and minimum score denotes low innovativeness.

4.6.2.3.2 Risk Orientation

The scale developed by Supe (1969) was used with slight modification to measure the risk orientation of the respondents.

The scale consists of 6 statements of which two are negative. The respondents were asked to respond on five point continuum rating scale as strongly agree, agree, undecided, disagree and strongly disagree giving 5, 4, 3, 2, and 1 score for the positive statement and a vis-a-versa, respectively. The total score were calculated by summing up the score obtained for each statement per respondent. The maximum score that could be obtained for a respondent were 30 and minimum 6.

The respondents were classified in to three categories on the basis of mean and S.D. as following

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Categories</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slight Risk Taker</td>
<td>= &lt; Mean – S.D.</td>
</tr>
<tr>
<td>2</td>
<td>Moderate Risk Taker</td>
<td>= Mean ± S.D.</td>
</tr>
<tr>
<td>3</td>
<td>High Risk Taker</td>
<td>= &gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

4.6.2.3.3 Perception of coconut plantation growers about quality and damaged caused by eriophyid mite on coconut
4.6.2.3.3.1 Details on Perception about quality and damaged caused by eriophyid mite on coconut

The study of perception is concerned with identifying the process through which we interpret and organize sensory information to produce our conscious experience of objects and object relationship.

Perception is the process of understanding sensation or attaching meaning based on past experience to signs (Taneja, 1989).

“Perception is the process of receiving information about and making sense of the world around us. It involves deciding which information to notice, how to categorize this information and how to interpret it within the framework of existing knowledge”. In other word, it can be said that a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment.

To measure the perception level of respondents about quality and damage caused by eriophyid mite on coconut questionnaire were prepared. The scale divided in to three major head viz. quality aspects of coconut, infestation of eriophyid at pre harvest stage and infestation of eriophyid mite at post harvest stage. The quality aspects of coconut contained 13 items. Whereas, infestation of eriophyid mite at pre harvest and post harvest stage contained 6 and 10 items, respectively. Thus total consisted 29 items concerning about quality and damage caused by eriophyid mite on coconut. The respondents were asked to answer correct or incorrect, right or wrong and “Yes” or “No”, against each item. The perception scores of an individual respondent were obtained by summing up the responses according to major head. Three major head consistent 13, 6 and 10 statements, respectively. The mean score were obtained individual major head and converted into percentage and assigned the rank.
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Perception</th>
<th>Mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quality aspects of coconut</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Infestation of eriophyid mite on coconut at</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(A) Pre harvest stage</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td>(B) Post harvest stage</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>29</strong></td>
</tr>
</tbody>
</table>

### 4.6.2.3.3.2 Overall Perception about quality and damaged caused by eriophyid mite

To measure the overall perception level of respondents about quality and damaged caused by eriophyid mite on coconut questionnaire were prepared. The perception scores of an individual respondent were obtained by summing up the responses over all the 29 statements. The respondents were classified into three categories on the basis of mean and standard deviation.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Categories</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low perception</td>
<td>= &lt; Mean – S.D.</td>
</tr>
<tr>
<td>2</td>
<td>Medium perception</td>
<td>= Mean ± S.D.</td>
</tr>
<tr>
<td>3</td>
<td>High perception</td>
<td>= &gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

### 4.6.2.3.4 Symbolic Adoption

Symbolic adoption was operationalised as the positive decision taken by an individual to adopt an innovation. In this study, messages related to five major subject matter areas on different control measures of coconut eriophyid mite pertaining to knowledge aspects and adoption
aspects. Each respondent was asked to state (i) Whether he has decided to adopt the recommended fertilizers, micro nutrient, agrobiocide, pesticides and indigenous methods recommended by JAU in his farm, (ii) Whether he proposes to use the recommended technology in a stipulated time and (iii) Whether he proposes to cover the entire area under coconut cultivation. Positive responses on the above questions received a score of 2 and negative response received a unit score. For the stipulated time option following scoring pattern was used.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Items (Symbolic adoption)</th>
<th>Score used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Within a week</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>After a month</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Next season</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Never</td>
<td>1</td>
</tr>
</tbody>
</table>

Based on the range of symbolic adoption of the practices as expressed by the respondents, the following scoring pattern was followed.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Items (Symbolic adoption)</th>
<th>Score used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single tree</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Portion of farm</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Entire farm</td>
<td>3</td>
</tr>
</tbody>
</table>
Then the total score for symbolic adoption was computed for each respondent. The score ranges from five to forty five.

**4.6.2.3.5 Attitude towards coconut cultivation**

Attitude towards coconut cultivation was measured by using the scale developed by Singh (1990). The scale consists of 8 items. Each statement was provided with 5-point response categories ranging from strongly agree to strongly disagree. Each statement were given scores for strongly agree-5, agree-4, undecided-3, disagree-2 and strongly disagree-1, to positive statement and vis-a-versa to negative. Scores assigned by individual respondent to the eight statements were summed up. Thus, for all respondents scores were calculated and an index of attitude toward coconut cultivation was developed. The coconut growers were divided in to three categories viz.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less favourable attitude</td>
<td>= &lt; (Mean – S.D.)</td>
</tr>
<tr>
<td>Favourable attitude</td>
<td>= (Mean ± S.D.)</td>
</tr>
<tr>
<td>Highly favourable attitude</td>
<td>= &gt; (Mean + S.D.)</td>
</tr>
</tbody>
</table>

**4.6.2.4 Extension – communication characteristics**

**4.6.2.4.1 Information seeking behaviour**

Rogers and Shoemaker (1971), stated on this issue, "it is difficult to reckon source and channel as separate elements in most diffusion researches, which are usually conducted by obtaining, recall data from receivers via personal interviews. For the purpose of study, the term sources include channels also and they collectively termed as information source."
It is postulated as the extent to which an individual was exposed to the messages related to agriculture and allied areas through various information sources for the past one year. This was measured on twenty seven sources of information. The scoring procedure was developed for the study. The scoring was done based on the frequency of exposure to different sources as follows.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Sources / Channels</th>
<th>Frequency</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Professional Sources</td>
<td>Regularly / Occasionally / Never</td>
<td>3 / 2 / 1</td>
</tr>
<tr>
<td>1</td>
<td>Assistant Agril. Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Agricultural Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Horticultural Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Assistant Directors (SMS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Agricultural / Extension Officers (Bank / Co-operative societies)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Scientists from JAU (including KVK)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Scientists from ICAR / NHB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Officers from NGOs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Representatives from private firms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Village Administrative Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Others (Please specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Para – Professional Sources</td>
<td>Regularly / Occasionally / Never</td>
<td>3 / 2 / 1</td>
</tr>
<tr>
<td>1</td>
<td>Formal Discussion Group conveners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Contact farmers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Village / Local leaders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Farmers Association Members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Self Help Group (SHG) leaders</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non – Professional Sources</td>
<td>Other Sources</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------</td>
<td>---------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>6</td>
<td>Others (Please specify)</td>
<td>Regularly / Occasionally / Never</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Family members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Neighbours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Friends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Relatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Leaflets / Folders / Booklets</td>
<td>Regularly / Occasionally / Never</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Posters / Charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Wall paintings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Advertisement boards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Film show</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Agricultural Exhibitions / Traders</td>
<td>Regularly / Occasionally / Never</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Hoardings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Lessons from Video / Audio cassettes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Others (Please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sum of the scores on these four items was taken as a measure of the information seeking behaviour of a respondent. Based on the scores and the identified intervals, the respondents were categorized.

**4.6.2.4.2 Extension participation**

Extension participation refers to the degree of involvement of farmers in various extension activities including individual contact, group contact and mass contact methods with a view to obtain information.

It was measured with the help of scale developed by Siddaramaiah and Jalihal (1983). The scale consist of eight items having different scale values administered to the respondents and obtained information on the participation of coconut growers in different extension activities during the period of previous one year. The extension participation
score of an individual of coconut growers was the sum total of the scale value of the items in which coconut growers has participated.

Actual total score value

Extension participation Index = \[ \text{sum total of scale value of items} \times 100 \]

Possible total score value

According to the extension participation index of coconut growers, the mean and standard deviation worked out and respondent was grouped into three categories.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low extension participation</td>
<td>(&lt; \text{Mean} - \text{S.D.}))</td>
</tr>
<tr>
<td>2</td>
<td>Medium extension participation</td>
<td>(\text{Mean} \pm \text{S.D.}))</td>
</tr>
<tr>
<td>3</td>
<td>High extension participation</td>
<td>(&gt; \text{Mean} + \text{S.D.}))</td>
</tr>
</tbody>
</table>

### 4.6.2.4.3 Participation in training programme

The participation in training was measured based on number and duration of various kinds of training taken by the coconut growers to improve their skill and performance as coconut growers. To measure this variable the schedule developed by Nagaraja (1989) was used. The coconut growers were asked to indicate whether they attended any training in the past three years, if so, how often. The score ranged from 0 to 9 for an individual respondent.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Frequency</th>
<th>Duration of training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 day</td>
</tr>
<tr>
<td>1.</td>
<td>Participated once</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Participated twice</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Participated thrice and above</td>
<td>3</td>
</tr>
</tbody>
</table>
(Figures in column 3, 4 and 5 indicate score value for the coconut growers participation in training programme held in the organization)

The respondents were grouped into three categories viz., low participation in training programme < (\( \bar{x} - SD \)), medium participation in training programme between the score of (\( \bar{x} \pm SD \)) and high participation in training programme >(\( \bar{x} + SD \)).

### 4.7 CONSTRAINTS FACE BY THE COCONUT PLANTATION GROWERS IN ADOPTION OF IMPROVED COCONUT CULTIVATION TECHNOLOGY

Constraints are the forcible restriction and confinement of action. Constraints play a vital role in adoption of improved technology. The benefits actually derived only when it is efficiently used by the farmers at their local situation. Unless farmers’ problems in adoption of coconut plantation practices identified and solved, it is impossible to operate by them farming system sustainably. The constraints were operationally defined as the difficulties experienced by the coconut growers in adoption of coconut production technologies. For measuring a simple ranking system was applied. The percentage was calculated and rank order was given from the highest percentage to lowest percentage.

### 4.8 SUGGESTIONS OFFERED BY COCONUT PLANTATION GROWERS TO OVERCOME THE CONSTRAINTS FACED BY THEM

Suggestions are the remedies recommended by the coconut growers to overcome problems faced by them to elevate coconut plantation. It is fact that coconut growers are the ultimate users of coconut cultivation technology. Among various group of persons involved in the generation, refinements, dissemination and implementation the coconut cultivation technology, they are the closest
to the situation where coconut cultivation practices are to be applied. Therefore, they know better about what are the problems and its nature and also have an insight to overcome the problems in the prevailing situation and the background in which they live. The respondents were asked to offer their valuable suggestions for development of modern coconut cultivation technology systematically among the coconut growers and the peasant community. The responses were compiled and percentage was calculated. The rank order was given from the highest to the lowest percentage.

4.9 CONSTRUCTION OF INTERVIEW SCHEDULE

Interview schedule is the tool used for collection of primary information/data from the member of the population. It guides and directs the researcher how and what information/data is sought for the study. It saves both, time and money, of the researcher.

In the present study, information regarding independent variables, the coconut growers’ characteristics, and dependent variable, the managerial efficiency were needed on the line of scales developed/choose for a particular variable. Because of coconut growers’ low level of understanding it was difficult to collect information directly on the scales. For getting right information easily, all items in the scales for independent variables and sub-indicators in the managerial efficiency scale were transformed in to interrogative forms and thus simple, short and in understandable manner interview schedule was prepared (Appendix - III).

4.10 TOOLS AND TECHNIQUES USED FOR THE DATA COLLECTION
The main tools and techniques used in the present study was interview schedule along with the suitable scales and indices for measurement of dependent and independent variables. (Appendix–III).

4.11 METHOD OF DATA COLLECTION

A pretested structured interview schedule was used for collection of needed data. Initially the interview schedule was prepared after discussing with a group of experts and necessary modifications were made. The data were collected through personal interviewed by the researcher using the final interview schedule. (Appendix – III).

4.12 STATISTICAL METHODS USED FOR ANALYSIS OF DATA

For the interpretation and drawing inferences, the following statistical methods were used in the present study.

4.12.1 Percentage

Simple comparisons were made on the basis of percentage.

4.12.2 Mean and standard deviation

Arithmetic mean and standard deviation was used for classification of the coconut growers into different categories.

\[
\overline{X} = \frac{\sum Xi}{n} \quad \text{S.D.} = \left[ \frac{\sum (Xi - \overline{X})^2}{n - 1} \right]^{\frac{1}{2}}
\]

Where,

\( \overline{X} \) = General mean

\( Xi \) = Observed values

S.D. = Standard Deviation

\( n \) = Number of observation
4.12.3  **Coefficient of variation**

Coefficient of variation was used for comparing the variability present in various independent variables.

\[
\text{C.V. } \% = \frac{\text{S.D.}}{\bar{X}} \times 100
\]

Where.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.V.</td>
<td>Coefficient of variation</td>
</tr>
<tr>
<td>S.D.</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>( \bar{X} )</td>
<td>Mean</td>
</tr>
</tbody>
</table>

4.12.4  **Coefficient of correlation**

It was computed to find out the relationship between each of the independent variable and dependent variable by employing following formula:

\[
r = \frac{\sum xy}{\left[ \sum x^2 \cdot \sum y^2 \right]^{1/2}}
\]

Where,

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( r )</td>
<td>Coefficient of correlation</td>
</tr>
<tr>
<td>( \sum xy )</td>
<td>Correlated sum of products between x and y variables</td>
</tr>
<tr>
<td>( \sum x^2 )</td>
<td>Correlated sum of square for x variable</td>
</tr>
<tr>
<td>( \sum y^2 )</td>
<td>Correlated sum of square for y variable</td>
</tr>
</tbody>
</table>
4.12.5  **Multiple regression analysis**

This analysis was done to know the combined effect of the independent variables in explaining the variation in the dependent variable. The prediction equation used was:

\[
\hat{Y} = a + \sum_{i=1}^{k} b_i x_i
\]

Where,

\(\hat{Y}\)  = Predicted dependent variable

\(a\)  = Intercept or constant

\(\sum_{i=1}^{k} b_i x_i\)  = Sum of partial regression coefficient of \(Y\) with \(X_1 \ldots X_k\) variables

\(x_i \ldots x_k\)  = Number of independent variables included in multiple regression analysis.

4.12.6  **Stepwise multiple regression analysis**

The stepwise multiple regression analysis was carried out to know the important variables with their predictive ability in explaining the variation in the dependent variable.

In the stepwise method, the regression analysis was started with regression of \(Y\) with \(x_i \ldots x_k\) taken singly. The variable giving the greatest reduction in sum of squares of \(Y\) was first selected. Then, the bivariate regression in which \(X_1\) appeared was worked out. The variate which gives the greatest additional reduction in sum of square after fitting \(X_1\) was selected. All trivariate regressions that include both \(X_1\)
and \( X_2 \) were computed. The analysis was continued until the last variate of which additional contribution was the least of all variates. The prediction equation used was

\[
\hat{Y} = a + \sum_{i=1}^{k} b_i x_i
\]

Where,

\( \hat{Y} \) = Predicted dependent variable

\( a \) = Intercept or constant

\( \sum_{i=1}^{k} b_i x_i \) = Sum of partial regression coefficient of \( Y \) with \( X_i \ldots X_k \) variables

\( x_i \ldots x_k \) = Number of independent variables included in multiple regression analysis.

### 4.12.7 Standard partial regression coefficient:

In order to assign the rank to various selected independent variables, the standard partial regression coefficient was used. To calculate the same, the following formula (Snedecor and Cochran, 1967) was used.

\[
b'_{y \times i \times j} = b_{y \times i \times j} \cdot \left[ \sum \frac{x^2}{\sum y^2} \right]^{1/2}
\]

Where,
$b'_{y \cdot x_i \cdot j}$ = Standard partial regression coefficient $y$ with $x_i$

$b_{y \cdot x_i \cdot j}$ = Partial regression coefficient of $y$ with $x_i$

$\sum x^2$ = Corrected sum of square for variable $x$

$\sum y^2$ = Corrected sum of square for variable $y$

### 4.13 Research Hypotheses (Stated in Null Form)

Based on the literature reviewed and theoretical orientation of the study the following hypotheses pertaining to the specific objectives were developed:

H.1 There is no association between coconut plantation growers managerial efficiency about scientific cultivation of coconut plantation and their personal characteristics viz. age and educational status.

H.2 There is no association between coconut plantation growers managerial efficiency about scientific cultivation of coconut plantation and their socio-economic characteristics viz. farm size, area under coconut cultivation, herd size, annual income, social participation and access to market facilities.

H.3 There is no association between coconut plantation growers managerial efficiency about scientific cultivation of coconut plantation and their psychological characteristics viz. innovativeness, risk orientation, perception about quality and damaged caused by eriophyid mite on coconut, symbolic adoption and attitude towards coconut cultivation.
H.4 There is no association between coconut plantation growers' managerial efficiency about scientific cultivation of coconut plantation and their extension communication characteristics viz. information seeking behaviour, extension participation and participation in training programme.
CHAPTER V

FINDINGS AND DISCUSSION

CHAPTER V

FINDINGS AND DISCUSSION
The information related to this study was collected from the respondents i.e. coconut plantation growers by the means of structured interview schedule. The purpose of the present study was also to develop and standardize an objective scale to measure managerial efficiency of coconut plantation growers. The collected information was classified, tabulated and analyzed in light of the objectives of the study. The facts and findings derived after analyzing the information have been presented under the following main heads and discussed in succeeding pages:

5.1 Development of managerial efficiency scale
5.2 Relative importance of indicators of the scale
5.3 Measurement of dependent variables (managerial efficiency of coconut plantation growers)
   5.3.1 Overall managerial efficiency of coconut growers
   5.3.2 Detail analysis of main indicators of managerial efficiency
5.4 Measurement of independent variables
5.5 Relationship of personal, socio-economical, psychological and extension-communicational characteristics with managerial efficiency of coconut plantation growers
5.6 Extent of contribution of selected independent variables on the dependent variable of the coconut plantation growers
5.7 Constraints faced by the coconut plantation growers and suggestions to overcome the constraints

**5.1 DEVELOPMENT OF MANAGERIAL EFFICIENCY SCALE**

**5.1.1 Identification of the indicators**

In order to identify the basic components of managerial efficiency, a good number of indicators and sub – indicators pertaining to managerial efficiency of coconut growers were collected through review of literature, correspondence with experts and discussions with extension/management specialists. A total number of ten main indicators and 172 sub – indicators were selected tentatively as possible
indicators and sub-indicators of managerial efficiency of coconut growers.

These main indicators and sub-indicators were mailed to 100 judges, the academicians, administrators and management personnel working in various universities and institutions in India. The judges were requested to indicate whether each of the main indicator and sub indicator sent to them was relevance or not for inclusion in the scale. Simultaneously they were also requested to give weightage out of 100 to main indicators and rank them according to their relative importance in measurement of managerial efficiency of coconut growers. The judges were also requested to give their opinion regarding sub indicators of all 10 main indicators. They were asked to indicate whether the sub indicators are relevant or not for inclusion in the scale battery.

In total, the 100 judges were selected and enquired the scale for their opinion. The responses from 67 judges were received out of 100. The responses of all these 67 judges were critically analysed and finally the responses of 60 judges were considered for final analysis.

The responses received from the judges supported the relevance of all the ten main indicators and 132 sub-indicators out of 172 sub-indicators. Those indicators that received more than 75 per cent responses were considered as relevance item for inclusion in the scale. The details on relevancy are furnished in Table 8.

### 5.1.2 Obtaining scale values

Based on the weightage assigned by the judges to each of the selected main indicators and then converted into rank, the scale values of all the main indicators were calculated by using the Normalised Rank Approach as suggested by Guilford (1954). A complete scale comprising
of 10 main indicators along with their percent relevancy is given in Table 8. The reliability and validity of the managerial efficiency scale were determined by employing the suitable methods as described in preceding chapter-IV.

Table 8: Relevancy of main indicators of the scale

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Relevant</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of scientific cultivation</td>
<td>60</td>
<td>100.00</td>
</tr>
<tr>
<td>2</td>
<td>Ability in planning</td>
<td>60</td>
<td>100.00</td>
</tr>
<tr>
<td>3</td>
<td>Ability to make rational decision</td>
<td>57</td>
<td>95.00</td>
</tr>
<tr>
<td>4</td>
<td>Ability to organizing the activities</td>
<td>53</td>
<td>88.33</td>
</tr>
<tr>
<td>5</td>
<td>Ability to coordinate the activities</td>
<td>50</td>
<td>83.33</td>
</tr>
<tr>
<td>6</td>
<td>Budgeting</td>
<td>56</td>
<td>93.33</td>
</tr>
<tr>
<td>7</td>
<td>Communication &amp; human relationship</td>
<td>55</td>
<td>91.67</td>
</tr>
<tr>
<td>8</td>
<td>Ability to rational marketing</td>
<td>59</td>
<td>98.33</td>
</tr>
<tr>
<td>9</td>
<td>Value addition</td>
<td>56</td>
<td>93.33</td>
</tr>
<tr>
<td>10</td>
<td>Ability to controlling the activities</td>
<td>49</td>
<td>81.67</td>
</tr>
</tbody>
</table>

5.1.3 Validity of the scale

In the present investigation, the validity of the scale was determined by two types of validity tests viz,

5.1.3.1 Content validity
The content validity was worked out by two ways. Firstly, the indicators selected for inclusion in the scale were based on extensive and exhaustive literature and secondly, the opinions of panel of 60 judges were obtained to know whether the indicators were relevant for inclusion in the scale. More than 75 per cent judges endorsed proposed indicators as relevant, indicating the scale was valid.

5.1.3.2 Criterion validity

It was established by correlating the managerial efficiency scores obtained from 20 non-sampled respondents with their respective area under coconut grower. The coefficient of correlation (0.405) between the two variables was found to be significant at 0.01 per cent level of significance indicated that the scale was valid.

5.1.4 Reliability of the scale

The split-half method was used to achieve the reliability of the scale. The scale was administered to 20 non-sampled farmers. The coefficient of correlation was used for the two sets of score. The reliability coefficient of correlation obtained (0.858) was significant at 0.01 level of significance indicated that the scale was reliable.

It can be inferred from the above findings that all the ten indicators and 132 sub-indicators were found relevant for inclusion in the scale. The results of the content and criterion validity tests were indicated that the developed scale was valid. The split-half reliability coefficient stated that the developed scale was reliable.

5.2 RELATIVE IMPORTANCE OF INDICATORS OF THE SCALE

In order to know the relative importance of different main indicators of managerial efficiency scale, the scale value of each main indicator were compared with the mean score assigned by the respondents. Two methods were adopted for ascertaining the correlation. Firstly between the two sets of score by applying Pearson’s
product moment coefficient of correlation and secondly, between the ranks of the two sets of the score by applying Spearman’s rank correlation. The data are presented in Table 9.

The values of the Pearson’s product moment Correlation Coefficient (0.731) and Spearman’s rank correlation coefficient (0.795) were significant at 0.01 per cent level of significance, indicating positive and significant correlation between the two observations. Thus, it can be inferred that all the indicators were important and hence, none of the main indicators was eliminated. However, their importance was varied as the scale value of each main indicator was different.

It can be observed from Table 9 that the highest scale value was obtained by knowledge of scientific cultivation followed by ability in planning, ability to rational marketing, ability to rational decision, and budgeting. The indicators viz. communication and human relationship, ability to organizing the activities, value addition, ability to controlling the activities, ability to coordinate the activities were next in their scale values in descending order.

It can be concluded that the first rank was assigned by the judges to knowledge of scientific cultivation indicator followed by planning, rational marketing, make rational decision, and budgeting. For the proper management of any coconut plantation, adequate knowledge regarding scientific cultivation of coconut practices is the prime requirement. Knowledge about current technology is essential to maximize return from an enterprise. It is saying that education is the panacea for the life and knowledge is the determinant factor for the education.

In management of any programme/activities, proper planning is the prime requirement, involve determination of objectives and course of actions to be followed. Planning helps the farmer in proper allocation of resources and better organization of the farm activities. It enables the
farmers to achieve the desired goals. Rational marketing is the capacity of the farmers to get maximum returns for their produce. Understanding trend of current marketing strategy, person should try to sale his products.

According to R. S. Daver (quoted from Karthikeyan et al, 2008), decision making is the selection based on some criteria of one alternative from two/more possible alternatives. To decide means “to cut off” or in practical “to come to conclusion”. Rationality in decision making helps the farmer to clearly set up the goals in farming. Budget is an estimate of future needs arranged according to an orderly basis, covering some or all of the activities of an enterprise for a definite period of time. Budgeting involves the allotment of the fund to the various activities and credit is an important input for production, which helps in obtaining full benefits of the technology. These may be the reasons for giving the higher ranking to these indicators by the judges.

Communication and human relationship and organizing the activities were given sixth and seventh rank respectively. Better communication obtains current and profitable information about modern farm technology keeps the farmer up to date about scientific cultivation. The ability to communicate effectively with other is a management skill. It helps the farmers to receive and disseminate profitable information relating to farm enterprise. Communication skill also enables the farmer to keep good contact with the agricultural support system. Communicating includes an effective and proper selection of ways and means of communication for achieving effective management efficiency. At the same time, human relationship used for discharging their duties with a consideration of labour morale, treat them as social beings, which positively influence on management efficiency. Organizing is a process of identifying and grouping the work to be performed. Which includes (1) the determination of activities necessary to accomplish the objectives (2) the grouping of activities and
assigning them to specified position/persons and (3) the creation of network of positions/ persons for managing.

The indicators viz; value addition; controlling and coordinating the activities were given eighth, ninth and tenth rank respectively. Farmers try to develop themselves as entrepreneurs and adopt value addition skill to get higher reward of products. Role of value addition aptitude should be recognize and requisite feature of managerial function. According to F. L. Brech (quoted from Karthikeyan et al, 2008), Controlling is the checking current performance against predetermined standard contained in the plan, with a view to ensuring adequate progress and satisfactory performance, also recording the experience gained from the working of these plans as a guide to possible future operations. Controlling of group is the very essence in management and assuring conformity of performance to plan.

Co-ordination is the balancing and keeping the team together by ensuring a suitable allocation of working activities to the various members and seeing that they are performed with due harmony among the members themselves (F. L. Brech). Co-ordination is essential to orderly arrangement of group efforts and activities. It is also to get the production inputs timely and adequate quantities. Coconut growers used these tools for wise counseling, monitoring, evaluation and promoting teamwork were next important ones in descending order.

Table 9: Scale value of different indicators of the managerial efficiency scale

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Indicator</th>
<th>Scale value</th>
<th>Rank</th>
<th>Means score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge of scientific cultivation</td>
<td>9.61</td>
<td>I</td>
<td>84.10</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Ability in planning</td>
<td>8.78</td>
<td>II</td>
<td>72.20</td>
<td>IX</td>
</tr>
</tbody>
</table>
5.3 MEASUREMENT OF DEPENDENT VARIABLE
(MANAGERIAL EFFICIENCY OF COCONUT PLANTATION GROWERS)

5.3.1 Overall managerial efficiency of coconut plantation growers

Henri Fayol (quoted from Karthikeyan et al, 2008) defined management, as the conduct of affairs of a business, moving its objective through a continuous process of improvement and optimization of resources via the essential management functions. The manager has to forecast and plan, to organize to command, to co-ordinate, and to control the business for attaining its goals.

Some authors consider farm management as an ‘Art’. Art means skill or dexterity not only in the physical but also in the mental sense. Some farmers are more efficient or skillful in performing certain jobs than others. Those authors who define farm management as an ‘art’
consider individual’s skill (human factor) as the most important factor determining the performance of farm business.

Profit maximization is the main goal of any business. When farming is considered as a business, earning maximum profit continuously from the farm as a whole is an important goal. Though maximum profit is an important goal it is not the only goal. Farmers have multiple goals. Minimizing the cost of production, maintaining liquidity, production of certain products for family consumption, growth in farm business, increasing the net worth, avoiding losses, reducing borrowing are other goals.

Farmers as managers have to perform three important functions, they are; making decisions, implementing the decisions and assuming financial responsibility.

In order to measure the managerial efficiency of coconut plantation growers about scientific cultivation of coconut plantation, the scale that constructed was applied to the each coconut plantation growers. The complete response was received from each coconut plantation grower and the managerial efficiency index was calculated. The classification of respondents based on their managerial efficiency index is categories into three groups as presented in Table 10 and diagrammatically in figure 8.

**Table 10: Distribution of respondents by managerial efficiency**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low ME (below 48.96)</td>
<td>37</td>
<td>24.67</td>
</tr>
<tr>
<td>2</td>
<td>Medium ME (48.96 to 88.47)</td>
<td>77</td>
<td>51.33</td>
</tr>
<tr>
<td>3</td>
<td>High ME (above 88.47)</td>
<td>36</td>
<td>24.00</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>Mean = 68.72</td>
<td>S.D. = 19.76</td>
<td>C.V. = 28.75</td>
<td></td>
</tr>
</tbody>
</table>

It can be seen from the Table 10 and figure 8 that majority (51.33 per cent) of coconut plantation growers had medium level of overall managerial efficiency, while slightly less than one fourth (24.67 per cent) of respondents fall under the category of low managerial efficiency. The remaining 24.00 per cent respondents possessed high managerial efficiency. Thus, the managerial efficiency of the respondents was predominantly medium.

It can be concluded from the above finding that the managerial efficiency of coconut plantation growers about scientific cultivation of coconut plantation was medium.

![Managerial Efficiency](image)

**Fig. 8**: Distribution of respondents according to their managerial efficiency
This may be due to the medium education level, less training received on management aspects and having medium level of farm inputs with majority of the coconut plantation growers. The knowledge, ability to rational marketing, ability to co-ordinate activities, rational decision and perception might be the reason to have medium level of overall managerial efficiency among majority (51.33 per cent) of the coconut plantation growers. Further, slightly less than three-fifth respondents had medium level of attitude towards modern agriculture resulting into medium level of managerial efficiency.

The finding was in the conformity with the findings of those Toppo et al (2004), Jadav (2005), Patel (2005a), and Patel (2006).

5.3.2 Detail analysis of main indicators of managerial efficiency

In order to measure managerial efficiency of coconut growers, ten indicators were identified. These indicators were; knowledge of scientific cultivation, ability in planning, ability to make rational decision, ability to organizing the activities, ability to coordinate the activities, budgeting, communication and human relationship, ability to make rational marketing, value addition and ability to controlling the activities in coconut plantation. These indicators are responsible to make an individual coconut plantation grower as an efficient manager of the coconut plantation cultivation. The facts and findings derived after analyzing the information have been presented under the following heads and discussed in succeeding pages.

5.3.2.1 Knowledge about scientific coconut cultivation

It is understood information possessed by a coconut grower about coconut cultivation technology recommended by the agricultural universities/state department of agriculture for better and profitable economic achievement. This is one of the important components needed
for a coconut grower to be a good manager of coconut cultivation. Understanding, importance of this variable, the information was collected and the results are presented in Table 11.

Persuasion of data presented in Table 11 indicated that among the different package of practices, coconut plantation growers had the highest knowledge in intercropping in coconut plantation and quality of coconut products (I rank) followed by soil and soil preparation (II rank) and propagation and sowing (III rank).

Whereas, coconut plantation growers had the lowest knowledge in value addition, farm yard manure & fertilizers and plant protection measure having ninth, tenth and eleventh rank, respectively.

### Table 11: Distribution of respondents according to their knowledge of scientific coconut cultivation practices

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Practices</th>
<th>Mean Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weather condition / Climate</td>
<td>138.66</td>
<td>IV</td>
</tr>
<tr>
<td>2</td>
<td>Soil and Soil preparation</td>
<td>142.00</td>
<td>II</td>
</tr>
<tr>
<td>3</td>
<td>Varieties</td>
<td>138.00</td>
<td>V</td>
</tr>
<tr>
<td>4</td>
<td>Propagation and Sowing</td>
<td>139.00</td>
<td>III</td>
</tr>
<tr>
<td>5</td>
<td>Transplanting &amp; Planting distance</td>
<td>113.25</td>
<td>VII</td>
</tr>
<tr>
<td>6</td>
<td>Farm yard manure &amp; fertilizer</td>
<td>108.92</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>Irrigation</td>
<td>116.75</td>
<td>VI</td>
</tr>
<tr>
<td>8</td>
<td>Plant protection</td>
<td>101.94</td>
<td>XI</td>
</tr>
<tr>
<td>9</td>
<td>Intercropping</td>
<td>150.00</td>
<td>I</td>
</tr>
</tbody>
</table>

n = 150
The knowledge of package of practices for coconut growers was helpful in increasing managerial efficiency and it plays an important role for production and productivity of nuts.

The practices like intercropping and quality coconut product occupied first rank. It is but natural that knowledge of these practices led coconut plantation growers to adopt different crops as intercrop, which gave additional income and the quality coconut product fetched higher price in market, increase the income of coconut plantation growers. Hence, the knowledge of these practices stood first.

At the same time, the knowledge regarding farm yard manure, fertilizer and plant protection occupied last position, it was because of lack of opportunity to acquire knowledge might be the probable reason for this finding.

5.3.2.2 Ability to planning in coconut plantation

The ability of planning is the degree to which the coconut grower is capable of stating the activities that he intends to do by a systemic procedure in coconut plantation cultivation. This is one of the important components for the coconut plantation grower to make proper preparation, arrangement, scheduling and plan various activities of coconut plantation cultivation. This ability is needed by the coconut plantation grower to be an efficient supervisor of coconut cultivation. Understanding, importance of this variable, the information was collected and the results are presented in Table 12.
The persuasion of data presented in Table 12 revealed that coconut plantation growers had given first choice to planning about the inputs i.e. quantity of seed (nuts), fertilizer and plant protection chemicals needed for cultivation of coconut plantation followed by planning for increasing the yield of coconut plantation and decreasing the cost of production in coconut cultivation.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Determination of objectives</td>
<td>46.30</td>
<td>V</td>
</tr>
<tr>
<td>2.</td>
<td>Future plan for coconut plantation</td>
<td>53.33</td>
<td>IV</td>
</tr>
<tr>
<td>3.</td>
<td>Points to be considered while planning for management of coconut plantation</td>
<td>44.70</td>
<td>VI</td>
</tr>
<tr>
<td>4.</td>
<td>Strategies for marketing</td>
<td>36.30</td>
<td>VIII</td>
</tr>
<tr>
<td>5.</td>
<td>Planning about the inputs</td>
<td>83.33</td>
<td>I</td>
</tr>
<tr>
<td>6.</td>
<td>Consult while planning</td>
<td>44.50</td>
<td>VII</td>
</tr>
<tr>
<td>7.</td>
<td>Planning for increasing yield</td>
<td>72.66</td>
<td>II</td>
</tr>
<tr>
<td>8.</td>
<td>Decreasing the cost of production in coconut plantation</td>
<td>66.00</td>
<td>III</td>
</tr>
</tbody>
</table>
Further, it can be seen that consulting while planning and strategies for marketing occupied seventh and eighth rank, respectively. It means that coconut plantation growers had given least importance to these aspects.

In nutshell, it was found that planning about the inputs and planning for increasing yield of coconut occupied higher position in all aspects pertaining to planning.

The planning regarding inputs i.e. saplings, fertilizers, FYM, insecticides, pesticides and application for plant protection measures got first rank in ability of planning components. The inputs are the prerequisite for coconut plantation and accordingly every coconut plantation growers must be able to planning for this input might be the reason for this fact.

5.3.2.3 Ability to make rational decision

The ability to make rational decision is the degree of desirability and likelihoods of weighing the available alternatives by choosing the most appropriate one for achieving maximum profit from the coconut plantation by the coconut growers. This ability is highly needed by the coconut growers to formulate balanced judgment considering the obtainable options by selecting the most suitable one for accomplishing highest profit from the coconut cultivation. Accepting importance of this variable, the information was collected and the results are presented in Table 13.

**Table 13 : Distribution of respondents according to their ability to make rational decision** n = 150

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Decision at proper time</td>
<td>69.67</td>
<td>III</td>
</tr>
<tr>
<td>2</td>
<td>Technical competency in making decision</td>
<td>72.00</td>
<td>II</td>
</tr>
</tbody>
</table>
Examination of Table 13 revealed that implementing the decision got first rank followed by technical competency in making decision (II rank) and decision at proper time for coconut plantation (III rank).

Whereas, decision regarding types and quantity of fertilizers and plant protection measure in coconut crops had take last position.

In general, it was found that received implementing the decision, technical competency in making decision and decision at proper time were increased the managerial efficiency of coconut plantation growers.

The coconut plantation growers had got highest ability of making decision regarding implementing the decision, technical competency and decision at proper time for coconut plantation but they had poor ability for making the decision regarding types and quantity of fertilizers and plant protection measure. Though, the coconut plantation growers were competent to planning about required inputs for coconut cultivation but because of enough technical knowledge they could not make perfect decision regarding use of fertilizer at proper time and plant protection measures, might be the probable reason for this finding.

### 5.3.2.4 Organizing the activities
According to Louis Allen (quoted from Karthikeyan et al, 2008), organization is a process of identifying and grouping the work to be performed, defining and delegating responsibility and authority, and establishing relationships for the purpose of enabling people to work most effectively together in accomplishing objectives.

In organizing activities involve the determining the activities to be performed, assignment of responsibilities, delegation of authority, selecting right men for right jobs, providing right environment, measurement, evaluation and control.

**Table 14: Distribution of respondents according to their organizing the activities**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organization of activities based on priority and past experience</td>
<td>53.60</td>
<td>VI</td>
</tr>
<tr>
<td>2</td>
<td>Form team for various farming operations to achieve the goal</td>
<td>88.67</td>
<td>I</td>
</tr>
<tr>
<td>3</td>
<td>Delegation of authority to perform a job</td>
<td>54.33</td>
<td>V</td>
</tr>
<tr>
<td>4</td>
<td>Division of work among family members and labours</td>
<td>81.67</td>
<td>III</td>
</tr>
<tr>
<td>5</td>
<td>Assignment of work for various farm operation</td>
<td>86.00</td>
<td>II</td>
</tr>
<tr>
<td>6</td>
<td>Optimum use of technological improvement</td>
<td>81.00</td>
<td>IV</td>
</tr>
</tbody>
</table>

The data presented in Table 14 indicated that coconut plantation growers were organized in a way to make group for various farming operations to achieve the goal followed by assigning the work of various farm operation. Whereas, delegation of authority to perform a job and
organization of activities based on priority and past experience at last in organizing activities.

It can be concluded that formation of team for various farming operations to achieve the goal and assignment the work for farm operations were the component of organizing activities for coconut plantation as they occupied first and second rank. Whereas, delegation of authority to perform a job and organization of activities based on priority and past experience had occupied fifth and sixth rank, respectively.

The team work, distribution and assignment of work may be very essential as it helps in achieving the goal easily and speedily and coconut plantation growers knew the importance of both the team work and division of work might be the reasons for this finding.

5.3.2.5 Ability to coordinate activities

The ability to co-ordinate activities being an important ingredient of management, manager should have enough knowledge and skill of linking two or more tasks in an agreement to achieve desired results. In the present study, it was operationalized as degree to which the coconut grower was capable of linking two or more functions for harmonious accomplishment of desired activity in coconut plantation cultivation. Understanding corollary of this variable as an important feature of managerial function, the information was collected and the results are presented in Table15.
Table 15: Distribution of respondents according to their ability to coordinate activities

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Engagement of skill labours throughout the year</td>
<td>70.00</td>
<td>VII</td>
</tr>
<tr>
<td>2</td>
<td>Co-ordinate with other farmers for sharing some inputs, resources and information</td>
<td>70.67</td>
<td>VI</td>
</tr>
<tr>
<td>3</td>
<td>Integration of work with family member and labour</td>
<td>85.33</td>
<td>II</td>
</tr>
<tr>
<td>4</td>
<td>Cooperation from extension workers and scientists</td>
<td>82.67</td>
<td>IV</td>
</tr>
<tr>
<td>5</td>
<td>Collective thinking to achieve common goal</td>
<td>78.00</td>
<td>V</td>
</tr>
<tr>
<td>6</td>
<td>Mobilization of diversified interest for effective management of coconut plantation</td>
<td>83.66</td>
<td>III</td>
</tr>
<tr>
<td>7</td>
<td>Consultation with extension worker when incidences of insect-pest, eriophyid mite and disease attack etc.</td>
<td>87.00</td>
<td>I</td>
</tr>
</tbody>
</table>

The data presented in Table 15 indicated that coconut plantation growers were consulted extension worker when they heard about the incidences of insect-pests, eriophyid mite in epidemic condition or disease attack on the coconut plantation (I rank) followed by integrating the work with family member and labour (II rank). Whereas, the ability to co-ordinate with other farmers for sharing some inputs, resources and information and engagement of skill labours throughout the year to
hire their services for irrigation, interculturing, fertilizer application, collection of nuts etc. stood last position.

From above finding it can be summarized that farmers had sufficient ability to consult the extension workers for important agricultural operations in coconut plantation cultivation as well as they were able to integration the work with family members and labour. At the same time they had poor coordination ability in case of other farmers for sharing some inputs, resources and information and engagement of skill labours throughout the year to hire their services for irrigation, intercultural operation, fertilizer application and collection of nuts.

Consultation is an integral part of coordination as it helps in linking more than two tasks. The coconut plantation growers as managers had ability of consultation with extension workers for the guidance and solution of some problems for coconut plantation cultivation and ability to integrate the work according to the capacity of family members and labours. These abilities were necessary for day to day farm operations in coconut plantation cultivation. This might be the probable reason for the finding.

The engagement of skill labour throughout year and coordination with other farmers for sharing some inputs, resources and information were the last in rank. It means the coconut plantation growers were unable in coordination of these functions but perhaps these need of coconut plantation growers were fulfill by their own family members might be the reason for the finding.

5.3.6. Budgeting

Among the several techniques of managerial control, budgeting is one and it is a statement of anticipated results expressed in numerical terms. It is prepared in advanced of the period to which it applied.
Budgeting deals with estimating costs and returns, securing funds, spending and accounting for the same. It becomes necessary to derive best results from coconut plantation. The information was collected and the results are presented in Table 16.

**Table 16 : Distribution of respondents according to their budget**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Make provision for budget</td>
<td>45.13</td>
<td>IV</td>
</tr>
<tr>
<td>2</td>
<td>Planning the budget</td>
<td>58.50</td>
<td>III</td>
</tr>
<tr>
<td>3</td>
<td>Consultation with family members about source of credit</td>
<td>73.67</td>
<td>I</td>
</tr>
<tr>
<td>4</td>
<td>Involvement of family member in decision making regarding credit</td>
<td>70.33</td>
<td>II</td>
</tr>
</tbody>
</table>

The data presented in Table 16 showed that coconut plantation growers had given choice in descending order as to consultation with family members about source of credit, involvement of family member in decision making regarding credit, planning the budget and make provision for budget in coconut plantation.

It can be inferred from above findings, the coconut plantation growers as manager always consults and involved their family members for borrowing the credits from different sources.

The probable reason for above finding might be that coconut plantation growers were consulted with family members for borrowing the credit from different sources because all members of family as whole and decided to take the credit for their enterprise/ coconut plantation. Though, coconut plantation growers as manager had involved family
members in decision making regarding credit, planning the budget and provision for budget.

### 5.3.2.7 Communication and human relationship

Communication is a natural instinct of all living creatures. It is the basic need of all human beings. It plays significant role in the present day organizations which are complex, dynamic and socially oriented. Effective communication keeps the organization vibrant, vital and smooth sailing. The information regarding abilities of communication and human relationship as manager was collected and the results are presented in Table 17.

The data in Table 17 showed that coconut plantation growers were known about co-operation with co-workers which produce better results in form of desirable work hours followed by instructions to the labour regarding the care of coconut tree i.e. timely irrigation, digging of pits, plant protection as they occupied first and second rank. Further, Table 17 showed that coconut plantation growers were unable to pass latest information about coconut plantation to other fellow farmers and less knowledge of the habit of the people as they stood last rank i.e. eighth and ninth rank, respectively.

<p>| Table 17: Distribution of respondents according to their communication and human relationship | n = 150 |</p>
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Instructions to the labour regarding the care of coconut tree i.e. timely irrigation, digging of pits, plant protection etc.</td>
<td>79.00</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Consultation for solution of problems</td>
<td>69.33</td>
<td>V</td>
</tr>
<tr>
<td>3</td>
<td>Pass on the latest information about coconut plantation to other fellow farmers</td>
<td>61.00</td>
<td>VIII</td>
</tr>
<tr>
<td>4</td>
<td>Personal contact to others for coconut cultivation</td>
<td>67.33</td>
<td>VII</td>
</tr>
<tr>
<td>5</td>
<td>Recognize and appreciate of work carried out by people</td>
<td>72.00</td>
<td>IV</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge of the habit of the people</td>
<td>60.67</td>
<td>IX</td>
</tr>
<tr>
<td>7</td>
<td>During the act of listening, avoid undesirable arguments</td>
<td>68.33</td>
<td>VI</td>
</tr>
<tr>
<td>8</td>
<td>Co-operation with co-workers</td>
<td>92.00</td>
<td>I</td>
</tr>
<tr>
<td>9</td>
<td>Interest in development of workers</td>
<td>74.33</td>
<td>III</td>
</tr>
<tr>
<td>10</td>
<td>Consideration of a team work</td>
<td>68.33</td>
<td>VI</td>
</tr>
</tbody>
</table>

It can be concluded that co-operation with co-workers which produce better results in form of desirable work hours and instructions to the labour regarding the care of coconut tree.

The coconut plantation growers were enough competent in communication and human relationship in case of cooperation with co-workers and instruction to the labour regarding the care of coconut trees i.e. timely irrigation, digging of pits, plant protection measures etc. Both these factors are directly related with the maximum utilization of available resources. In such a manner, that they can get maximum
returns from coconut plantation cultivation. It is but natural because those factors are necessary for maximum profitability. Hence, coconut plantation growers automatically developed this capability.

At the same time, they were poor in passing latest information about coconut plantation to other fellow farmers and knowledge of the habit of the people, because these factors are not directly involved with the return of coconut plantation cultivation. This might be the reason for finding.

5.3.2.8 Ability to make rational marketing

The ability to rational marketing is the capacity of coconut grower to get maximum returns for his produce from coconut cultivation. Understanding trend of current marketing strategy, person should try to sale his products. The aptitude in balanced selling is highly needed by coconut growers to obtain greatest profits for their produce. Thus, not only higher production but selling of produce is also important in agriculture to get maximum output. Accepting, consequence of this talent as an essential attribute of managerial job, the information was collected and the results are presented in Table 18.

The data illustrated in Table 18 indicated that coconut plantation growers were given more emphasis on supply of coconut fruits to the market when high price occupied first position followed by collecting information about various markets to sell the produce (II rank). Whereas coconut plantation growers had given less emphasis on collection of information about price of produce at various markets as well as price of previous year / season and grading of mature coconut fruits to market, these occupied last position as they occupied sixth and seventh rank, respectively.

Table 18: Distribution of respondents according to their ability to make rational marketing

<p>| Ability to make rational marketing | n = 150 |</p>
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collect information about various markets to sell the produce</td>
<td>84.00</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Collect information about price of produce at various markets as well as price of previous year/season</td>
<td>76.33</td>
<td>VI</td>
</tr>
<tr>
<td>3</td>
<td>Select a market where competitive price for the produce and assurance of less malpractices</td>
<td>80.33</td>
<td>IV</td>
</tr>
<tr>
<td>4</td>
<td>Efforts for receiving high price of immature coconut</td>
<td>78.67</td>
<td>V</td>
</tr>
<tr>
<td>5</td>
<td>Grading of mature coconut fruits to market</td>
<td>74.67</td>
<td>VII</td>
</tr>
<tr>
<td>6</td>
<td>Supply of coconut fruits to the market when high price</td>
<td>94.00</td>
<td>I</td>
</tr>
<tr>
<td>7</td>
<td>Following timely plant protection measures for quality nut</td>
<td>83.67</td>
<td>III</td>
</tr>
</tbody>
</table>

It can be seen from above findings that supply of coconut fruits to the market, when high price of produce and collect information about various markets to sell the produce were the important factors to make rational marketing.

The successful coconut plantation growers as a manager always put their efforts for obtaining maximum return from their produce. In this case, the intelligent coconut growers always collect the information about supply of coconut fruits to the markets when high price and to collect information about various markets to sell the produce. Which help them in making the right decision for marketing of his produce for maximum return, might be reason for this finding.

Further, it is noted that the ability of coconut growers pertaining to collect information about price of produce at various markets as well as price of previous year/ season and grading of mature coconut fruits
to market ability were poor. It is due to fact that coconut growers had less knowledge about this aspects, might be reason for this finding.

### 5.3.2.9 Value addition in coconut production

The value addition in coconut was worked out by knowing processes or styles of marketing adopted by the coconut growers to add the value of the coconut for better economic returns. In present scenario of WTO, to get advantages of international and local markets, like other entrepreneurs, farmers should also try to develop themselves as entrepreneurs and adopt value addition skill to get higher reward of products. Recognizing, role of this aptitude as requisite feature of management, the data were collected and the results are presented in Table 19.

From the Table 19, it can be said that coconut plantation growers were given first rank to sell the coconut produce after grading process, and second rank to sell the coconut and coconuts products as purpose for medicines and sell the coconut fruit production through contractual method.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Selling of coconut produce after grading process</td>
<td>87.33</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Selection of tender nuts at the time of harvesting</td>
<td>86.00</td>
<td>IV</td>
</tr>
<tr>
<td>3</td>
<td>Control measure of eriophyid mite to avoid</td>
<td>84.33</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Selling of coconut pulp product in different forms</td>
<td>55.00</td>
<td>VIII</td>
</tr>
<tr>
<td>5</td>
<td>Sell the coconut fruit production through contractual method</td>
<td>87.00</td>
<td>II</td>
</tr>
<tr>
<td>6</td>
<td>Sell the coconut and coconuts products as purpose for medicines</td>
<td>87.00</td>
<td>II</td>
</tr>
<tr>
<td>7</td>
<td>Sell the coconut leaves for making thatching houses, covering retting pits, making baskets &amp; partition walls etc.</td>
<td>83.67</td>
<td>VI</td>
</tr>
<tr>
<td>8</td>
<td>Sell the coconut midribs of leaves for making broom, baskets, fish traps, petioles bunch stalks, spathes, stipules, thresh &amp; jhaps</td>
<td>86.67</td>
<td>III</td>
</tr>
<tr>
<td>9</td>
<td>Sell the old coconut trees as timber for house construction</td>
<td>82.33</td>
<td>VII</td>
</tr>
</tbody>
</table>

Further, the coconut plantation growers were less interest in sell the wet meat / kernel of coconut product in different forms like Chutneys, Curries, Toffee, Sweet and other culinary purpose, etc. as it occupied last rank by the respondents.

It can be inferred that coconut plantation growers had ability to sell the coconut produce after grading process which increase value addition.

The coconut plantation growers were manager, they know about damage caused by eriophyid mite, resulting poor quality of nuts and get less price in market. However, coconut plantation growers select a good quality of fruit and sold it in the market for getting more return of their product. At present, most of the farmers sold their product through contractual method. So, middleman tries to get more return for the coconut growers might be the reason for this finding.
Due to salty irrigation water in some area, somewhat per cent of the tree are dried or old tree. They sold the old coconut tree as timber and some coconut growers were sold coconut for pulp making in different forms. It is because of inability of coconut growers to prepared different coconut product might be the reason for this findings.

5.3.2.10 Ability to controlling activities

Controlling is the integral part of managerial process. It is a monitoring function of ascertaining whether organizational efforts are heading towards the stated objectives or not. The managerial function of controlling is mainly concerned with measuring and recording variations in performance and taking necessary corrective actions for the future in coconut plantation. Assuring conformity of performance to plan is control.

The data regarding the ability of controlling activities while different agricultural operations in coconut plantation in particular and management of coconut plantation in general are collected and presented in Table 20.

Table 20 : Distribution of respondents according to their ability to controlling the activities  

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Mean score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Selection of labour as per type of work</td>
<td>51.17</td>
<td>IV</td>
</tr>
<tr>
<td>2</td>
<td>Maintain various records pertaining to coconut plantation operations</td>
<td>68.00</td>
<td>II</td>
</tr>
<tr>
<td>3</td>
<td>Payment wages to labour</td>
<td>63.67</td>
<td>III</td>
</tr>
<tr>
<td>4</td>
<td>Hire implement for agricultural operation</td>
<td>37.00</td>
<td>V</td>
</tr>
<tr>
<td>5</td>
<td>Supervise the working of people</td>
<td>97.33</td>
<td>I</td>
</tr>
</tbody>
</table>
It can be seen from the data presented in Table 20 that the coconut plantation growers were supervising the working of people while different agricultural operation seriously as it got first rank. Also they were aware the importance of maintain the necessary record of coconut plantation operation ranked second.

Further, data also indicated that they were hiring the implements for agricultural operation at limited level as it got last rank.

It can be summarized from above finding that coconut plantation growers were able to supervise the working of people and maintain the record of coconut plantation. Whereas, few coconut growers were hiring the implements for agricultural operation in coconut plantation.

The supervision of labour is an important function to finished the plantation operation in time and coconut growers were very serious in achieving this job might be the reason for this finding. Moreover coconut plantation growers were really professional and they maintain all necessary records of expenditure incurred and income from the produce, so that they can calculate the profit or loss in coconut plantation and accordingly they can take corrective measures for assuring the higher return.

Further, few coconut plantation growers were hiring he improved implements for different agricultural operation in coconut plantation. It was because they had their own implements and used for the purpose might be the reason for this finding.

5.4 MEASUREMENT OF INDEPENDENT VARIABLES

The managerial efficiency of the coconut plantation growers are mainly influenced as well as governed by the different characteristics of the coconut plantation growers. For the sake of easy discussion of the results all the independent variables were grouped as personal, socio-economic, psychological and extension communication variable. It was
beyond the scope of the present study to include all the characteristics of the coconut plantation growers. However, based on the review of literature and discussion with experts, some important characteristics of respondents were selected and studied.

5.4.1 **Personal Characteristics**

5.4.1.1 **Age**

Physical and psychological development of an individual is related to his age. It, thus, influences the interest and needs of an individual. It also plays a vital role in future goals and expectations and thereby it helps in developing favourable knowledge and attitude towards adoption of new technology.

The coconut plantation growers were asked to indicate their age in complete years and classified age-wise into three groups as presented in Table 21.

**Table 21: Distribution of respondents according to their age**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Young (up to 35 years)</td>
<td>34</td>
<td>22.67</td>
</tr>
<tr>
<td>2</td>
<td>Middle (36 to 50 years)</td>
<td>81</td>
<td>54.00</td>
</tr>
<tr>
<td>3</td>
<td>Old (above 50 years)</td>
<td>35</td>
<td>23.33</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The data presented in Table 21 indicated that 54.00 per cent of the respondents were in the middle age group, while 23.33 per cent were in the old-age group. The remaining 22.67 per cent respondents were from the young age group.
In general, it can be concluded from the above results that more than three fourth (77.33 per cent) of the respondents were in middle and old age group.

This might be due to the fact that generally in the rural social system, the head of the families who in the majority of the cases are either middle aged or old aged and take decision for their farming. In addition to this the plantation growers had adopted the diversified of profession and their spouse had started their business at some other place. Further, this might be also due to less interest among the young generation to be a part of farming occupation; at the same time middle and old aged farmers might not have got chance to get government or any other jobs. In such a situation they might have preferred to be a part of such occupations like agriculture where higher education is not considered necessary.

This finding was in conformity with the findings of Gorfad (1993), Chothani (1999), Patel (2005), Jadav (2005), Basanayak (2009) and Khodifad (2010).

5.4.1.2 Educational status

Education is generally considered as a process of producing the desired changes in the behaviour of the people. Education in a society is a primary condition for its socio-economic development. Logically, members with higher level of formal education are expected to have better participation in the society than those with lower level of formal education. Considering these aspects, the formal education of coconut growers was studied. According to the level of education, the respondents were classified into seven categories, viz., illiterate, functionally literate, primary education, middle education, secondary education, higher secondary education and college and above level
The data in this respect are presented in Table 22 and figure 9.

The Table 22 revealed that 20.00 per cent of the coconut plantation growers were functionally literate, whereas 19.33 per cent of them were educated up to primary level, 16.67 per cent of them were higher secondary education, 14.67 per cent were middle education, 11.33 per cent of them were educated up to secondary school level, 7.33 per cent were illiterate and 10.67 per cent were educated up to college and above level.

It can be summarized that more than one third (34.00 per cent) of the coconut plantation growers were educated up to primary and middle level education and 38.67 per cent of them were educated from secondary to higher education level.

**Table 22 : Distribution of respondents according to their educational status**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Educational Status</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Illiterate (unable to read or write)</td>
<td>11</td>
<td>07.33</td>
</tr>
<tr>
<td>2</td>
<td>Functionally literate (only read and write)</td>
<td>30</td>
<td>20.00</td>
</tr>
<tr>
<td>3</td>
<td>Primary education (1 to 5 standard)</td>
<td>29</td>
<td>19.33</td>
</tr>
<tr>
<td>4</td>
<td>Middle education (6 to 7 standard)</td>
<td>22</td>
<td>14.67</td>
</tr>
<tr>
<td>5</td>
<td>Secondary education (8 to 10 standard)</td>
<td>17</td>
<td>11.33</td>
</tr>
<tr>
<td>6</td>
<td>Higher secondary education (11 to 12 standard)</td>
<td>25</td>
<td>16.67</td>
</tr>
<tr>
<td></td>
<td>College and above</td>
<td></td>
<td>10.67</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------</td>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The probable reason for this finding might be that 76.67 per cent of the coconut plantation growers were from young and middle age group; they might be benefited with the existing educational facilities prevailing in the area. Hence, majority of the coconut plantation growers were educated up to primary level followed by middle and secondary level of education.

In general, it can be also said that farmers with at least secondary or more than that level of education were more involved in the management of coconut cultivation. The management of coconut cultivation is such a skillful practice, where a person needs to know market intelligence, modern methods and many other aspects, for this, formal education helps them to have contacts with different research and extension agencies to collect information about management of coconut cultivation. This might be the reason of more involvement in the management of coconut cultivation of those farmers, who had at least secondary or more than that level of formal education.
5.4.2 Socio-economic characteristics

5.4.2.1 Farm size

The size of land holding is one of the most important indicators to measure one's socio-economic status. It is believed that big land holders take some calculative risk to manage farming; such possibility is less in case of small and marginal farmers. The respondents were classified into four groups according to their farm size namely, marginal farmers (up to 2.5 acres), small farmers (2.51 to 5.00 acres), medium farmers...
(5.01 to 10.00 acres) and big farmers (above 10.00 acres). Information on the farm size of the respondents was collected and data presented in Table 23 and figure 10.

It is quite clear from Table 23 that nearly three fifth (59.33 per cent) of the respondents were medium farmers, followed by one fourth (26.67 per cent) of small coconut growers, 12.00 per cent of big farmers and only 2.00 per cent of marginal coconut plantation growers.

**Table 23 : Distribution of respondents according to their farm size**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Level of land holder</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marginal farmers (Up to 2.5 acres)</td>
<td>03</td>
<td>02.00</td>
</tr>
<tr>
<td>2</td>
<td>Small farmers (2.51 to 5.00 acres)</td>
<td>40</td>
<td>26.67</td>
</tr>
<tr>
<td>3</td>
<td>Medium farmers (5.01 to 10.00 acres)</td>
<td>89</td>
<td>59.33</td>
</tr>
<tr>
<td>4</td>
<td>Big farmers (More than 10.00 acres)</td>
<td>18</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

It can be concluded that majority (86.00 per cent) of the respondents were under the category of small and medium farmers.

The result indicated that coconut cultivation was observed more popular among those farmers, who had five to ten acres of medium land holding.

This might be due to the fact that coconut plantation cultivation was realized more profitable as compared to other crops. Generally farmers adopt the new technology proportionately to their land holding and other resources available to them. The farmers with large size of
land holding are generally economical sound and can able to take more risk thereby they can adopt new technology.

In addition to this, due to the technical guidance provided by the Junagadh Agricultural University, Junagadh and motivational efforts made by state department of horticulture through providing subsidy, especially to small and marginal farmers, farmers with 5 to 10 acres of land holding might have preferred to go for the coconut cultivation.

![Graph showing distribution of respondents according to their farm size](image)

**Fig.10: Distribution of respondents according to their farm size**

The finding of Chothani (1999), Jadav (2005), Patel (2006), Bharad (2007), Yadav *et al* (2007), Anandaraja *et al* (2008) and Patel (2011a) were in conformity with present finding, while the findings of Thakur *et al.* (1991), Ashok Kumar *et al* (2007) and Gorfad (1993) were differed from this finding.

### 5.4.2.2 Area under coconut cultivation
The area under coconut cultivation is also one more important economic indicator affecting to the managerial efficiency of the coconut growers. Thus, to understand its role on the managerial efficiency of the coconut growers, information was collected and the distribution of the respondents according to their area under coconut cultivation is given in Table 24 and figure 11.

**Table 24 : Distribution of respondents according to their area under coconut cultivation**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Farm size</th>
<th>Number</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Up to 2.5 acres</td>
<td>12</td>
<td>08.00</td>
</tr>
<tr>
<td>2</td>
<td>2.51 to 5.00 acres</td>
<td>64</td>
<td>42.67</td>
</tr>
<tr>
<td>3</td>
<td>5.01 to 10.00 acres</td>
<td>64</td>
<td>42.67</td>
</tr>
<tr>
<td>4</td>
<td>Above 10.00 acres</td>
<td>10</td>
<td>06.66</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

It is evident from the above Table 24 that equal per cent of the coconut growers were holding coconut farm from 2.51 to 5.0 acre (42.67 percent) and 5.01 to 10 acre (42.67 percent) area under coconut cultivation. Whereas only 8.00 and 6.66 per cent of them had more than 10 acre and up to 2.50 acre area under coconut cultivation, respectively.

Thus, from above result, it can be concluded that almost half (50.67 per cent) of the coconut growers had up to 5.00 acres of area under coconut cultivation. The result indicates that coconut cultivation was preferred more by small and medium farmers. In other words it can also be said that coconut cultivation was found more suitable to the
small and medium farmers. The maximum profit through coconut cultivation is possible, if farmers give their maximum time.

The reason for this finding might be that half of respondents had covered their total land under coconut cultivation and simultaneously they grew banana, turmeric, onion, beetle vine, forage, fodder, arecanut, beetle vine and other short duration crops as intercrops. Thereby, they minimize the risk as if coconut is failed or low production, they can get extra income from intercrop and thus, they compensate their income.


Fig. 11: Distribution of respondents according to their area under coconut cultivation

The area under coconut cultivation is divided into four categories: Up to 2.5 acres, 2.51 to 5.00 acres, 5.01 to 10.00 acres, and Above 10.00 acres. The distribution is as follows: 6.66% for Up to 2.5 acres, 8.00% for 2.51 to 5.00 acres, 42.67% for 5.01 to 10.00 acres, and 42.67% for Above 10.00 acres.

The graph shows that the majority of respondents have their land under coconut cultivation in the 5.01 to 10.00 acres category, followed by the Above 10.00 acres category. The least percentage is in the Up to 2.5 acres category.
5.4.2.3 Herd size

The size of herd refers to the number of animals such as cows, buffaloes and bullocks possessed by the coconut growers. For carrying out some important agricultural operations, catering to their day to day needs of bread and butter and for earning additional income through selling of milk, possession of animal is most common phenomenon in rural Indian community. It is also one of the important factors to determine the economic status of the farmers. Keeping this in view, the herd size possessed by the coconut growers was studied and it was categorized into three categories as shown in Table 25.

**Table 25 : Distribution of respondents according to their herd size**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Herd size</th>
<th>Number</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small herd size (Up to 3 animals)</td>
<td>71</td>
<td>47.33</td>
</tr>
<tr>
<td>2</td>
<td>Medium herd size (4 to 6 animals)</td>
<td>60</td>
<td>40.00</td>
</tr>
<tr>
<td>3</td>
<td>Large herd size (Above 6 animals)</td>
<td>19</td>
<td>12.67</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

It is evident from Table 25 that majority (47.33 per cent) of the coconut growers were found having small size of herd (up to 3 animals) followed by medium herd size (40.00 per cent). Only 12.67 per cent respondents were found having large herd size (above 6 animals).

It can be concluded that 87.33 per cent respondents were found having up to 6 animals.

The probable reason might be that respondents were highly aware about the importance of dairying which provides a quick and regular flow of income and minimizes risk of the failure in coconut plantation,
thus in addition to coconut cultivation they might have preferred to have milch animals. The probable reason might be also that the coconut growers were growing fodder crops in inter cropping which is useful for animals.

This finding gets supports from the findings of Temkar (2000), and Patel (2007), while the findings of Patel (2005a) and Patel (2006) were differed from this finding.

5.4.2.4 Annual income

Income is an important variable, which makes the farmers amenable to adopt scientific technology. The detail regarding the classification of farmers with respect to their annual income and the corresponding frequency distribution is presented in Table 26.

The results in Table 26 indicated that more than half (52.00 per cent) of the coconut plantation growers were at the income range of ` 50,001 to 1,00,000 followed by 21.33 per cent of farmers earning from ` 1,00,001 to 1,50,000 as an annual income. About one tenth (11.33 per cent) of farmers were under the income range between ` 1,50,001 and ` 2,00,000 and 10.67 per cent of the farmers had obtained up to ` 50,000. Least percentage (4.67 per cent) of the farmers had obtained above ` 2,00,000 as an annual income from farming and allied activities.

Table 26: Distribution of respondents according to annual income

<table>
<thead>
<tr>
<th>Annual Income Range</th>
<th>Frequency Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>` 50,001 to 1,00,000</td>
<td>52.00%</td>
</tr>
<tr>
<td>` 1,00,001 to 1,50,000</td>
<td>21.33%</td>
</tr>
<tr>
<td>` 1,50,001 to 2,00,000</td>
<td>11.33%</td>
</tr>
<tr>
<td>` 2,00,000 to 50,000</td>
<td>10.67%</td>
</tr>
<tr>
<td>More than ` 50,000</td>
<td>4.67%</td>
</tr>
</tbody>
</table>

n = 150
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Up to ` 50,000</td>
<td>16</td>
<td>10.67</td>
</tr>
<tr>
<td>2</td>
<td>` 50,001 to 1,00,000</td>
<td>78</td>
<td>52.00</td>
</tr>
<tr>
<td>3</td>
<td>` 1,00,001 to 1,50,000</td>
<td>32</td>
<td>21.33</td>
</tr>
<tr>
<td>4</td>
<td>` 1,50,001 to 2,00,000</td>
<td>17</td>
<td>11.33</td>
</tr>
<tr>
<td>5</td>
<td>Above ` 2,00,000</td>
<td>07</td>
<td>04.67</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

It is inferred from the results that majority (89.33 per cent) of the coconut plantation growers had their earning of more than fifty thousand rupees per year.

The reason for this finding might be that most of coconut plantation growers are not only depending on plantation crop as a major source of income. But, they also earned additional income from selling such as dairying, selling of midribs of leaves, petioles, bunch stalks, spathes, stipules etc as well as used as fuel.

This finding was differed from the findings of those Chothani (1999), Babanna (2002) and Vedamurthy (2002).

5.4.2.5 Social participation

Participation in any formal and informal organization/ institution enhances one’s social mobility. It makes the participant to have a good relationship with other members of his society, which in turn helps him to gather new ideas and information. The data collected on this variable is presented in Table 27.
From Table 27, it is observed that more than two third (66.67 per cent) of the respondents had medium social participation followed by low (21.33 per cent) and high (12.00 per cent) social participation.

**Table 27: Distribution of respondents according to social participation**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low (below 1.53 score)</td>
<td>32</td>
<td>21.33</td>
</tr>
<tr>
<td>2</td>
<td>Medium (1.53 to 3.27 score)</td>
<td>100</td>
<td>66.67</td>
</tr>
<tr>
<td>3</td>
<td>High (above 3.27)</td>
<td>18</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Mean = 1.71  
S.D. = 1.56  
C.V.= 91.06

It can be summarized that majority of the coconut plantation growers had medium social participation.

The coconut plantation growers were the members of the village co-operative society and milk producers’ co-operative society irrespective of their farm size. The coconut growers might be aware about the participation in social and co-operative organization.

The similar findings were observed by Jadav (2005), Kachhiapatel (2006), Bharad (2007), Anandaraja et al (2008), Chauhan (2008) and Khodifad (2010).

**5.4.2.6 Access to market facilities**

Market facilities is an operationally advantageous position taking into account the infrastructural facilities like network of roads, railways, river navigation, banking, post office and other communication facilities available or likely to be developed in the area by the time the market yard gets ready. Hence, it is worth to access the
market facilities as the distance of the market, opinion on market facilities, type of market, type of transport, mode of transport, commission of middleman and term of payment by which a respondent does in the post production process.

Keeping this in view, the access to market facilities used by the coconut growers was studied and it was categorized into three groups as shown in Table 28 and figure 12.

The data presented in Table 28 revealed that nearly three fifth (57.33 per cent) of the coconut growers had high access to market facilities followed by medium (42.00 per cent) and low (00.67 per cent) access to market facilities.

**Table 28 : Distribution of respondents according to their access to market facilities**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low access to market facilities</td>
<td>01</td>
<td>00.67</td>
</tr>
<tr>
<td></td>
<td>(7 to 14 scores)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Medium access to market facilities</td>
<td>63</td>
<td>42.00</td>
</tr>
<tr>
<td></td>
<td>(15 to 22 scores)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>High access to market facilities</td>
<td>86</td>
<td>57.33</td>
</tr>
<tr>
<td></td>
<td>(23 to 31 scores)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

It can be concluded that majority of the coconut plantation growers had high access to market facilities.

From the above findings, it was cleared that majority of the coconut growers were in high access to market facilities. This was because of believed of farmers that in a competitive and ever changing
environment, they should remain all time alert and knowledgeable about market related issues to get maximum market benefits in terms fetching high price as only higher production might not be the strategy of good profit.

![Access to market facilities](image)

**Fig. 12:** Distribution of respondents according to their access to market facilities

Similar results were obtained by Chauhan (2008) and Khodifad (2010), while differed by findings of those Javiya (2004), Patel (2005c) and Ashok Kumar *et al* (2007).

### 5.4.3 Psychological characteristics

#### 5.4.3.1 Innovativeness

Innovativeness is the degree to which an individual is relatively earlier in adopting the new ideas than other members of his social system. It shows the desire and interest of an individual to seek changes in farming. It is an important character of making changes in
his own farm when found practicable and feasible. The data collected on innovative behaviour of farmers are given in Table 29.

### Table 29: Distribution of respondents according to their innovativeness

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>As soon as it is brought to my knowledge</td>
<td>51</td>
<td>34.00</td>
</tr>
<tr>
<td>2</td>
<td>After I have seen it, being adopted by other farmers successfully</td>
<td>56</td>
<td>37.33</td>
</tr>
<tr>
<td>3</td>
<td>I prefer to wait and take my own time</td>
<td>43</td>
<td>28.67</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

The information in Table 29 revealed that about more than one third (37.33 per cent) of farmers reported to adopt an innovation ‘after they had seen it’ followed by 34.00 per cent with ‘as soon as it is brought to their knowledge’ and the remaining 28.67 per cent ‘prefer to wait and take their own time’.

The above result concluded that two third of them (66.00 per cent) reported that ‘after they had seen and prefer to wait for the adoption of innovation’.

The reason might be that coconut growers were ready to accept new ideas to some extent and they embraced the ideas whole heartedly if it was found to be beneficial by other farmers.

5.4.3.2 Risk orientation

The risk orientation is described as the degree to which an individual is oriented towards the risk and uncertainty and has courage to face the problems in farming. This is one of the important qualities of managerial efficiency. To understand role of this variable data were collected and are presented in Table 30. The respondents were classified into three groups according to their risk orientation based on mean and standard deviation.

An examination of the data presented in Table 30 revealed that more than half (56.67 per cent) of coconut growers had medium risk orientation while, 22.67 per cent and 20.66 per cent of coconut growers had low and high level of risk orientation, respectively.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low (below 15.01 score)</td>
<td>34</td>
<td>22.67</td>
</tr>
<tr>
<td>2</td>
<td>Medium (15.01 to 23.73 score)</td>
<td>85</td>
<td>56.67</td>
</tr>
<tr>
<td>3</td>
<td>High (above 23.73 score)</td>
<td>31</td>
<td>20.66</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 30: Distribution of respondents according to their risk orientation

n = 150
It can be concluded that most of the plantation growers had to prefer medium to low risk in cultivation of coconut plantation.

The probable reason might be that most of the coconut plantation growers were small and medium farmers and due to limited resources they could not take much risk.

This finding was in agreement with the findings of Babanna (2002), Vedamurthy (2002), Jadav (2005), Patel (2006), Khodifad (2010) and Gohil (2010).

5.4.3.3 Perception

5.4.3.3.1 Perception of coconut plantation growers about quality and damaged caused by eriophyid mite on coconut

Perception is the true beginning of knowledge. It is the process of attaining awareness or understanding of sensory information. Perception about quality and damaged caused by eriophyid mite on coconut were measured. The results were given in Table 31 and figure 13.

Table 31: Distribution of respondents according to their different aspects of perception

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Perception</th>
<th>Mean score</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quality aspects of coconut</td>
<td>10.7</td>
<td>82.30</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Infestation of eriophyid mite on coconut at</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A)</td>
<td>Pre harvest stage</td>
<td>4.6</td>
<td>76.66</td>
<td>III</td>
</tr>
<tr>
<td>(B)</td>
<td>Post harvest stage</td>
<td>8.4</td>
<td>84.00</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Over all perception</td>
<td>23.6</td>
<td>80.99</td>
<td></td>
</tr>
</tbody>
</table>
A perusal of table 31 indicated that 84.00 per cent of coconut growers had perception about infestation of eriophyid mite on coconut at post harvest stage which had obtained first rank followed by quality aspects of coconut (82.30 per cent) and infestation of eriophyid mite on coconut at pre harvest stage had second and third ranked, respectively.

It can be concluded that perception of coconut plantation growers had more in post harvest stage.

The probable reason might be that coconut growers perceived quality as an important aspect for selling of coconut in market. They took adequate care to maintain reasonable quality standards. Damaged caused by eriophyid mite which was an important aspects of quality. It was not ignored because they were not perceived market price of their produce.

5.4.3.3.2 Overall Perception of coconut plantation growers about quality and damaged caused by eriophyid mite on coconut

The data regarding the perception about quality and damaged caused by eriophyid mite on coconut were presented in Table 32.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low perception (below 12.83 score)</td>
<td>28</td>
<td>18.67</td>
</tr>
<tr>
<td>2</td>
<td>Medium perception (12.83 to 23.22 score)</td>
<td>95</td>
<td>63.33</td>
</tr>
<tr>
<td>3</td>
<td>High perception (above 23.22 score)</td>
<td>27</td>
<td>18.00</td>
</tr>
</tbody>
</table>
It is evident from the data shown in Table 32 that less than one third (63.33 per cent) of coconut growers had medium perception level about quality and damaged caused by eriophyid mite in coconut, while nearly equal per cent of them had low (18.67 per cent) and high (18.00 per cent) level of perception about it.

It can be concluded that majority of the coconut growers had medium level of perception about quality and damaged caused by eriophyid mite in coconut.

![Distribution of respondents according to their perception about quality and damaged caused by eriophyid mite](image)

**Fig. 13 : Distribution of respondents according to their perception about quality and damaged caused by eriophyid mite**

This might be due to the reason that farmers perceived quality as an important aspect of coconut cultivation. They took adequate care to maintain reasonable quality standards. But coconut growers do not
have good understanding of the quality and damaged caused by the eriophyid mite, resulted the appearance of nut is deshape. Ultimately coconut growers can not get remunerative price of their products.


5.4.3.4 **Symbolic adoption**

Symbolic adoption was operationalised as the positive decision taken by an individual to adopt an innovation. Coconut growers have pertaining to knowledge and adoption aspects that he has decided to adopt the recommended technology from JAU in a stipulated time and proposes to cover area under coconut cultivation in his farm.

The data in Table 33 and figure 14 revealed that three fifth (60.00 per cent) of coconut growers had medium symbolic adoption for recommended technology from agricultural Universities in a stipulated time and covered area under coconut cultivation on their farm followed by 23.33 per cent had high and 16.67 per cent had low symbolic adoption.

**Table 33 : Distribution of respondents according to their symbolic adoption**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low (below 15.48 score)</td>
<td>25</td>
<td>16.67</td>
</tr>
<tr>
<td>2</td>
<td>Medium (15.48 to 31.26 score)</td>
<td>90</td>
<td>60.00</td>
</tr>
<tr>
<td>3</td>
<td>High (above 31.26 score)</td>
<td>35</td>
<td>23.33</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Mean = 23.37  S.D. = 7.89  C.V. = 33.76

It can be concluded that more than four fifth of the plantation growers had to medium to high level of symbolic adoption for
recommended technology from agricultural universities in a stipulated time and covered area under coconut cultivation on their farm. This means more than 80 per cent of the coconut growers were positive in adoption of technology in a stipulate time on their farm.

The probable reason may be that coconut growers had medium education, extension participation, risk taking orientation, perception, participation in training and high access to market facilities. Moreover, coconut plantation growers are always eager to get high production of the coconut plantation and extension workers also motivated farmers to put their decisions in reality to adopt the coconut plantation technology.

This finding was in agreement with the findings of those Ahmed (1998), Jadav (2005) and Rao et al (2008).

![Symbolic adoption](image)

**Fig. 14**: Distribution of respondents according to their symbolic adoption

### 5.4.3.5 Attitude towards coconut cultivation

Attitude is the degree of positive or negative feelings of the coconut growers associated with adoption of coconut crop production as one of
the major crops on their farm. It is expected that positive or favourable attitude of an individual towards any activity or technology plays important role in increasing degree of interest and involvement in that activity. Understanding this, an attitude of the coconut growers towards adoption of coconut cultivation as one of the major variable was thought to study and information was collected. The data regarding attitude of the respondents were categorized into three groups as shown in Table 34 and figure 15.

With regards to attitude toward the coconut cultivation, the data are presented in Table 34 revealed that slightly less than three-fifth (59.33 per cent) of the respondents had moderately favourable attitude towards the cultivation of coconut as one of the major crops. The 24.67 and 16.00 per cent of the respondents fell in high favourable and less favourable attitude towards in categories, respectively.

**Table 34 : Distribution of respondents according to their attitude towards the coconut cultivation**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less favourable (below 18.91 score)</td>
<td>24</td>
<td>16.00</td>
</tr>
<tr>
<td>2</td>
<td>Moderately favourable (18.91 to 31.53 score)</td>
<td>89</td>
<td>59.33</td>
</tr>
<tr>
<td>3</td>
<td>Highly favourable (above 31.53 score)</td>
<td>37</td>
<td>24.67</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Mean = 25.22  S.D. = 6.31  C.V. = 25.02

Thus, from the above finding it can be concluded that great majority (84.00 per cent) of the farmers had moderately to highly
favourable attitude towards the cultivation of coconut as one of the major crops.

This might be due to the fact that most of the coconut plantation growers had medium to high level of social participation, extension participation and education which shaped into positive attitude towards coconut plantation crop. Further, there was more scope of earning high income from coconut cultivation as compared to traditional crops which led them to positive attitude.

This finding is in line with those of Joshi (2004), Rani (2005), Jadav (2005), Patel (2006) and Khodifad (2010).

![Bar chart showing distribution of respondents according to their attitude towards coconut cultivation.](image)

**Fig. 15 : Distribution of respondents according to their attitude towards coconut cultivation**

### 5.4.4 Extension – communication characteristics

#### 5.4.4.1 Information seeking behaviour

On the basis of the information seeking behaviour coconut growers were categorized using the class intervals based on the score.
The details of percentage distribution of the respondents under each class interval are furnished in Table 35.

**Table 35 : Distribution of respondents according to their information seeking behaviour**  

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Below average (27 - 34)</td>
<td>59</td>
<td>39.33</td>
</tr>
<tr>
<td>2</td>
<td>Average (35 - 42)</td>
<td>58</td>
<td>38.67</td>
</tr>
<tr>
<td>3</td>
<td>Above average (43 and above)</td>
<td>33</td>
<td>22.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The data in the Table 35 indicated that 38.67 per cent of farmers seek the average level of information with a score of 35 to 42, followed by two fifth (39.33 per cent) of the farmers with below average level of information seeking behaviour and the remaining 22.00 per cent with high average level of information seekers.

It is concluded that majority of the farmers were in the category of average and above average level. These farmers were seeking information from different sources such as professional, para-professional, non-professional and other sources offer sources of information.

The reason for the result of below average level of information seeking behaviour might be due to the fact that frequency of visits made by the professional agents to the village was less. Moreover farmers had lost their faith and confidence over the professional and para-professionals as they were not a reliable resource of information.

This finding was in conformity with the finding of Anandaraja *et al* (2008).
5.4.4.2 Extension participation

The extension participation encourages the farmers to achieve higher goals in farming. The farmers’ participation in various extension activities motivates them to adopt new technologies. Therefore, it was studied and data regarding this aspect are presented in Table 36.

The data presented in Table 36 revealed that 54.67 per cent of the coconut growers had medium extension participation, whereas 27.33 per cent and 18.00 per cent of them had low and high extension participation, respectively.

Table 36: Distribution of respondents according to their extension participation

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low (below 21.88 score)</td>
<td>41</td>
<td>27.33</td>
</tr>
<tr>
<td>2</td>
<td>Medium (21.88 to 65.22 score)</td>
<td>82</td>
<td>54.67</td>
</tr>
<tr>
<td>3</td>
<td>High (above 65.22 score)</td>
<td>27</td>
<td>18.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Mean = 43.55
S.D. = 21.67
C.V. = 49.76

It can be inferred that more than half of the coconut plantation growers had medium level of extension participation.

The probable reason for this finding might be that the frequent contacts of coconut plantation growers with extension functionaries encouraged them to participate in number of extension activities.

5.4.4.3  Participation in training programme

Training is one of the means by which the desired changes in knowledge, skill and performance of coconut growers can be brought. It is also possible that the individual’s attitudes and motivation influenced by training can lead to their successful performance. Data in this regard are presented in Table 37 and figure 16.

**Table 37:** Distribution of respondents according to their participation in training programme  

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low/Untrained (below 0.18 score)</td>
<td>39</td>
<td>26.00</td>
</tr>
<tr>
<td>2</td>
<td>Medium trained (0.18 to 2.95 score)</td>
<td>79</td>
<td>52.67</td>
</tr>
<tr>
<td>3</td>
<td>High trained (above 2.95 score)</td>
<td>32</td>
<td>21.33</td>
</tr>
</tbody>
</table>

Total: 150  
Mean = 1.57  
S.D. = 1.39  
C.V. = 88.56

It is apparent from the Table 37 that more than half (52.67 per cent) of the coconut plantation growers had medium level of training followed by 26.00 per cent of coconut grower were untrained. The slight more than one fifth (21.33 per cent) of the coconut plantation growers had more training regarding the management of coconut plantation.

It can be concluded that 78.67 per cent coconut plantation growers were either medium trained or untrained.

This might be due to lack of awareness regarding new technological know-how and there was no any coconut plantation problem oriented training course conducted by any institute.
This finding was in conformity with the findings of Chothani (1999), Jadav (2005), Patel (2005a), Patel (2006) and Goyal & Solanki (2007).

5.5 RELATIONSHIP OF PERSONAL, SOCIO-ECONOMICAL, PSYCHOLOGICAL AND EXTENSION COMMUNICATIONAL CHARACTERISTICS WITH MANAGERIAL EFFICIENCY OF COCONUT PLANTATION GROWERS

5.5.1 Correlation analysis

To study the relationship between characteristics of coconut growers and their managerial efficiency is of great importance in management of coconut plantation. These factors play an important role in deciding the management of coconut plantation growers.

In order to ascertain the association between managerial efficiency of coconut plantation growers (dependent variables) and their selected characteristics (independent variables) the correlation coefficient ‘r’ was
calculated. On the basis of operational measure developed for the variable null hypothesis were stated for testing the relationship and their significance on zero order correlation. The zero order correlation is given in Table 38.

5.5.1.1  Personal characteristics

5.5.1.1.1  Age and managerial efficiency

The data presented in Table 38(I)(1) were used for testing the null hypothesis (H.1.1), that there is no association between managerial efficiency of coconut plantation growers and their age was tested.

The calculated correlation co-efficient value \( r = -0.14605 \) was found non significant at 0.05 level. Thus, the null hypothesis was accepted.

It can be concluded that there was negative and non significant association between managerial efficiency of coconut plantation growers and their age.

This might have happened because managerial efficiency of coconut plantation growers and their age were independent from each other. It means that there was no influence of age on managerial efficiency of coconut plantation growers.

Similar finding was observed by Patel (2005a), and Khodifad (2010).

5.5.1.1.2  Educational status and managerial efficiency

The data in Table 38(I)(2) were used to test the null hypothesis (H.1.2) that there is no association between coconut growers’ managerial efficiency about scientific cultivation of coconut plantation and their educational status.
The calculated correlation coefficient value of $r = 0.41688$ was positive and highly significant at 0.01 level of probability. Hence, the null hypothesis was rejected.

It can be concluded from the above result that the education had positive and significant relationship with managerial efficiency. It means farmers having higher level of education had higher level of managerial efficiency.

The probable reason might be that education exposes coconut growers to more communication media and source of information led them to better perception and comprehension. Further, the education of coconut plantation grower helps them to collect information and pragmatic decision making. Thus, education provides a persistent reorientation to the coconut plantation growers where in they gradually subsume science and innovation changing on a better entrepreneur and ultimately reflecting on better management of the enterprise. Therefore, the findings seemed to be logical.


5.5.1.2 Socio-economic characteristics

5.5.1.2.1 Farm size and managerial efficiency

The data in Table 38(II)(1) were used to test the null hypothesis (H.2.1) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their farm size.
The calculated correlation coefficient value of $r = 0.20605$ was significant at 0.05 level of probability. Hence, the null hypothesis was rejected.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Independent variables</th>
<th>‘r’ value</th>
</tr>
</thead>
</table>

It can be inferred that the association was positive and significant relationship with managerial efficiency. It means farmers having higher farm size had higher level of managerial efficiency.

The big size of farm means better economic condition of an individual, better economic condition gives chance to take risk and capacity to test, experience and apply new innovation liberally. In addition to this, because of better extension participation, high market facilities and having information seeking behaviour in big farmers, they learnt modern methods to manage their farms effectively. This might be the reason to have better managerial efficiency among those farmers, who had big size of farms and therefore positive relationship was observed between farm size of the coconut growers and their managerial efficiency.

This finding is in concurrence with the findings of Rao (1985), Bora & Ray (1986), Nagarajan (1989), Ramegowda (1991), Vyas (1995) and Patel (2006). This finding was differed with findings of those of Jadav (2005) and Gohil (2010).

Table 38: Zero order correlation coefficient of independent variables with managerial efficiency of coconut plantation growers
5.5.1.2.2 Area under coconut cultivation and managerial efficiency

The data in Table 38(II)(2) were used to test the null hypothesis (H.2.2) that there is no association between coconut growers managerial
efficiency about scientific cultivation of coconut and their area under coconut cultivation.

The calculated correlation coefficient value of $r = 0.38635$ was positive and highly significant at 0.01 level of probability. Hence, the null hypothesis was rejected.

It is obvious that there was significant correlation existing between the level (degree) of managerial efficiency of coconut plantation growers and their area under coconut cultivation. It implied that increase in coconut plantation growers’ area under coconut cultivation as compared to the total land resulted in increasing of positive managerial efficiency about scientific cultivation of coconut.

This finding gets supports from the finding reported by Pandya and Vekaria (1994), while this finding differed with the findings of Dangar (1996) and Kotadia (2006).

5.5.1.2.3 Herd size and managerial efficiency

The data in Table 38(II)(3) were used to test the null hypothesis (H.2.3) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their herd size.

The calculated correlation coefficient value of $r = 0.12365$ was found non significant at 0.05 level of probability. Hence, the null hypothesis was accepted.

It can be concluded that there was positive and non significant association between managerial efficiency of coconut plantation growers and their herd size. This indicated that both the variable is independent from each other.

The study was conducted in Saurashtra region, where because of better marketing facility created by cooperative society of dairy,
generally male members of farm family remain engaged in farm production activities while; female family members remain engaged in grazing and maintaining the herd size for milk production. Thus crop production and animal husbandry have become important part of almost majority of families of farmers. Thus, because of homogeneity in case of keeping milch animals among the greater part of farmers, non-significant relation might be observed between herd size and managerial efficiency of the coconut growers.

This finding was in concurrence with finding of Patel (2005a), Patel (2006), and Patel et al (2000) and differed with the finding of Temkar (2000).

5.5.1.2.4 Annual income and managerial ability

The data in Table 38(II)(4) were used to test the null hypothesis (H.2.4) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their annual income.

The calculated correlation coefficient $r = 0.38496$ was found positive and highly significant at 0.01 level hence, the null hypothesis was rejected.

It can aptly be concluded that there was association between managerial efficiency of coconut growers and their annual income. The positive relationship indicated that with increase in annual income the managerial efficiency also increased.

The probable reason might be that farmers with higher level of annual income enable them to take more risk, more chances of exposure of communication mass media, controlling various agricultural activities; manage different activities and taking right decision leading to higher production. Thus, higher level of managerial
efficiency was observed among those farmers who had higher level of annual income.

This finding is in line with the finding of Jadav (2001) and Jadav (2005), while differed with the finding of Singh (2005).

5.5.1.2.5 Social participation and managerial ability

The data in Table 38(II)(5) were used to test the null hypothesis (H.2.5) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their social participation.

The calculated value of correlation coefficient \( r = 0.14919 \) was non significant at 0.05 level of probability. Hence, null hypothesis was accepted.

It can be concluded that there was non significant association between social participation and managerial efficiency of coconut growers.

The probable reason might be that generally, it is considered that social organization are helping farmers in various ways but all activities of social organization did not play any pivotal role in improving managerial efficiency of coconut growers.

The similar results were obtained by Gohil (2010), while differed with findings of Jadav (2005) and Khodifad (2010).

5.5.1.2.6 Access to market facilities and managerial ability

The data in Table 38(II)(6) were used to test the null hypothesis (H.2.6) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their access to market facilities.
The calculated value of correlation coefficient \( r = 0.65940 \) was positive and highly significant at 0.01 level of probability. Hence, null hypothesis was rejected.

It is concluded that there was association between managerial efficiency of coconut growers and their access to market facilities. The positive relationship indicated that the both the variable were dependent on each other as with increase in access to market facilities, the managerial efficiency also increased.

The probable reason might be that success of productive enterprise depends to a great extent on the ability of the managerial efficiency to make intelligent buying of the inputs and selling of the produce. Access to market facilities of the coconut growers is an important component of sustained progress of the coconut plantation. For marketing the output, information regarding demand of the market and price trends plays an important role in accessing to market facilities.

This finding is in conformity with the findings of Satish Kumar (2006) and Khodifad (2010).

### 5.5.1.3 Psychological characteristics

#### 5.5.1.3.1 Innovativeness and managerial efficiency

The data in Table 38(III)(1) were used to test the null hypothesis (H.3.1) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their innovativeness.
The calculated value of correlation coefficient $r = 0.58575$ was positive and highly significant at 0.01 level of probability. Hence, null hypothesis was rejected.

It is concluded that the managerial efficiency of coconut plantation growers was highly associated with their innovativeness. The relationship clearly indicated that the managerial efficiency increased with increasing of the level of innovativeness.

It might be due to the fact that the respondents were eager to know the coconut production technology earlier than others. Therefore, significant relationship was observed between innovativeness and managerial efficiency of coconut plantation growers. The coconut growers, who had high level of interest and desire to seek change through coconut cultivation, the related operations as and when found practicable and feasible were adopted by them had high level of managerial efficiency. It is natural that person who was practical and dynamic in nature to make necessary change will always be active to manage other activities also.


### 5.5.1.3.2 Risk orientation and managerial efficiency

The data in Table 38(III)(2) were used to test the null hypothesis (H.3.2) that there is no association between coconut growers' managerial efficiency about scientific cultivation of coconut plantation and their risk orientation.

The calculated value of correlation coefficient $r = 0.19517$ was positive and significant at 0.05 level of probability. Hence, null hypothesis was rejected.
It is concluded that the managerial efficiency of coconut plantation growers was associated with their risk orientation. The relationship clearly indicated that the managerial efficiency was increased with increasing of the level of risk orientation.

The risk is an important variable to become coconut growers a good manager because the coconut growers with high level of risk bearing ability were able to take any type of decisions for maximizing their income from coconut cultivation. The coconut plantation growers who had high level of risk bearing ability were enough competent to manage any type adverse factors, because they were more innovativeness, highly educated, more interaction with extension workers as well as scientists and knowledgeable which enable them in minimizing the adverse situation might be the reasons for this finding.


5.5.1.3.3 Perception and managerial efficiency

The data in Table 38(III)(3) were used to test the null hypothesis (H.3.3) that there is no association between coconut growers' managerial efficiency about scientific cultivation of coconut plantation and their perception.

The calculated value of correlation coefficient \( r = 0.37978 \) was positive and highly significant at 0.01 level of probability. Hence, null hypothesis was rejected.
It is concluded that the managerial efficiency of coconut plantation growers was highly associated with their perception. The relationship clearly indicated that the managerial efficiency was increased with increasing of the level of perception.

The right perception of coconut plantation growers helped them to make right decision at right time which led them to cope with the adverse situation. This ultimately resulted in to the successful cultivation of coconut.

This finding gets support from findings reported by Satish Kumar (2006) and Daniel et al (2007).

5.5.1.3.4 Symbolic adoption and managerial efficiency

The data in Table 38(III)(4) were used to test the null hypothesis (H.3.4) that there is no association between coconut growers' managerial efficiency about scientific cultivation of coconut plantation and their symbolic adoption.

The calculated value of correlation coefficient $r = 0.20034$ was positive and significant at 0.05 level of probability. Hence, null hypothesis was rejected.

It is concluded that the managerial efficiency of coconut plantation growers was associated with their symbolic adoption. The relationship clearly indicated that the managerial efficiency increase with increase in the level of symbolic adoption.

This might be due to the fact that farmers with better level of symbolic adoption are more active as compared to average farmers. This kind of behaviour motivate an individual to do something new for getting desired level of results. Indirectly we can also say that these farmers got all those qualities leading towards better managerial efficiency. Hence, naturally the farmers with higher level of symbolic adoption will have higher level of managerial efficiency.

5.5.1.3.5 Attitude towards coconut cultivation and managerial efficiency

The data in Table 38(III)(5) were used to test the null hypothesis (H.3.5) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their attitude towards coconut cultivation.

The calculated correlation coefficient value of $r = 0.47283$ was positive and highly significant at 0.01 level of probability. Hence, the null hypothesis was rejected.

It can be inferred that attitude towards coconut cultivation had positive and highly significant relationship with managerial efficiency of coconut grower about scientific cultivation of coconut plantation. It means, as favorable attitude towards coconut cultivation the managerial efficiency is more.

The positive attitude towards coconut cultivation forms as a result of high degree of interest, attention, concentration, importance and awareness about coconut cultivation. It is natural that coconut growers with positivism in above listed characters will have more efficiency to work with coconut cultivation. In addition to this, coconut growers with positive feelings towards coconut cultivation will always try to involve more and collect information to get the guidance about coconut cultivation from the extension functionaries or university scientists. Thus, such constructive qualities among those coconut growers with positive attitude towards coconut cultivation might have played important role to make them better managers of the coconut cultivation. Because of this reason, positive and significant relationship between attitude towards coconut cultivation of coconut growers and their managerial efficiency might have been observed.
The findings of Thakkar and Joshi (2003), Jadav (2005), Patel (2006) and Khodifad (2010) were supported this finding.

5.5.1.4 Extension Communication characteristics

5.5.1.4.1 Information seeking behaviour and managerial efficiency

The data in Table 38(IV)(1) were used to test the null hypothesis (H.4.1) that there is no association between coconut growers managerial efficiency about scientific cultivation of coconut plantation and their information seeking behaviour.

The calculated correlation coefficient value of $r = 0.39754$ was positive and highly significant at 0.01 level of probability. Hence, the null hypothesis was rejected.

It can be inferred that information seeking behaviour had positive and highly significant relationship with managerial efficiency of coconut grower about scientific cultivation of coconut plantation. It means, as higher information seeking behaviour the managerial efficiency is more.

High level of information seeking behaviour may help to coconut plantation growers to collect all required information pertaining to coconut cultivation. Which increased the knowledge of coconut growers led them to make right decision resulted in to perfect planning of coconut cultivation for maximizing profit might be the reasons for this finding.

Similar results were obtained by Vyas (1995) and Patel (2005a).

5.5.1.4.2 Extension participation and managerial efficiency

The data presented in the Table 38(IV)(2) were used to test the null hypothesis (H.4.2) that there is no association between managerial efficiency and extension participation of the respondents.
The calculated correlation coefficient value of \( r = 0.49045 \) was positive and highly significant at 0.01 level of probability. Hence, the null hypothesis was rejected.

It can be inferred that extension participation had positive and highly significant relationship with managerial efficiency of coconut grower about scientific cultivation of coconut plantation.

It can be construed that increase in extension participation increasing the managerial efficiency.

Farmers with high extension participation, they can see the exhibition, they can participation in work as demonstration farmers and can expose to more mass media which increase their knowledge as well as they can learnt the skill for application of this knowledge. Which led them to be a good manager might be the reason for this finding.

This finding gets supports from the findings reported by Sumathi (1987), Kotadia (2006) and Gohil (2010), while differed with the finding of Jadav (2005).

5.5.1.4.3 Participation in training programme and managerial efficiency

The data presented in the Table 38(IV)(3) was used to test the null hypothesis (H.4.3) that there is no association between managerial efficiency and their participation in training programme.

The calculated correlation coefficient \( r = 0.15894 \) was non significance at 0.05 level. Hence, the null hypothesis was accepted.

It can be concluded that training had not played the important role in managerial efficiency of coconut plantation growers about scientific cultivation of coconut plantation.

This finding was in opposite with the findings of Rao (1995), Jadav (2005), Patel (2005a) and Patel (2006).
Based on the above results of correlation analysis, it can be concluded that the variables viz; education, area under coconut plantation cultivation, annual income, access to market facilities, innovativeness, perception about quality and damaged cause by eriophyid mite, attitude toward coconut cultivation, information

<table>
<thead>
<tr>
<th>Variables</th>
<th>Where,</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_2$ Educational status</td>
<td>$X_{10}$ Risk orientation</td>
</tr>
<tr>
<td>$X_3$ Farm size</td>
<td>$X_{11}$ Perception</td>
</tr>
<tr>
<td>$X_4$ Area under coconut cultivation</td>
<td>$X_{12}$ Symbolic adoption</td>
</tr>
<tr>
<td>$X_6$ Annual income</td>
<td>$X_{13}$ Attitude towards coconut cultivation</td>
</tr>
<tr>
<td>$X_8$ Access to market facilities</td>
<td>$X_{14}$ Information seeking behaviour</td>
</tr>
<tr>
<td>$X_9$ Innovativeness</td>
<td>$X_{15}$ Extension participation</td>
</tr>
</tbody>
</table>
Fig. 17: Relationship between coconut plantation growers’ characteristics and managerial efficiency (The final paradigm)

seeking behaviour and extension participation had highly significant relationship with managerial efficiency of coconut plantation growers. Another independents variables viz. farm size, risk orientation and symbolic adoption had significant relationship with managerial efficiency of coconut plantation growers. Age, herd size, social participation and participation in training programme had non significant correlation relationship with managerial efficiency of coconut growers. Which are shown in figure 17.

5.6 EXTENT OF CONTRIBUTION OF SELECTED INDEPENDENT VARIABLES ON THE MANAGERIAL EFFICIENCY OF THE COCONUT PLANTATION GROWERS

In the previous sections, the relationship between independents and dependent variable was ascertained by computing correlation coefficients (r). The correlation coefficient provides the strength and direction of association between the two characters or variables, but does not reflect on predictive ability of independent variables to the dependent variable. Hence, in order to assess the amount of contribution (influence or predictive abilities) of each independent variable to the managerial efficiency, the stepwise regression analysis was carried out with the help of computer programme.

The stepwise regression as stated by Efroymson’s (1962) that it is one such method which is widely adopted in multiple regression analysis. It has got the added advantage that at each stage of analysis; every variable is subjected to an examination for its predictive value.

The multiple correlations co-efficient (R) represents the correlation between the dependent variable and a set of independent variables
fitted in multiple regression equation. The co-efficient of determination ($R^2$) gives amount of variation accounted in dependent variables, when all independent variables were taken together in the equation. It is tested with ‘F’ test for its significance.

The partial regression co-efficient ($by_{i,j}$) represents the change in dependent variable ($y$) with a unit change in independent variable ($x_i$) keeping other variables constant and it was tested with Student's 't' test for its significance.

The various independent variables had their own unit of measurement, which did not permit a comparison of the partial regression coefficient ($by_{i,j}$) values. To facilitate comparison among the partial regression coefficient ($by_{i,j}$) values, they were converted into standardized partial regression coefficient ($by'_{i,j}$) values, which were free from the units of measurements.

The independent variables were then ranked on the basis of standardized partial regression coefficient ($by'_{i,j}$) values (ignoring sign) to find out their relative importance in predicting the dependent variable.

5.6.1 Extent of variation

5.6.1.1 Multiple regression analysis

Pearson’s correlation analysis merely portrays coexistence of relation between any two variables. This procedure does not capture the interaction effect among variables. One variable is associated with or is simultaneously dependent on several others. Managerial efficiency was postulated as a linear function of various variables. It is not influenced solely by any of these factors taken in isolation but as a part of complex and interacting system. Based on this approach, the multiple regression analysis using linear model was carried out to know the combined effect of the independent variables in explaining the total variation in the dependent variable.
In multiple regression analysis, all the 16 independent variables were fitted to explain the variation in managerial efficiency. The results are presented in Table 39.

All the independent variables mentioned in Table 39 explained as much as 69.90 per cent of total variation in the managerial efficiency. The unexplained variation was of 30.10 per cent may be due to the factors outside the scope of the study.

It can also be revealed that the ‘t’ values of seven variables viz; educational status, farm size, area under coconut cultivation, access to market facilities, innovativeness, risk orientation and participation in training programme were highly significant at 0.01 level of significance and the ‘t’ value of three variable i.e. age, annual income and social participation was significant at 0.05 level of significance. These ten variables significantly contributed in explaining the variation in managerial efficiency. Remaining variables have failed to contribute significantly in managerial efficiency of coconut growers about scientific cultivation of coconut plantation.
Table 39: Multiple regression analysis of managerial efficiency

\( n = 150 \)

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Variables</th>
<th>Regression coefficient (( b_i ))</th>
<th>S.E. of ( b_i )</th>
<th>‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age ( (X_1) )</td>
<td>0.3568</td>
<td>0.1680</td>
<td>2.124*</td>
</tr>
<tr>
<td>2</td>
<td>Educational status ( (X_2) )</td>
<td>3.8316</td>
<td>0.9935</td>
<td>3.857**</td>
</tr>
<tr>
<td>3</td>
<td>Farm size ( (X_3) )</td>
<td>-3.2572</td>
<td>0.7823</td>
<td>-4.164**</td>
</tr>
<tr>
<td>4</td>
<td>Area under coconut ( (X_4) )</td>
<td>2.3958</td>
<td>0.8539</td>
<td>2.806**</td>
</tr>
<tr>
<td>5</td>
<td>Herd size ( (X_5) )</td>
<td>-0.8328</td>
<td>0.5248</td>
<td>-1.587NS</td>
</tr>
<tr>
<td>6</td>
<td>Annual income ( (X_6) )</td>
<td>0.0001</td>
<td>0.0001</td>
<td>2.101*</td>
</tr>
<tr>
<td>7</td>
<td>Social participation ( (X_7) )</td>
<td>-1.4422</td>
<td>0.7025</td>
<td>-2.053*</td>
</tr>
<tr>
<td>8</td>
<td>Access to market facilities ( (X_8) )</td>
<td>1.7276</td>
<td>0.3020</td>
<td>5.721**</td>
</tr>
<tr>
<td>9</td>
<td>Innovativeness ( (X_9) )</td>
<td>10.2866</td>
<td>1.8767</td>
<td>5.481**</td>
</tr>
<tr>
<td>10</td>
<td>Risk orientation ( (X_{10}) )</td>
<td>-0.9130</td>
<td>0.3078</td>
<td>-2.966**</td>
</tr>
<tr>
<td>11</td>
<td>Perception ( (X_{11}) )</td>
<td>-0.5652</td>
<td>0.3322</td>
<td>-1.701NS</td>
</tr>
<tr>
<td>12</td>
<td>Symbolic adoption ( (X_{12}) )</td>
<td>-0.3489</td>
<td>0.1883</td>
<td>-1.853NS</td>
</tr>
<tr>
<td>13</td>
<td>Attitude towards coconut cultivation ( (X_{13}) )</td>
<td>0.3032</td>
<td>0.2652</td>
<td>1.143NS</td>
</tr>
<tr>
<td>14</td>
<td>Information seeking behaviour ( (X_{14}) )</td>
<td>0.3103</td>
<td>0.2127</td>
<td>1.459NS</td>
</tr>
<tr>
<td>15</td>
<td>Extension participation ( (X_{15}) )</td>
<td>-0.0045</td>
<td>0.0789</td>
<td>-0.058NS</td>
</tr>
<tr>
<td>16</td>
<td>Participation in training programme ( (X_{16}) )</td>
<td>-2.5241</td>
<td>0.8582</td>
<td>-2.941**</td>
</tr>
</tbody>
</table>

**NS = Non significant**

* = Significance at 0.05 level (1.960)

** = Significance at 0.01 level (2.576)

\( R^2 = 0.6990 \)
It can be concluded that 69.90 per cent total variation in managerial efficiency was explained by set of 16 independent variables together. It can also be concluded that out of 16 variables, ten variables viz; age, educational status, farm size, area under coconut cultivation, annual
income, social participation, access to market facilities, innovativeness, risk orientation and participation in training programme had significant contribution in managerial efficiency. This result provides evidence about the overwhelmingly important role of ten significant variables in achieving managerial efficiency, which presented in figure 18.

5.6.1.2 **Stepwise multiple regression analysis**

Efroymsons (1962) stated that stepwise regression is one such method, which has been widely adopted in multiple regression analysis nowadays. It has the added advantage that at each stage of analysis, every variable is subjected to an examination for its predictive value. Based on this approach, the stepwise multiple regression analysis was carried out to know the important variables with their predictive ability in explaining the variation in the dependent variable.

In stepwise regression analysis, all the 16 independent variables were considered and the results are presented in Table 40.

It is clear from Table 40 that the eight variables viz. age, educational status, access to market facilities, innovativeness, risk orientation, perception, information seeking behaviour and participation in training programme put together explained as much as 63.48 per cent of total variation in the managerial efficiency. The unexplained variation was 36.52 per cent may be due to factors other than above mentioned eight factors.

**Table 40 : Stepwise multiple regression analysis of managerial efficiency**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Independent variables</th>
<th>Partial regressi -on coefficie -nt</th>
<th>S.E. of bi (SE of byi)</th>
<th>‘t’ value</th>
<th>‘F’ value</th>
<th>Standardi -zed partial regression coefficient</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age (X1)</td>
<td>0.5962</td>
<td>0.1692</td>
<td>3.5236**</td>
<td>12.4160**</td>
<td>0.29100</td>
<td>IV</td>
</tr>
<tr>
<td></td>
<td>Educational status ($X_1$)</td>
<td></td>
<td>Access to market facilities ($X_2$)</td>
<td></td>
<td>Innovativeness ($X_9$)</td>
<td></td>
<td>Risk orientation ($X_{10}$)</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------</td>
<td>---</td>
<td>-------------------------------</td>
<td>---</td>
<td>------------------------</td>
<td>---</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>2</td>
<td>4.8776</td>
<td>0.9669</td>
<td>5.0446**</td>
<td>25.4477**</td>
<td>0.45618</td>
<td>II</td>
<td>2.0022</td>
</tr>
<tr>
<td>3</td>
<td>-1.3008</td>
<td>0.3055</td>
<td>-4.2579**</td>
<td>18.1300**</td>
<td>-0.28680</td>
<td>V</td>
<td>-0.8936</td>
</tr>
<tr>
<td>4</td>
<td>-2.7089</td>
<td>0.8872</td>
<td>-3.0533**</td>
<td>9.3227**</td>
<td>-0.19025</td>
<td>VIII</td>
<td>0.5421</td>
</tr>
<tr>
<td>5</td>
<td>0.5421</td>
<td>0.1842</td>
<td>2.9430**</td>
<td>8.6612**</td>
<td>0.21523</td>
<td>VII</td>
<td>0.5421</td>
</tr>
<tr>
<td>6</td>
<td>0.5421</td>
<td>0.1842</td>
<td>2.9430**</td>
<td>8.6612**</td>
<td>0.21523</td>
<td>VII</td>
<td>0.5421</td>
</tr>
<tr>
<td>7</td>
<td>0.5421</td>
<td>0.1842</td>
<td>2.9430**</td>
<td>8.6612**</td>
<td>0.21523</td>
<td>VII</td>
<td>0.5421</td>
</tr>
<tr>
<td>8</td>
<td>0.5421</td>
<td>0.1842</td>
<td>2.9430**</td>
<td>8.6612**</td>
<td>0.21523</td>
<td>VII</td>
<td>0.5421</td>
</tr>
</tbody>
</table>

Regression Constant = -17.13

Multiple R = 0.7967

** = Significance at 0.01 level (2.576)

It can also be seen from the Table 40 that the ‘t’ values and ‘f’ values for all the above eight variables were found significant at 0.01 level of significance indicating significant contribution of these eight variables on managerial efficiency. The partial regression coefficients indicated that one unit change in age, educational status, access to market facilities, innovativeness, risk orientation, perception, information seeking behaviour and participation in training programme would change 0.29100 unit, 0.45618 units, 0.49766 units, 0.42490 units, -0.28680 units, -0.23505 units, 0.21523 units and -0.19025 units in the managerial efficiency, respectively.

As a result of stepwise regression analysis, following regression model was obtained.
\[ \hat{Y} = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_9 X_9 + b_{10} X_{10} + b_{11} X_{11} + b_{14} X_{14} + b_{16} X_{16} \]

Where,

\( \hat{Y} \) = Predicted dependent variable (Managerial efficiency)

\( a \) = The intercept or Constant i.e. -17.13

\( b_1 \) = Partial regression coefficient of \( Y \) on \( X_1 \) (age)

\( b_2 \) = Partial regression coefficient of \( Y \) on \( X_2 \) (educational status)

\( b_8 \) = Partial regression coefficient of \( Y \) on \( X_8 \) (access to market facilities)

\( b_9 \) = Partial regression coefficient of \( Y \) on \( X_9 \) (innovativeness)

\( b_{10} \) = Partial regression coefficient of \( Y \) on \( X_{10} \) (risk orientation)

\( b_{11} \) = Partial regression coefficient of \( Y \) on \( X_{11} \) (perception)

\( b_{14} \) = Partial regression coefficient of \( Y \) on \( X_{14} \) (information seeking behaviour)

\( b_{16} \) = Partial regression coefficient of \( Y \) on \( X_{16} \) (participation in training programme)

Therefore, the fitted equation is as under

\[ \hat{Y} = (-17.13) + (0.5962) X_1 + (4.8776) X_2 + (2.0022) X_8 + (10.5923) X_9 + (-1.3008) X_{10} + (-0.8936) X_{11} + (0.5421) X_{14} + (-2.7089) X_{16} \]
5.6.1.3 **Standard partial regression coefficient**

The various independent variables had their own units of measurement which did not permit a comparison of the partial regression coefficient values. To facilitate comparison, the partial values were converted into standardized partial values which were free from the units of measurements. The independent variables were then ranked based on standardized partial regression coefficient values ($b'_i$), which are presented earlier in Table 5.33. The order of these eight variables from highest to lowest was as (i) access to market facilities (0.49766) (ii) educational status (0.45618) (iii) innovativeness (0.42490) (iv) age (0.29100) (v) risk orientation (-0.28680) (vi) perception (-0.23505), (vii) information seeking behaviour (0.21523) and participation in training programme (-0.19025).

The stepwise variations accounted by different independent variables are presented in Table 41 and figure 19.

It is clear from Table 41 and Figure 19 that the variable, access to market facilities alone account 43.48 per cent variation in managerial efficiency followed by access to market facilities + innovativeness (48.18 per cent), access to market facilities + innovativeness + risk orientation (52.98 per cent), access to market facilities + innovativeness + risk orientation + educational status (55.35 per cent), access to market facilities + innovativeness + risk orientation + educational status + age (58.15 per cent), access to market facilities + innovativeness + risk orientation + educational status + age + Perception (60.05 per cent), access to market facilities + innovativeness + risk orientation + educational status + age + Perception + participation in training programme (61.23 per cent) and access to market facilities + innovativeness + risk orientation + educational status + age +...
Perception + participation in training programme + information seeking behaviour (63.48 per cent).

It can be concluded from the above results of stepwise regression analysis that 63.48 per cent variation was accounted by a set of eight independent variables viz, access to market facilities, innovativeness, risk orientation, educational status, age, perception, participation in training programme and information seeking behaviour put together in managerial efficiency. Access to market facilities by coconut plantation alone was accounted 43.48 per cent variation. The standardized partial values also indicated that the access to market facilities (0.49766) and educational status (0.45618) were in highest order of magnitude, which reflected its importance.

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Variables included</th>
<th>Multiple ‘R’</th>
<th>Total variation accounted ( (R^2) )</th>
<th>Variation between step</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Access to market facilities ( (X_8) )</td>
<td>0.6594</td>
<td>0.4348 ( (43.48 \text{ %}) )</td>
<td>43.48</td>
</tr>
</tbody>
</table>

**Table 41: Stepwise variation accounted by different independent variables in managerial efficiency**

\( n = 150 \)
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Scale</th>
<th>0.6941</th>
<th>0.4818 (48.18 %)</th>
<th>04.70</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Innovativeness ((X_9) + (X_8))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Risk orientation ((X_{10}) + (X_9) + (X_8))</td>
<td></td>
<td>0.7279</td>
<td>0.5298 (52.98 %)</td>
<td>04.80</td>
</tr>
<tr>
<td>IV</td>
<td>Educational status ((X_2) + (X_{10}) + (X_9) + (X_8))</td>
<td></td>
<td>0.7440</td>
<td>0.5535 (55.35 %)</td>
<td>02.37</td>
</tr>
<tr>
<td>V</td>
<td>Age ((X_1) + (X_2) + (X_{10}) + (X_9) + (X_8))</td>
<td></td>
<td>0.7625</td>
<td>0.5815 (58.15 %)</td>
<td>02.80</td>
</tr>
<tr>
<td>VI</td>
<td>Perception ((X_{11}) + (X_1) + (X_2) + (X_{10}) + (X_9) + (X_8))</td>
<td></td>
<td>0.7749</td>
<td>0.6005 (60.05 %)</td>
<td>01.90</td>
</tr>
<tr>
<td>VII</td>
<td>Participation in training programme ((X_{16}) + (X_{11}) + (X_1) + (X_2) + (X_{10}) + (X_9) + (X_8))</td>
<td></td>
<td>0.7825</td>
<td>0.6123 (61.23 %)</td>
<td>01.18</td>
</tr>
<tr>
<td>VIII</td>
<td>Information seeking behaviour ((X_{14}) + (X_{16}) + (X_{11}) + (X_1) + (X_2) + (X_{10}) + (X_9) + (X_8))</td>
<td></td>
<td>0.7967</td>
<td>0.6348 (63.48 %)</td>
<td>02.25</td>
</tr>
</tbody>
</table>
Where,

Step I = Access to market facilities (X_8)

Step II = Innovativeness (X_9) + (X_8)

Step III = Risk orientation (X_{10}) + (X_9) + (X_8)

Step IV = Educational status (X_2) + (X_{10}) + (X_9) + (X_8)

Step V = Age (X_1) + (X_2) + (X_{10}) + (X_9) + (X_8)

Step VI = Perception (X_{11}) + (X_1) + (X_2) + (X_{10}) + (X_9) + (X_8)

Step VII = Participation in training programme (X_{16}) + (X_{11}) + (X_1) + (X_2) + (X_{10}) + (X_9) + (X_8)

Step VIII = Information seeking behaviour (X_{14}) + (X_{16}) + (X_{11}) + (X_1)
Fig. 19: Extent of variation accounted in stepwise multiple regression analysis
5.7 CONSTRAINTS FACED BY THE COCONUT PLANTATION GROWERS AND SUGGESTIONS TO OVERCOME THE CONSTRAINTS.

5.7.1 Constraints faced by coconut plantation growers in the adoption of improved coconut production technology.

The constraints mean the difficulties or restraints in the way of adoption and management of improved practices of coconut cultivation. For ascertaining the constraints, respondents were asked to state the difficulties faced by them in adoption and management of improved practices of coconut cultivation, as an open question. The intensity of each constraint was computed in percentage according to the frequency of the respondents against the constraints and finally the rank was assigned on the basis of the percentage. The information about constraints is presented in Table 42.

5.7.1.1 Technical constraints

It is obvious from the Table 42(I) that in case of technical constraints, coconut plantation growers faced the constraints were; lack of awareness about control measure to eriophyid mite (98.67 per cent) followed by button shedding and premature nuts falling problems was high (91.33 per cent), unavailability of hybrid coconut sapling i.e. T X D and D X T in sufficient quantity from Government Nursery (85.33 per cent), lack of guidance for post harvest technology (76.67 per cent), problems of salty irrigation water (69.33 per cent), irregular and insufficient supply of electric power (62.00 per cent), lack of proper extension services (58.67 per cent), lack of assured irrigation throughout the year (51.33 per cent), lack of awareness about recommendations from agril. universities (42.67 per cent) and lack of improved agricultural implements (38.00 per cent).

5.7.1.2 Socio-psychological constraints
So far as constraints related to socio psychological were concerned, it was observed from Table 42(II) that 85.33 per cent coconut plantation growers say about neighboring farmers do not spray insecticides to control eriophyid mite so difficult to get good result followed by lack of skilled labours (72.67 per cent), shortage of skilled labour during critical operation like spraying insecticide, harvest the tender and mature nuts as well as post harvest stages (71.33 per cent), lack of motivation and education (68.00 per cent), lack of trust worthiness about recommendations (63.33 per cent) and lack of local resource farmers (57.33 per cent).

5.7.1.3 Constraints of fertilizer

In case of fertilizer, major constraints faced by coconut growers were; lack of timely availability of fertilizers (79.33 per cent), lack of knowledge about how to calculate plantwise need of fertilizer (72.00 per cent), non availability of required quantity of FYM and lack of knowledge about recommended dose of fertilizer application (69.33 per cent), unavailability of good quality of FYM (66.67 per cent) and lack of knowledge about importance of vermicompost (56.67 per cent).

5.7.1.4 Constraints of plant protection

The plant protection is the important factors for crop production and quality of coconut fruits. The major constraints faced by coconut growers were; serious problems of eriophyid mites (98.67 per cent), lack of modern spraying equipment to control the eriophyid mite (94.00 per cent), high cost of insecticides and pesticides (94.00 per cent), premature nuts damaged by eriophyid mite had difficult to identify in early stage (93.33 per cent), deteriorating the quality and quantities of the nuts due to eriophyid mite (88.67 per cent), difficult to spray insecticide on tall coconut tree (88.67 per cent), non availability of effective bio-pesticides and bio-fertilizers (68.67 per cent), lack of
knowledge on concentration of pesticide chemicals (62.00 per cent), unavailability of specific sprayer to use on tall coconut tree (59.33 per cent), operational difficulty in application of root feeding insecticide for coconut (55.33 per cent) and rodent/s damaged to tender nuts (54.67 per cent).

**Table 42: Constrains faced by coconut plantation growers in adoption of improved coconut cultivation technology**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Constraints</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td><strong>Technical constraints</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Button shedding and premature nuts falling problems is high</td>
<td>137</td>
<td>91.33</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Problems of salty irrigation water</td>
<td>104</td>
<td>69.33</td>
<td>V</td>
</tr>
<tr>
<td>3</td>
<td>Lack of awareness about recommendations from agril. universities</td>
<td>64</td>
<td>42.67</td>
<td>IX</td>
</tr>
<tr>
<td>4</td>
<td>Lack of guidance for post harvest technology</td>
<td>115</td>
<td>76.67</td>
<td>IV</td>
</tr>
<tr>
<td>5</td>
<td>Lack of improved agricultural implements</td>
<td>57</td>
<td>38.00</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Unavailability of hybrid coconut sapling i.e. T X D and D X T in sufficient quantity from Government Nursery</td>
<td>128</td>
<td>85.33</td>
<td>III</td>
</tr>
<tr>
<td>7</td>
<td>Lack of awareness about control measure to eriophyid mite</td>
<td>148</td>
<td>98.67</td>
<td>I</td>
</tr>
<tr>
<td>8</td>
<td>Irregular and insufficient supply of electric power</td>
<td>93</td>
<td>62.00</td>
<td>VI</td>
</tr>
<tr>
<td>Rank</td>
<td>Issue</td>
<td>Percentage</td>
<td>Cluster</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Lack of assured irrigation throughout the year</td>
<td>77</td>
<td>VIII</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Lack of proper extension services</td>
<td>88</td>
<td>VII</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lack of trust worthiness about recommendations</td>
<td>95</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lack of skilled labours</td>
<td>109</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lack of motivation and education</td>
<td>102</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lack of local resource person</td>
<td>86</td>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Neighboring farmers do not spray insecticides to control eriophyid mite so difficult to get good result</td>
<td>128</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Shortage of skilled labour during critical operation like spraying insecticide, harvest the tender and mature nuts as well as post harvest stages</td>
<td>107</td>
<td>III</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Non availability of required quantity of FYM</td>
<td>104</td>
<td>III</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lack of timely availability of fertilizers</td>
<td>119</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Unavailability of good quality of FYM</td>
<td>100</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lack of knowledge about recommended dose of fertilizer application</td>
<td>104</td>
<td>III</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Lack of knowledge about importance of vermicompost</td>
<td>85</td>
<td>VI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of knowledge about how to calculate plantwise need of fertilizer</td>
<td>108</td>
<td>72.00</td>
<td>II</td>
</tr>
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<td>---</td>
<td>---------------------------------------------------------------------</td>
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<tr>
<td><strong>IV</strong></td>
<td><strong>Plant protection</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Serious problems of eriophyid mites</td>
<td>148</td>
<td>98.67</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Lack of modern spraying equipment to control the eriophyid mite</td>
<td>141</td>
<td>94.00</td>
<td>II</td>
</tr>
<tr>
<td>3</td>
<td>Lack of knowledge on concentration of pesticide chemicals</td>
<td>93</td>
<td>62.00</td>
<td>VI</td>
</tr>
<tr>
<td>4</td>
<td>Rodent/s damaged to tender nuts</td>
<td>82</td>
<td>54.67</td>
<td>IX</td>
</tr>
<tr>
<td>5</td>
<td>Premature nuts damaged by eriophyid mite had difficult to identify in early stage</td>
<td>140</td>
<td>93.33</td>
<td>III</td>
</tr>
<tr>
<td>6</td>
<td>Operational difficulty in application of root feeding insecticide for coconut</td>
<td>83</td>
<td>55.33</td>
<td>VIII</td>
</tr>
<tr>
<td>7</td>
<td>Deteriorating the quality and quantities of the nuts due to eriophyid mite</td>
<td>133</td>
<td>88.67</td>
<td>IV</td>
</tr>
<tr>
<td>8</td>
<td>Non availability of effective bio-pesticides and bio-fertilizers</td>
<td>103</td>
<td>68.67</td>
<td>V</td>
</tr>
<tr>
<td>9</td>
<td>High cost of insecticides and pesticides</td>
<td>141</td>
<td>94.00</td>
<td>II</td>
</tr>
<tr>
<td>10</td>
<td>Difficult to spray insecticide on tall coconut tree</td>
<td>133</td>
<td>88.67</td>
<td>IV</td>
</tr>
<tr>
<td>11</td>
<td>Unavailability of specific sprayer to use on tall coconut tree</td>
<td>89</td>
<td>59.33</td>
<td>VII</td>
</tr>
<tr>
<td><strong>V</strong></td>
<td><strong>Financial</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lack of adequate institutional support to small farmers for credit</td>
<td>54</td>
<td>36.00</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>Lack of subsidies for insecticides, pesticides and fertilizer</td>
<td>121</td>
<td>80.67</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>Issue Description</td>
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</tr>
<tr>
<td>3</td>
<td>Unaware about various horticultural schemes</td>
<td>63</td>
<td>42.00</td>
<td>IX</td>
</tr>
<tr>
<td>4</td>
<td>Complicated method and delay / insufficient facilities of loan and subsidies</td>
<td>123</td>
<td>82.00</td>
<td>I</td>
</tr>
<tr>
<td>5</td>
<td>High labour wages</td>
<td>99</td>
<td>66.00</td>
<td>V</td>
</tr>
<tr>
<td>6</td>
<td>High cost of chemical fertilizers</td>
<td>118</td>
<td>78.67</td>
<td>III</td>
</tr>
<tr>
<td>7</td>
<td>High cost of insecticide, pesticide and fungicide</td>
<td>117</td>
<td>78.00</td>
<td>IV</td>
</tr>
<tr>
<td>8</td>
<td>High price of organic manure / FYM</td>
<td>87</td>
<td>58.00</td>
<td>VI</td>
</tr>
<tr>
<td>9</td>
<td>High cost of hybrid coconut sapling</td>
<td>81</td>
<td>54.00</td>
<td>VIII</td>
</tr>
<tr>
<td>10</td>
<td>Difficult to store product due to urgent need of money</td>
<td>86</td>
<td>57.33</td>
<td>VII</td>
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<tbody>
<tr>
<td>VI</td>
<td><strong>Intercropping</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lack of knowledge about intercropping</td>
<td>58</td>
<td>38.67</td>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Difficulty to irrigation and fertilization due to intercropping</td>
<td>93</td>
<td>60.00</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Problem of spraying insecticide while taking intercrop</td>
<td>107</td>
<td>71.33</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Shedding effect on intercropping</td>
<td>98</td>
<td>65.33</td>
<td>III</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Intercropping increase weed problem</td>
<td>101</td>
<td>67.33</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Damage to intercrop by wild animals (Blue bull, pig etc.)</td>
<td>82</td>
<td>54.67</td>
<td>V</td>
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</table>

<table>
<thead>
<tr>
<th></th>
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<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td><strong>Training</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lack of emphasis on value addition training</td>
<td>115</td>
<td>76.67</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Insufficient training and</td>
<td>92</td>
<td>61.33</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>VIII</td>
<td>Marketing</td>
<td></td>
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<td>-----------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Unaware about export system</td>
<td>109</td>
<td>72.67</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Unremunerative price for tender nuts and mature nuts</td>
<td>141</td>
<td>94.00</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lack of accessing to resource / marketing</td>
<td>131</td>
<td>87.33</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Malpractices of the middleman in the market</td>
<td>77</td>
<td>51.33</td>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Lack of knowledge about other markets</td>
<td>111</td>
<td>74.00</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Lack of local market for selling</td>
<td>122</td>
<td>81.33</td>
<td>III</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IX</th>
<th>Value addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lack of knowledge on value addition of copra</td>
</tr>
<tr>
<td>2</td>
<td>Lack of knowledge about coconut based industry</td>
</tr>
</tbody>
</table>

5.7.1.5 Financial constraints

The data presented in Table 42(V) that major constraints faced by the coconut plantation growers were; complicated method and delay / insufficient facilities of loan and subsidies (82.00 per cent), lack of subsidies for insecticides, pesticides and fertilizer (80.67 per cent), high cost of chemical fertilizers (78.67 per cent), high cost of insecticide, pesticide and fungicide (78.00 per cent), high labour wages (66.00 per cent), high price of organic manure/ FYM (58.00 per cent), difficult to store product due to urgent need of money (57.33 per cent), high cost of hybrid coconut sapling (54.00 per cent), unaware about various horticultural schemes (42.00 per cent) and lack of adequate institutional support to small farmers for credit (36.00 per cent).

5.7.1.5 Constraints of intercropping
The key constraints faced by coconut plantation growers related to intercropping were; problem of spraying insecticide while taking intercrop (71.33 per cent), intercropping increase weed problem (67.33 per cent), shedding effect on intercropping (65.33 per cent), difficulty to irrigation and fertilization due to intercropping (60.00 per cent), damage to intercrop by wild animals (54.00 per cent) and lack of knowledge about intercropping (38.67 per cent).

5.7.1.6 Constraints of training

Training plays crucial role for improvement of skill and knowledge of coconut plantation growers. The major constraints were; lack of emphasis on value addition training (76.67 per cent) and insufficient training and demonstration facilities (61.33 per cent).

5.7.1.7 Marketing constraints

Coconut plantation growers were faced major constraints in marketing were; unremunerative price for tender nuts and mature nuts (94.00 per cent), lack of accessing to resource/ marketing (87.33 per cent), lack of local market for selling (81.33 per cent), lack of knowledge about other markets (74.00 per cent), unaware about export system (72.67 per cent) and malpractices of the merchant in the market (51.33 per cent).

5.7.1.8 Constraints in value addition

In value addition of coconut, major constraints faced by coconut plantation growers were; lack of knowledge about coconut industry (77.33 per cent) and lack of knowledge on value addition of copra (62.00 per cent).

From above discussion, it could be concluded that more number of coconut plantation growers faced the major constraints were; lack of awareness about control measure to eriophyid mite, neighboring farmers do not spray insecticides to control eriophyid mite so difficult to
get good result, lack of skilled labours, lack of timely available of fertilizers, serious problems of eriophyid mites, complicated method and delay / insufficient facilities of loan and subsidies, problem of spraying insecticide while taking intercrop, lack of emphasis on value addition training, unremunerative price for tender nuts and mature nuts and lack of knowledge about coconut based industry

5.7.2 Suggestions offered by coconut plantation growers to overcome the constraints

An attempt was also made to know the valuable suggestions to overcome the constraints in adoption of improved coconut cultivation practices, the suggestions were invited openly from the coconut growers. The frequency was calculated for each suggestion and converted into percentage. The rank was assigned on the basis of the percentage. The suggestions along with their percentage and rank are presented in Table 43.

The most important suggestions offered by the coconut plantation growers to overcome the constraints in adoption of improved coconut production technology are as under.

Table 43 : Suggestions to overcome the constraints faced by coconut plantation growers  

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Suggestions</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Technical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Creating awareness about damaged and deteriorate quality of coconut caused by eriophyid mite</td>
<td>145</td>
<td>96.67</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Proposed Measures</td>
<td>Score</td>
<td>Percentage</td>
<td>Chapter</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>2</td>
<td>Government / Horticulture Mission should be helpful to farmers for establishment of coconut based industries</td>
<td>119</td>
<td>79.33</td>
<td>II</td>
</tr>
<tr>
<td>3</td>
<td>Cooperative society for coconut should be started</td>
<td>72</td>
<td>48.00</td>
<td>VII</td>
</tr>
<tr>
<td>4</td>
<td>More information regarding coconut value addition should provide</td>
<td>84</td>
<td>56.00</td>
<td>VI</td>
</tr>
<tr>
<td>5</td>
<td>Regular electricity power supply should made available</td>
<td>110</td>
<td>73.33</td>
<td>III</td>
</tr>
<tr>
<td>6</td>
<td>Government should provide certified hybrid variety of coconut sapling in sufficient quantity to the farmers</td>
<td>103</td>
<td>68.67</td>
<td>IV</td>
</tr>
<tr>
<td>7</td>
<td>Extension workers should regularly contact the farmers to disseminate latest coconut production technology</td>
<td>98</td>
<td>65.33</td>
<td>V</td>
</tr>
</tbody>
</table>

**II Fertilizer**

<table>
<thead>
<tr>
<th></th>
<th>Recommendations</th>
<th>Score</th>
<th>Percentage</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Availability of sufficient organic manure and fertilizer</td>
<td>95</td>
<td>63.33</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Government should provide subsidy for chemical fertilizer</td>
<td>104</td>
<td>69.33</td>
<td>I</td>
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</table>

**III Plant protection**

<table>
<thead>
<tr>
<th></th>
<th>Proposed Measures</th>
<th>Score</th>
<th>Percentage</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Effective control measures of pests and diseases should be evolved</td>
<td>106</td>
<td>70.67</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Required pesticides should be made available in time</td>
<td>80</td>
<td>53.33</td>
<td>IV</td>
</tr>
<tr>
<td>3</td>
<td>Specific pest effective insecticide should be recommended</td>
<td>123</td>
<td>82.00</td>
<td>I</td>
</tr>
</tbody>
</table>
### Effective bio-pesticides and bio-fertilizers should be recommended

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</thead>
<tbody>
<tr>
<td>IV</td>
<td>Financial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>High cost horticultural technologies and inputs should be subsidized</td>
<td>98</td>
<td>65.33</td>
</tr>
<tr>
<td>2</td>
<td>Credit facilities should be made available for establishment of new coconut plantation</td>
<td>103</td>
<td>68.67</td>
</tr>
<tr>
<td>3</td>
<td>Price of pesticides and fertilizers should be reasonable</td>
<td>111</td>
<td>74.00</td>
</tr>
<tr>
<td>4</td>
<td>Crop insurance scheme should be introduce for coconut crop</td>
<td>95</td>
<td>63.33</td>
</tr>
<tr>
<td>5</td>
<td>Remunerative minimum prices should be fixed by the Government</td>
<td>103</td>
<td>68.67</td>
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</table>

### Training

<p>| | | | |</p>
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<tr>
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<tbody>
<tr>
<td>V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Short term training programme should be conducted on use of herbicide and plant protection</td>
<td>96</td>
<td>64.00</td>
</tr>
<tr>
<td>2</td>
<td>Facilities for field training should be increased</td>
<td>54</td>
<td>36.00</td>
</tr>
<tr>
<td>3</td>
<td>Special training for the value addition in coconut</td>
<td>78</td>
<td>52.00</td>
</tr>
<tr>
<td>4</td>
<td>Training should be given to the coconut growers in relation to the best plantation and post harvest management</td>
<td>91</td>
<td>60.67</td>
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</table>

### Marketing

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<tbody>
<tr>
<td>VI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Establishment of market facilities at local level (Taluka level)</td>
<td>117</td>
<td>78.00</td>
</tr>
</tbody>
</table>
5.7.2.1 Technical

The major suggestions offered by coconut plantation growers were; creating awareness about damaged and deteriorate quality of coconut caused by eriophyid mite (96.67 per cent), Government/Horticulture Mission should be helpful to farmers for establishment of coconut based industries (79.33 per cent), regular electricity power supply should made available (73.3 per cent), Government should provide certified hybrid variety of coconut sapling in sufficient quantity to the farmers (68.67 per cent), extension workers should regularly contact the farmers to disseminate latest coconut production technology (65.33 per cent), more information for coconut value addition should provide (56.33 per cent) and cooperative society for coconut should be started (48.00 per cent)

5.7.2.2 Fertilizer

In case of fertilizer, major suggestions given by coconut plantation growers were; Government should provide subsidy in chemical fertilizer (69.33 per cent) and availability of sufficient organic manure and fertilizer (63.33 per cent).

5.7.2.3 Plant protection

The major suggestion in plant protection were; specific pest effective insecticide should be recommended (82.00 per cent), effective control measures of pests and diseases should be evolved (70.67 Per cent), effective bio-pesticides and bio-fertilizers should be recommended
(66.67 Per cent) and required pesticides should be made available in time (53.33 Per cent).

### 5.7.2.4 Financial

In finance, major suggestion given by coconut plantation growers were; price of pesticides and fertilizers should be reasonable (74.00 per cent), credit facilities should be made available for establishment of new coconut plantation (68.67 per cent), remunerative minimum prices should be fixed by the Government (68.67 per cent), high cost horticultural technologies and inputs should be subsidized (65.33 per cent) and crop insurance scheme should be introduce for coconut crop (63.33 per cent).

### 5.7.2.5 Training

The major suggestion offered by coconut plantation growers for training were; short term training programme should be conducted on use of herbicide and plant protection (64.00 per cent), training should be given to the coconut growers in relation to the best plantation and post harvest management (60.67 per cent), special training for the value addition in coconut (52.00 per cent) and facilities for field training should be increased (36.00 per cent).

### 5.7.2.6 Marketing

Establishment of market facilities at local level (78.00 per cent) and supply and transport facilities should be easily available (67.33 per cent) were major suggestions offered by coconut plantation growers for marketing.

It can be concluded that important suggestions offered by majority of the coconut plantation growers were; creating awareness
about damaged and deteriorate quality of coconut caused by eriophyid mite, government should provide subsidy for chemical fertilizer, specific pest effective insecticide should be recommended, price of pesticides and fertilizers should be reasonable, short term training programme should be conducted on use of herbicide and plant protection measures and establishment of market facilities at local level.

5.8 EMPIRICAL MODEL

To show the conceptual frame work of the study, a tentative paradigm was developed in beginning of the study (Fig. 3). Now, final form of empirical model is being suggested in Figure 20, which is based on findings of the present investigation.
Fig. 20: The Empirical Model
CHAPTER VI

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

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

6.1 SUMMARY

6.1.1 Introduction:

The coconut palm is one of the most useful plants in the world. It is grown in more than 92 countries of the world. Indonesia and the Philippines are the first and the second largest coconut producing countries in the world. India is the third largest coconut producing country having an area of about 1830.9 thousand hectares under the crop. Annual production is about 15,730 million nuts with an average of 8303 nuts per hectare. It accounts for 58.05 per cent of the area and 90.70 per cent of the coconut production share under major plantation crops in India during 2009-10. South East Asia is regarded as the origin of Coconut. The major coconut growing states in India are Kerala, Tamilnadu, Karnataka, A.P, West Bengal, Maharashtra, Gujarat, Orissa, Assam, Goa, Daman and Diu, Lakshwadeep. Kerala stand first in production accounting 39 percent of total production in the country.

Gujarat state has achieved considerable growth rate in coconut plantation during last five years because of serious efforts made by the State Govt. In Gujarat, 16,674 hectares area and 250.63 million nuts
productions with productivity 8433 nuts per hectare are recorded. Average productivity per tree is 40 nuts in irrigated area in Gujarat, whereas, average productivity of India is 44 nuts per tree.

Coconut is a product having multifarious utility. It is noticeable that almost all the parts of freshly grown coconut, eatable coconut or dried are used in some or the other manner. (1) Coconut water or milk is an excellent natural soft drink for all. It is useful for diabetics and heart patients. It is very useful to people suffering from diarrhea and vomiting. It helps in increasing blood circulation in the kidneys. (2) Oil is extracted from dry copra. Copra contains about 65 to 75 percent oil. Copra is also used in the preparation and decoration of cakes. Sweets such as Ladoo, Barfi etc are prepared from it. (3) The unopened spathe is tapped for toddy. This toddy can be converted into jaggery, vinegar and sugar. (4) Kernel (wet meat) is mainly used in making curries, chutney, toffee, sweet and for other cooking purposes. (5) Coir, the fibrous husk of the coconut, is used in a surprisingly large number of ways. Ropes and yarns, aquarium filters, car seat covers, flower pots, soundproofing, mulch for plant growing, heat insulation, brushes, bristles, mattresses, door mats and matting, rugs, carpets... the list goes on and on. (6) Leaves are used for making thatch, jhaps and for other purposes while leaflets are collected and composted. (7) Coir pith (or) coir dust is used as a soil conditioner (manure). (8) Midribs and leaf petioles are used for making brooms. (9) Inflorescence bunk stalk, stipules and dried spathe are used for warming water or for cooking purpose. (10) Coconut shell is used for making fancy items, house holds utensils etc. (11) Decoction obtained from roots is used as mouthwash and gargle. (12) Coconut oil is one of the most important edible oil for domestic use. It has also some medicinal value (as it prevents skin diseases like Eczema).
Farmers all over the world are working as managers of their farms. Irrespective of the economic, social, cultural, physical and technological environment, the farmer manages a production system to get a return from it. Consciously or unconsciously, management is farmers’ primary concern.

Return from the farm which may be in the form of produce or money is crucial for the farmers, as they depend through which the farmer can meet the goals of the family. In highly competitive world, the challenges before the farmer are how well he can manage the farm to enhance the return on a sustained basis. To meet these challenges effectively, it is imperative to develop the managerial ability of the farmers.

Management, for the purpose of the present study, has been defined as the process by which the farmer is able to enhance maximum return from the farm on a sustained basis from available resources for the attainment of family goals.

It is generally observed that the coconut plantation growers are semi educated and medium perception and knowledgeable. Similarly, they have experience of coconut growing but not of scientific management of coconut plantation. Thus, neither they have higher knowledge nor they have an experience of scientific management of coconut plantation, even though they carry out good production. India being the second largest producer of coconut fruit occupies a very prestigious position in the world. Therefore, good management of coconut plantation is the most essential for the development of Indian plantation. The cultivation of coconut plantation enterprise mainly depends on the managerial role played by the coconut plantation growers.
Moreover, the coconut growers perform many functions in carrying out the better production such as: preparing a plan of work, giving clear instructions, integrating the work, taking proper decision at right time, implementing the decision, etc. in carrying out the management activity in coconut plantation. All the above functions involve in one or the other way many management components *viz.* planning, organizing, controlling, human relation, coordinating and decision making.

In view of these facts, it was highly considered necessary to carry out the study entitled "Managerial Efficiency of Coconut Plantation Growers in Coastal Area of Saurashtra Region" with following specific objectives:

1. To study the personal, socio-economic, psychological and extension communication profile of coconut plantation growers.
2. To develop and standardize a scale to measure the managerial efficiency of coconut plantation growers in coconut cultivation.
3. To ascertain managerial efficiency of coconut plantation growers.
4. To assess the perception of coconut plantation growers about quality and damage caused by eriophyid mite on coconut.
5. To ascertain the relationship between managerial efficiency of coconut plantation growers and their selected characteristics.
6. To know the extent of variation caused by selected independent variables in the managerial efficiency of coconut plantation growers.
7. To elicit the constraints faced by coconut plantation growers in adoption of improved coconut cultivation technology and their suggestions to overcome the constraints.

On the basis of literature reviewed related to the problem, a theoretical orientation was developed for the study. The various
concepts were operationalized. Based on assumption, a tentative conceptual model was developed and with the help of theoretical orientation, the statistical hypotheses were formulated. Ex-post-facto research design was applied for the study.

### 6.1.2 Methodology:

Present study was carried out in Junagadh, Bhavnagar and Porbandar districts of Saurashtra region. The selected talukas from the Junagadh district were Mangrol, Veraval and Una. While from the Bhavnagar district, Mahuva taluka and from the Porbandar district, Porbandar taluka were selected. In the present investigation, selection of district, talukas, villages and respondents was based on the highest area under coconut plantation. Total 15 villages; 9 from Junagadh district, 3 from Bhavnagar district and 3 from Porbandar district were selected purposively based on the number of farmers who adopted coconut plantation. A sample of total 150 coconut plantation growers from 15 villages was selected for the study who having highest area of coconut plantation. Ten coconut plantation growers from each selected village were selected as respondents and having minimum one acre of coconut plantation.

The dependent variable undertaken in this study was managerial efficiency. The independent variables were; age, educational status, farm size, area under coconut plantation, herd size, annual income, social participation, access to market facilities, innovativeness, risk orientation, perception about quality and damaged cause by eriophyid mite, symbolic adoption, attitude towards coconut cultivation, information seeking behaviour, extension participation and participation in training programme.

To measure managerial efficiency of the coconut plantation growers, ten indicators *viz.*, knowledge, ability in planning, ability to
make rational decision, ability to organizing the activities, ability to coordinate the activities, budgeting, communication and human relationship, ability to make rational marketing, value addition in coconut and ability to controlling the activities were included. In order to measure the managerial efficiency of coconut plantation growers, the standardized scale developed for the purpose was used. Selected independent variables were measured either with help of developed scales or by developing schedules and indices. Constraints faced by coconut growers in adoption of scientific coconut plantation cultivation practices and suggestions to overcome the constraints were also studied.

An interview schedule was developed in accordance with the objectives of the study and it was pre-tested and translated into Gujarati. The data of this study were collected through personal interview. The data so collected were classified, tabulated, analyzed and interpreted in order to make the findings meaningful. The statistical measures such as; percentage, mean, standard deviation, co-efficient of correlation, stepwise multiple regressions and standard partial regression coefficient were used in the study.

### 6.2 Major Findings and Conclusions

The conclusions, which were drawn, based on the findings of this study were as under:

#### 6.2.1 Development of scale to measure managerial efficiency

A large number of indicators and sub-indicators pertaining to managerial efficiency were collected through relevant literature and specialists of extension. The indicators so collected were then sent to judges to know the relevancy of indicators as well as to obtain the rank. Those indicators that received more than 75.00 percent ‘relevant’
responses were included in the scale. Finally, ten main indicators and 132 sub-indicators emerged from the study, which were used for measurement of managerial efficiency of coconut plantation growers. The scale value of finally selected indicators and sub-indicators were worked out by using the Normalised Rank Approach as suggested by Guilford (1954). The indicators were; knowledge about scientific cultivation with sixty seven sub indicators, ability in planning with eight sub indicators, ability to make rational decision with nine sub indicators, ability to organizing the activities with six sub indicators, ability to coordinate the activities with seven sub indicators, budgeting with four sub indicators, communication and human relationship with ten sub indicators, ability to make rational marketing with seven sub indicators, value addition in coconut with nine sub indicators and ability to controlling the activities with five sub indicators.

The content validity was determined by using review of literature and opinion of a panel of 60 judges and the criterion validity was measured by correlating managerial ability score of non-sampled respondents with their area under coconut plantation. The coefficient of correlation between the two variables was found to be significant.

In order to determine reliability of the scale, the split-half reliability coefficient of correlation (0.371) obtained and it was significant indicating the developed scale was reliable.

6.2.2 Relative importance of the indicators of scale:

The scale value of each indicator was compared with the mean score assigned by the respondents and then Spearman’s product moment correlation coefficient was worked out for their ranks. Both coefficients were found significant. Finally, it was concluded that ten indicators were important. However, their importance was varied, as the scale value of each indicator was different. The indicators in descending
ordered were; knowledge about scientific cultivation of coconut plantation, planning, ability to rational marketing, decision making, budgeting, communication and human relationship, organizing the activities, value addition, controlling the activities and coordinating the activities.

6.2.3 Managerial efficiency of coconut plantation growers

6.2.3.1 Overall Managerial efficiency

More than half of coconut growers (51.33 per cent) had medium level of overall managerial efficiency, while almost same number of respondents (24.67 per cent and 24.00 per cent) was fall under low and high managerial efficiency, respectively.

6.2.3.2 Detail analysis of main indicator of managerial efficiency

6.2.3.2.1 Knowledge about scientific coconut cultivation

In case of knowledge, the coconut plantation growers had highest knowledge in intercropping in coconut plantation and quality of coconut products (I rank) followed by soil and soil preparation (II rank) and propagation and sowing (III rank).

6.2.3.2.2 Ability to planning in coconut plantation

Coconut plantation growers had given first choice to planning about the inputs followed by planning for increasing yield of coconut plantation and decreasing the cost of production of coconut plantation.

6.2.3.2.3 Ability to make rational decision

Technical competency in making decision got first rank followed by implementing the decision (II rank) and decision at proper time for coconut plantation (III rank). Whereas, decision regarding types and quantity of fertilizers and plant protection measure in coconut crops had got last position.
6.2.3.2.4 Organizing the activities

With regards to the organizing the activities, the coconut plantation growers gave importance to team work to achieve the goal (I rank) followed by assigning the work of various farm operation (II rank). Whereas, delegation of authority to perform a job and organization of activities based on priority and past experience got last position in organizing activities.

6.2.3.2.5 Ability to coordinate activities

Coconut plantation growers were consulted extension worker when they heard about the incidences of insect-pests, eriophyid mite in epidemic condition or disease attack on the coconut plantation (I rank) followed by integrating the work with family member and labour (II rank). Whereas, the ability to co-ordinate with other farmers for sharing some inputs, resources and information and engagement of skill labours throughout the year to hire their services for irrigation, interculturing, fertilizer application, collection of nuts etc stood last position.

6.2.3.2.6. Budgeting

Coconut plantation growers had given choice in descending order as to consultation with family members about source of credit, involvement of family member in decision making regarding credit, planning the budget and make provision for budget in coconut plantation.

6.2.3.2.7 Communication and human relationship

Coconut plantation growers were well aware about co-operation with co-workers, which produce better results in form of desirable work
hours followed by instructions to the labour regarding the care of coconut tree i.e. timely irrigation, digging of pits, plant protection as they occupied first and second rank.

6.2.3.2.8 Ability to make rational marketing

The supply of coconut fruits to the market when high price of produce and collect information about various markets to sell the produce were the important factors to make rational marketing.

6.2.3.2.9 Value addition in coconut production

The coconut plantation growers had ability to sell the coconut produce after grading process, which increase value addition.

6.2.3.2.10 Ability to controlling activities

The coconut plantation growers were supervising the working of people while different agricultural operation seriously as it got first rank. Also they were aware the importance of maintaining the necessary record of coconut plantation operation ranked second. Further, they were hiring the implements for agricultural operation at limited level as it got last rank.

6.2.4 Characteristics of coconut plantation growers

6.2.4.1 Personal characteristics

In respect of the personal characteristics, more than three fourth (77.33 per cent) of the respondents were in middle and old age group and more than one third (34.00 per cent) of the coconut plantation growers were educated up to primary and middle level education.
6.2.4.2 Socio-economic characteristics

As regards to socio-economic characteristics, majority (86.00 per cent) of the respondents were under the category of small and medium farmers, almost half (50.67 per cent) of the coconut growers had up to 5.00 acres of area under coconut cultivation, majority (47.33 per cent) of the coconut growers were found having small size of herd size (up to 3 animals), majority (89.33 per cent) of the coconut plantation growers had their earning of more than fifty thousand rupees per year, more than two third (66.67 per cent) of the respondents had medium social participation and nearly three fifth (57.33 per cent) of the coconut growers had high access to market facilities.

6.2.4.3 Psychological characteristics

The respondents with related to the psychological variables, two third of them (66.00 per cent) reported that ‘as soon as it is brought to their knowledge’ and ‘prefer to wait and take their own time’, more than half (56.67 per cent) of coconut growers had medium risk orientation, less than one third (63.33 per cent) of coconut growers had medium perception level about quality and damaged caused by eriophyid mite in coconut, three fifth (60.00 per cent) of coconut growers had medium symbolic adoption for recommended technology from agricultural Universities in a stipulated time and covered area under coconut cultivation on their farm and great majority (84.00 per cent) of the farmers had moderately to highly favourable attitude towards the cultivation of coconut as one of the major crops.

6.2.4.4 Extension – communication characteristics
Looking to the extension communication variables, majority (60.67 per cent) of the farmers were in the category of average and above average level in case of information seeking behaviour, more than half (54.67 per cent) of the coconut plantation growers had medium level of extension participation and 78.67 per cent coconut plantation growers were either medium trained or untrained.

6.2.5. Relational analysis

6.2.5.1 Correlation analysis

Based on the coefficient of correlations, nine independent variables viz, education, area under coconut plantation cultivation, annual income, access to market facilities, innovativeness, perception about quality and damaged cause by eriophyid mite, attitude toward coconut cultivation, information seeking behaviour and extension participation had highly significant relationship with managerial efficiency of coconut plantation growers. Another three independents variables viz. farm size, risk orientation and symbolic adoption had significant relationship with managerial efficiency of coconut plantation growers. Age, herd size, social participation and participation in training programme had non significant correlation relationship with managerial efficiency of coconut growers.

6.2.5.2 Multiple regression analysis

The seven variables viz;, educational status, farm size, area under coconut cultivation, access to market facilities, innovativeness, risk orientation and participation in training programme were highly significant at 0.01 level of significance and the ‘t’ value of three variable i.e. age, annual income and social participation was significant at 0.05 level of significance. All the 16 independent variables together explained total variation in managerial efficiency to the extent of 69.90 per cent.

6.2.5.3 Stepwise multiple regression analysis
On the basis of the results of stepwise multiple regression analysis, access to market facilities alone account 43.48 per cent variation in managerial efficiency followed by access to market facilities + innovativeness (48.18 per cent), access to market facilities + innovativeness + risk orientation (52.98 per cent), access to market facilities + innovativeness + risk orientation + educational status (55.35 per cent), access to market facilities + innovativeness + risk orientation + educational status + age (58.15 per cent), access to market facilities + innovativeness + risk orientation + educational status + age + Perception (60.05 per cent), access to market facilities + innovativeness + risk orientation + educational status + age + Perception + participation in training programme (61.23 per cent) and access to market facilities + innovativeness + risk orientation + educational status + age + Perception + participation in training programme + information seeking behaviour (63.48 per cent).

6.2.5.4 Standard partial regression coefficient

The standardized partial values indicated that the eight variables from highest to lowest was as (i) access to market facilities (0.49766) (ii) educational status (0.45618) (iii) innovativeness (0.42490) (iv) age (0.29100) (v) risk orientation (0.28680) (vi) perception (-0.23505), (vii) information seeking behaviour (0.21523) and participation in training programme (-0.19025).

Based on the above relational analysis, the result led to the conclusion that the important characteristics of coconut growers for selection criteria in relation to managerial efficiency were; educational status, area under coconut plantation cultivation, annual income, access to market facilities, innovativeness, perception about quality and damaged cause by eriophyid mite, attitude toward coconut cultivation, information seeking behaviour, extension participation, farm size, risk orientation and symbolic adoption. Therefore, due weightage should be
given to the above characteristics of coconut growers to achieve higher managerial efficiency resulting in to effective management of scientific cultivation of coconut plantation.

6.2.6  Constraints and suggestion

6.2.6.1  Constraints faced by coconut plantation growers in adoption of improved coconut production technology

The major constraints faced by majority of the coconut growers in adoption and management of coconut production technology were; lack of awareness about control measure to eriophyid mite (98.67 per cent), serious problems of eriophyid mites (98.67 per cent), lack of modern spraying equipment to control the eriophyid mite (94.00 per cent), high cost of insecticides and pesticides (94.00 per cent), unremunerative price for tender nuts and mature nuts (94.00 per cent), difficult to identify premature nuts damaged by eriophyid mite at early stage (93.33 per cent), lack of accessing to resource/ marketing (87.33 per cent), neighboring farmers do not spray insecticides to control eriophyid mite so difficult to get good result (85.33 per cent), complicated method and delay / insufficient facilities of loan and subsidies (82.00 per cent), lack of timely availability of fertilizers (79.33 per cent), lack of knowledge about coconut based industry (77.33 per cent), lack of emphasis on value addition training (76.67 per cent), lack of skilled labours (72.67 per cent), problem of spraying insecticide while taking intercrop (71.33 per cent) and intercropping increase weed problem (67.33 per cent).

6.2.6.2  Suggestions to overcome the constraints faced by coconut plantation growers

The important suggestions offered by majority of the coconut plantation growers were; creating awareness about damaged and deteriorate quality of coconut caused by eriophyid mite (96.67 per cent), specific pest effective insecticide should be recommended (82.00 per
cent), establishment of market facilities at local level (78.00 per cent), price of pesticides and fertilizers should be reasonable (74.00 per cent), government should provide subsidy for chemical fertilizer (69.33 per cent), short term training programme should be conducted on use of herbicide and plant protection measures (64.00 per cent).

6.2.7 EMPIRICAL MODEL

Based on results of relationship of independent variables with managerial efficiency of coconut growers, an empirical model has been prepared and it has been given in Figure 20.

6.3 IMPLICATIONS OF THE STUDY

The implications suggested on the basis of the above findings of the study are as under:

1. The coconut plantation growers had land range from 2.51 to 10.00 acres and among this half of them had up to 5 acres of their land under coconut cultivation. It means coconut cultivation is a major source of income of the half of the respondents. Further, they were of middle age group and had educational level up to secondary and above. The policy makers should take these facts in to consideration while preparing extension strategies for equipping the coconut plantation growers in knowledge of coconut cultivation, ability of planning, coordinating and decision making in execution of their plan. Thus, the managerial efficiency of the coconut growers can be improved ultimately helping them to earn higher income from coconut plantation enterprise.

2. Eriophyid mite is a major problem in coconut plantation now a day as this pest deteriorated the quality of coconut fruits. Because of
eriophyid mite affected fruits may not be preferred by merchants as well as customers. Ultimately, coconut plantation growers may not get remunerative price of their products. The coconut plantation growers had poor knowledge regarding the eriophyid mite, its symptoms, major control measures for the remedies of this pest in initial stage. This pest is recently appeared and adversely affected the coconut fruits and gradually it is spreading all over the coconut growing coastal area. The scientists of Agricultural Universities had recommended to control this eriophyid mite but because of lack of knowledge, coconut growers do not adopt the same. The coconut plantation growers always eager to earn higher return from coconut cultivation but due to the unawareness about coconut cultivation technology, they could not adopt of recommended pesticide/miticide for remedies. Hence, policy makers should prepare the extension strategies for imparting scientific knowledge regarding control measures of eriophyid mite in specific and other pests and diseases in general through different extension methodology such as training programme, personal visit of the farm, mass campaign, result demonstration, method demonstration, agricultural exhibition, etc.

3. As far as value addition practices are concerned, some of the coconut growers may not be well aware and have knowledge. By adoption of these practices, coconut growers can earn higher price of the products. The practices are selling the coconut produce after grading, selling product in other cities where high demand, selling product in different forms like Chutneys, Curries, Toffee, Sweet and other culinary purpose, selling the coconut leaves for making thatching houses, covering retting pits, making baskets and partition walls, selling the coconut midribs of leaves for making broom, baskets, fish traps, petioles bunch stalks, spathes, stipules,
thresh and jhaps, selling the old coconut trees as timber for house construction, selling the coconut and coconuts products as purpose for medicines. Hence, extension workers should organize special training on value addition in coconut cultivation, so that coconut growers will be able to understand the importance of these practices and can accept it and adopt it properly.

The Government of Gujarat should establish the coconut product base industries for value addition; for example the coir industries started by South India States. This will support the coconut growers to get higher return. Moreover, the coconut growers should be organized in form of Coconut Growers Co-operative Society, so that coconut growers can purchase the required inputs and sell their products through Coconut Growers Co-operative Society.

4. The educational status, farm size, area under coconut cultivation, access to market facilities, innovativeness, risk orientation and participation in training programme, age, annual income and social participation together contributed 69.90 per cent of variation on overall managerial efficiency of the coconut growers. Thus, to get best results from the coconut cultivation, young and educated farmers with big size of land holding should be motivated through adequate scientific training and improving their information seeking behaviour, extension participation, innovativeness and risk orientation by contacting them personally by extension personnel.

5. The scale developed to measure the managerial efficiency of coconut growers is standardized. The extension functionaries engaged in transfer of technology should use this scale to identify the managerial efficiency and point out the weaknesses of coconut growers in managing the coconut plantation enterprise. The extension policy makers should prepare such extension
programme, so that these weaknesses can be corrected. This exercise may improve the managerial efficiency of coconut growers for higher production of the coconut plantation leading them to earn higher income from their coconut products.

6. The coconut growers were facing number of constraints like lack of modern spraying equipments to control the eriophyid mite, high cost of inputs and in time availability, lack of awareness regarding mass scale control measure of eriophyid mite/pest, could not get remunerative price of coconut product due to lack of proper marketing system, complicated methods of loaning procedure, lack of emphasis on value addition training and so on. Simultaneously, they had also offered possible solutions of these problems. The extension policy makers should take these aspects in to consideration and incorporate the same in extension programmes.

6.4 SUGGESTIONS FOR THE FURTHER RESEARCH

This study leads to the following areas for the further research.

1. The present study was conducted only in Junagadh, Bhavnagar and Porbandar districts of Saurashtra region. This study might be the first of its kind to deal with the managerial efficiency of coconut growers. To strengthen the findings of this study, similar study may be replicated in other coconut growing pockets of the Gujarat state and nation.

2. Ten components were identified in the present study to measure the managerial efficiency of coconut growers. It is worth investigating to see whether these components identified in the study are consistent in the other technologies like animal husbandry, poultry, crop enterprises or not.
3. A comparative study of farmers engaged in different enterprise such as animal husbandry, poultry, commercial crop production, etc. might be undertaken.

4. To remove existing constraints faced by coconut growers, the solution of these constraints need to be investigated.

5. Similar type of study may be conducted with more variables, which have not been included in this study.

6. Such studies should be repeated after some lapse of time.

7. This study was limited to only coconut crop. The further study may have to be taken for the orchardists’ of other plantation/major fruit crops of the state.

8. Same study can be undertaken after five years of this study to know the change in managerial efficiency of coconut growers about scientific cultivation of coconut plantation.

9. The major indicator wise analysis of managerial efficiency indicated that there is much shortfall in case of extension participation and communication. There should be need to strengthen the present extension system with both quality and quantity of extension workers, increase spread of mass media like agricultural magazine, newspapers with better agricultural information coverage, provide computers and internet facility at village level. Besides, farmers should be encouraged to take active part in planning and implementation of the developmental programmes.


Daniel, D., Gilbert, L. and Kimberlee, H. (2007). Targeting extension efforts for the adoption of sustainable farming practices. E-mail: dand@ext.usu.edu.


Submitted to Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar.


http://www.coconutboard.nic.in  2011

http://www.coconutboard.nic.in  2011

http://www.fao.in

http://www.icar.org.in  2011


APPENDIX-I

TREE OF ABUNDANCE

KING OF PALMS

TREE OF LIFE

NATURES SUPER MARKET

GODS GIFT TO MANKIND

APPENDICIES
Dear Sir,

This is in connection with the research study undertaken by one of my Ph. D. students, Mr. B. N. Kalsariya. He is developing a scale to measure the "Managerial Efficiency of Coconut Growers in Coastal Area of Saurashtra Region". Considering your vast experience in this field, you are requested to act as one of the judges.

The study includes two parts viz.-A and B. In part A, the main components include the managerial efficiency of coconut growers. You are requested to indicate whether each of these main components are relevant or not for inclusion in the scale and then give weightage out of 100 to each main component according to their importance.

In part-B, the sub–components of each main component are mentioned. You are also requested to indicate whether these sub-components are relevant or not for inclusion in the respective main component.

Further, you may suggest any other components or sub-components if you feel it appropriate for its inclusion in the scale.

Hard pressed of time as you are, the weightage and relevance procedure may appear a bit laborious one, but once you start doing this, you will find it easy and little time consuming.

Lastly, I would like to request you to return dully filled in questionnaire to Shri B. N. Kalsariya, Assistant Extension Educationist, Sardar Smruti Kendra, Junagadh Agricultural University, Moti Baug, Junagadh-362 001 in attached self-addressed stamped envelope at your earliest convenience preferably within week’s time.

Thanking you very much.

Encl : Appendix - I

Your Sincerely

(M. N. Popat)
A SCALE TO MEASURE THE MANAGERIAL EFFICIENCY OF COCONUT PLANTATION GROWERS IN COASTAL AREA OF SAURASHTRA REGION

Please indicate whether each of the main components are relevant or not for inclusion in the scale by putting tick mark (✓) against appropriate column and then give weightage out of 100 to each components according to their importance in measuring managerial efficiency of coconut growers in coastal area of Saurashtra region.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Main indicator</th>
<th>Relevancy</th>
<th>Weightage out of 100</th>
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<td></td>
<td>Relevant</td>
<td>Not Relevant</td>
</tr>
<tr>
<td>1.</td>
<td>Knowledge of scientific practices</td>
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<td></td>
</tr>
<tr>
<td>2.</td>
<td>Ability in planning</td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>Ability to make rationale decision</td>
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<td>4.</td>
<td>Organizing the activities</td>
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<td>5.</td>
<td>Ability to co-ordinate activities</td>
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<td>6.</td>
<td>Budgeting</td>
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<td>7.</td>
<td>Communication and human relationship</td>
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<td>8.</td>
<td>Ability in rational marketing</td>
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<td>9.</td>
<td>Value addition in coconut</td>
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<td>10.</td>
<td>Ability to controlling activities</td>
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<td>11.</td>
<td>Any other</td>
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<td></td>
<td><strong>Total</strong></td>
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## Appendix II

### Scale Value Main Indicator of Managerial Efficiency of Coconut Plantation Growers

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<thead>
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<td>13</td>
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<td>1</td>
<td>8</td>
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<td>23</td>
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<td>2</td>
<td>3</td>
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<td>45</td>
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<td>7</td>
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<td>1</td>
<td>2</td>
<td>0</td>
<td>11</td>
<td>4</td>
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<td>2</td>
<td>14</td>
<td>4</td>
<td>60</td>
<td>35</td>
<td>4</td>
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<tr>
<td>8</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>20</td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>15</td>
<td>10</td>
<td>60</td>
<td>25</td>
<td>4</td>
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<tr>
<td>9</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>24</td>
<td>60</td>
<td>15</td>
<td>3</td>
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<tr>
<td>10</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>26</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>8</td>
<td>16</td>
<td>60</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

**Sfi** = 60 60 60 60 60 60 60 60 60 60 = 600

**Sfiic** = 423 402 340 247 193 329 268 373 231 194 = 3000 = 5Nn

**Mc=Rj** = 7.05 6.70 5.67 4.12 3.22 5.48 4.47 6.22 3.85 3.23 = 5N

**Rc** = 9.61 8.78 6.35 2.69 0.57 5.91 3.52 7.64 2.06 0.61 = 47.75

\[
\frac{(Ri - 0.5) \times 100}{n} \quad \text{RC} = 2.357 \times \frac{Rj - 7.01}{n} \]

\[
P = \frac{50}{n} \quad \text{Sfiic} = \frac{3000}{n}
\]

\[
= \frac{50 - 5N}{n}
\]

\[
(10-0.5) \times 100
\]
Where,

\begin{align*}
A & = \text{Knowledge of scientific cultivation} & B & = \text{Ability to planning} \\
C & = \text{Ability to make rational decision} & D & = \text{Ability to organizing the activities} \\
E & = \text{Ability to coordinate the activities} & F & = \text{Budgeting} \\
G & = \text{Communication and human relationship} & H & = \text{Ability in rational marketing} \\
I & = \text{Value addition in coconut production} & J & = \text{Ability to controlling the activities} \\
ri & = \text{Ranks given by judges to ten components} \\
Ri & = \text{Rank values (in the reverse order of rank i.e., rank one getting ten, rank two getting nine and rank ten getting one)} \\
P & = \text{Centile value} \\
n & = \text{Number of variables ranked} \\
C & = \text{Values determined to each centile value (P)} \\
fii & = \text{Total number of judges who have ranked ten components} \\
fiic & = \text{Ca or CE} \\
MC & = RJ = \frac{fiic}{fii} \\
Rc & = \text{(Scale value)} = 2.357 RJ - 7.01 \\
P & = (Rj - 0.5) \times 100/n
\end{align*}
APPENDIX-III

INTERVIEW SCHEDULE
MANAGERIAL EFFICIENCY OF COCONUT PLANTATION GROWERS IN COASTAL AREA OF SAURASHTRA REGION

Respondent No. : ________    Date : _______________
Name of the farmer  : ________________________________________________
Village : _____________  Taluka : _____________   District : ______________

PART - I

I. **Personal information**
   1. What is your **age** : _____________ years
   2. **Educational status**
      Indicate the level of your formal education :
      □ (a) No formal education
      □ (b) Primary education
      □ (c) Middle school education
      □ (d) High school education
      □ (e) College education

II. **Socio-economical information**
   1. **Farm size** :
      (a) Indicate total cultivable area _______ acre /s.
      (b) Area under coconut cultivation _______ acre /s.
   2. **Herd size** :
      Indicate total number of animals possessed by you:
      Buffalow _____, Cow ____, Bullocks _____, Other _____,
      Total :_______
   3. **What is your annual income ?**
      I. From coconut plantation Rs......................
II. Other field crops  Rs......................
III. Business income  Rs......................
IV. Employment  Rs.........................
V. Other income  Rs.........................
VI. Total income  Rs ______________

4. **Social participation**

Are you a member and / or holding any position in any organization?

Yes / No , If yes, give the details

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Organization</th>
<th>Weightage</th>
<th>Member</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Village panchayat</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Taluka panchayat</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>District panchayat</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Primary Agril. Credit society</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Milk producer co-operative society</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Farmers mandal</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Yuvak mandal</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Other (Pl. specify)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

(Figures in column 3 and 5 indicate score value for the membership and position of the respondents held in the organization)

5. **Access to market facility**

1. Distance to which you sell your produce ( km )
   
   (a) ≤ 5 (c) 11 – 15 (e) 21 – 25 (g) ≥31
   
   (b) 6 – 10 (d) 16 – 20 (f) 26 – 30

2. Opinion on market facilities
   
   (a) Good (b) Satisfactory (c) Fair (d) poor

3. Where do you sell the product?
   
   1. Nearest market 4. Govt. fair price shop
2. Private money lenders 5. Local private market
3. Middle men 6. Others specify
4. What type of transport you have for the marketing of your produce?
   1. Owned 2. Hire
5. Means of transport for marketing:
   1. Railway 4. Auto/chhakrda rickshaw
   2. Tractor trolley / Truck 5. Bullock cart
   3. RTC bus ( S. T. bus)

6. What mark up (commission) of middleman was paid for selling your produce?
   (1) $\leq$ 1.00 %
   (2) 01.10 to 2.00 %
   (3) 2.10 to 03.00 %
   (4) $\geq$ Rs. 03.10 %

7. Which term of payment buyers put while buying your produce after sale?
   1. Immediate (Same day)
   2. 2 to 7 days
   3. 8 to 15 days
   4. $> 15$ days

III. Psychological information
1. Innovativeness

   When would you prefer to adopt an improved agricultural technology? Please indicate your responses by giving a tick (✓) on any following one of the statements.

<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 it is brought to my knowledge</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>I Prefer to wait and take my own time</td>
<td>1</td>
</tr>
</tbody>
</table>
2. **Risk orientation**

Following are the statements indicating the willingness to take risk. It varies with individual to individual. Kindly tick mark as against each statement in any response category to which you agree.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A coconut grower who is willing to take greater risk than the average farmers usually does better financially. (+ve)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>A coconut grower should take more of a chance in making a big profit than to be content with a smaller, but less risky profit. (+ve)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>A coconut grower should grow large number of crops to avoid greater risk involved in growing one or two crops. (-ve)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>It is good for a coconut grower to take risk when he knows his chance of success if fairly high. (+ve)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Trying entirely a new coconut plantation by a coconut grower involves risk but it is worthy. (+ve)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>It is better for a coconut grower not to try new coconut plantation method unless most of other coconut plantation have used. (-ve)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**SA** = Strongly agree,  **A** = Agree,  **UD** = Undecided,  **D** = Disagree,  **SD** = Strongly disagree

3. **Perception**

Kindly read the statements carefully and give your opinion by yes or no of following statements.
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statements</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I</strong></td>
<td><strong>Quality aspect of coconut</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>For tender nuts, eriophyid mite infestation lead to somewhat filled of water in nuts are poor quality coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Spot on nuts due to eriophyid mite damaged are poor quality coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Nuts with gummosis indicate inferior quality of coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Nuts with hard husk shells denotes poor quality of coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Nuts of rotten look due to infestation of eriophyid mite denotes poor quality of coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Nuts is affected by eriophyid mite denotes good quality of coconut (-ve)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Discoloured copra due to eriophyid mite damage indicate good quality of coconut (-ve)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Shriveled nuts due to eriophyid mite denotes inferior quality of coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Crack on nuts due to eriophyid mite damage indicate poor quality coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Nut deshape due to attack of eriophyid mite</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>Eriophyid mite attack on coconut buttons, so it look like triangular yellowish white colour, grayish (spot) batches and oozing of gum</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>Eriophyid mite spreads through water, air and insects</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>Eriophyid mite is attacking all varieties of coconut</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>II</strong></td>
<td><strong>Infestation of eriophyid mite</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td><strong>Pre harvest stage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Attack of eriophyid mite on nut at any time during pre-harvest stage of nuts</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>Incidence of insects causing damage to nuts leads to infestation of eriophyid mite</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>16</td>
<td>Development of crack during nuts growth due to</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
### Symbolic Adoption

#### 1. Recommended Fertilizer and Nutrients

i) Do you propose to use the recommended fertilizers by JAU in your coconut farm?
   - Yes / No

ii) If yes, when do you propose to use?
   - Within a week / after a month / next season / never

iii) If yes, how much area do you propose to cover?
   - One tree / portion of farm / entire farm

---

<table>
<thead>
<tr>
<th></th>
<th>infestation of eriophyid mite</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>High wind velocity lead to infestation of eriophyid mite</td>
</tr>
<tr>
<td>18</td>
<td>Lack of timely spray of insecticide / miticide lead to infestation of eriophyid mite</td>
</tr>
<tr>
<td>19</td>
<td>Delay harvesting of nuts leads to damaged by eriophyid mite</td>
</tr>
</tbody>
</table>

(b) **Post harvesting stage**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Small size of tender nuts due to heavy attack of eriophyid mite</td>
</tr>
<tr>
<td>21</td>
<td>Quality of raw kernel is decreases due to infestation of eriophyid mite</td>
</tr>
<tr>
<td>22</td>
<td>Price of tender nut earn low in market due to damaged by eriophyid mite</td>
</tr>
<tr>
<td>23</td>
<td>Infestation of eriophyid mite lead to poor copra making practices</td>
</tr>
<tr>
<td>24</td>
<td>Infestation of eriophyid mite lead to lower oil recovery</td>
</tr>
<tr>
<td>25</td>
<td>Eriophyid mite cause formidable losses by deteriorating the quality &amp; quantity of the husk fibre</td>
</tr>
<tr>
<td>26</td>
<td>Eriophyid mite cause low yield of copra</td>
</tr>
<tr>
<td>27</td>
<td>Eriophyid mite cause low yield of nuts</td>
</tr>
<tr>
<td>28</td>
<td>Eriophyid mite cause the nuts to shrink</td>
</tr>
<tr>
<td>29</td>
<td>Eriophyid mite causes the nuts to shrink, so there are problems even in the marketing of coconuts and by products</td>
</tr>
</tbody>
</table>
2. **Recommended Micro Nutrients**

i) Do you propose to use the recommended micro nutrients by JAU in your coconut farm?
   
   Yes/No

ii) If yes, when do you propose to use?
   
   Within a week / after a month / next season / never

iii) If yes, how much area do you plan to cover?
   
   One tree / portion of farm / entire farm

3. **Recommended Agrobiocide**

i) Do you propose to use the JAU recommended agrobiocide in your coconut farm?

   Yes / No

ii) If yes, when do you propose to use?

   Within a week / after a month / next season / never

iii) If yes, how much area do you propose to cover?

   One tree / portion of farm / entire farm

4. **Recommended Chemical Pesticide**

i) Do you propose to use the recommended chemical pesticide to control insects, pests and rates by JAU in your coconut farm?

   Yes/No

ii) If yes, when do you propose to use?

   Within a week / after a month / next season / never

iii) If yes, how much area do you plan to cover?

   One tree / portion of farm / entire farm

5. **Recommended Indigenous Methods**

i) Do you propose to use the recommended indigenous control measures to insects, pests and rates by JAU in your coconut farm?

   Yes/No

ii) If yes, when do you propose to use?

   Within a week / after a month / next season / never

iii) If yes, how much area do you propose to cover?

   One tree / portion of farm / entire farm
5. **Attitude towards coconut cultivation**

The scale to measure the attitude of the farmers towards modern horticulture had 8 items. Each statement was provided with 5 point response categories ranging from strongly agree to strongly disagree. Each statement were given scores for strongly agree-5, agree-4, undecided- 3, disagree-2 and strongly disagree-1. Scoring was reversed for the unfavourable statement.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Statement</th>
<th>SA 5</th>
<th>A 4</th>
<th>UD 3</th>
<th>D 2</th>
<th>SD 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The faced problems of coconut grower can be solved through the use of modern horticultural practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>It is better to use aid practices then to take risk in modern horticultural practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>It is good to use modern horticultural practices for higher coconut yield</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Though the use of modern horticultural practices is good but economic situation of most of the coconut farmers do not permit to use of it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Use of modern horticultural practices enhances the socio-economic status of the coconut farmers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Modern horticultural practices are more complex and technical in nature.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Profit is more than the cost involved in the use of modern horticultural practices.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Use of modern horticultural practices, enhances the infestation of insects, pests and disease in crop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SA = Strongly agree, A = Agree, UD = Undecided D = Disagree SD = Strongly disagree
IV. **Extension-communicational information**

1. **Information Seeking Behaviour**

Kindly tell me the sources through which you get information with regarding agricultural practices and coconut cultivation.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Sources / Channels</th>
<th>Regularly</th>
<th>Occasionally</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Professional Sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Assistant Agril. Officer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Agricultural Officer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Horticultural Officer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Assistant Directors (SMS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Agricultural / Extension Officers (Bank / Co-operative societies)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Scientists from JAU (including KVK)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Scientists from ICAR / NHB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Officers from NGOs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Representatives from private firms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Village Administrative Officer</td>
<td></td>
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<tr>
<td>11</td>
<td>Others (Please specify)</td>
<td></td>
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<tr>
<td><strong>B</strong></td>
<td>Para – Professional Sources</td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td>Formal Discussion Group conveners</td>
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<tr>
<td>2</td>
<td>Contact farmers</td>
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<tr>
<td>3</td>
<td>Village / Local leaders</td>
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<td></td>
<td>Non-Professional Sources</td>
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<tr>
<td>1</td>
<td>Family members</td>
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<td>Neighbours</td>
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<tr>
<td>3</td>
<td>Friends</td>
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<td>4</td>
<td>Relatives</td>
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<table>
<thead>
<tr>
<th></th>
<th>Other Sources</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Leaflets / Folders / Booklets</td>
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</tr>
<tr>
<td>2</td>
<td>Posters / Charts</td>
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<tr>
<td>3</td>
<td>Wall paintings</td>
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</tr>
<tr>
<td>4</td>
<td>Advertisement boards</td>
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<tr>
<td>5</td>
<td>Film show</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>Agricultural Exhibitions / Traders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Hoardings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Lessons from Video / Audio cassettes</td>
<td></td>
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</tr>
<tr>
<td>9</td>
<td>Others (Please specify)</td>
<td></td>
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</tr>
</tbody>
</table>

Score: Regularly = 3, Occasionally = 2 and Never = 1

2. **Extension Participation**

Did you participate in the following extension programme?

Yes / No, if yes, give the answer the following.
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of Extension activities</th>
<th>Weightage</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Have you Conducted demonstration on your farm ?</td>
<td>9.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Did you discussion with extension workers ?</td>
<td>6.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Do you participated in field days on the farmers’ fields ?</td>
<td>6.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Do you participated in extension meetings?</td>
<td>6.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Have you see demonstration plot of your neighbour and had discussion with him ?</td>
<td>6.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Have you participated in krushi mela ?</td>
<td>4.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Have you visited any agricultural exhibition?</td>
<td>2.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Had you read extension publications ?</td>
<td>1.89</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3. Participation in training programme

Have you attended any training programme related to coconut plantation during the last three years?

Yes / No ,   If ‘yes’, please give the details.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Frequency</th>
<th>Duration of training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 day</td>
</tr>
<tr>
<td>1.</td>
<td>Participated once</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Participated twice</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Participated thrice and above</td>
<td>3</td>
</tr>
</tbody>
</table>

(Figures in column 3, 4 and 5 indicate score value for the participate in training of the respondents held in the organization)
PART - II

Managerial Efficiency Scale

1. Knowledge of scientific practices

A number of ‘statements’ pertaining to various aspects of scientific cultivation of coconut plantation are given below. Please tell whether do you know it or do not know? But items are not scored but used to confirm the answer given by the respondents

(Yes=1, True=1, while No=0, False=0)

[ Maximum Score : 67] and [Scale Value : 9.61 ]

[A] Weather Condition / Climate

1. In which type of atmosphere should be favourable for good growth and fruiting for coconut?
   (a) Nearer to coastal area  (b) Far from coastal area
   (c) Both a & b  (d) Any type

2. Low sunshine during day time reduced the coconut yield?
   True [ ] / False [ ]

3. The coastal climate is more humid and less temperature (subject to wide fluctuation) results in the excellent growth of the coconut palm?
   True [ ] / False [ ]

[B] Soil and Soil Preparation

4. Rich alluvial loam having adequate soil moisture and provision of excess water drainage are the best for coconut grown?
5. Pre-monsoon ploughing reduces soil erosion and maximizes water percolation. [True [ ] / False [ ]]

6. How many cultivation needs the coconut plantation in a year?
   (a) Before onset of monsoon & after completion of the rainy season
   (b) Before onset of monsoon & during the rainy season
   (c) During the rainy season & after completion of the rainy season

[C] Variety

7. Which variety of coconut is recommended for the Saurashtra region?
   (a) Tall  (b) Dwarf  (c) T X D & D X T

8. Do you agree, coconut hybrids are early bearer and high yielder?
   Yes [ ] / No [ ]

9. Do you agree, hybrid varieties are comparatively tolerant to pests and diseases?
   Yes [ ] / No [ ]

[D] Propagation and Sowing

10. Do you know, coconut is mainly propagated by seeds?
    Yes [ ] / No [ ]

11. Sowing of seed nuts in seed beds should be done before onset of rains?
    True [ ] / False [ ]

[E] Transplanting & Planting distance

12. What is recommended size of pits for planting of seedling?
    (a) 75-90 X 75-90 X 75-90 cm³
    (b) 60-75 X 60-75 X 60-75 cm³
    (c) 90-110 X 90-110 X 90-110 cm³
13. What are the age of seedlings for transplanting?
   (a) 5 to 8 months   (b) 9 to 12 months (c) 15 to 18 months

14. What is recommended planting distance for tall type variety?
   (a) 9 X 9 meters   (b) 7.5 X 7.5 meters (c) 10 X 10 meters

15. What is recommended planting distance for dwarf type variety of coconut?
   (a) 9 X 9 meters   (b) 6 X 6 meters  (c) 10 X 10 meters

[F] Farm yard manure & Fertilizer

16. Green manuring improves physical condition and soil fertility of coconut plantation? True [ ] / False [ ]

17. How much quantity of FYM / compost are recommended per plant per year for newly planted coconut seedling up to three years?

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>FYM / Compost Kg/tree/year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(In May – June)</td>
</tr>
<tr>
<td>First</td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td></td>
</tr>
</tbody>
</table>

18. How much quantity of FYM / compost are recommended per plant per year for tall, dwarf and hybrid variety of adult coconut tree (productive tree) ?

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>FYM / Compost Kg/tree/year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(In May – June)</td>
</tr>
<tr>
<td>Fourth and onward</td>
<td></td>
</tr>
</tbody>
</table>

19. How much quantity of chemical fertilizer are recommended per plant per year for newly planted coconut seedling up to three years?
20. How much quantity of chemical fertilizer are recommended per plant per year for tall, dwarf and hybrid variety of adult coconut tree (productive tree)?

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Ammonium sulphate</th>
<th>Single super phosphate</th>
<th>Murate of potash</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Third</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fourth and onward</td>
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</tr>
</tbody>
</table>

21. How many times (installment) fertilizers should be applied in a year?

.................................

22. In which months do you apply the fertilizer in a year?

.................................

23. What is the distance of application of fertilizer from trunk of coconut?

................................. in cm.

24. What is the purpose of application of potash in coconut?

(a) Drought tolerance   (b) Pest & disease resistance
(c) Increased yield     (d) All of these

25. Which element deficient in coconut caused to formation of small leaves where in the leaf size is reduced to 50% and leaflets become chlorotic, narrow and reduced in length?
26. Which element deficient in coconut caused the nuts become long and narrow in shape?

27. Which element deficient in coconut caused to reduced copra quality and oil content?

28. Which element deficient in coconut caused in decreasing the number of nuts and copra content?

[G] Irrigation

29. What is recommended interval of irrigation in winter for rearing of coconut seedling?
   (a) 6 to 8 days  (b) 8 to 10 days  (c) 10 to 12 days

30. What is recommended interval of irrigation in summer for rearing of coconut seedling?
   (a) 2 to 4 days  (b) 4 to 6 days  (c) 6 to 8 days

31. What is recommended interval of irrigation in winter and summer for adult tree, respectively?
   (a) 16 to 18 days and 6 to 8 days
   (b) 20 to 22 days and 12 to 15 days
   (c) 26 to 28 days and 20 to 22 days

32. How much quantity of water is given to coconut tree through drip irrigation system in winter and summer an alternate days, respectively?
   (a) 20 liters and 80 liters
(b) 40 liters and 140 liters
(c) 60 liters and 100 liters

**Plant Protection**

33. What care should be taken to check the termite attack on seed nuts?
   (a) Seed nuts should be treated with 2 per cent Methyl Parathion dust before sowing
   (b) Seed nuts should be treated with 0.2 per cent BHC 50 % WP before sowing
   (c) Seed nuts should be treated with chloropyriphos 35 % EC before sowing

34. What is the method of application of acaricides?
   (a) Direct application  (b) rooting feeding
   (c) Injection  (d) None of these

35. What is the time taken for absorption of acaricides when it is given through roots?
   (a) 24 hours  (b) 12 hours
   (c) 48 hours  (d) 60 hours

36. Which pest cause bore through unopened fronds and spathes?
   (a) White Grub  (b) Eriyophide mite
   (c) Rhinocerous beetle  (d) Black headed caterpillar

37. What is the cause of galleries made of silk and reinforced with leaf scrapes and excreta?

..........................................................

38. Which pest suck the sap from the tender meristematic mesocarp tissues?
39. Which pesticide should be recommended to control the Rhinoceros beetle?
(a) DDVP / chlorophene  (b) carbaryl
(c) Endosulphan  (d) Monocrotophose

40. Which pesticide should be recommended to control the Black headed caterpillar?
(a) DDVP  (b) Monocrotophose
(c) Endosulphan  (d) Carbaryl

41. Which pesticide should be recommended to control the Eriophyid mite?
(a) DDVP  (b) Monocrotophose & Ajadirect
(c) Endosulphan  (d) Carbaryl

42. Which bio-control agent cause disease to Eriyophide mite?
(a) NPV  (b) Cristula thomsani
(c) BT  (d) Pseudamonas

43. Which disease caused by the fungus that result in appearance of minute yellow spot on the leaflets and later turn brown?
(a) Leaf blight / grey blight  (b) Fungus
(c) Late blight  (d) No any one

44. What is caused of reducing the growth and vigour of coconut?

..........................................................

45. Which disease caused by the fungus that result in come out bloody liquid from trunk and create rot in it which result in dry the whole tree?
(a) Leaf blight / grey blight  (b) Stem bleeding
46. Which fungicide is recommended to control the leaf blight?
(a) Copper oxychloride  
(b) Zinc sulphate  
(c) Ferrous sulphate  
(d) No any one

47. Which fungicide is recommended to control the stem bleeding?
(a) Boraudex pest & Increase drainage capacity  
(b) Zinc sulphate  
(c) Ferrous sulphate & Increase drainage capacity  
(d) No any one

48. How rat (Mouse) are harmful to coconut?
(a) Drink immature coconut water  
(b) Dropping the coconut from tree by cutting  
(c) Cut the leaves & trunk

49. Which rodenticide are use to control the rat (Mouse)?
(a) Zinc sulphate 2 %  
(b) Copper sulphate 2 %  
(c) Ferrous sulphate 2 %  
(d) No any one

50. During which stage the fruit dropping causes maximum reduction in nuts production?
(a) Button size fruits  
(b) Medium size fruits  
(c) Big size fruits

51. What are causes for dropping of immature nuts / Button size fruits?

..........................................................

[I]  **Intercropping**

52. Which crops are recommended as intercropping in coconut plantation?

..........................................................
Quality of coconut

53. Do you know, what is the moisture percentage of dried copra to stored for long period?
   (a) Below 7 % under well ventilated storage conditions
   (b) Below 17 % under well ventilated storage conditions
   (c) Below 27 % under well ventilated storage conditions

Harvesting

54. What are the characteristics of fully ripe coconut nuts?
   (a) Fully ripe coconuts having 35 % rind, 12 % shell, 28 % copra and 25 % water in total weight.
   (b) Fully ripe coconuts having 45 % rind, 22 % shell, 18 % copra and 25 % water in total weight.
   (c) Fully ripe coconuts having 55 % rind, 32 % shell, 8 % copra and 25 % water in total weight.

55. When should we harvest the coconut nuts after the application of chemical acaricides?
   (a) 10 days  (b) 45 days
   (c) 60 days  (d) 100 days

56. When coconut is harvested for the purpose of water?
   Nuts of ...................... months of age
   (a) 4 to 5 months  (b) 5 to 6 months  (c) 6 to 7 months

57. When coconut is harvested for the raw copra in culinary purpose?
   Nuts of ...................... months of age
   (a) 6 to 8 months  (b) 8 to 10 months  (c) 10 to 12 months
58. Dry copra is needed, when nuts is harvested?
   Fully ripe of ......................... months or so old
   (a) 8 to 10 months   (b) 10 to 12 months   (c) 12 to 14 months

59. What is the average productivity of nuts per tree per year in irrigated area of coconut plantation?
   (a) 40 nuts per tree/ year   (b) 20 nuts per tree/ year
   (c) 60 nuts per tree/ year   (d) 80 nuts per tree/ year

[L] Value Addition

60. Do you know, the medicinal value of immature nuts contain water?
   ........................................................................

61. How many percentage of oil content in dry copra?
   (a) 65 to 75 % oil   (b) 45 to 55 % oil   (c) 85 to 95 % oil

62. Which items can be prepared from wet meat / kernel of coconut?
   ........................................................................

63. Which items can be prepared from dry copra?
   ........................................................................

64. What are the used of coconut nut coir?
   ........................................................................

65. What are the used of coconut leaves?
   ........................................................................

66. What are the used of coconut leaf petioles and rachis / midribs?
   ........................................................................

67. What are the used of coconut dried spathe, inflorence bunch stalk & stipules?
2. **Ability to planning in coconut plantation**

A coconut grower has synchronized systematically perform the various factors of scientific cultivation of coconut plantation. The following ‘statements’ are related to these aspects. Indicate whether you have followed them in the previous year.

**[ Maximum Score : 25 ]**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What are the objectives in planning for management of coconut plantation ?</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>To get more income per year</td>
<td>(4)</td>
</tr>
<tr>
<td>b)</td>
<td>To maximize overall production of plantation</td>
<td>(3)</td>
</tr>
<tr>
<td>c)</td>
<td>To minimize the total cost</td>
<td>(2)</td>
</tr>
<tr>
<td>d)</td>
<td>To get maximum return from available resources</td>
<td>(1)</td>
</tr>
</tbody>
</table>

| 2.     | On which basis you decide the future plan for coconut plantation ? |       |
| a)     | Based on commodities prices /market | (3)   |
| b)     | Based on number of bearing coconut tree | (2)   |
| c)     | Based on resources available | (1)   |

| 3.     | Which points do you consider while planning for management of coconut plantation ? |       |
| a)     | Recommendation of coconut production technology (JAU) | (4)   |
| b)     | Past experience |       |
| c)     | Availability of capital |       |
4. What are the main strategies while planning for the management of coconut plantation?
   a) Adopting/including new recommended coconut practices (4)
   b) To adopt new variety (3)
   c) Marketing (2)
   d) Value addition (1)

5. Do you planning about the amount of seed (nuts), fertilizer and plant protection chemicals needed for cultivation of coconut plantation?
   a) Always (4)
   b) Rarely (3)
   c) Never (2)

6. To whom you consult while planning?
   a) Agricultural expert (4)
   b) Gram Sevak (3)
   c) Progressive coconut plantation growers (2)
   d) Family member (1)
   e) Not any one (0)

7. Do you think that planning in coconut plantation increase the yield.
   a) Always (2)
   b) Rarely (1)

8. Are you calculate the cost of production in coconut production?
   a) Always
   b) Rarely
   c) Never

3. Ability to make rational decision

A coconut grower has performed various roles in rational decision making procedure of coconut plantation. Give justification for the following decisions taken in previous year(s).

[ Maximum Score : 32 ] and [ Scale Value : 6.35 ]

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you always take decision at proper time?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Rarely</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(0)</td>
</tr>
<tr>
<td>2</td>
<td>Do you always apply technical competency in making decision?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Rarely</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(0)</td>
</tr>
</tbody>
</table>
3 To whom will you discuss, while taking important decision?
   a) Family member  (3)
   b) Other plantation growers  (2)
   c) Labour  (1)

4 Do you always implementing the decision?
   a) Always  (2)
   b) Rarely  (1)
   c) Never  (0)

5 How did you decide the type of fertilizer for your coconut crop?
   a) Based on crop and soil requirements  (5)
   b) Based on on-hand availability  (4)
   c) Based on the advice of extension workers  (3)
   d) Based on the advice of friend/relatives/neighbors  (2)
   e) Based on the advice of salesman  (1)

6 How did you decide the quantity of fertilizer for your coconut tree?
   a) Based on the advice of extension worker  (5)
   b) Based on experience of previous year  (4)
   c) Based on on-hand availability  (3)
   d) Based on soil analysis  (2)
   e) Based on advise of salesman  (1)

7 How did you decide about plant protection measure in coconut crop?
a) After consulting scientists/extension workers
b) Based on advice of salesman
c) Based on advice of friends/relatives/neighbours
d) Based on previous experience of casual use
e) Based on attack of pest
f) Not known

---

8 How did you decide the time of application of fertilizer, irrigation and how much quantity of water required for your coconut tree?

   a) After consulting scientists/extension workers
   b) Based on advice of salesman
c) Based on advice of friends/relatives/neighbours
d) Based on previous experience of casual use

---

9 How did you decide about coconut sapling?

   a) Based on advice of extension workers
   b) According to advice of friends/relatives/neighbours
c) Based on whatever the variety available
d) Based on the advice of nursery salesman
e) Not knowing

---

4. Organizing the activities

A coconut grower performs various roles in organizing the activities in scientific cultivation of coconut production. The following ‘statements’ are related to these aspects. Please indicate whether you have followed them in the previous year.
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How do you carry out the activities in coconut plantation?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Based on the priority of work</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>b) Based on information given by different people</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>c) Based on past experience</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Do you always group the various farming operations to achieve the goal?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Rarely</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Do you delegate the authority for his responsibility to perform a job?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Rarely</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>How do you carry out division of work among family members and labours?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Based on skilled</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>b) Based on experienced</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>c) Based on relatives</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Do you assign work of various farm operation?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td></td>
</tr>
</tbody>
</table>
b) Rarely  

6. Do you adopt the optimum use of technological improvement?

a) Always  
b) Rarely  
c) Never

5. Ability to coordinate the activities

A coconut grower performs various roles to coordinate the activities in coconut plantation. The following ‘statements’ are related to these aspects. Please indicate your opinion.

[ Maximum Score: 14 ]  

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
</table>
| 1      | Are you able to engage the skill labours throughout the year to hire their services like irrigation, interculturing, fertilizer application, collection of nuts etc.? | a) Always (2)  
b) Sometimes (1)  
c) Never (0) |
| 2      | Do you co-ordinate with other farmers for helping some inputs, resources and information? | a) Always (2)  
b) Sometimes  
c) Never |
3. Do you integrate the work with family member and labour?
   a) Always
   b) Sometimes
   c) Never

4. Do you get cooperation from extension workers and scientists?
   a) Always
   b) Sometimes
   c) Never

5. Do you think collectively to achieve common goal?
   a) Always
   b) Sometimes
   c) Never

6. Are you able to get all diversified interest for effective management of coconut plantation?
   a) Always
   b) Rarely
   c) Never

7. Did you consult extension worker when you heard about the incidences of insect-pest, eriophyid or disease attack on the coconut plantation in village?
   a) Always
b) Sometimes  
   (2)  
c) Never  
   (1)  
   (0)  

6. Budgeting

A coconut grower performs various roles in Budgeting in coconut plantation. The following ‘statements’ are related to these aspects. Please give your opinion whether you have followed them in the previous year.

[ Maximum Score : 12 ] 
and  
[ Scale Value : 5.91 ]

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What provision have you made for budget?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) By own sources</td>
<td>(5)</td>
</tr>
<tr>
<td></td>
<td>b) Relative and friends</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>c) Loan from bank/co-operative society</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>d) Money Lander</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>e) Not decided any thing</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>2</td>
<td>While planning the budget, which of the following items you give priority ?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Priority to inputs i.e. chemical fertilizer, pesticides, insecticides, fungicides</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>b) Priority to irrigation</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>c) Priority to post harvest management</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>3</td>
<td>Do you consult to your family member about the source of credit ?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td></td>
</tr>
</tbody>
</table>
4. Do you involve family member in decision making regarding to obtain credit?
   
a) Always
   b) Sometimes
   c) Never

7. Communication and human relationship

A coconut grower performs various roles in communication and human relationship in coconut plantation. How often do you communicate and make personal touch to your fellows about the following sub-components of communicating and human relationship? Please give your valuable suggestions.

[ Maximum Score : 20 ] and [ Scale Value : 3.52 ]

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you give clear cut instructions to the labour regarding the care of coconut tree i.e. timely irrigation, digging of pits, plant protection, etc.</td>
<td></td>
</tr>
</tbody>
</table>
   a) Always
   b) Sometimes
   c) Never |
| 2      | To whom do you consult to solve the problems which are faced by you in management of coconut plantation? | 

3. Do you pass on the latest information about coconut plantation to other fellow farmers?
   a) Always (2)
   b) Sometimes (1)
   c) Never (0)

4. Do you try to make always personal contact to others?
   a) Always (2)
   b) Rarely (1)
   c) Never (0)

5. Do you recognize and appreciate the work done by people working under you?
   a) Always (2)
   b) Rarely (1)
   c) Never (0)

6. Do you try to know the habit of the people working under you?
   a) Always (2)
   b) Rarely (1)
   c) Never (0)

7. During the act of listening, do you avoid undesirable arguments?
8. **Ability in rational marketing**

A coconut grower performs various roles of ability in rational marketing in coconut plantation. Before selling the produce, have you considered the following in the previous year(s)?
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you collect information about various markets to sell the produce?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Do you collect information about price of produce at various markets as well as price of previous year / season?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Do you always select a market where competitive price for the produce and less malpractices are assured?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Do you follow the receiving high price of immature coconut for water purpose?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5 Do you follow the grading of mature coconut fruits to market?
   a) Always
   b) Sometimes
   c) Never

6 Do you think about supply of coconut fruit to the market when high price?
   a) Always
   b) Sometimes
   c) Never

7 Do you follow the timely plant protection measures for good quality appearance of nut for high prices in market?
   a) Always
   b) Sometimes
   c) Never

9. Value addition in coconut production

A coconut grower has performed various roles in controlling the activities of coconut plantation. Please read following sentences carefully and give the answer according to whatever you have done.
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you sell the coconut produce after grading process?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(0)</td>
</tr>
<tr>
<td>2</td>
<td>Do you select the coconut fruit at the time of harvesting for immature (tender) nuts for water purpose?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(0)</td>
</tr>
<tr>
<td>3</td>
<td>Do you take the control measure of eriophyid mite to avoid disappearance of nuts before marketing?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(0)</td>
</tr>
<tr>
<td>4</td>
<td>Do you sell the wet meat / kernel of coconut product in different forms like Chutney, Curries, Toffee, Sweet &amp; other culinary purpose etc?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Sometimes</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td>(0)</td>
</tr>
<tr>
<td>5</td>
<td>Do you sell the coconut fruit production through contractual method?</td>
<td></td>
</tr>
</tbody>
</table>
6. Do you sell the coconut leaves for making thatching houses, covering retting pits, making baskets & partition walls etc.?
   a) Always (2)
   b) Sometimes (1)
   c) Never (0)

7. Do you sell the coconut medribs of leaves for making broom, baskets, fish traps, petioles bunch stalks, spathes, stipules, thresh & jhaps?
   a) Always (2)
   b) Sometimes (1)
   c) Never (0)

8. Do you sell the old coconut trees as timber for house construction?
   a) Always (2)
   b) Sometimes (1)
   c) Never (0)

9. Do you sell the coconut and coconuts products as purpose for medicines?
   a) Always (2)
   b) Sometimes
   c) Never
10. **Ability to controlling activities**

A coconut grower has performed various roles in controlling the activities of coconut plantation. How often do you control your fellows in following regard of controlling?

- **Maximum Score**: 10
- **Scale Value**: 0.61

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Sub indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What type of labour do you prefer?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Skilled</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>b) Semi skilled</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>c) Unskilled</td>
<td>(1)</td>
</tr>
<tr>
<td>2</td>
<td>Do you maintain various records pertaining to coconut plantation operations?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Yes, If yes, what types of records?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) No</td>
<td>(1)</td>
</tr>
<tr>
<td>3</td>
<td>How do you pay the wages to labour working under you</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) As per the govt. Approved rates</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>b) As per the rate commonly followed in village</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>c) Minimum</td>
<td>(1)</td>
</tr>
<tr>
<td>4</td>
<td>Do you hire equipment/implement for agricultural operation?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Always</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>b) Rarely</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>c) Never</td>
<td></td>
</tr>
</tbody>
</table>
Do you supervise the working of people under you?

a) Always
b) Rarely
c) Never
PART – III

1. CONSTRAINTS FACED BY COCONUT PLANTATION GROWERS IN ADOPTION OF COCONUT CULTIVATION TECHNOLOGY

1.
2.
3.
4.

2. SUGGESTIONS OFFERED BY COCONUT PLANTATION GROWERS TO OVERCOME THE CONSTRAINTS IN ADOPTION OF SCIENTIFIC COCONUT CULTIVATION TECHNOLOGY

1
2
3
4